RAPID ASSESSMENT OF AVOIDABLE BLINDNESS

MANICALAND PROVINCE, ZIMBABWE, 2016

SUMMARY OF RESULTS

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Date: 17 May 2016

Council for the Blind

LIST OF ACRONYMS

BCVA	Best Corrected Visual Acuity
CBM	Christian Blind Mission
CEHI	Community Eye Health Institute, University of Cape Town
CSR	Cataract Surgical Rate
CSC	Cataract Surgical Coverage
EA	Enumeration Areas
FLV	Functional Low Vision
IOL	Intraocular Lens
MoHCC	Ministry of Health and Child Care
MRCZ	Medical Research Council of Zimbabwe
MVI	Moderate Visual Impairment
PVA	Presenting Visual Acuity
RAAB	Rapid Assessment of Avoidable Blindness
SCB	Standard Chartered Bank
SIB	Seeing is Believing
SVI	Severe Visual Impairment
URE	Uncorrected Refractive Errors
VA	Visual Acuity
ZCfB	Zimbabwe Council for the Blind

1. BACKGROUND

A rapid assessment of avoidable blindness (RAAB) was conducted in Manicaland Province, Zimbabwe from March to April 2016. This population based survey was organised by the Ministry of Health and Child Care, in collaboration with CBM, Zimbabwe Council for the Blind and the Community Eye Health Institute, University of Cape Town. The research was funded through Standard Chartered Bank, *Seeing is Believing* project. The aim was to assess the current situation on blindness and visual impairment in Manicaland. In this report, all data refer to the population of people aged 50 years or older, unless another age group is specified.

No national survey on blindness and visual impairment has been conducted in Zimbabwe before. Looking at the prevalence of blindness in neighbouring countries with similar health care infrastructure, population composition and socio-economic conditions, the prevalence of blindness in Manicaland in people aged 50 years or older was estimated at 2.7%.

2. METHODOLOGY

a. Sampling

The latest national census was conducted in 2012 and reported a total population for Zimbabwe of 16 010 791. The population of Manicaland is 1 752 698, the population aged 50 years or older is 205 056, a proportion of 11.7% of the total population. There are 79 393 males and 122 199 females.

With the resources and time available a sample size of 3000-4000 was considered feasible. This sample size would, with an expected prevalence of 2.7% and non-compliance of 10%, be powerful enough for a variation of 24% around the estimate with 95% confidence.

A total sample size of 3 935 (80 clusters of size 50) was taken for Manicaland. With a lower prevalence, the variation (accuracy of the estimate) will be wider. A list of selected clusters in Manicaland is included as Appendix 1.

The sampling frame is based on the 2012 national census, consisting of 261 enumeration areas (EAs) called wards in Manicaland Province. The population in the wards varies from 17 to 28 787, with an average population of 6 715. Using the cluster selection module in the RAAB software, 79 EAs were selected from this sampling frame with a probability proportional to the size of the population. The smallest selected EA has a population of 17 people, the largest 28 787.

b. Data collection

Four teams, comprised of ophthalmic and eye-trained nurses were used in the field. Additionally, a 5th team, comprised of ophthalmologists, was also trained and used as the gold standard (see *CEHI RAAB Training report*) for the intra-observer variation test. Because of the distances involved, the data collection teams were allocated clusters according to the origin of the team members.

Using high level maps downloaded from the internet, the cluster informers created detailed maps with the help of ward counsellors.

With 11.7% of the population aged 50 years or older, about 50/11.2=442 people or 500 people (rounded for ease of calculation) would be required to provide a cluster of 50 people of 50 years or older. Each EA with a larger population was divided into segments of around 500 persons. The segment to be examined was then selected randomly. It was also decided that a second segment would be selected randomly at the same time in the event that the first segment does not yield the 50 participants.

The cluster with 17 inhabitants (cluster number 32) had no inhabitants 50 years or older, hence the next adjacent cluster from the sampling frame was selected and examined.

The four survey teams commenced with data collection on 7 March, using the mRAAB application on mobile smartphones. The data was sent to the survey coordinator via email, who in turn sent it to the RAAB trainer for verification and upload. The facilitator provided regular updates of progress to the coordinator and principal investigators, including reports of errors and guidance for correction. Halfway through the data collection, the co-principal investigator made a monitoring visit to the field teams to identify challenges and provide support where needed.

The first round of data collection was characterised by incorrect assignment of cluster numbers due to confusion with the ward numbers. Fortunately this was picked up on the first day, and teams were alerted to the correct use of cluster numbers. Three clusters were affected through this error, of which the data of one was discarded and another segment selected for examination. The other two incorrected cluster numbers were corrected in the data file.

A number of inconsistency errors marked the second round of data collection. This was due to a software error, which was corrected in a later version of the mRAAB application. The errors were related to incorrect recording of best-corrected visual acuities for “light perception only” eyes.

The data collection concluded on 7 April 2016. The survey coordinator made arrangements to collect the paper consent forms (as required by the Medical Research Council of Zimbabwe) and investigate any ethical issues that may have arisen during the data collection. All relevant research materials and equipment were also collected as well as transport logs, detailed maps, etc.

3. RESULTS

The fieldwork was carried out between March and April 2016. The smartphone method of data collection was used.

a. Response rate

The survey included 3 936 people aged 50 years or older, of whom 3 505 were actually examined. The response rate was 89.0%, 340 persons (8.6%) were absent, 90 (2.3%) refused to participate in the study, and 1 was not able to do the tests. (See Table 1 of Summary report appended)

In order to assess whether the sample was representative, the age and sex composition of the sample was compared with the latest estimate for the actual population of Manicaland Province.

Figure 1a: Proportion of males in total survey area and sample

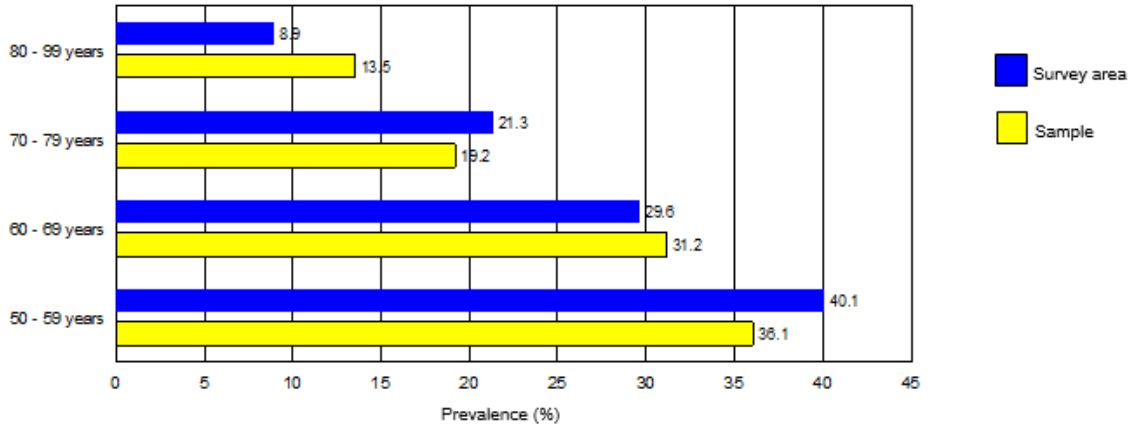
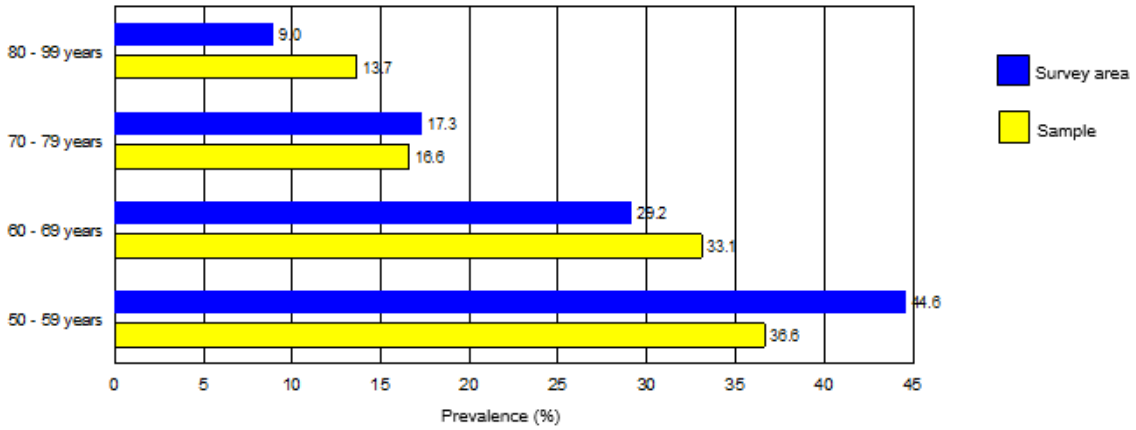


Figure 1b: Proportion of females in total survey area and sample



The prevalence of blindness and visual impairment increases strongly with age and in most communities, females are more affected than males. Ideally, the people examined in the sample should have the same composition by age and by sex as the total population in the survey area. However, Figure 1 shows that both for males and females, the older age groups are over-represented and the youngest age group is under-represented in the sample compared to the actual population of Manicaland Province. This means that the sample prevalence for males is likely to be higher than the age and sex adjusted prevalence. The adjusted prevalence is closest to the actual prevalence in the area under investigation.

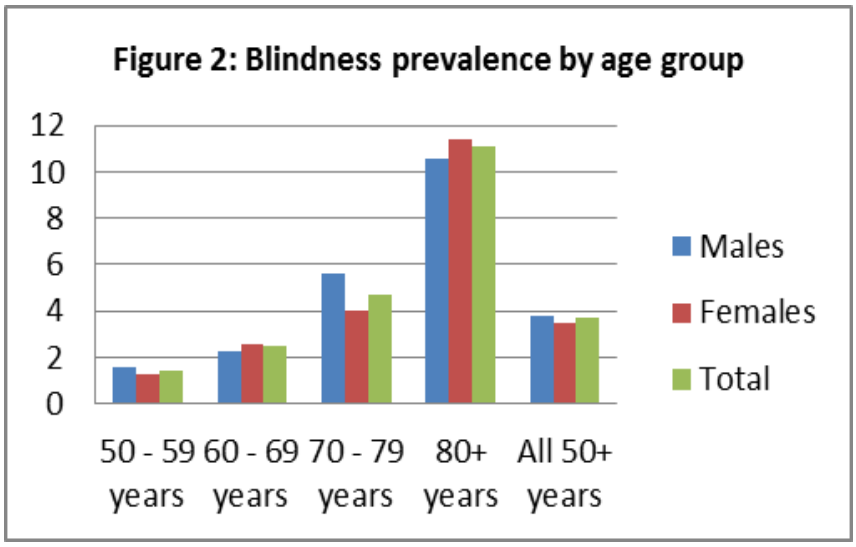
b. Blindness and visual impairment in the sample

The sample prevalence of bilateral blindness with available correction (presenting visual acuity: PVA) <3/60 in people aged 50 years or older in the better eye is 3.7% (2.9 – 4.4); 3.8% in males and 3.5% in females. The prevalence of bilateral severe visual impairment (SVI) is 2.8% and bilateral moderate visual impairment (MVI) 10.4%. The prevalence of functional low vision, requiring low vision services, is 2.8%. (See Table 3 of Summary report)

c. Age and sex adjusted blindness and visual impairment

In Manicaland an estimated 6 158 persons aged 50 years or older are bilateral blind, representing a blindness prevalence for the province of 3.1%. A further 4 989 persons aged 50 years or older are severely visually impaired and another 18 657 persons have moderate visual impairment. Among them 4 857 persons aged 50 years or older have functional low vision, requiring low vision services. The differences between males and females are not statistically significant. (See Table 4 of Summary report)

The age-specific prevalence of blindness and low vision by age group is shown also in Figure 2. The exponential increase in prevalence is clearly visible.



d. Causes of bilateral blindness

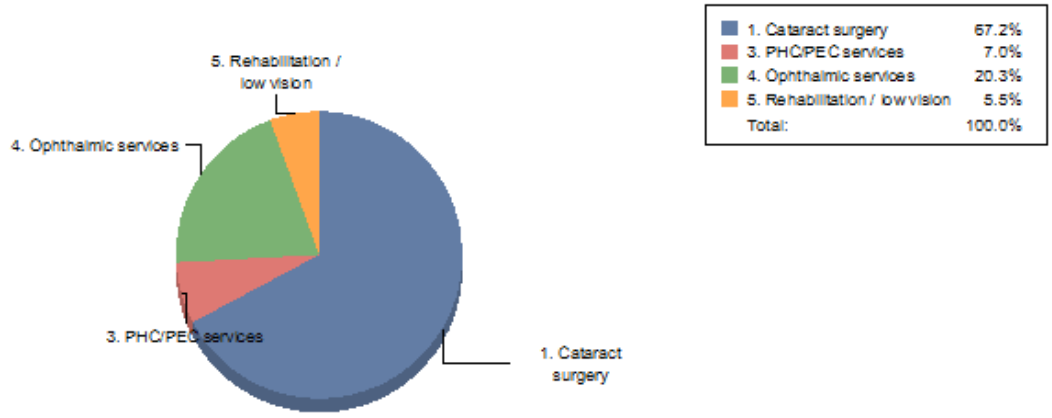
Table 6 of the Summary report shows causes of visual impairment in people aged 50 years or older with bilateral blindness, SVI and MVI. In people aged 50 years or older, untreated cataract is the most common cause of bilateral blindness (PVA<3/60 in the better eye) with 67.2%, followed by glaucoma (19.5%), non-trachomatous corneal opacity (7.0%) and other posterior segment disease (4.7%). For SVI, cataract is also the main cause with 64.6%, followed by uncorrected refractive errors (11.1%) and glaucoma and other posterior segment disease (7.1% and 6.1% respectively). For MVI, uncorrected refractive errors (53.2%) and untreated cataract (35.3%) are the main causes.

Of all bilateral blindness in Manicaland, 94.5% is considered avoidable, 67.2% is considered treatable (cataract, aphakia and URE), 7.0% avoidable by primary eye care and 20.3% potentially avoidable by specialised ophthalmic care. Posterior segment diseases account for 25.0% of all bilateral blindness.

There does not seem to be a significant difference between the cause-specific prevalences of males and females with cataract responsible for 69.8% of male persons' blindness and 65.3% of female persons' blindness; glaucoma responsible for 22.6% and 17.3% respectively. The pattern is similar for other conditions. However, the differences in prevalences between the sexes are more pronounced for the causes of SVI and MVI.

The main intervention strategies to reduce avoidable blindness in Manicaland are shown in figure 3. Priority should be given to cataract surgery, followed by the development of ophthalmic services, which would be addressing 87.5% (67.2% and 20.3%) of the causes. Although the development of ophthalmic services may be more costly, it may be justified because of the high prevalence of posterior segment disease, especially glaucoma.

Figure 3: Action required to reduce blindness



e. Cataract (see table 7 and 8 of Age and sex adjusted prevalence reports)

The age and sex adjusted prevalence of bilateral blindness due to cataract is 1.6% (95%CI: 1.0%-2.1%), which is an estimated 3 126 people in Manicaland Province. This represents approximately 51% of those who are blind; 1 405 males (1.8%) and 1 721 females (1.4%). There are an estimated 14 831 eyes blind due to cataract in the province.

With an indication for cataract surgery of best corrected visual acuity (BCVA) of <6/60 an estimated 5 251 people aged 50 years and older require surgery in both eyes and an estimated 14 831 eyes would require surgery.

With an indication for cataract surgery of BCVA <6/18 an estimated 11 171 aged 50 years and older require surgery in both eyes and an estimated 35 685 eyes would require surgery.

f. Cataract Surgical Coverage (CSC) (see table 14 of Age and sex adjusted prevalence reports)

In Manicaland Province only 48.5% of people of blind due to cataract (VA<3/60) have been operated on, 46.1% of males and 50.3% of females. This is low. The coverage for people with VA<6/60 is 37.5% (males 36.2% and females 38.2%) and for people with VA<6/18 is 25.6% (22.2% and 27.8%).

Further, only 37.1% of eyes blind due to cataract (VA<3/60) have been operated on, 36.4% for males and 37.6% for females. This is also low. The coverage for eyes with VA<6/60 is 28.8 (males 29.9% and females 28.1%) and eyes with VA<6/18 is 19.7% (20.1% and 19.4%).

This means that cataract blindness is poorly controlled in Manicaland Province.

g. Visual outcome after cataract surgery (see Visual outcome report)

Of all eyes operated for cataract, 55.9% can see 6/18 ("Good outcome") or better and 25.7% cannot see 6/60 ("Poor outcome") with available correction. With pinhole the results improve to 68.2% "Good outcome" and 21.8% "Poor outcome". 95.5% of the operated eyes had an IOL implanted, males 97.3% and females 94.3%. Aphakia is usually a result of cataract surgery with planned IOL implantation, but resulted in complications, hence no IOL could be implanted.

Visual outcome of eyes operated during the last 3 years (61.9% Good; 19.0% Poor) is worse compared to those operated 4-6 years ago (63.2% Good; 26.3% Poor) but better than those operated 7 or more years ago (42.1% Good; 35.1% Poor). These point to recent changes in ophthalmic services provision, or perhaps facilities. Usually, the longer time has passed since cataract surgery and the higher the age, the higher the risk of getting other sight threatening eye diseases. Visual outcomes after surgery are below the recommended standards of the WHO.

Selection is the main cause of poor outcome (78.6%), followed by posterior capsule opacification (75.0%) after surgery. Improvement of the pre-operative examination and individual adjustment of IOLs are likely to improve the visual outcome considerably. Review of the surgical procedures may lead to further improvement of the visual outcome. Adequate pre-operative examination of cataract patients may reduce the number of patients with concurrent blinding conditions who may not regain vision after surgery. Patients with concurrent blinding conditions may need counselling to provide them realistic expectations about their future vision.

h. Place of surgery

Of all cataract operations, 43.0% are conducted in a government hospital, 46.4% in a voluntary / charitable hospital and 7.3% in a private hospital. 3.4% are conducted in eye camps. There is no significant difference between males and females in the use of these facilities, but females seem to use outreach camps more than males (5.7% vs 0.0%). Visual outcome results are best in eyes operated in private hospitals (84.6% Good; 7.7% Poor), followed by government hospitals (62.3% Good; 27.3% Poor). Visual outcomes are poorest in voluntary / charitable hospitals[1] (45.8% Good; 26.5% Poor). The outcomes in voluntary facilities and in eye camps should raise concern. More investigation is required to find the reasons for this.

There might be a bias in the outcome findings because in many countries the private hospitals tend to select the easy, uncomplicated cataracts for surgery while they refer the more complicated cases to the public sector or university hospitals.

i. Barriers to cataract surgery (see Table 11 of Summary report)

Barriers are fairly similar for males and for females, except for 'Need not felt', which is more common in males. "Unaware that treatment is possible" (26.2%) is the most common barrier, followed by "Cost" (22.7%), "Fear" (18.4%) and "Cannot access treatment" (16.3%).

[1] Note that "charitable hospitals" denotes eye camps where operations are sponsored by charitable organizations at eye camps and performed conducted by ophthalmologists at government hospitals.

j. Refractive errors (see Table 16 of Sample results)

The prevalence of uncorrected refractive errors is 5.8% (males 6.8% and females). This does not include uncorrected presbyopia, which is very high at 94.2%. Uncorrected refractive error is the major cause of bilateral moderate visual impairment (53.2%) and the second cause of bilateral severe visual impairment (11.1%).

k. Diabetic retinopathy, glaucoma, ARMD and other posterior segment diseases

Posterior segment disease causes 25.0% of all blindness, 18.2% of severe visual impairment and 9.9% of moderate visual impairment. Glaucoma is the main cause and this occurs more commonly in males (56.8%) than females (41.7%). With the limited diagnostic equipment in RAAB, ARMD and diabetic retinopathy may be more difficult to diagnose and these may get classified under 'Other posterior segment disease'.

l. Functional low vision (FLV) requiring low vision services (see Tables 17-19 on page 24)

The age and sex adjusted prevalence of FLV (BCVA<3/18 to PL+), not caused by cataract, refractive error, uncorrected aphakia or pseudophakia with PCO) and requiring low vision services is 2.4% (95%CI 1.7-3.2). In Manicaland Province, an estimated 4 857 people aged 50 years or older (1 801 males and 3 055 females) require low vision services or training. The prevalence of FLV increases exponentially by age and is 6.9% in people aged 80 years and older.

The most common cause of FLV is glaucoma (47.4%) followed by other posterior segment disease (25.8%) and non-trachomatous corneal opacity (13.4%).

The projected all-ages prevalence of blindness in Manicaland province is 0.4%.

4. CONCLUSION

A rapid assessment of avoidable blindness (RAAB) was conducted in Manicaland Province, Zimbabwe from March to April 2016. The fieldwork was carried out using a smartphone method of data collection. The sample included 3 936 people aged 50 years or older, with a response rate of 89.0%.

In Manicaland an estimated 6 158 persons aged 50 years or older are bilateral blind, representing a blindness prevalence for the province of 3.1%. A further 4 989 persons aged 50 years or older are severely visually impaired and another 18 657 persons have moderate visual impairment. Among them 4 857 persons aged 50 years or older have functional low vision, requiring low vision services. The differences between males and females are not statistically significant.

In people aged 50 years or older, untreated cataract is the most common cause of bilateral blindness (VA<3/60 in the better eye) with 67.2%, followed by glaucoma (19.5%).

Of all bilateral blindness in Manicaland 94.5% is considered avoidable, 67.2% is considered treatable (cataract, aphakia and URE). Posterior segment diseases account for 25.0% of all bilateral blindness.

The age and sex adjusted prevalence of bilateral blindness due to cataract is 1.6% (95%CI: 1.0%-2.1%), which is an estimated 3 126 people in the province, representing 51% of those who are blind.

In Manicaland only 48.5% of people of blind due to cataract (VA<3/60) have been operated on, 46.1% of males and 50.3% of females. Further, only 37.1% of eyes blind due to cataract (VA<3/60) have been operated on, 36.4% for males and 37.6% for females.

Of all eyes operated for cataract, 55.9% can see 6/18 (“Good outcome”) or better and 25.7% cannot see 6/60 (“Poor outcome”) with available correction. With pinhole the results improve to 68.2% “Good outcome” and 21.8% “Poor outcome”. 95.5% of the operated eyes had an IOL implanted.

Visual outcome of eyes operated during the last 3 years (61.9% Good; 19.0% Poor) is worse compared to those operated 4-6 years ago (63.2% Good; 26.3% Poor). Selection is the main cause of poor outcome (78.6%) of cataract surgery, followed by posterior capsule opacification (75.0%).

Of all cataract operations, 43.0% are conducted in a government hospital, 46.4% in a charitable hospital. Visual outcomes are poorest in charitable hospitals (45.8% Good; 26.5% Poor).

“Unaware that treatment is possible” (26.2%) is the most common barrier, followed by “Cost” (22.7%), “Fear” (18.4%) and “Cannot access treatment” (16.3%).

Uncorrected refractive error is the major cause of bilateral moderate visual impairment (53.2%) and the second cause of bilateral severe visual impairment (11.1%).

Posterior segment disease causes 25.0% of all blindness, 18.2% of SVI and 9.9% of MVI. Glaucoma is the main cause and occurs more commonly in males (56.8%) than females (41.7%).

The age and sex adjusted prevalence of functional low vision is 2.4% (95%CI 1.7-3.2).

The projected all-ages prevalence of blindness in Manicaland province is 0.4%.

5. RECOMMENDATIONS

a. Improve the cataract surgical coverage by:

- Detailed analysis of the current cataract surgical services to identify possibilities to increase the surgical output;
- Making plans to implement cataract surgery capacity improvement measures such as strengthening of the surgical teams (training, recruitment);
- Intensified provincial and national health promotion to inform people of benefits of cataract surgery and sources of surgical provision;
- Reduction of the costs of cataract surgery, perhaps through reduction of the co-payment;
- Development of multi-partner strategy to obtain more resources for cataract surgery;
- Increased efficiency in referral system for cataract surgery;
- Setting target for CSR (cataract surgical rate) to increase by at least 10% per year to compensate for population growth.

b. Improve the visual outcome of cataract surgery through:

- Analysis of the reasons for poor visual outcome through routine monitoring of cataract outcome;
- Training to improve diagnostic capacities in the districts and implementation of detailed pre-operative ophthalmic procedures
- Improve biometry and optical services for cataract surgery;
- Analysis of current surgical practices to reduce surgical complications.

c. Develop and expand the uptake of special services for glaucoma:

- Expand health information on glaucoma and the importance of regular check-ups;
- Active screening of family members aged 40+ of glaucoma patients.

d. Expand refractive error and low vision services to deal with high prevalence of uncorrected presbyopia and functional low vision.

e. Consider Manicaland RAAB findings in future eye care planning for district, province and also for national strategic planning.

<END OF REPORT>

COPIED TO: CBM Country Coordinator: Mr Michele Angeletti ZIM RAAB Co-principal investigator: Dr Aaron Magava Director, Zimbabwe Council for the Blind: Mr Aplos Nyathi
Attachments: RAAB reports, cluster list