



# NATIONAL EYE SURVEY REPORT 2014





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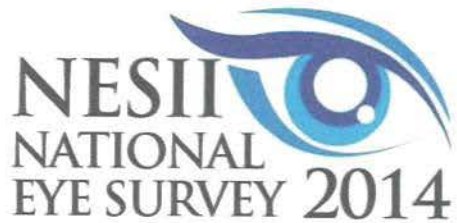
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# The National Eye Survey 2014



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## ***DISCLAIMER***

The views, interpretations, implications, conclusions and recommendations written in this report are those of the editor and contributors and do not necessarily represent the opinions of the other investigators participating in the project nor the views or the policy of the Ministry of Health Malaysia

## Organisation Chart

### NES II Committee

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Elias Hussein	Hospital Selayang
Goh Pik Pin	Clinical Research Center
Nor Fariza Ngah	Hospital Selayang
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Mimi Marina bt Mior Ibrahim	Hospital Telok Intan
Nor Fadzillah Abd Jalil	Hospital Melaka
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## **Foreword from the Director of Health, MALAYSIA**

In any health system, data are the essential element required for the country to progress. Feeding of accurate and relevant data to the health system allows for proper planning, implementation, monitoring and evaluation of health intervention programme that are already in place or are to be put in place.

The National Eye Survey II (NES II) was conducted due to Malaysia's commitment to the World Health Organization (WHO). It is an indicator of our country commitment's progress following the endorsement of the World Health Assembly resolution (WHA66.4), signed in Geneva, March 2013. Among the required indicators are the Prevalence of Blindness and Low Vision, Cataract Surgical Rate and Cataract Surgical Coverage. Until the NES II was carried out, Malaysia lacked sufficient and current eye health data obtained by population survey. The only data available were from the result of the National Eye Survey I in 1996. Dynamic demographic changes have since made these findings difficult to apply in current times.

The National Eye Survey II witnessed one of the most elaborate and extensive collaboration in the history of Ophthalmology and Optometry Services in the country. This project received support from many individuals, institutions and organizations from within and out of the country. From October to December 2014, there was extensive mobilization of manpower within Ophthalmology and Optometry Services throughout the country. The success of the NES II can be attributed to cohesiveness and understanding of all the parties involved. The focused objective of obtaining population eye health data to help in the planning of eye care services was clearly understood by everyone. The NES II is a testament of successful team work by Ophthalmology and Optometry Services in the country which should be emulated by other disciplines in the Ministry of Health.

NES II has taken the eye health planning in the country several steps ahead. It allows for the first time in the history of Eye Care in the country, a detailed analysis of various zones in Malaysia as well as clear demarcations of areas which need improvement in Eye Care strategies to be done. Comparisons could also be made regionally and internationally as the methodology was standardized by WHO.

I believe with these invaluable data in hand, Ophthalmology and Optometry Services can further steer eye health in the country towards greater heights in achieving the national aspiration of a developed nation by 2020.

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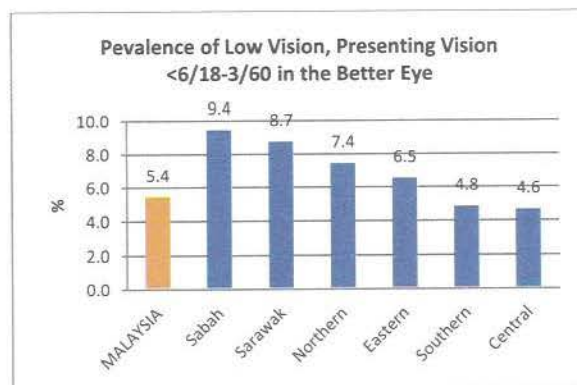
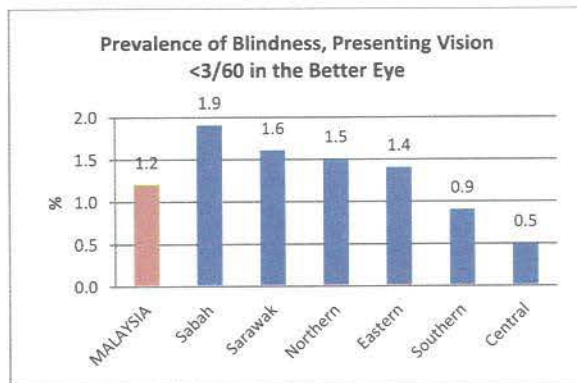
NES II results from a concerted effort of many individuals, from proposal to the publications. It is a great pleasure to acknowledge the contributions of these individuals and institutions without which this survey could not have been possible to conduct.

In particular we would like to thank the following:

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9. District Hospital Directors, Pegawai Kesihatan Daerah and their staff.
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## Executive Summary

Malaysia is divided into six zones for the Prevention of Blindness administrative purposes. National Eye Survey was conducted simultaneously involving all these zones from October to November 2014. Findings from the survey revealed that Sabah has the highest prevalence of both blindness and low vision. The main cause of blindness and low vision in all the zones are cataract.



While Sabah has the highest prevalence of bilateral blindness due to cataract, prevalence of unilateral blindness due to cataract is high in all the zones, in particular highest in the Northern Zone. This could possibly be due to the high percentage of patients who have undergone cataract surgery in one eye but do not feel that it is necessary to undergo surgery in the fellow eye. Although the estimated cataract surgical backlog is the highest, almost 50.0% of all the respondents in the Northern Zone who have cataract believed that they did not need any surgical treatment. This is a worrying phenomenon as late presentation will lead to increasing percentage of intra-operative complication and poor post-operative visual outcome.

In term of estimated numbers, NES II revealed that, there were 413 000 individuals in the country with visual impairment (presenting vision  $<6/18$  in the better eye), out of which 113 000 individuals were blind (presenting vision  $<6/60$  in the better eye). It also revealed that as many as 43 000 individuals were blind in both eyes due to cataract (corrected vision  $<6/60$  in the better eye). In total, it was estimated that more than 670 000 cataract surgeries have to be done in the next 4-5 years on individuals with visual impairment due to cataract (corrected vision  $<6/18$ ).

Highlights from the survey findings suggest that activity to create or increase patients' awareness on cataract, steps to increase case detection through outreach activities and efforts to increase cataract surgical output should be enhanced.



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## **Abbreviation**

BCVA : Best Corrected Visual Acuity

CRC : Clinical Research Center

CSC : Cataract Surgical Coverage

EB : Enumeration Block

DEFF : Design Effect

EVI : Early Visual Impairment

FLV : Functional Low Vision

IKU : Institut Kesehatan Umum

IOV : Interobserver Variation

MVI : Moderate Visual Impairment

NES : National Eye Survey

NED : National Eye Database

NPL : No Perception to Light

PL : Perception to Light

PVA : Presenting Vision

RAAB : Rapid Assessment of Avoidable Blindness

SVI : Severe Visual Impairment

VA : Visual Acuity

## Specific Definition

This survey used the WHO definition on blindness, low vision and visual impairment. Blindness was defined as presenting visual acuity of less than 3/60 in the better eye using available means of correction (with spectacles when available). Low vision was defined as presenting visual acuity of less than 6/18 but equal to or greater than 3/60 in the better eye using available means of correction (with spectacles when available). Visual impairment was defined as presenting visual acuity of less than 6/18 in the better eye using available means of correction (with spectacles when available). As far as the policy is concern, cataract blindness for the country is defined as corrected vision of less than 6/60 in the better eye. (Table 1)

**Table 1: Definition of Blindness and Low Vision**

<b>Visual Impairment (any causes)</b>	<b>Visual Acuity in the better eye with available correction (presenting visual acuity)</b>
Blindness	<3/60
Severe Visual Impairment	<6/60-3/60
Moderate Visual Impairment	<6/18-6/60
<b>Cataract Blindness</b>	<b>Visual Acuity in the better eye (corrected visual acuity)</b>
Blindness	<6/60 (policy definition for Malaysia)
	Or <3/60

An Enumeration Block (EB) is a geographical area which is artificially created and usually consists of specific boundaries such as natural boundaries, administrative boundaries, man-made boundaries and imaginary boundaries. In Malaysia, on average an EB consists of approximately 300 people of all ages.





**Figure 1: Example of an Enumeration Block**

## **World Health Assembly Resolution WHA 66.4**

Following the request of the Member States at the Sixty-fifth World Health Assembly in 2011, the Secretariat, in close consultation with Member States and international partners, developed a draft action plan for the prevention of avoidable visual impairment for the period 2014–2019.

The content and structure of the action plan were built on experiences in prevention of avoidable visual impairment gained through major international partnerships and alliances along with lessons learnt in implementing comprehensive eye health interventions at district and national levels. A major effort was made in engaging all stakeholders in the development of the action plan and stimulating their feedback on the draft through web-based consultations and consultative meetings. The Sixty-sixth World Health Assembly endorsed the action plan in May 2013 by adopting resolution WHA66.4 entitled “**Towards Universal Eye Health: A Global Action Plan 2014–2019**”.

There are **three indicators** to measure progress at the national level, (i) the prevalence and causes of visual impairment; (ii) the number of eye care personnel; and (iii) cataract surgical service delivery

## **Introduction**

The Ophthalmology and Optometry Services, Ministry of Health (MOH) have been collecting hospital based data through the participation of MOH hospitals in the National Eye Database (NED) since the year 2002. Data on patients' demographic, clinical practice, complication and treatment outcome on sight threatening eye diseases have been used to formulate healthcare plan and policy for services, in particular the prevention of blindness activities. NED contributed data for the development of proposal and policies for the Satellite Cataract Services, *Klinik Katarak 1Malaysia* (KK1M) and the National Intraocular Lens Bank. These data have also been used in service to procure equipments and to develop new subspeciality services in certain hospitals.

However, such data has limitation that they will not provide us with a bigger picture of the health system. The status of eye health in the country can only be obtained from a population based data through a population survey. Such population data do not only provide us the information on the burden of blindness and visual impairment but also provide us with the information on the coverage and barrier to service. Prevalence of Blindness and Low Vision, Cataract Surgical Rate and Cataract Surgical Coverage in particular provide the eye health providers the proxy indicators regarding the status of eye health and the efficacy of the general eye-care delivery system. Data from a population survey is a powerful tool to be used to justify the need for improvement in budget, equipment and manpower distribution to meet the nation's demand for progress.

## **Introduction to National Eye Survey II**

The National Eye Survey (NES) II is a population based eye survey conducted by the Ophthalmology Service in collaboration with the Institute of Public Health (IKU) and Center of Clinical Research (CRC), Ministry of Health Malaysia. The objective of this survey is to estimate the prevalence of blindness and low vision in Malaysia. It also aims to assess the coverage and identify barriers for cataract surgical services in the country.

This survey is part of our country's commitment towards the WHO Resolution WHA 66.4 and the Global Action Plan for the Prevention of Avoidable Blindness and Visual Impairment 2014-2019. NES II was done separately in different administrative zones but simultaneous throughout the country.

Data from this survey have been used as country's baseline eye health data. Findings can now be compared with data from other countries in the region and countries in other parts of the world as data are collected and analysed using standard protocol. NES III will be conducted in 2019 to monitor and evaluate the effectiveness of action plans following NES II.

The last population eye survey was conducted in 1996. It was a conventional population survey using stratified two stage cluster sampling method involving individuals of all age group. This survey was based on the National Health and Morbidity Survey (NHMS) platform where interviews and examination were done by randomised Living Quarters (LQ). The main findings were, prevalence of bilateral blindness was 0.29%, prevalence of low vision was 2.44%, the main cause of blindness was cataract (39.1%) and the main cause for low vision was refractive error (48.3%). These results were country representative but not zone representative therefore could not be used for regional planning.

## **Aim**

The main aims of RAAB in NES II are:

1. to estimate the prevalence and causes of avoidable blindness and visual impairment in people aged 50 and above
2. to assess cataract surgical coverage
3. to identify barriers to the uptake of cataract surgery
4. to measure outcome after cataract surgery

## **Method**

### **RAAB methodology**

This method has been used in NES II. It is a standardised method to conduct a population based survey on blindness and visual impairment in a defined population. This can be a district, a state or province or an entire country. Reliable population data are essential and therefore RAAB should be conducted for administrative entities for which such data are available. RAAB uses a standardised survey form, a standard protocol and standardised examination protocol which can be used by local ophthalmic staff. The sample size varies between 2500 and 5000 persons aged 50+. The rationale for limiting to age 50 and above is because of all blindness, the prevalence is high in this age group (80% or more). Hence the sample size can be much lower than when people of all ages are included. That saves time and money. Data from the survey forms are entered into the specially designed RAAB software. Data are analysed automatically and reports are generated after removing inconsistencies and errors from the data.

These data are essential for the planning of new blindness intervention programmes and evaluation of ongoing programmes. Nearly 200 RAABs have now been conducted in more than 50 countries. Because all data are collected and analysed using the same protocol, findings are comparable worldwide.

Malaysia was divided into six zones for administrative purposes in the Prevention of Blindness programme. (Figure 1)





Zone	States	Total Population(million)	Population 50 years and above, NO (%)
Central	Kuala Lumpur, Putrajaya, Selangor and Negeri Sembilan	8.22	1 471 200 (27)
Northern	Perlis, Kedah, Pulau Pinang and Perak	6.09	1 433 600 (26)
Southern	Melaka and Johor	4.17	847 400 (16)
Eastern	Kelantan, Terengganu and Pahang	4.08	790 900 (14)
Sabah	Sabah and Wilayah Persekutuan Labuan	3.30	429 400 (8)
Sarawak	Sarawak	2.47	500 600 (9)

Figure 2: Zone Division and Population

### Sample size calculation

Sample size calculation was performed separately for each administrative zone. The size of the population aged 50 and above, the expected prevalence of bilateral blindness, the worst acceptable (widest variation from expected prevalence, either below or above), and the non-compliance (proportion of eligible people that are absent, refuses to participate or is unable to participate) were entered into the software.

The sample size for simple random sampling at 80, 90 and 95% confidence were automatically calculated. These variations determined, together with the Design Effect, the sample size required for cluster sampling. A sample size of 2500 (50 clusters of size 50) were powerful enough to estimate a prevalence of blindness of 4.0% in people aged 50 and above with an interval of 3.0% - 5.0%, a confidence level of 95% and 90% compliance in each zone.

Sample size calculation

Parameters		Simple Random Sampling		
Population size	1,433,600	Confidence	Sample size	Select
Expected frequency	4.00 %	80%	700	<input type="radio"/>
Worst acceptable	5.00 %	90%	1,153	<input type="radio"/>
Non-compliance	10 %	95%	1,637	<input checked="" type="radio"/>

Cluster sampling with confidence 95% and interval 3.00% - 5.00%

Cluster size	Design effect	Sample size	No. of clusters
40	1.4	2,292	58
50	1.5	2,456	50
60	1.6	2,620	44

Print Close

Figure 3: Sample Size Calculation for Northern Zone

Sample size calculation

Parameters		Simple Random Sampling		
Population size	790,900	Confidence	Sample size	Select
Expected frequency	4.00 %	80%	700	<input type="radio"/>
Worst acceptable	5.00 %	90%	1,153	<input type="radio"/>
Non-compliance	10 %	95%	1,636	<input checked="" type="radio"/>

Cluster sampling with confidence 95% and interval 3.00% - 5.00%

Cluster size	Design effect	Sample size	No. of clusters
40	1.4	2,290	58
50	1.5	2,454	50
60	1.6	2,618	44

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Figure 4: Sample Size Calculation for Eastern Zone

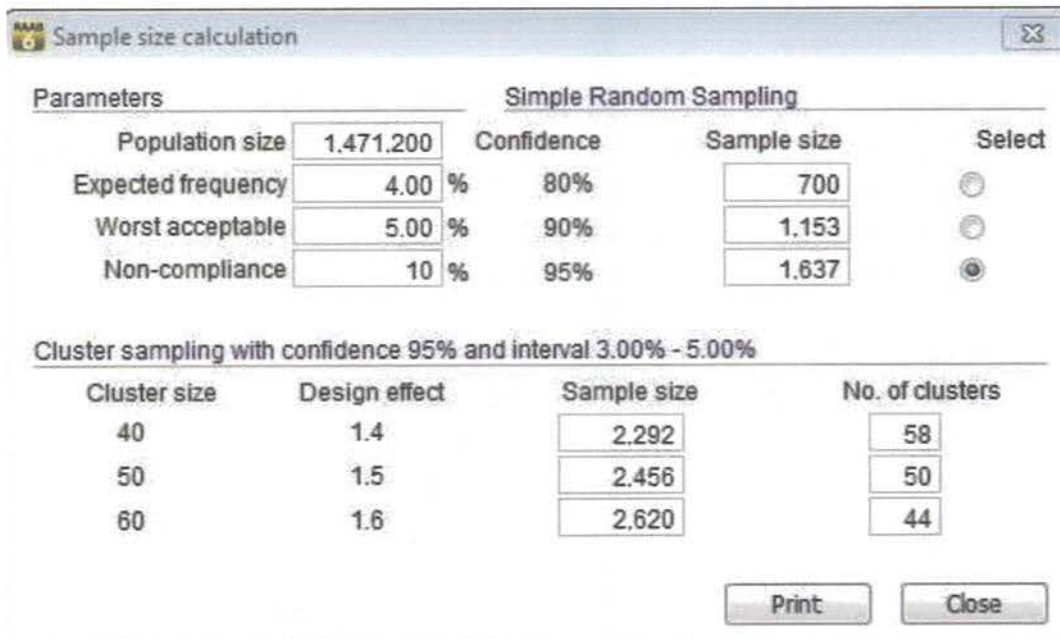


Figure 5: Sample Size Calculation for Central Zone

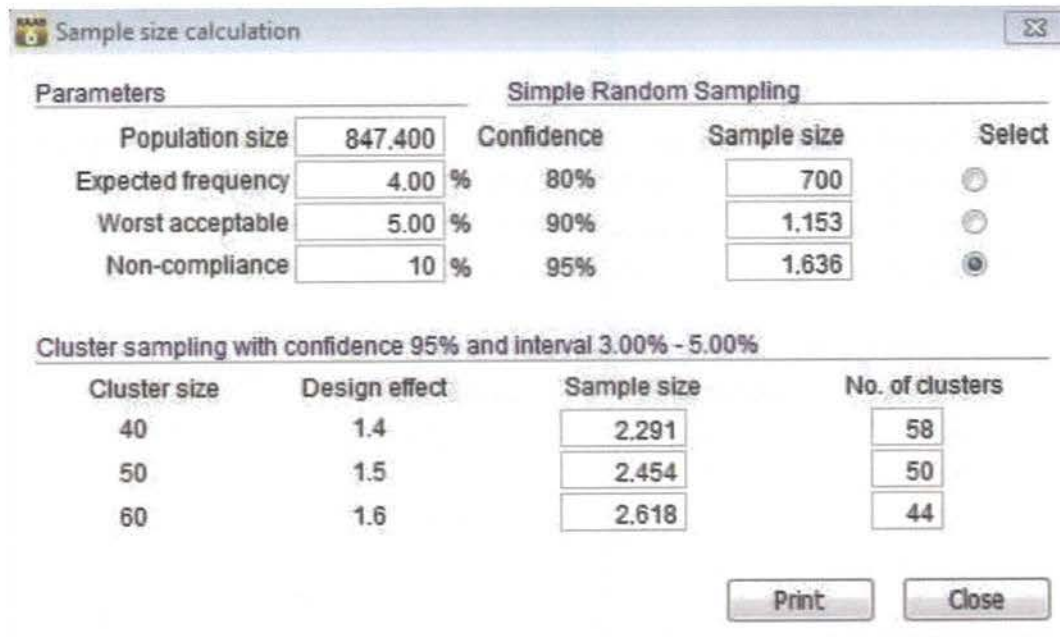


Figure 6: Sample Size Calculation for Southern Zone

Sample size calculation

Parameters		Simple Random Sampling		
Population size	429,400	Confidence	Sample size	Select
Expected frequency	4.00 %	80%	700	<input type="radio"/>
Worst acceptable	5.00 %	90%	1,152	<input type="radio"/>
Non-compliance	10 %	95%	1,633	<input checked="" type="radio"/>

Cluster sampling with confidence 95% and interval 3.00% - 5.00%

Cluster size	Design effect	Sample size	No. of clusters
40	1.4	2,287	58
50	1.5	2,450	50
60	1.6	2,614	44

Print Close

Figure 7: Sample Size Calculation for Sabah

Sample size calculation

Parameters		Simple Random Sampling		
Population size	500,600	Confidence	Sample size	Select
Expected frequency	4.00 %	80%	700	<input type="radio"/>
Worst acceptable	5.00 %	90%	1,152	<input type="radio"/>
Non-compliance	10 %	95%	1,634	<input checked="" type="radio"/>

Cluster sampling with confidence 95% and interval 3.00% - 5.00%

Cluster size	Design effect	Sample size	No. of clusters
40	1.4	2,288	58
50	1.5	2,451	50
60	1.6	2,615	44

Print Close

Figure 8: Sample Size Calculation for Sarawak



## Sampling Frame

Sampling frame for each zone was obtained from the Department of Statistics. Specific permission was given to access data the smallest population unit (codes, name of population unit, expected total number of population of all ages and expected total number of population 50 years and above) in the zone regardless of strata. The expected number was based on the 2014 projected population from 2010 national census. Using the cluster selection module in the RAAB software, 50 EBs were selected from this sampling frame with a probability proportional to the size of the population. As can be seen in the list, some of the larger EBs had to be sub-divided in smaller segments, each containing approximately 50 people aged 50 years and above. Some EBs had less than 50 eligible people. (Appendix) In these places the survey team continued sampling in the 'next nearest' EB (standby EB). Detailed maps of the selected EBs and their neighbouring standby EBs were provided by the Department of Statistic through IKU.

During NES II, survey was conducted through door-to-door interview in randomly selected EB using compact segment sampling method. Brief interview followed by simple eye examination were done on eligible individuals.

The survey was a nationwide exercise but sampling, randomisation, data collection and analysis were done separately by each zone. Unlike the previous survey, results were more representative of each zone. The results of all zones were then multiplied with a weighting factor for the population in each zone to calculate the prevalence of blindness and visual impairment for the entire country.

Each zone had one coordinator. These coordinators were responsible for:

- monitoring the smooth conduct and progress of the survey
- ensuring quality of data collected by the survey teams within his/her zone
- managing finances required for the survey and
- managing publicity within the survey zone

There were five survey teams and 50 randomised Enumeration Block (EB) in each zone. Each team consisted of three individuals, namely 1 medical officer, 1 optometrist and 1 paramedical staff. Each team was assigned to complete survey on 10 EBs according to the RAAB protocol. In contrast to the previous eye survey where subjects were individuals of all ages living in randomised selected Living Quarters, in NES II subjects comprised of 50 individuals 50 years and above for each EB. Survey was done from door-to-door until 50 subjects have been recruited.

Data entries were done by survey team members into the RAAB software. They performed inconsistency check and validation through double data entry once each data collection for any particular EB was completed. Cleaned data were emailed in specific folders to the coordinators who were responsible to merge the results and monitor data quality. Reports were automatically generated using the software.

## **Training**

Training for survey teams is essential prior to field work in any population survey. The main aim is to ensure data quality and strict adherence to standard protocol and methods employed.

RAAB methodology requires survey team members to attend four full days of training. Training includes lectures about NES and RAAB, inter-observer variation assessment and field work. Real surveys were done in one of the nearest EBs during field work.

The 1st NES II training session was conducted for the Northern Zone in Alor Star, Kedah on 22nd September 2014. It was followed by training for the Eastern, Central and Southern Zones in Kuala Lumpur on the 29th of September 2014. Training of survey teams for Sabah and Sarawak was conducted in Kota Kinabalu on the 7<sup>th</sup> of October 2014.

## Age and Sex Adjusted Prevalence

The prevalence of blindness and visual impairment increases strongly with age and in most communities, females are more affected than males. Normally, the people examined in the sample should have the same composition by age and by sex as the total in the survey area. When there is a difference, the prevalence for the survey area will also differ. Age and Sex composition of the population in each zone was entered into the individual RAAB file in the software to allow for calculation of the “age and sex specific prevalence” with the actual population, the “age and sex adjusted prevalence”, the actual number of people affected in the survey area and the 95% CI interval based on the sample error in cluster sampling.

## Aggregated Results

NES II results were calculated separately by each zone. The results are presented below to compare the findings in between zones. They are adjusted results in the population (after adjusting the age and sex of the population using sample error in cluster sampling) unless specifically mentioned otherwise. Results for the country were obtained from weighted average.

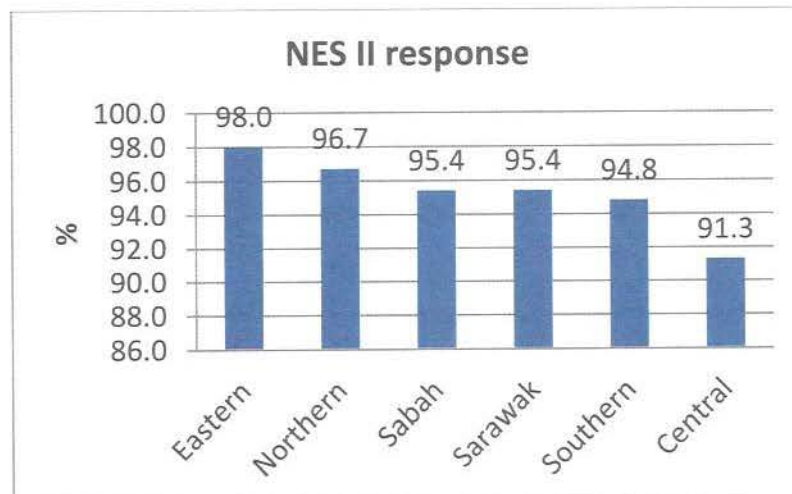


Figure 9: Percentage of Response by Zone

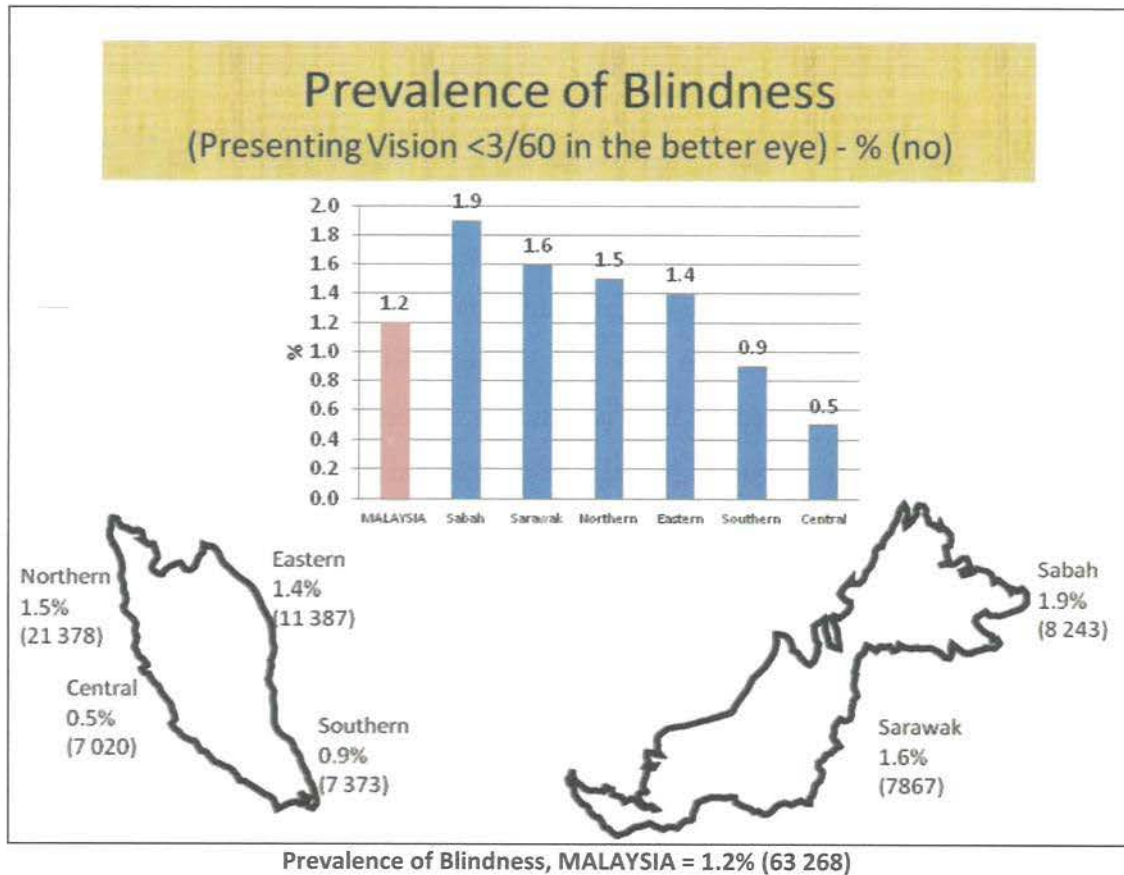


Figure 10: Adjusted Prevalence of Blindness and Estimated Number of Blind Persons

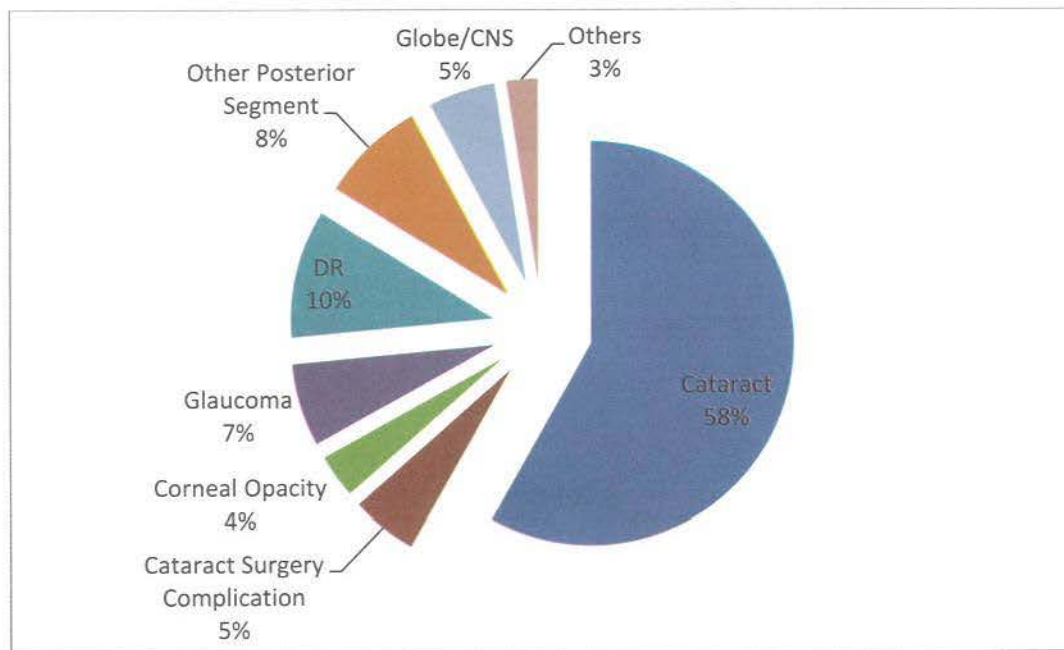
Table 2: Adjusted Prevalence of Blindness (Presenting Vision <3/60 in the Better Eye) and Variations

Zone	Prevalence (Male) %	95% CI	Prevalence (Female) %	95% CI	Prevalence (Total)	95% CI
Northern	1.1	(0.5%, 1.7%)	1.9	(1.1%, 2.7%)	1.5	(1.0%, 2.0%)
Eastern	1.2	(0.5%, 1.9%)	1.6	(1.0%, 2.3%)	1.4	(0.9%, 1.9%)
Central	0.7	(0.2%, 1.2%)	0.2	(0.0%, 0.5%)	0.5	(0.2%, 0.7%)
Southern	1.0	(0.3%, 1.6%)	0.8	(0.2%, 1.3%)	0.9	(0.4%, 1.4%)
Sabah	1.7	(0.9%, 2.5%)	2.1	(1.3%, 3.0%)	1.9	(1.3%, 2.5%)
Sarawak	1.0	(0.4%, 1.7%)	2.1	(1.3%, 3.0%)	1.6	(1.0%, 2.1%)
MALAYSIA	1.0	(1.0%, 1.4%)	1.3	(1.0%, 1.4%)	1.2	(1.0%, 1.4%)



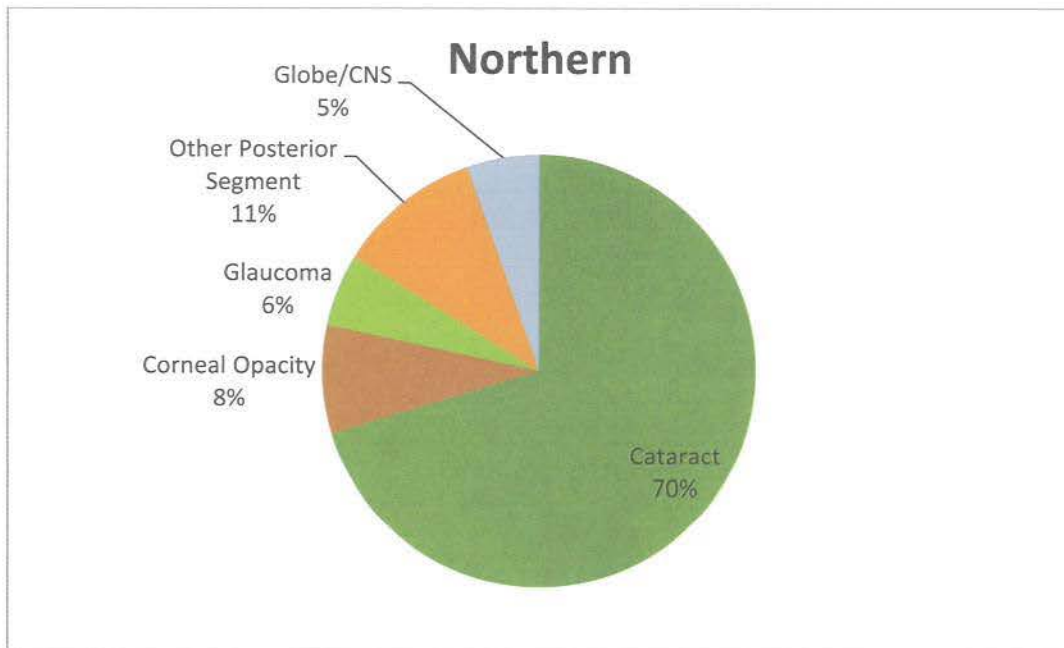
**Table 3: Prevalence of Blindness (Presenting Vision <3/60 in the Better Eye) and Variations in Sabah**

	n	%	95%CI
Malaysian	2194	1.6	(1.0%,2.2%)
Foreigner with Documents	245	5.8	(3.5%,8.1%)
Foreigner without Documents	60	7.7	(2.9%,12.5%)



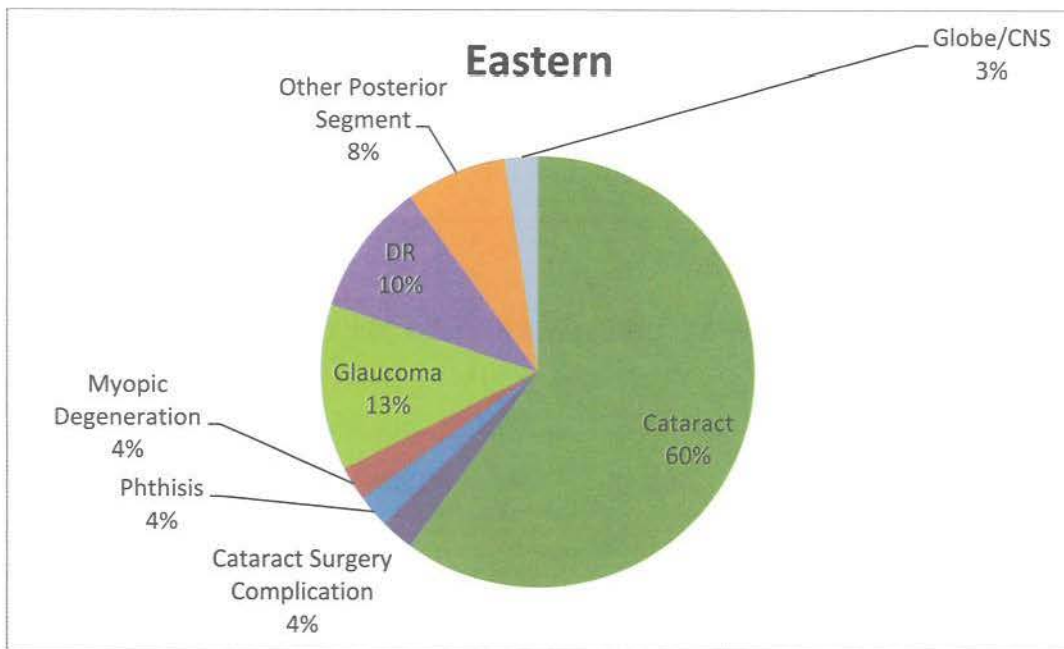
CNS=Central Nervous System, DR=Diabetic Retinopathy

**Figure 11: Causes of Blindness (Country)**



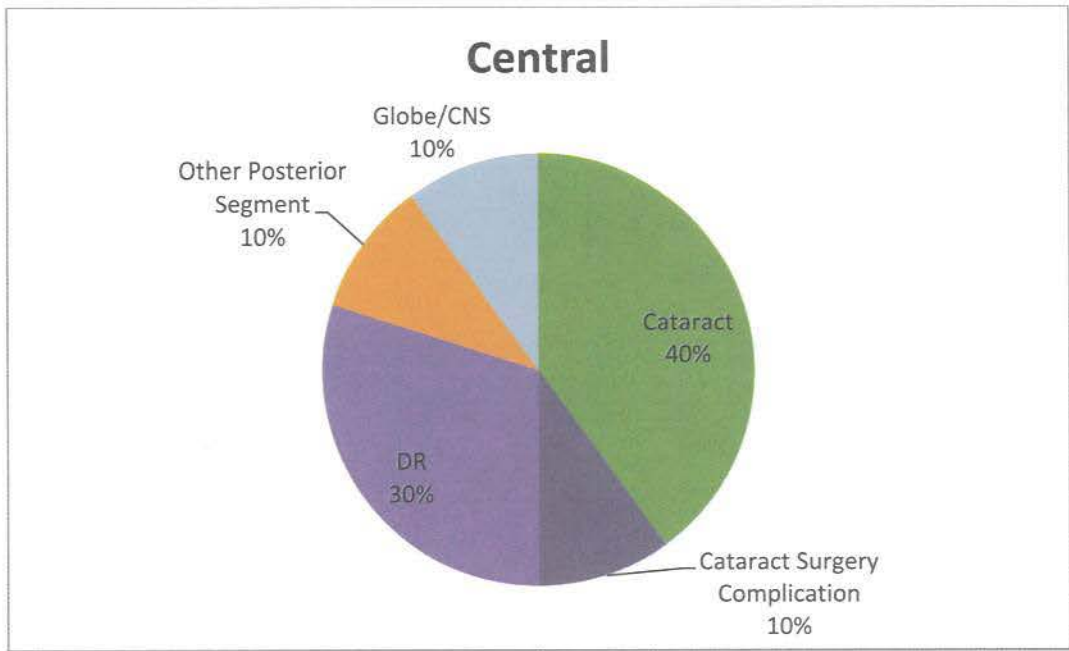
CNS=Central Nervous System

**Figure 12: Causes of Blindness (Northern Zone)**



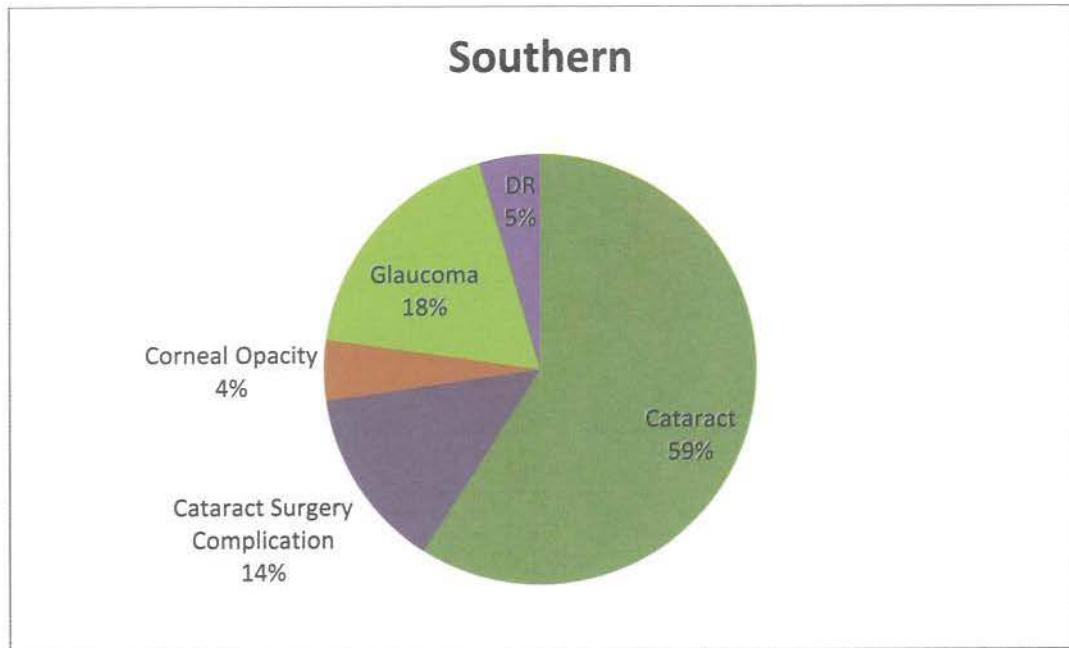
CNS=Central Nervous System, DR=Diabetic Retinopathy

**Figure 13: Causes of Blindness (Eastern Zone)**



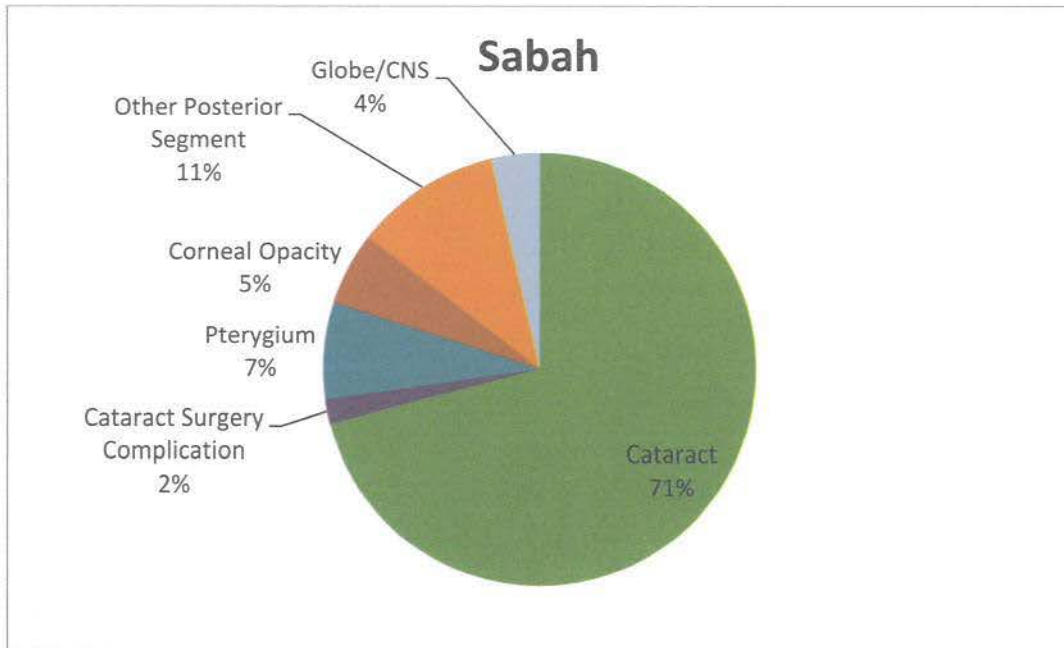
CNS=Central Nervous System, DR=Diabetic Retinopathy

**Figure 14: Causes of Blindness (Central Zone)**



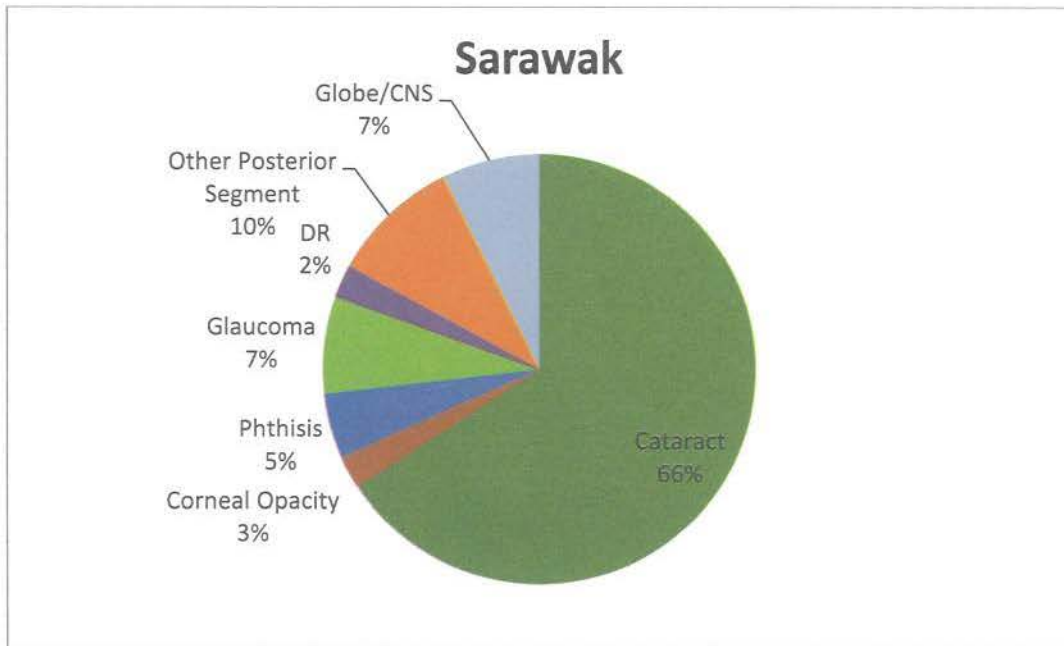
DR=Diabetic Retinopathy

**Figure 15: Causes of Blindness (Southern Zone)**



CNS=Central Nervous System

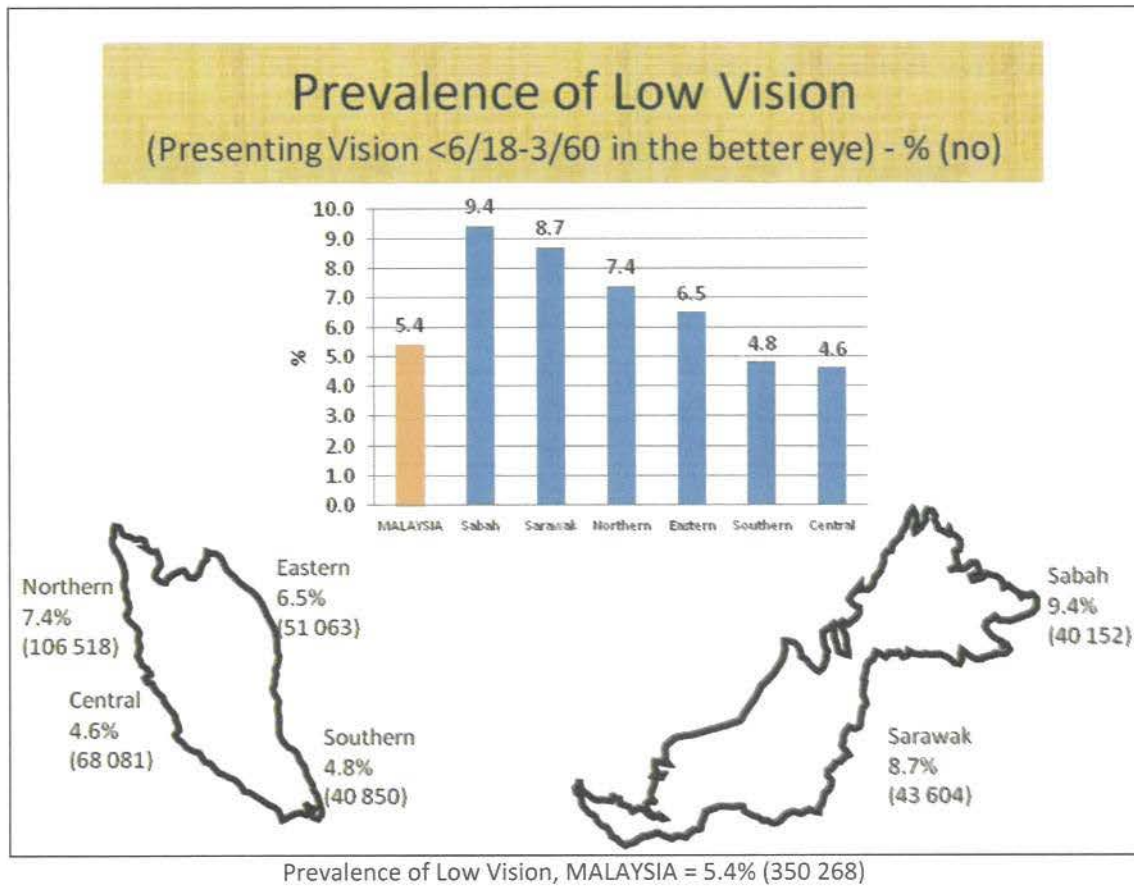
**Figure 16: Causes of Blindness (Sabah)**



CNS=Central Nervous System, DR=Diabetic Retinopathy

**Figure 17: Causes of Blindness (Sarawak)**





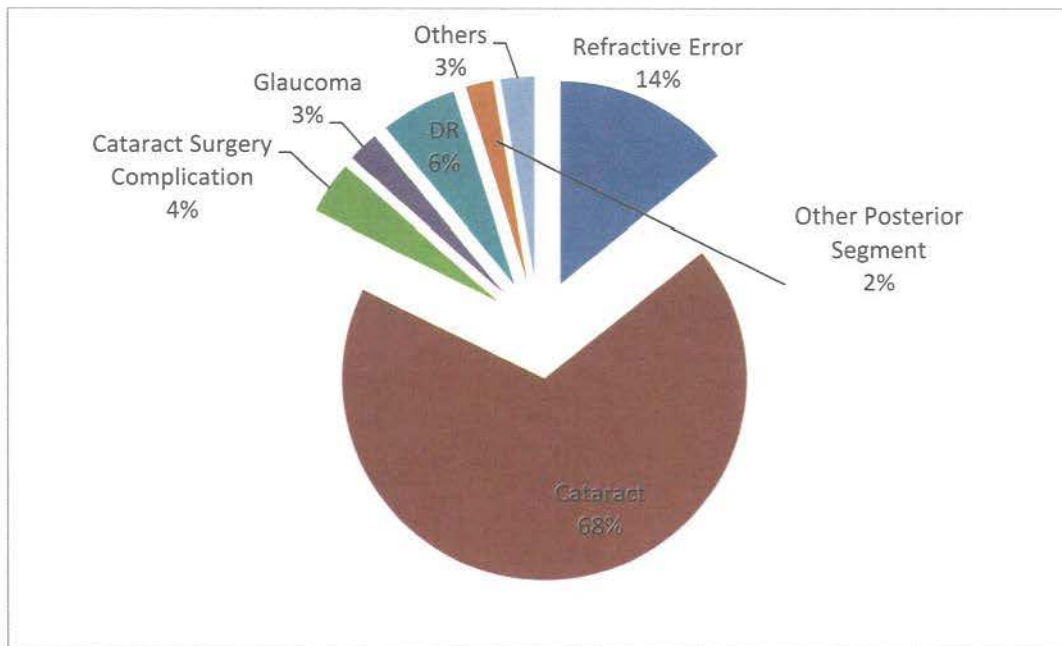
**Figure 18: Adjusted Prevalence of Low Vision and the Estimated Number of Individuals with Low Vision**

**Table 4: Adjusted Prevalence of Severe Visual Impairment (Presenting Vision <6/60-3/60 in the Better Eye) and Variations**

Zone	Prevalence (Male) %	95% CI	Prevalence (Female) %	95% CI	Prevalence (Total)	95% CI
Northern	1.1	(0.5%,1.7%)	1.4	(0.8%,2.1%)	1.3	(0.8%,1.7%)
Eastern	1.1	(0.4%,1.8%)	1.6	(1.0%,2.3%)	1.2	(0.8%,1.7%)
Central	0.5	(0.1%,0.9%)	0.3	(0.0%,0.6%)	0.4	(0.2%,0.6%)
Southern	0.6	(0.1%,1.1%)	0.8	(0.2%,1.3%)	0.7	(0.3%,1.1%)
Sabah	1.0	(0.3%,1.8%)	1.4	(0.7%,2.2%)	1.2	(0.6%,1.8%)
Sarawak	0.9	(0.3%,1.5%)	1.3	(0.6%,2.0%)	1.1	(0.6%,1.6%)
MALAYSIA					0.9	(0.6%,1.2%)

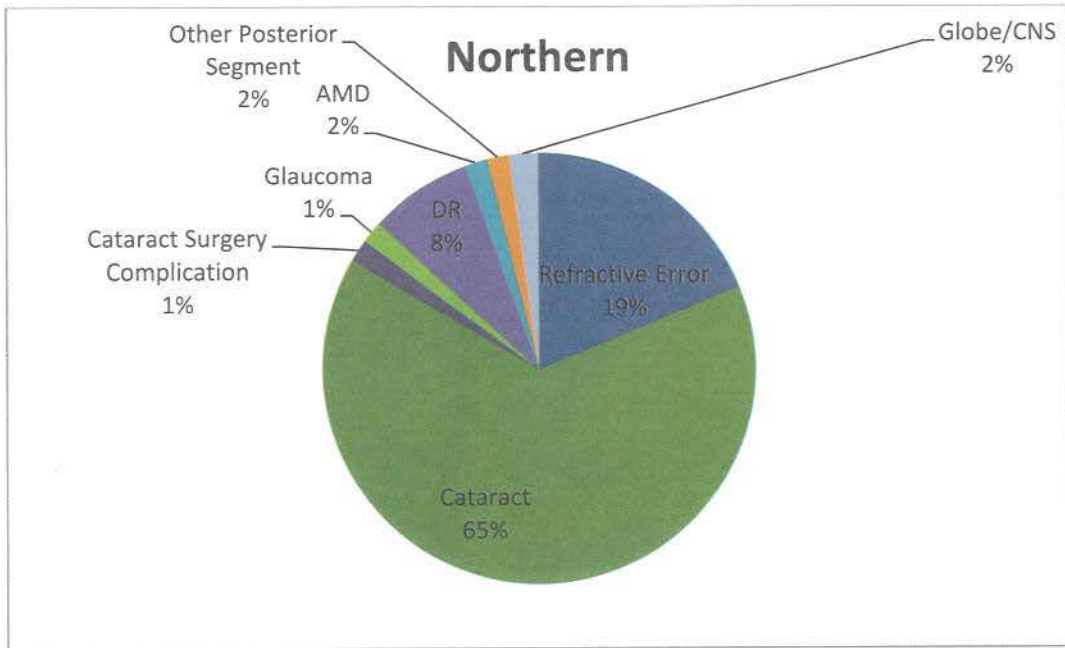
**Table 5: Adjusted Prevalence of Moderate Visual Impairment (Presenting Vision <6/18-6/60 in the Better Eye) and Variations**

Zone	Prevalence (Male) %	95% CI	Prevalence (Female) %	95% CI	Prevalence (Total)	95% CI
Northern	5.6	(4.0%,7.3%)	6.7	(5.0%,8.3%)	6.2	(4.9%,7.4%)
Eastern	4.7	(3.3%,6.1%)	5.7	(4.2%,7.2%)	5.2	(4.2%,6.2%)
Central	3.7	(2.4%,4.9%)	4.9	(3.2%,6.5%)	4.2	(3.0%,5.5%)
Southern	4.5	(2.9%,6.1%)	3.8	(2.5%,5.0%)	4.1	(3.0%,5.2%)
Sabah	8.2	(6.5%,10.0%)	8.0	(6.4%,9.6%)	8.1	(6.8%,9.5%)
Sarawak	7.4	(5.4%,9.3%)	7.8	(5.8%,9.9%)	7.6	(5.9%,9.3%)
<b>MALAYSIA</b>					<b>5.5</b>	<b>(4.9%,6.1%)</b>



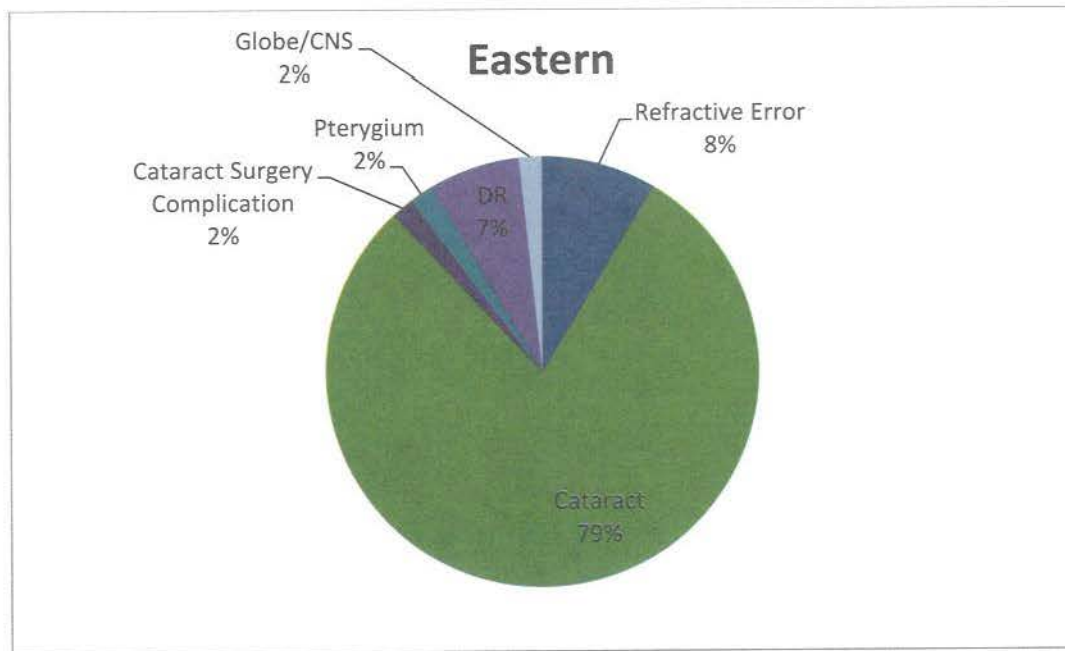
DR=Diabetic Retinopathy

**Figure 19: Causes of Low Vision (Country)**



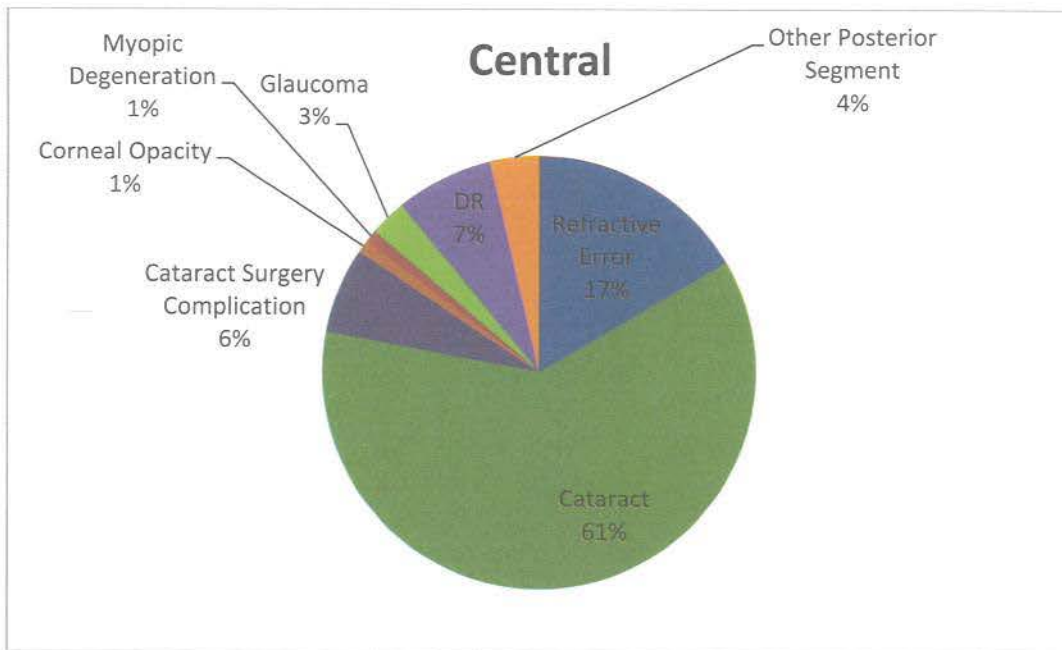
AMD=Age Macula Degeneration, CNS=Central Nervous System, DR=Diabetic Retinopathy

**Figure 20: Causes of Low Vision (Northern Zone)**



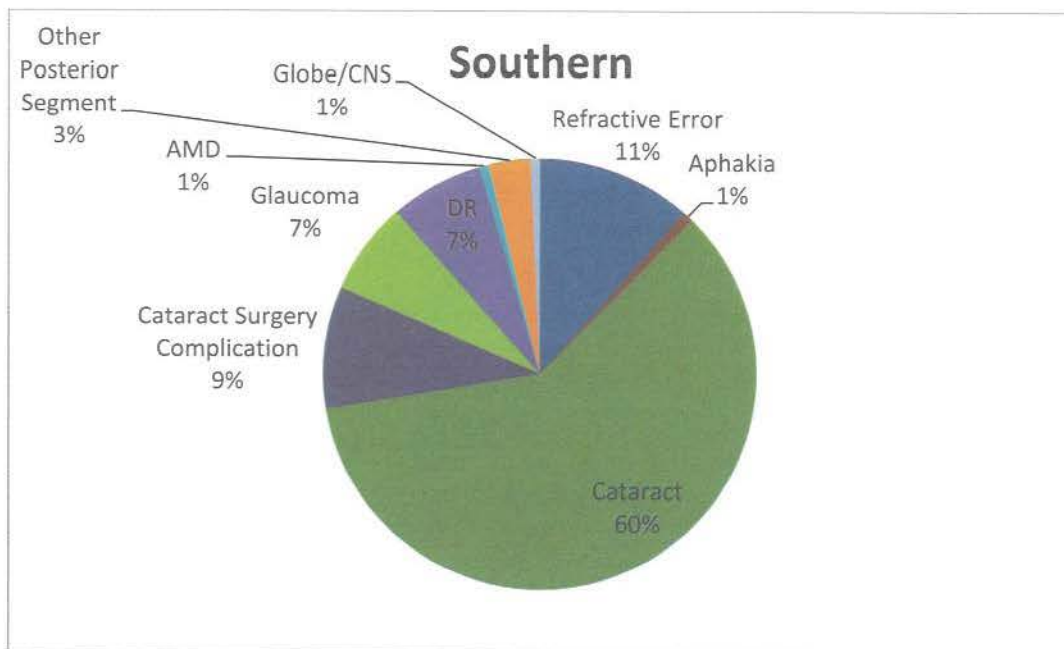
CNS=Central Nervous System, DR=Diabetic Retinopathy

**Figure 21: Causes of Low Vision (Eastern Zone)**



DR=Diabetic Retinopathy

**Figure 22: Causes of Low Vision (Central Zone)**



AMD=Age Macula Degeneration, CNS=Central Nervous System, DR=Diabetic Retinopathy

**Figure 23: Causes of Low Vision (Southern Zone)**



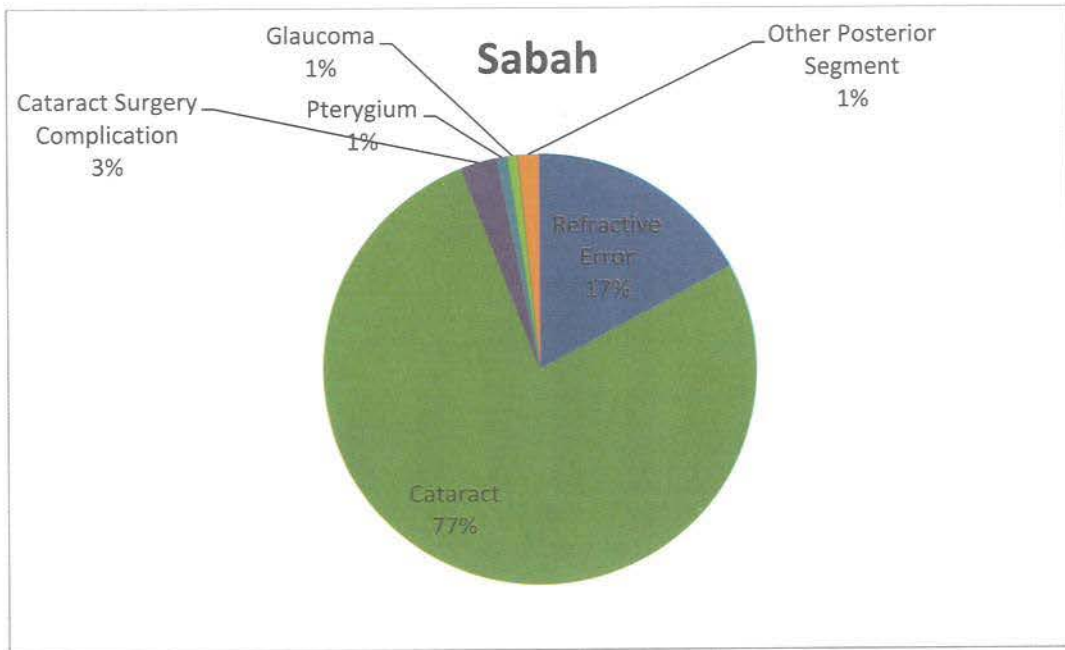
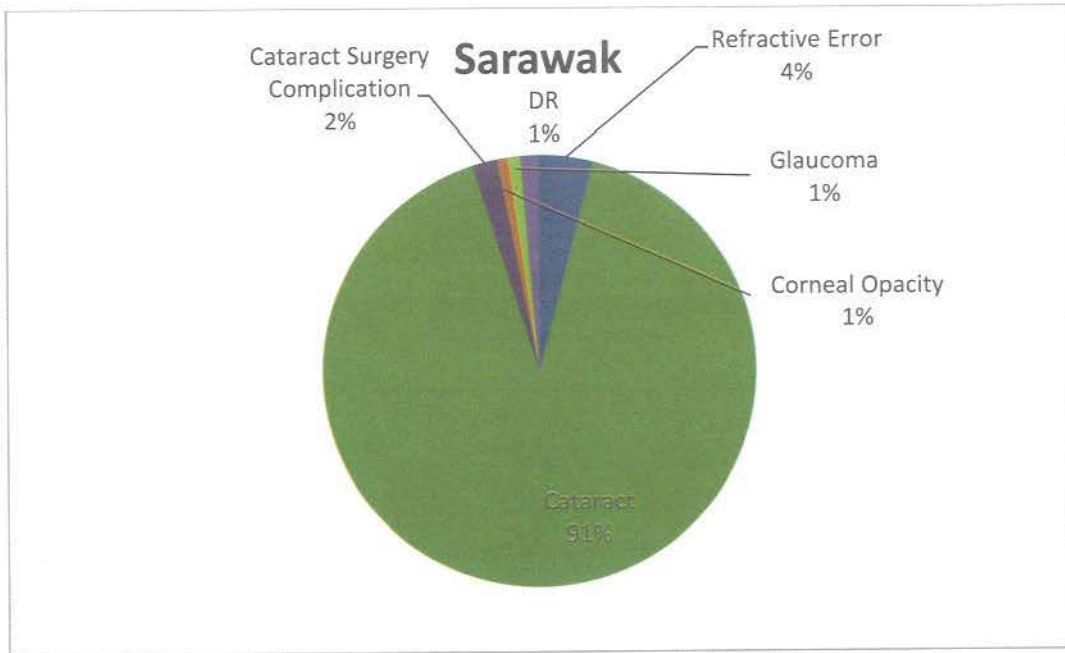


Figure 24: Causes for Low Vision (Sabah)



DR=Diabetic Retinopathy

Figure 25: Causes of Low Vision (Sarawak)

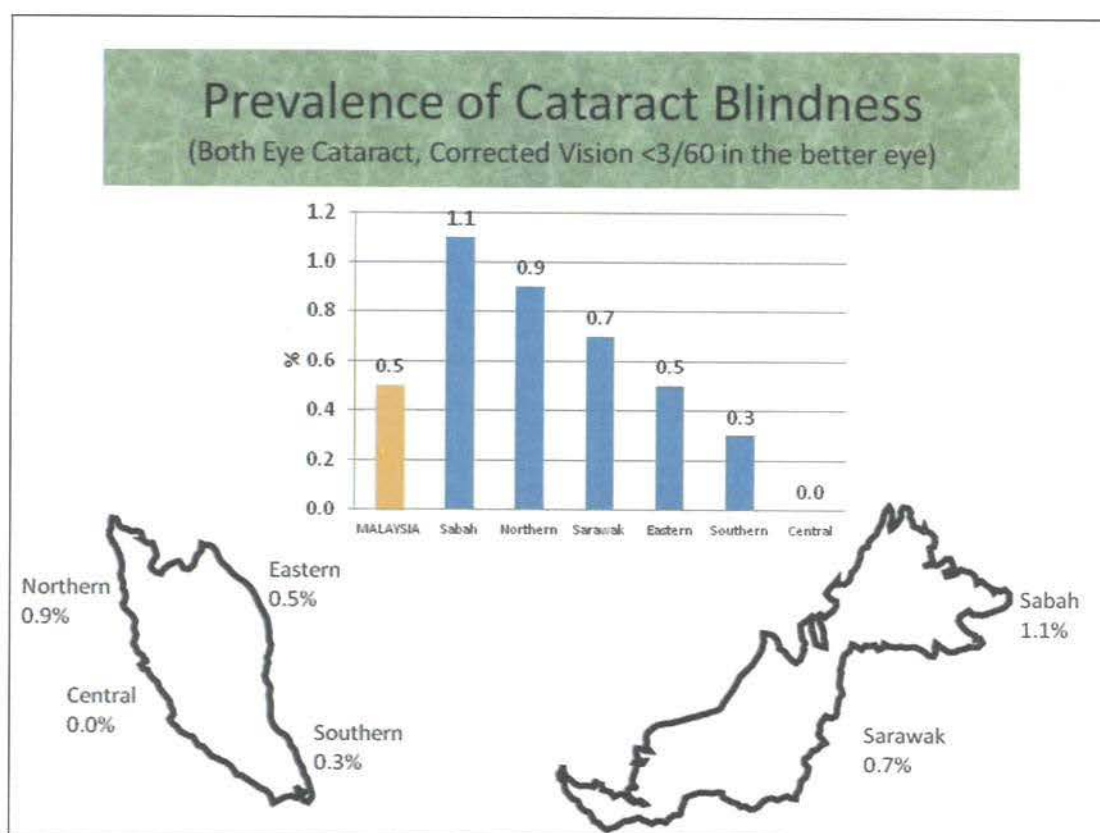


Figure 26: Adjusted Prevalence of Bilateral Cataract Blindness (Corrected Vision in the Better Eye <3/60)

Table 6: Adjusted Prevalence of Bilateral Cataract Blindness (Corrected Vision in the Better Eye <3/60) and Variations

Zone	Prevalence (Male) %	95% CI	Prevalence (Female) %	95% CI	Prevalence (Total)	95% CI
Northern	0.7	(0.2%,1.2%)	1.1	(0.5%,1.7%)	0.9	(0.5%,1.3%)
Eastern	0.1	(-0.1%,0.3%)	0.8	(0.3%,1.3%)	0.5	(0.2%,0.8%)
Central	0.0	(0.0%,0.0%)	0.0	(0.0%,0.0%)	0.0	(0.0%,0.0%)
Southern	0.3	(-0.1%,0.6%)	0.4	(0.0%,0.8%)	0.3	(0.1%,0.6%)
Sabah	0.7	(0.1%,1.3%)	1.5	(0.9%,2.2%)	1.1	(0.6%,1.6%)
Sarawak	0.2	(-0.1%,0.5%)	1.1	(0.5%,1.8%)	0.7	(0.3%,1.0%)

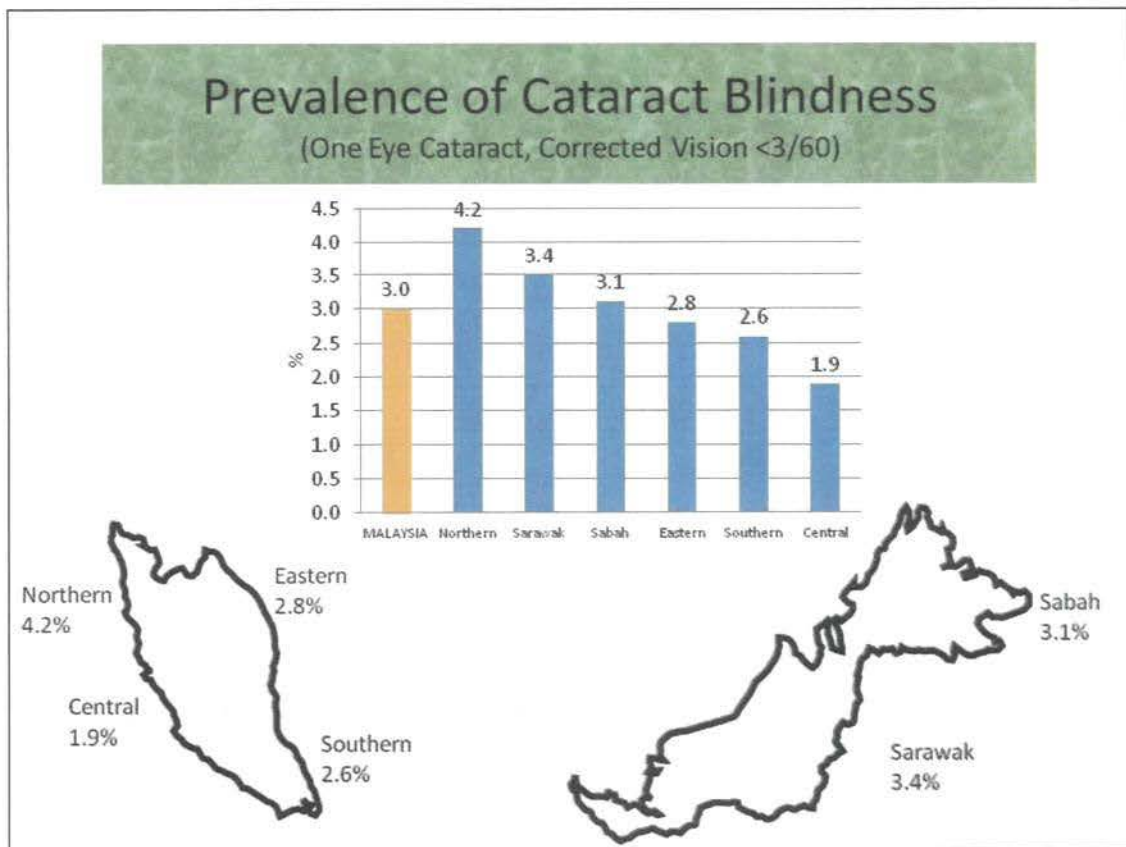


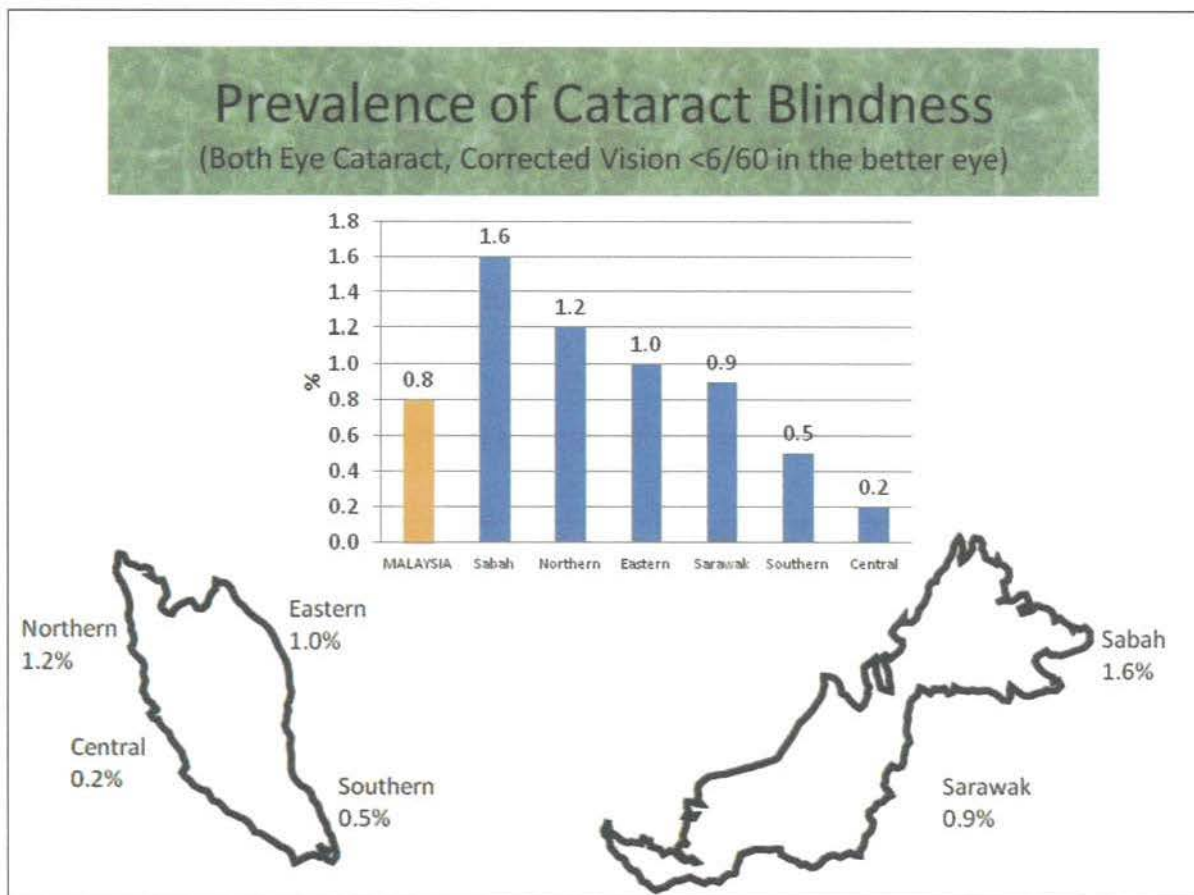
Figure 27: Adjusted Prevalence of Unilateral Cataract Blindness (Corrected Vision <3/60)

Table 7: Estimated Number of Cataract Blind Persons (Corrected Vision <3/60 in the Better Eye )

	Male	Female	Total
Northern	4,755	7,803	<b>12,558</b>
Eastern	271	3,370	<b>3,641</b>
Central	0	0	<b>0</b>
Southern	1,073	1,751	<b>2,824</b>
Sabah	1,680	3,104	<b>4,784</b>
Sarawak	600	2,823	<b>3,423</b>
<b>Total</b>			<b>27230</b>

**Table 8: Estimated Number of Cataract Blind Eyes (Corrected Vision <3/60)**

	Both eye		One eye		Total
	Male	Female	Male	Female	
Northern	4,755	7,803	26460	33698	<b>85274</b>
Eastern	271	3,370	10112	11755	<b>29149</b>
Central	0	0	13916	13770	<b>27686</b>
Southern	1,073	1,751	12473	9416	<b>27537</b>
Sabah	1,680	3,104	7162	6275	<b>23005</b>
Sarawak	600	2,823	9187	8024	<b>24057</b>
<b>Total</b>	<b>54460</b>		<b>162248</b>		<b>216708</b>

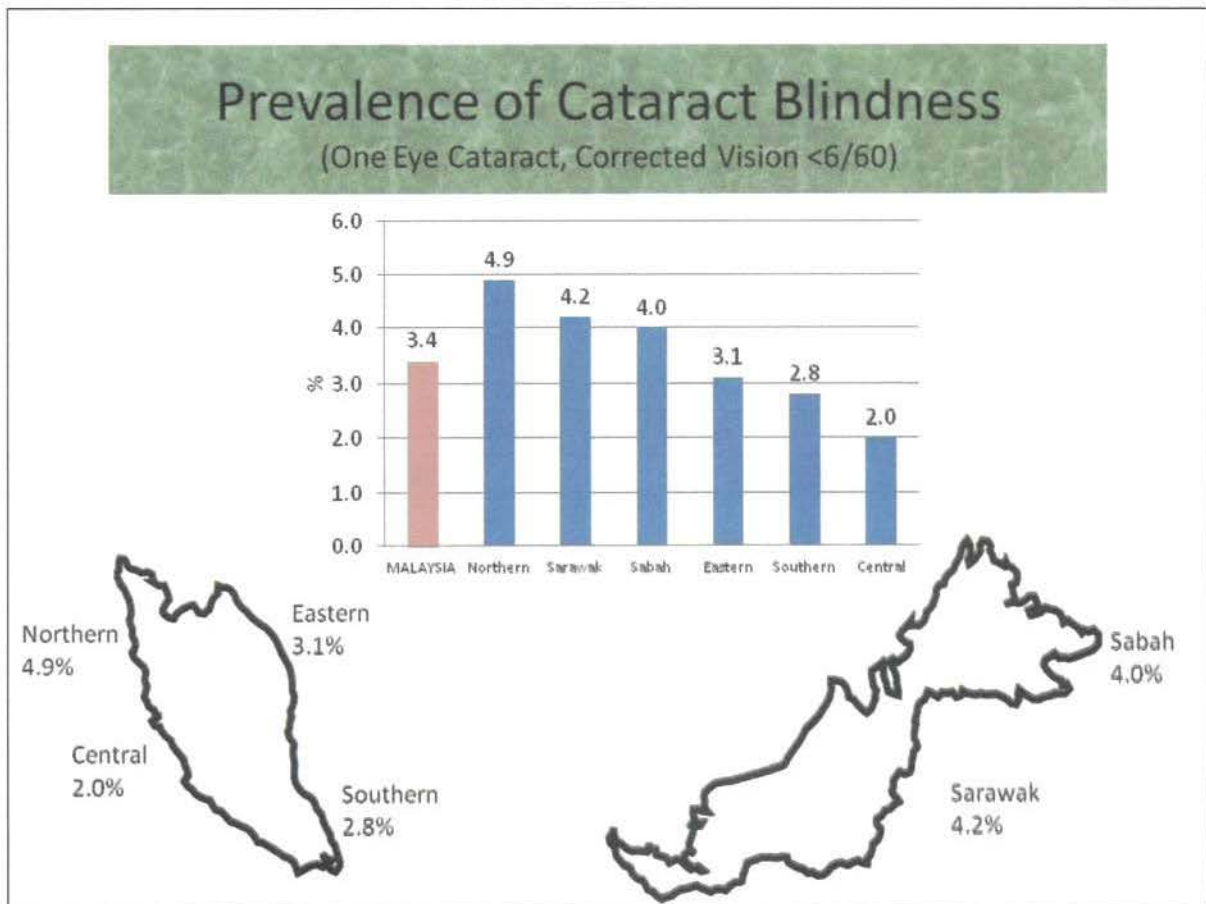


**Figure 28: Adjusted Prevalence of Bilateral Cataract Blindness (Corrected Vision in the Better Eye <6/60)**



**Table 9: Adjusted Prevalence of Cataract Blindness (Corrected Vision <6/60 in the Better Eye) and Variations**

Zone	Prevalence (Male) %	95% CI	Prevalence (Female) %	95% CI	Prevalence (Total)	95% CI
Northern	1.0	(0.4%,1.5%)	1.4	(0.8%,2.0%)	1.2	(0.8%,1.6%)
Eastern	0.5	(0.1%,1.0%)	1.4	(0.8%,2.0%)	1.0	(0.6%,1.3%)
Central	0.4	(0.2%,0.6%)	0.0	(0.0%,0.0%)	0.2	(0.1%,0.3%)
Southern	0.3	(0.0%,0.7%)	0.7	(0.2%,1.1%)	0.5	(0.2%,0.8%)
Sabah	1.2	(0.5%,1.8%)	2.1	(1.3%,2.9%)	1.6	(1.1%,2.1%)
Sarawak	0.5	(0.2%,0.9%)	1.3	(0.7%,2.0%)	0.9	(0.5%,1.3%)



**Figure 29: Adjusted Prevalence of Unilateral Cataract Blindness (Corrected Vision <6/60)**

**Table 10: Estimated Number of Cataract Blind Persons (Corrected Vision <6/60 in the Better Eye)**

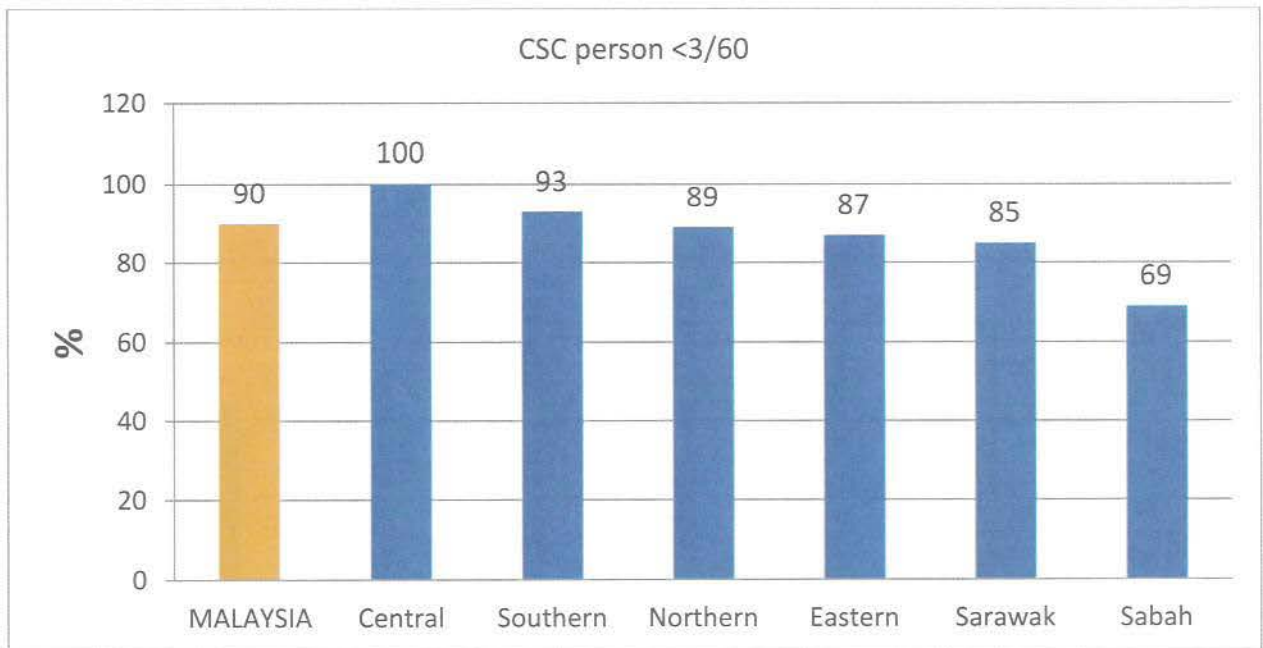
	Male	Female	Total
Northern	6713	10275	<b>16988</b>
Eastern	2075	5668	<b>7743</b>
Central	2741	0	<b>2741</b>
Southern	1338	2718	<b>4056</b>
Sabah	2632	4198	<b>6830</b>
Sarawak	1418	3337	<b>4755</b>
<b>Total</b>			<b>43113</b>

**Table 11: Estimated Number of Cataract Blind Eyes (Corrected Vision <6/60)**

	Both eye		One eye		Total
	Male	Female	Male	Female	
Northern	6713	10275	28553	40983	<b>103512</b>
Eastern	2075	5668	10794	13814	<b>40094</b>
Central	2741	0	13176	16118	<b>34776</b>
Southern	1338	2718	13949	10143	<b>32204</b>
Sabah	2632	4198	8392	8771	<b>30823</b>
Sarawak	1418	3337	10674	10414	<b>30598</b>
<b>Total</b>	<b>86226</b>		<b>185781</b>		<b>272007</b>

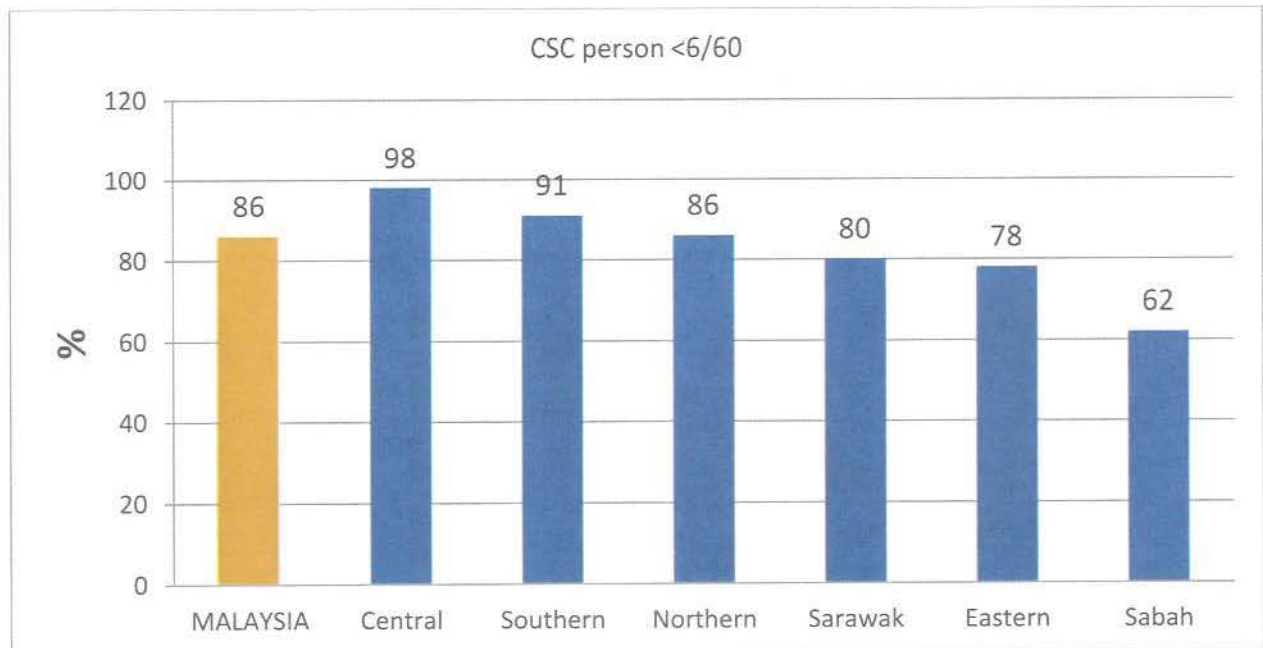
**Table 12: Estimated Number of Cataract Eyes Backlog by Level of Corrected Vision**

	<3/60	<6/60	<6/18	<6/12
Northern	85274	103512	208464	398422
Eastern	29149	40094	102590	218765
Central	27686	34776	107844	213148
Southern	27537	32204	74070	195160
Sabah	23005	30823	73507	141777
Sarawak	24057	30598	101371	196460
<b>TOTAL</b>	<b>216708</b>	<b>272007</b>	<b>667846</b>	<b>1363732</b>



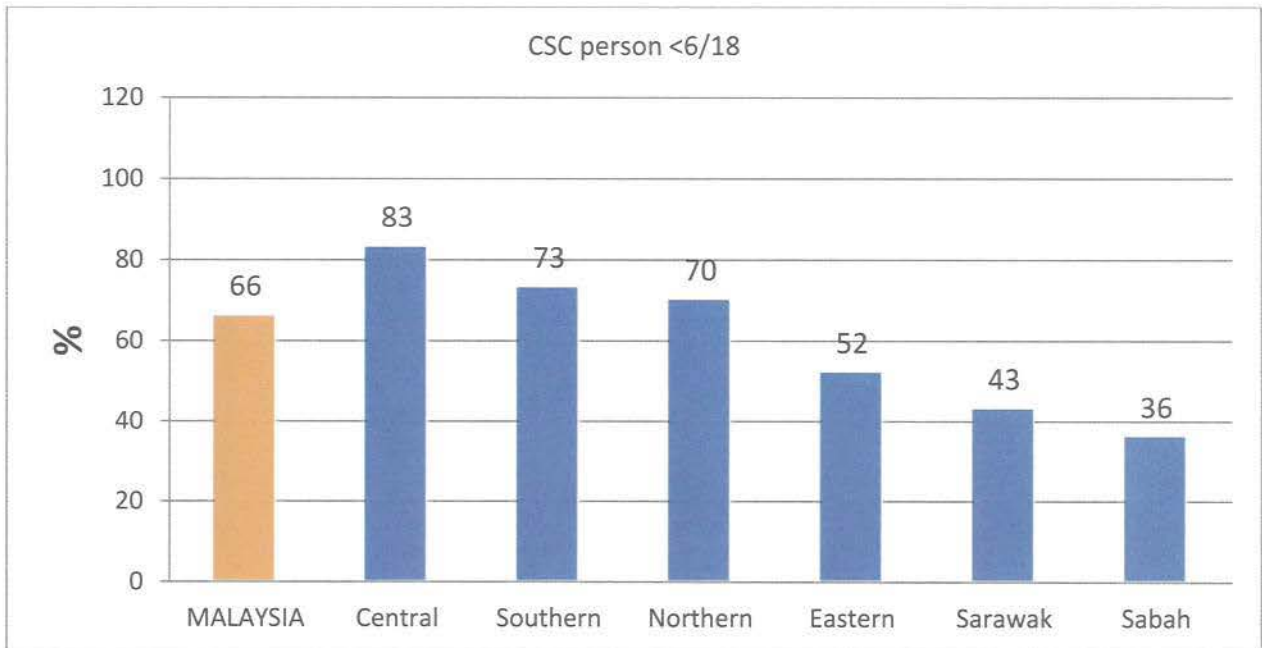
Cataract Surgical Coverage,CSC= Proportion of people with bilateral cataract eligible for cataract surgery who have received cataract surgery in one or both eyes

**Figure 30: Cataract Surgical Coverage (person) Vision <3/60**



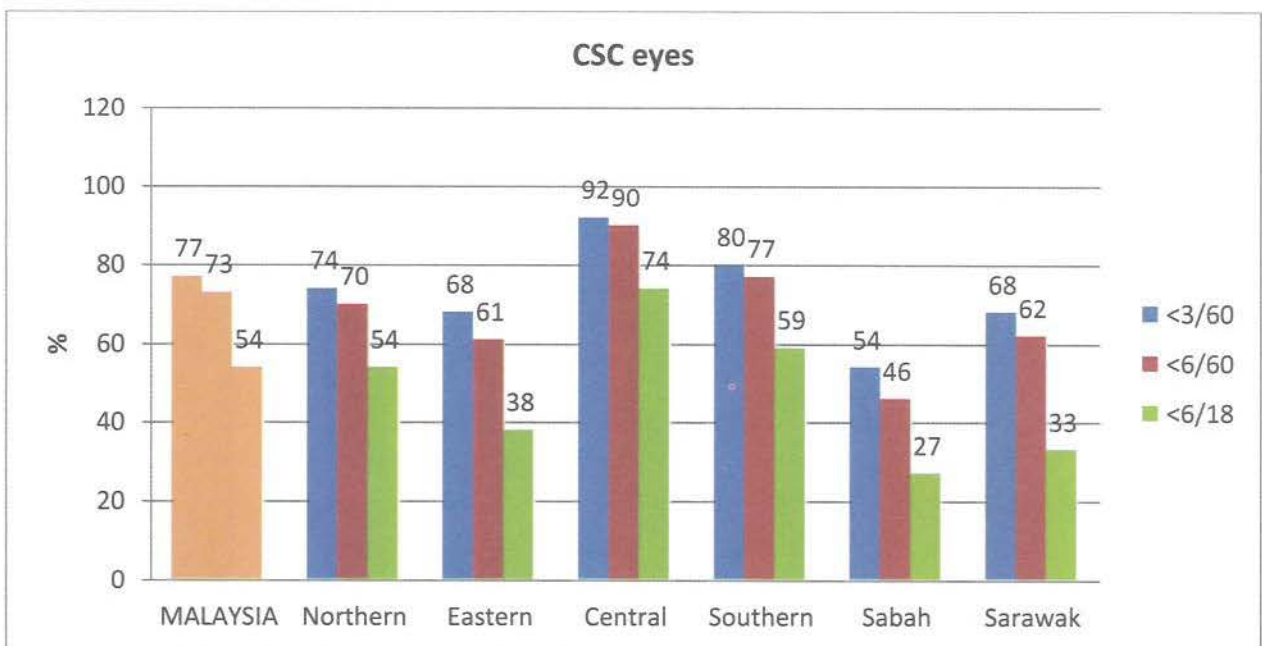
Cataract Surgical Coverage,CSC= Proportion of people with bilateral cataract eligible for cataract surgery who have received cataract surgery in one or both eyes

**Figure 31: Cataract Surgical Coverage (person) Vision <6/60**



Cataract Surgical Coverage, CSC= Proportion of people with bilateral cataract eligible for cataract surgery who have received cataract surgery in one or both eyes

**Figure 32: Cataract Surgical Coverage (person) Vision <6/18**



**Figure 33: Cataract Surgical Coverage (Eyes)**



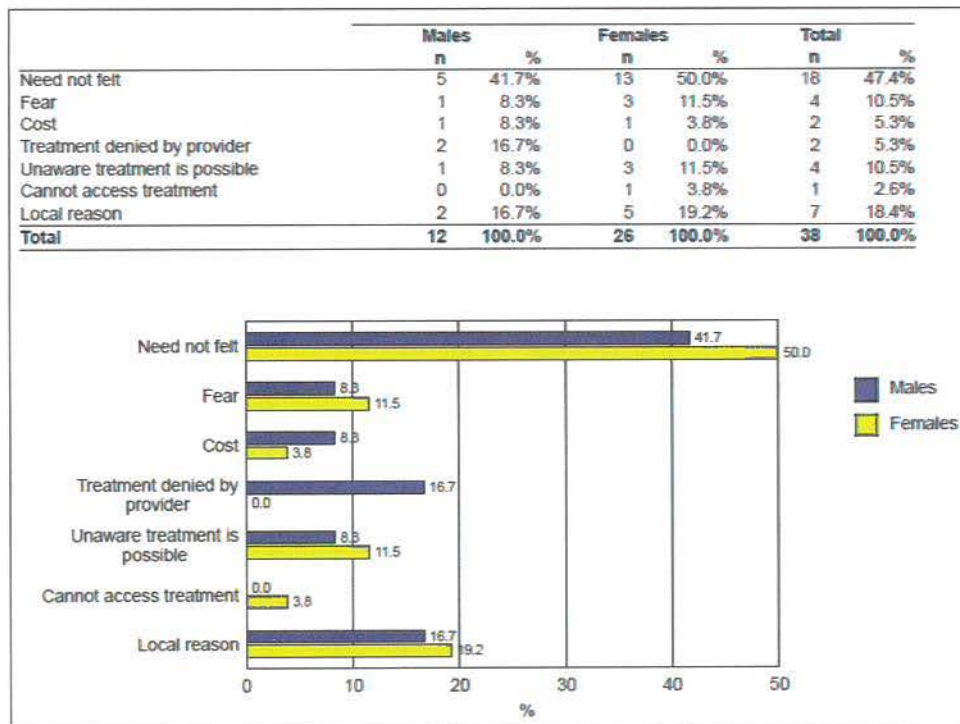


Figure 34: Barriers to Cataract Surgery in Sample (Corrected Vision <6/60 in the Better Eye) in Northern Zone

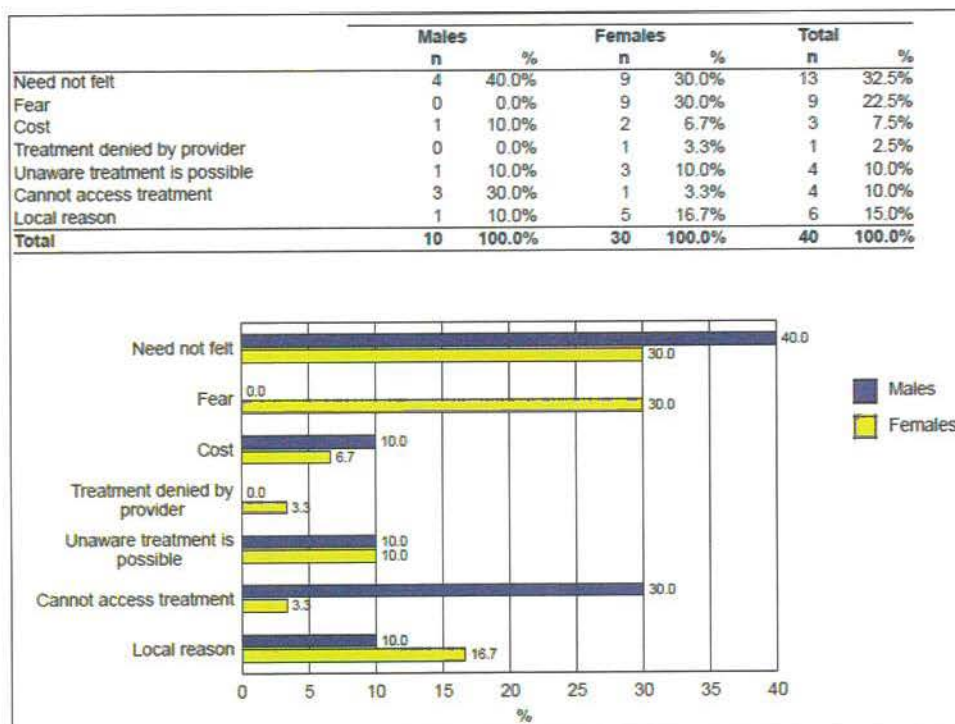


Figure 35: Barriers to Cataract Surgery in Sample (Corrected Vision <6/60 in the Better Eye) in Eastern Zone

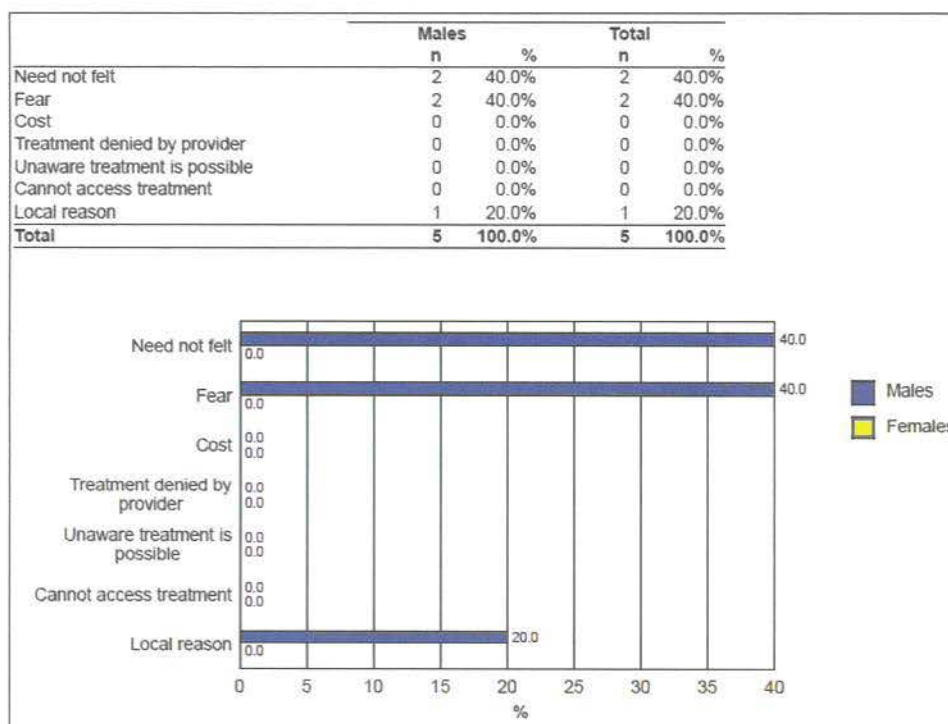


Figure 36: Barriers to Cataract Surgery in Sample (Corrected Vision <6/60 in the Better Eye) in Central Zone

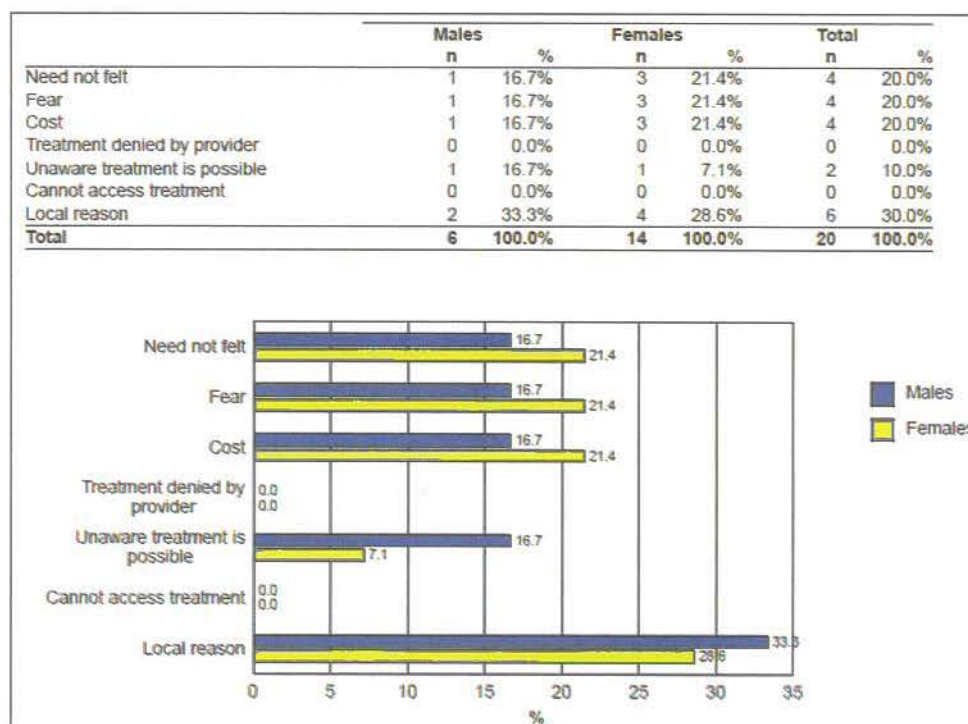


Figure 37: Barriers to Cataract Surgery in Sample (Corrected Vision <6/60 in the Better Eye) in Southern Zone

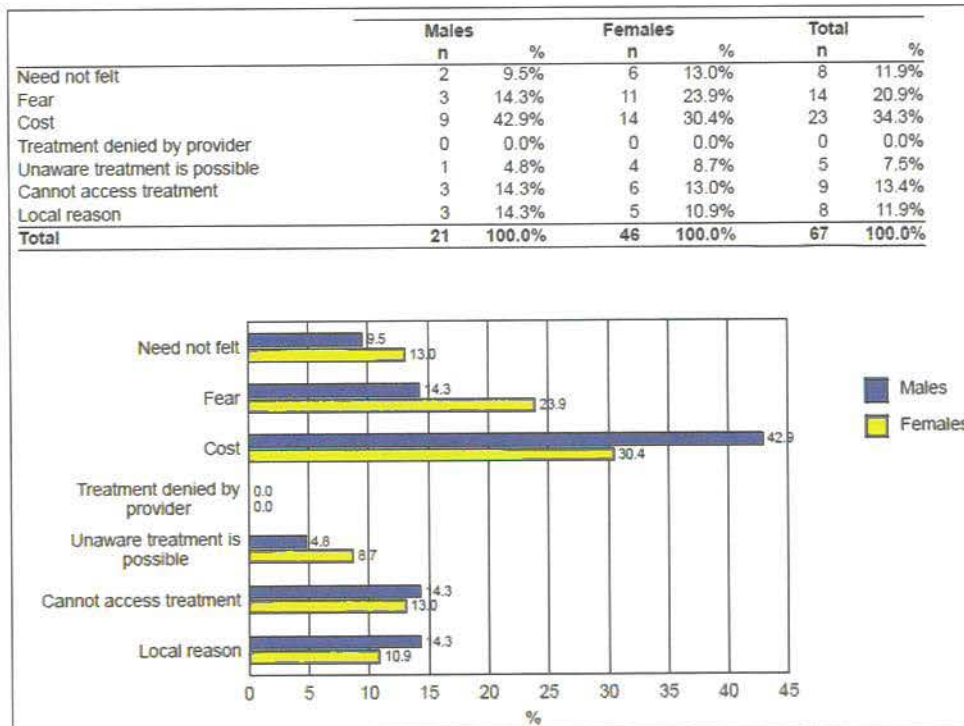


Figure 38: Barriers to Cataract Surgery in Sample (Corrected Vision <6/60 in the Better Eye) in Sabah

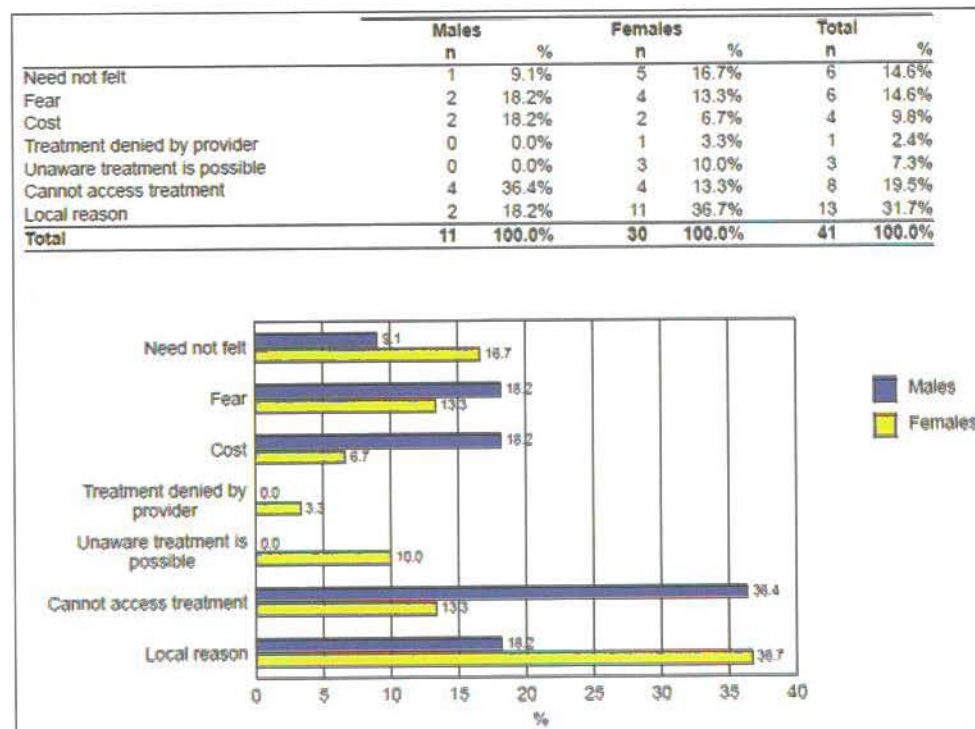


Figure 39: Barriers to Cataract Surgery in Sample (Corrected Vision <6/60 in the Better Eye) in Sarawak

**Table 13: Presenting Vision in the Operated Eyes, All Eyes (in Sample)**

Zone	Visual Outcome			
	Very good	Good	Borderline	Poor
Northern	70.4%	13.3%	7.6%	8.8%
Eastern	60.5%	17.1%	10.1%	12.3%
Central	73.3%	12.2%	10.0%	4.4%
Southern	70.2%	13.6%	8.6%	7.7%
Sabah	65.4%	10.6%	17.3%	6.7%
Sarawak	62.0%	18.3%	8.0%	11.8%
MALAYSIA	68.6%	13.7%	9.7%	8.0%
WHO Guideline	>80.0%		<15.0%	<5.0%

Very good = Can see 6/12, Good = Can see 6/18, Borderline = Can see 6/60, Poor = Cannot see 6/60

1908 with IOL

20 without IOL

1 couching

**Table 14: Best Corrected Vision in the Operated Eyes, All Eyes (in Sample)**

Zone	Visual Outcome			
	Very good	Good	Borderline	Poor
Northern	79.1%	6.6%	5.9%	8.3%
Eastern	70.6%	12.7%	6.1%	10.5%
Central	81.9%	8.6%	5.4%	4.0%
Southern	76.7%	11.2%	5.6%	6.5%
Sabah	73.2%	12.8%	9.5%	4.5%
Sarawak	73.0%	10.6%	6.8%	9.5%
MALAYSIA	77.2%	9.6%	6.1%	6.9%
WHO Guideline	>90.0%		<5.0%	<5.0%

Very good = Can see 6/12, Good = Can see 6/18, Borderline = Can see 6/60, Poor = Cannot see 6/60

1908 with IOL

20 without IOL

1 couching



The overall response rate was 95.3% [highest in Northern (98.0%) and lowest in Central (91.3%)] (Figure 9). The results which showed significant difference were:

1. **Prevalence of Blindness:** Central Zone had significantly lower prevalence as compared to other zones except Southern Zone. There was no significant difference between genders within zone but females in Central Zone had significantly lower prevalence compared to females in other zone except Southern Zone. (Table 2)
2. **Prevalence of Blindness:** Foreigners in Sabah had significantly higher prevalence as compared to the local population. (Table 3) But the number of foreigners without document was too small for any solid conclusion to be drawn.
3. **Prevalence of Severe Visual Impairment:** Central Zone had significantly lower prevalence as compared to other zones except Southern Zone. There was no significant difference between genders within zone but females in Central Zone had significantly lower prevalence compared to females in other zone except Southern Zone. (Table 4)
4. **Prevalence of Moderate Visual Impairment:** Central Zone had significantly lower prevalence as compared to Sabah and Sarawak. There was no significant difference between genders within zone but males in Central Zone had significantly lower prevalence compared to Sabah and Sarawak. (Table 5)
5. **Prevalence of Cataract Blindness <3/60:** Central Zone had significantly lower prevalence compared to all other zones. Females in Central Zone had significantly lower prevalence than females in all other zones. Females' prevalence was higher than males' prevalence in Eastern Zone and Sarawak. (Table 6)
6. **Prevalence of Cataract Blindness <6/60:** Central Zone had significantly lower prevalence compared to other zones except Southern Zone. There was no significant difference between genders within zones but females in Central Zone had significantly lower prevalence compared to females in all other zones. (Table 9)

The main causes of Blindness for Malaysia was Cataract (58.6%) followed by Diabetic Retinopathy (10.4%) and Glaucoma (6.6%). (Figure 11) The main causes of Blindness varied for each specific zone. (Figure 6-17).

The main causes of Low Vision for Malaysia was Cataract (68.0%) followed by Refractive Error (14.2%) and Diabetic Retinopathy (6.1%). (Figure 19) The main causes of Low Vision also varied for each specific zone. (Figure 20-25)

The common barrier to cataract surgery was “need not felt” especially in the Northern and Eastern Zone where the prevalence and number of unilateral blind eyes due to cataract was high. While the barrier in Sabah with high prevalence of blindness, low vision and bilateral cataract blindness was cost. (Figure 33-38)

The proportion of people who could see 6/18 or better (with available correction) was 82.3%, more than 80.0% as recommended by WHO. (Table 13) The proportion of people who could see 6/18 or better (with best correction) was 86.8%, close to 90.0% as recommended by WHO. (Table 14)

## **Discussion**

The overall response rate for this survey was above the standard which was set for RAAB methodology (10.0% of non response). The findings suggested that prevalence of blindness/low vision and cataract blindness were high in Sabah, Sarawak, Eastern and Northern Zones. Although Cataract constituted the common main cause of blindness and low vision in all zones, prevalence of Diabetic Retinopathy and Glaucoma varied between the zones. Action plan therefore has to be tailored to the need of each zone.

Sabah has the highest prevalence of blindness, prevalence of low vision and prevalence of bilateral cataract blindness (both corrected vision <3/60 and corrected vision <6/60).

CSC (person) indicates the proportion of people 50 years and above with bilateral cataract who were eligible for cataract surgery and who have received cataract surgery in one or both eyes. It is assessed by three levels of vision (BCVA <3/60, <6/60 and <6/18). The World Health Organization (WHO) currently takes CSC person <6/60 as monitoring indicator. There is no standard achievement set for CSC. Performance is by monitoring the trend of proportions obtained from RAABs.

Sabah also has the lowest CSC (person) at all three levels of vision. In term of cataract output suggested by Cataract Surgery Coverage (eyes), the proportions in Sabah were also the lowest at all three levels of vision. These findings suggested that in term of action plan, focus is crucially required for Sabah.

Northern has the highest prevalence of unilateral cataract blindness (both corrected vision <3/60 and corrected vision <6/60). It also has the highest estimated cataract blindness backlog among all zones. This could possibly be explained by its high population and high proportion of people 50 years and above and also the ambivalent attitude of not perceiving the necessity to have cataract surgery among people with operable cataract in the Northern Zone.

## Conclusions

- The adjusted prevalence of blindness among people aged 50+ in the country is 1.2%, an estimated **63 268** people.
- The adjusted prevalence of low vision among people aged 50+ in the country is 5.4%, an estimated **350 268** people.
- Untreated cataract is the major cause of avoidable blindness and low vision.
- Estimated number of bilaterally blind people due to cataract:
  - **27 230** (cannot see 3/60)
  - **43 113** (cannot see 6/60)
  - **175 984** (cannot see 6/18)
- Estimated number of blind/ataract eyes:
  - **216 708** (cannot see 3/60)
  - **272 007** (cannot see 6/60)
  - **667 846** (cannot see 6/18)
  - **1 363 732** (cannot see 6/12)

- Cataract surgical coverage is quite high. There is no difference between males and females
- The main barriers why people with bilateral cataract and corrected vision <6/60 have not yet been operated upon are relatively similar between males and females.
- 99.3% of the operated patients received an IOL. The visual outcome is very close to the WHO norm
- Although visual outcome after cataract surgery is close to the WHO norm, poor selection, inadequate optical correction and surgical complications are the major causes of poor outcome.

## Recommendations

1. Increase the Cataract Surgical Rate (CSR) through:
  - i. Intensified state and national health promotion to inform the people of benefits of cataract surgery
  - ii. Intensified outreach activities and case finding
  - iii. Routine visual screening of people 50 years and above particularly in primary care setting
  - iv. Increased efficiency in referral system for cataract surgery
  - v. Application of high output methods;
  - vi. Adoption of a variety of communication strategy to overcome differences in barriers for cataract surgery.

(CSR needs to increase by at least 5-10% per year to compensate for the country's demographic trend)
2. Improve the visual outcome of cataract surgery through:
  - i. Improve biometry and optical services for cataract surgery;
  - ii. Analysis of current practice to determine power of IOLs;
  - iii. Analysis of current surgical practices to reduce surgical complications;
  - iv. Stress importance of detailed pre-operative ophthalmic examinations.
3. Expansion of optic services to reduce prevalence of uncorrected refractive errors.
4. Intensify specialised ophthalmic care for glaucoma and diabetic retinopathy.



National Eye Survey II was simultaneously and successfully conducted in six zones throughout the country. Unlike the previous survey, essential data on eye health were collected, analysed, produced and represented by zones therefore comparison was advantageously possible. This success was contributed by a colossal and coordinated team work by the local contact person, publicity officers, data collectors, assistant zone coordinators, zone coordinators, trainers and the stakeholders within zones throughout the country.

The publication of this report does not indicate the end of a project. Indeed, it is the beginning of a monumental task for all of us. While it is an obligation to use these data and translate them into recommendation for policies, the real challenge remains to bring eye health into the public health agenda and to engage key national partners to use these data in a coordinated public health approach to improve the nation's eye health.

National Eye Survey III using similar methodology will be conducted in 2019. The results can then be compared to NES II to assess the effectiveness of actions plans following this survey.

## Appendix

### Randomly Selected Enumeration Block by Zones

Northern				
Cluster No	Code	Name Of Population Unit	Total population	Total population >50 years old
1	803008008	Perak-Kinta-Sungai Raia	185	41
2	803060058	Perak-Kinta-Ulu Kinta	345	90
3	803013025	Perak-Kinta-Ulu Kinta	189	85
4	803043038	Perak-Kinta-Ulu Kinta	318	55
5	803045043	Perak-Kinta-Ulu Kinta	429	128
6	803044070	Perak-Kinta-Ulu Kinta	504	260
7	801056052	Perak-Batang Padang-Batang Padang	177	50
8	801002003	Perak-Batang Padang-Slim	622	117
9	802003086	Perak-Manjung-Pengkalan Baharu	536	142
10	802059066	Perak-Manjung-Sitiawan	590	32
11	806021017	Perak-Larut Dan Matang-Kamunting	256	49
12	805017072	Perak-Kuala Kangsar-Sungai Siput	361	111
13	805019091	Perak-Kuala Kangsar-Kota Lama Kiri	271	133
14	805034058	Perak-Kuala Kangsar-Kampung Buaya	295	133
15	806066029	Perak-Larut Dan Matang-Asam Kumbang	373	56
16	806022030	Perak-Larut Dan Matang-Ulu Selama	112	41
17	807025100	Perak-Hilir Perak-Telok Baharu	356	71
18	807026100	Perak-Hilir Perak-Durian Sebatang	410	81
19	810005033	Perak-Kampar-Kampar	271	49
20	810005045	Perak-Kampar-Kampar	211	100
21	704031084	Pulau Pinang-Timur Laut-Mukim 13 (Paya Terubong)	396	25
22	702027025	Pulau Pinang-Seberang Perai Utara-Mukim 12	524	117
23	703033048	Pulau Pinang-Seberang Perai Selatan-Mukim 6	72	6
24	702003037	Pulau Pinang-Seberang Perai Utara-Mukim 3	538	116
25	703016069	Pulau Pinang-Seberang Perai Selatan-Mukim 14	347	62
26	705015133	Pulau Pinang-Barat Daya-Mukim 9 (Bkt. Gemuroh)	263	8
27	705037081	Pulau Pinang-Barat Daya-Mukim 12 (Bayan Lepas)	351	140

<b>Northern</b>				
<b>Cluster No</b>	<b>Code</b>	<b>Name Of Population Unit</b>	<b>Total population</b>	<b>Total population &gt;50 years old</b>
28	702004104	Pulau Pinang-Seberang Perai Utara-Mukim 14	383	73
29	702005051	Pulau Pinang-Seberang Perai Utara-Mukim 15	114	33
30	701039082	Pulau Pinang-Seberang Perai Tengah-Mukim 14	185	10
31	704031128	Pulau Pinang-Timur Laut-Mukim 13 (Paya Terubong)	351	34
32	704012076	Pulau Pinang-Timur Laut-Bandaraya Georgetown	206	58
33	701039094	Pulau Pinang-Seberang Perai Tengah-Mukim 14	163	2
34	901001024	Perlis-Perlis-Titi Tinggi	146	12
35	901005005	Perlis-Perlis-Padang Siding	302	10
36	901003001	Perlis-Perlis-Kuala Perlis	260	59
37	203008020	Kedah-Kota Setar-Telok Chengai	350	80
38	203030123	Kedah-Kota Setar-Derga	468	122
39	203040032	Kedah-Kota Setar-Telaga Mas	494	108
40	205025005	Kedah-Kubang Pasu-Jerlun	228	43
41	205013091	Kedah-Kubang Pasu-Ah	333	79
42	201001026	Kedah-Baling-Telui Kanan	463	66
43	202003076	Kedah-B.Baharu-Bgn. Samak	372	62
44	204027052	Kedah-Kuala Muda-Sungai Pasir	538	51
45	204011025	Kedah-Kuala Muda-Semeling	488	35
46	204036062	Kedah-Kuala Muda-Sungai Petani	439	50
47	206046002	Kedah-Kulim-Padang Meha	440	74
48	206026103	Kedah-Kulim-Keladi	571	70
49	206016008	Kedah-Kulim-Kulim	591	116
50	207017028	Kedah-Langkawi-Ulu Melaka	353	64

<b>Eastern</b>				
<b>Cluster No</b>	<b>Code</b>	<b>Name Of Population Unit</b>	<b>Total population</b>	<b>Total population &gt;50 years old</b>
1	309014038	Kelantan-Kuala Krai-Kuala Pergau	453	66
2	305009115	Kelantan-Pasir Puteh-Bukit Merbau	456	93
3	309023001	Kelantan-Kuala Krai-Kuala Nal	339	41
4	308032050	Kelantan-Gua Musang-Bandar Gua Musang	449	34
5	306024060	Kelantan-Tanah Merah-Sokor	394	36
6	308028041	Kelantan-Gua Musang-Relai	287	27
7	305009114	Kelantan-Pasir Puteh-Bukit Tanah	302	68
8	304007060	Kelantan-Pasir Mas-Bandar Pasir Mas	352	70
9	307013148	Kelantan-Tumpat-Pasir Pekan	485	27
10	305009011	Kelantan-Pasir Puteh-Bukit Tanah	473	105
11	306010055	Kelantan-Tanah Merah-Maka	371	77
12	304027004	Kelantan-Pasir Mas-Apa-Apa	642	119
13	308032086	Kelantan-Gua Musang-Renok	516	85
14	307013027	Kelantan-Tumpat-Kok Keli	540	79
15	302021085	Kelantan-Kota Bharu-Kenali	374	79
16	306024033	Kelantan-Tanah Merah-Ulu Kusial	618	121
17	305009066	Kelantan-Pasir Puteh-Kampong Wakaf	380	82
18	302022063	Kelantan-Kota Bharu-Melor	380	74
19	303025097	Kelantan-Machang-Kerilla	494	53
20	608045073	Pahang-Temerloh-Perak	548	63
21	608020047	Pahang-Temerloh-Mentakab	292	60
22	605010026	Pahang-Lipis-Ulu Jelai	234	119
23	607042064	Pahang-Raub-Gali	414	64
24	604039007	Pahang-Kuantan-Kuala Kuantan	259	36
25	609046047	Pahang-Rompin-Keratong	125	2
26	604029004	Pahang-Kuantan-Kuala Kuantan	357	78
27	605011064	Pahang-Lipis-Telang	592	101
28	611018038	Pahang-Bera-Triang	614	161
29	608044028	Pahang-Temerloh-Mentakab	360	129
30	609013046	Pahang-Rompin-Pontian	222	51
31	608020014	Pahang-Temerloh-Mentakab	94	14
32	604009079	Pahang-Kuantan-Sungai Karang	486	91
33	611031037	Pahang-Bera-Bera	433	49
34	610032027	Pahang-Maran-Chenor	409	28
35	605011010	Pahang-Lipis-Kechau	402	81
36	606014016	Pahang-Pekan-Pulau Rusa	332	68
37	607016060	Pahang-Raub-Dong	368	107
38	1105007093	Terengganu-Marang-Alur Limbat	337	58
39	1102020015	Terengganu-Dungun-Sura	474	49
40	1104024017	Terengganu-Kuala Terengganu-Kepung	411	83
41	1104014054	Terengganu-Kuala Terengganu-Paluh	403	72
42	1101001117	Terengganu-Besut-Pasir Akar	500	103
43	1104014023	Terengganu-Kuala Terengganu-Manir	472	73
44	1103004041	Terengganu-Kemaman-Kemasik	345	63
45	1102003015	Terengganu-Dungun-Kuala Dungun	559	105
46	1103004134	Terengganu-Kemaman-Kerteh	322	10
47	1102020077	Terengganu-Dungun-Sura	258	36
48	1105007026	Terengganu-Marang-Alur Limbat	401	40
49	1101001126	Terengganu-Besut-Kuala Besut	317	44
50	1107002018	Terengganu-Setiu-Hulu Setiu	354	56



<b>Central</b>				
<b>Cluster No</b>	<b>Code</b>	<b>Name Of Population Unit</b>	<b>Total population</b>	<b>Total population &gt;50 years old</b>
1	1401026044	W.P.K.L-Kuala Lumpur-Batu	363	2
2	1401025047	W.P.K.L-Kuala Lumpur-Batu	588	76
3	1401022057	W.P.K.L-Kuala Lumpur-Petaling	379	21
4	1401016099	W.P.K.L-Kuala Lumpur-Ulu Kelang	217	6
5	1401013056	W.P.K.L-Kuala Lumpur-Kuala Lumpur	251	36
6	1401018136	W.P.K.L-Kuala Lumpur-Bandar K.L	280	59
7	1401005111	W.P.K.L-Kuala Lumpur-Batu	340	136
8	1401052067	W.P.K.L-Kuala Lumpur-Kuala Lumpur	386	126
9	1401048036	W.P.K.L-Kuala Lumpur-Petaling	191	9
10	1401047045	W.P.K.L-Kuala Lumpur-Petaling	235	4
11	1401048090	W.P.K.L-Kuala Lumpur-Petaling	389	58
12	1401036077	W.P.K.L-Kuala Lumpur-Batu	378	108
13	1401036080	W.P.K.L-Kuala Lumpur-Batu	325	76
14	1401032063	W.P.K.L-Kuala Lumpur-Setapak	381	102
15	1001090074	Selangor-Gombak-Batu	236	17
16	1001090012	Selangor-Gombak-Batu	250	24
17	1001011080	Selangor-Gombak-Rawang	334	17
18	1001167009	Selangor-Gombak-Batu	160	0
19	1001009036	Selangor-Gombak-Batu	288	30
20	1001045058	Selangor-Gombak-Ulu Kelang	530	159
21	1002148007	Selangor-Klang-Bandar Klang	331	33
22	1002058063	Selangor-Klang-Bandar Klang	507	105
23	1002003070	Selangor-Klang-Klang	227	77
24	1002057094	Selangor-Klang-Bandar Klang	587	44
25	1002057003	Selangor-Klang-Bandar Klang	285	53
26	1002086040	Selangor-Klang-Bandar Klang	331	9
27	1002101019	Selangor-Klang-Bandar Klang	386	55
28	1003038024	Selangor-Kuala Langat-Tanjung Dua Belas	304	82
29	1002035001	Selangor-Klang-Kapar	379	61
30	1003005040	Selangor-Kuala Langat-Kelanang	390	65
31	1004025023	Selangor-Kuala Selangor-Kuala Selangor	315	34
32	1005042028	Selangor-Petaling-Damansara	387	107
33	1005066006	Selangor-Petaling-Sungai Buloh	487	41
34	1004106027	Selangor-Kuala Selangor-Jeram	687	152
35	1005077078	Selangor-Petaling-Sungai Buloh	278	28
36	1005077033	Selangor-Petaling-Sungai Buloh	198	28
37	1005081105	Selangor-Petaling-Sungai Buloh	481	125
38	1005084061	Selangor-Petaling-Damansara	476	49
39	1005022019	Selangor-Petaling-Bandar Petaling Jaya	463	143
40	1005059021	Selangor-Petaling-Petaling	356	12
41	1005017008	Selangor-Petaling-Petaling	263	3
42	1005115001	Selangor-Petaling-Sungai Buloh	570	56
43	1005116014	Selangor-Petaling-Petaling	357	21
44	1005114051	Selangor-Petaling-Sungai Buloh	251	12
45	1005110099	Selangor-Petaling-Bukit Raja	510	87
46	1005085107	Selangor-Petaling-Damansara	232	28
47	1005156080	Selangor-Petaling-Petaling	540	60
48	1006026142	Selangor-Sabak Bernam-Sungai Panjang	343	60
49	1007134089	Selangor-Sepang-Dengkil	410	18
50	1008122031	Selangor-Ulu Langat-Cheras	422	50

<b>Southern</b>				
<b>Cluster No</b>	<b>Code</b>	<b>Name Of Population Unit</b>	<b>Total population</b>	<b>Total population &gt;50 years old</b>
1	109083109	Johor-Kulaijaya-Senai	407	65
2	102057076	Johor-Johor Bahru-Tebrau	274	41
3	101031098	Johor-Batu Pahat-Simpang Kiri	263	60
4	102027050	Johor-Johor Bahru-Tebrau	452	92
5	102050052	Johor-Johor Bahru-Pulai	361	22
6	102057037	Johor-Johor Bahru-Tebrau	526	56
7	102078017	Johor-Johor Bahru-Plentong	519	82
8	109052070	Johor-Kulaijaya-Senai	374	14
9	110073118	Johor-Ledang-Kesang	302	50
10	102049038	Johor-Johor Bahru-Pulai	382	75
11	102066087	Johor-Johor Bahru-Plentong	525	39
12	107022033	Johor-Pontian-API-API	217	59
13	101029075	Johor-Batu Pahat-Sungai Kluang	198	41
14	101001038	Johor-Batu Pahat-Sri Medan	373	99
15	102065008	Johor-Johor Bahru-Pulai	467	89
16	102038124	Johor-Johor Bahru-Pulai	585	41
17	103012067	Johor-Kluang-Kluang	326	55
18	103084023	Johor-Kluang-Kluang	357	92
19	102038105	Johor-Johor Bahru-Pulai	349	95
20	102009068	Johor-Johor Bahru-Bandar Johor Bahru	373	138
21	102048003	Johor-Johor Bahru-Plentong	449	62
22	108062044	Johor-Segamat-Buluh Kasap	352	66
23	106018061	Johor-Muar-Jalan Bakri	364	45
24	102027010	Johor-Johor Bahru-Tebrau	548	76
25	101047029	Johor-Batu Pahat-Simpang Kanan	334	45
26	103085038	Johor-Kluang-Kluang	351	37
27	106018002	Johor-Muar-Sg. Raya & Kg. Bukit Pasir	318	74
28	102081045	Johor-Johor Bahru-Pulai	491	36
29	102049005	Johor-Johor Bahru-Pulai	534	62
30	103085034	Johor-Kluang-Kluang	435	37
31	101001032	Johor-Batu Pahat-Sri Medan	600	156
32	102039044	Johor-Johor Bahru-Tebrau	332	14
33	102057096	Johor-Johor Bahru-Tebrau	389	14
34	102087025	Johor-Johor Bahru-Plentong	578	88
35	110073125	Johor-Ledang-Kesang	194	45
36	102080041	Johor-Johor Bahru-Plentong	293	24
37	104086013	Johor-Kota Tinggi-Pengerang	381	161
38	109007043	Johor-Kulaijaya-Sedenak	676	219
39	101031037	Johor-Batu Pahat-Simpang Kiri	437	35
40	110072005	Johor-Ledang-Bukit Serampang	82	8
41	403021126	Melaka-Melaka Tengah-Batu Berendam	771	4
42	403018056	Melaka-Melaka Tengah-Bandar Melaka	227	59
43	403016020	Melaka-Melaka Tengah-Paya Rumput	398	144
44	402015018	Melaka-Jasin-Nyalas	303	129
45	402022076	Melaka-Jasin-Merlimau	348	61
46	403021077	Melaka-Melaka Tengah-Batu Berendam	522	154
47	403017009	Melaka-Melaka Tengah-Bachang	402	77
48	401009017	Melaka-Alor Gajah-Kemuning	310	81
49	402004025	Melaka-Jasin-Jasin	401	62
50	402003044	Melaka-Jasin-Serkam	235	60

<b>Sabah</b>				
<b>Cluster No</b>	<b>Code</b>	<b>Name Of Population Unit</b>	<b>Total population</b>	<b>Total population &gt;50 years old</b>
1	1203035056	Sabah-Semporna	517	42
2	1204067040	Sabah-Sandakan	472	16
3	1203035082	Sabah-Semporna	530	11
4	1201033018	Sabah-Tawau	388	108
5	1201050048	Sabah-Tawau	1,006	26
6	1210017056	Sabah-Tuaran	207	42
7	1201050053	Sabah-Tawau	599	90
8	1201002024	Sabah-Tawau	228	67
9	1201002040	Sabah-Tawau	1,001	110
10	1201002035	Sabah-Tawau	504	70
11	1210017060	Sabah-Tuaran	498	80
12	1201031064	Sabah-Tawau	494	49
13	1224048034	Sabah-Tongod	307	15
14	1216023022	Sabah-Beaufort	479	85
15	1201001032	Sabah-Tawau	671	148
16	1204008028	Sabah-Sandakan	251	41
17	1204052034	Sabah-Sandakan	509	38
18	1204037001	Sabah-Sandakan	382	44
19	1204007010	Sabah-Sandakan	317	46
20	1204007050	Sabah-Sandakan	335	66
21	1223030023	Sabah-Kunak	542	56
22	1225060018	Sabah-Putatan	647	59
23	1208059044	Sabah-Ranau	508	70
24	1220027047	Sabah-Nabawan	307	24
25	1212074018	Sabah-Papar	665	89
26	1212061027	Sabah-Papar	501	74
27	1212019069	Sabah-Papar	1,009	70
28	1202004057	Sabah-Lahad Datu	773	80
29	1212074017	Sabah-Papar	376	75
30	1202066026	Sabah-Lahad Datu	504	59
31	1212061017	Sabah-Papar	438	36
32	1217024035	Sabah-Kuala Penyu	81	12
33	1213062006	Sabah-Kudat	239	30
34	1214063067	Sabah-Kota Marudu	526	72
35	1223030060	Sabah-Kunak	568	57
36	1207013042	Sabah-Kota Kinabalu	456	37
37	1207070001	Sabah-Kota Kinabalu	649	102
38	1206011030	Sabah-Beluran	838	87
39	1207013033	Sabah-Kota Kinabalu	554	46
40	1214063049	Sabah-Kota Marudu	419	31
41	1209016007	Sabah-Kota Belud	712	111
42	1221047031	Sabah-Keningau	685	67
43	1209042015	Sabah-Kota Belud	259	23
44	1209042044	Sabah-Kota Belud	516	83
45	1205010002	Sabah-Kinabatangan	997	25
46	1205038004	Sabah-Kinabatangan	365	5
47	1205054052	Sabah-Kinabatangan	422	58
48	1221028078	Sabah-Keningau	641	56
49	1221046072	Sabah-Keningau	516	41
50	1221075064	Sabah-Keningau	555	40



<b>Sarawak</b>				
<b>Cluster No</b>	<b>Code</b>	<b>Name Of Population Unit</b>	<b>Total population</b>	<b>Total population &gt;50 years old</b>
1	1304012017	Sarawak-Samarahan-Samar	494	109
2	1308024047	Sarawak-Lubok Antu-Engki	427	121
3	1303010028	Sarawak-Lundu-Lundu	358	50
4	1315078004	Sarawak-Sibu-Sibu	408	3
5	1329013011	Sarawak-Asajaya-Asaja	514	95
6	1307019082	Sarawak-Sri Aman-Sri A	80	5
7	1307019085	Sarawak-Sri Aman-Sri A	152	6
8	1315040019	Sarawak-Sibu-Sibu	452	96
9	1315042083	Sarawak-Sibu-Sibu	176	41
10	1315041028	Sarawak-Sibu-Sibu	245	100
11	1305014022	Sarawak-Serian-Seria	282	55
12	1315076137	Sarawak-Sibu-Sibu	575	48
13	1305014007	Sarawak-Serian-Seria	420	75
14	1311033079	Sarawak-Sarikei-Sarik	353	69
15	1311033052	Sarawak-Sarikei-Sarik	334	67
16	1319079065	Sarawak-Bintulu-Bintu	413	37
17	1310031013	Sarawak-Saratok-Roban	135	22
18	1317045084	Sarawak-Mukah-Mukah	279	76
19	1310030017	Sarawak-Saratok-Kabon	513	105
20	1324081066	Sarawak-Miri-Miri	524	38
21	1324057038	Sarawak-Miri-Miri	524	90
22	1324057083	Sarawak-Miri-Miri	296	48
23	1326063033	Sarawak-Limbang-Limba	540	68
24	1325062097	Sarawak-Marudi-Long	471	176
25	1325062048	Sarawak-Marudi-Long	467	26
26	1312035008	Sarawak-Maradong-Maradong	626	98
27	1308024044	Sarawak-Lubok Antu-Engki	371	82
28	1326063009	Sarawak-Limbang-Limba	493	66
29	1318047018	Sarawak-Kanowit-Kanow	202	9
30	1321051085	Sarawak-Kapit-Kapit	180	64
31	1313036014	Sarawak-Daro-Daro	246	45
32	1319079073	Sarawak-Bintulu-Bintu	28	2
33	1319080025	Sarawak-Bintulu-Bintu	392	13
34	1301071081	Sarawak-Kuching-Kuchi	595	43
35	1323054029	Sarawak-Belaga-Belag	234	54
36	1323082010	Sarawak-Belaga-Sunga	432	68
37	1309026008	Sarawak-Betong-Pusa	461	58
38	1301001071	Sarawak-Kuching-Kuchi	7	2
39	1301002066	Sarawak-Kuching-Kuchi	739	78
40	1301071018	Sarawak-Kuching-Kuchi	659	70
41	1301071051	Sarawak-Kuching-Kuchi	535	104
42	1301073136	Sarawak-Kuching-Kuchi	260	87
43	1301070041	Sarawak-Kuching-Kuchi	245	62
44	1301004029	Sarawak-Kuching-Kuchi	656	54
45	1301005110	Sarawak-Kuching-Kuchi	470	123
46	1301073007	Sarawak-Kuching-Kuchi	499	68
47	1301084052	Sarawak-Kuching-Kuchi	309	16
48	1301007093	Sarawak-Kuching-Kuchi	340	59
49	1322053010	Sarawak-Song-Song	511	118
50	1315042085	Sarawak-Sibu-Sibu	255	19





Consent Form



**BANCI MATA KEBANGSAAN 2014**

Saya ..... K/P No .....

dengan ini memberi kebenaran kepada kakitangan Kementerian Kesihatan Malaysia menjalankan temuramah dan pemeriksaan mata saya untuk tujuan di atas.

Tandatangan:

Tarikh:

**NATIONAL EYE SURVEY 2014**

I ..... NIC .....

herewith give consent to the staff of the Ministry of Health to conduct interview and examine my eyes for the above purpose.

Signature:

Date:

# Referral Form




## BANCI MATA KEBANGSAAN 2014 SURAT RUJUKAN

Kepada:	<input type="checkbox"/>	Segera
Jabatan:	<input type="checkbox"/>	Tidak segera mengikut ketetapan
Nama pesakit :		
No. K/P:	Umur:	Jantina:
<i>History:</i>		
<i>Findings:</i>		
<i>Diagnosis:</i>		
<i>Results of Investigation/Treatment:</i>		
<i>Purpose of referral :</i>		
Daripada		
Nama:	Tandatangan:	
Kumpulan/Zon:		
Tarikh:		

Publicity

Official Logo



**NESII**  
**NATIONAL**  
**EYE SURVEY 2014**

The logo features a stylized eye in shades of blue and dark blue, positioned to the right of the text. The eye has a white pupil and a dark blue iris, with a blue eyelid and a dark blue eyebrow.

**NESII**  
**BANCIAAN MATA**  
**KEBANGSAAN 2014**

The logo features a stylized eye in shades of blue and dark blue, positioned to the right of the text. The eye has a white pupil and a dark blue iris, with a blue eyelid and a dark blue eyebrow.



Banner

**BANCI MATA KEBANGSAAN**

**NESII BANCAN MATA KEBANGSAAN 2014**

Pemeriksaan mata ke atas rakyat Malaysia umur 50 tahun ke atas oleh pegawai profesional akan dijalankan di rumah yang terpilih di kawasan anda.

**Tarikh: September - Disember 2014**

Anjuran :  
Perkhidmatan Oftalmologi KKM dengan kerjasama Institut Kesihatan Umum dan Pusat Penyelidikan Klinikal Kebangsaan

Flyer

<p><b>BANCI MATA KEBANGSAAN</b></p> <p><b>September-Disember 2014</b></p> <p><b>NESII BANCAN MATA KEBANGSAAN 2014</b></p> <p>Kementerian Kesihatan Malaysia akan menjalankan banci mata di seluruh negara bermula September ini. Banci ini bertujuan untuk mendapatkan gambaran mengenai tahap kesihatan mata penduduk di Malaysia. Hasil banci ini akan digunakan untuk perancangan sistem kesihatan mata di negara kita.</p> <ul style="list-style-type: none"> <li>• Kawasan bancian dan rumah yang terlibat akan dipilih secara rawak</li> <li>• Kunjungan dari rumah ke rumah yang terpilih akan dijalankan oleh doktor dan juruswat mata.</li> <li>• Temuramah dan pemeriksaan mata akan dijalankan untuk penduduk berumur 50 tahun dan ke atas.</li> </ul> <p>Sila beri kerjasama. Kami menghargai masa dan kerjasama dari anda.</p> <p><b>National Eye Survey 2014</b></p> <p>Druselia National Eye Survey 2014 Tel: +603 40443060 atau +603 40443070 Fax: +603 40443090 Email: <a href="mailto:nationaleyeyesurvey2014@gmail.com">nationaleyeyesurvey2014@gmail.com</a> Website: <a href="http://www.crc.gov.my/nec2/">http://www.crc.gov.my/nec2/</a></p> <p></p>	<p><b>马来西亚国家眼科调查</b></p> <p><b>September-Disember 2014</b></p> <p><b>NESII BANCAN MATA KEBANGSAAN 2014</b></p> <p>大马国家卫生局(眼科)部门将会在2014年9月进行全国性的国家眼科调查。目的在于评估我国人口的眼睛健康水平。调查结果将有助于国家眼睛保健系统的周详策划。</p> <ul style="list-style-type: none"> <li>• 涉及的地区及门户是经过随机的程序挑选。</li> <li>• 眼科部门的医生、护士或眼科工作人员将逐一上门采访这些受挑选的门户。</li> <li>• 门户里所有年龄五十岁以上的市民将接受简短的采访及眼睛检查。</li> </ul> <p>敬请公众人士给予充分合作。 感谢您的时间和合作</p> <p><b>National Eye Survey 2014</b></p> <p>Druselia National Eye Survey 2014 Tel: +603 40443060 atau +603 40443070 Fax: +603 40443090 Email: <a href="mailto:nationaleyeyesurvey2014@gmail.com">nationaleyeyesurvey2014@gmail.com</a> Website: <a href="http://www.crc.gov.my/nec2/">http://www.crc.gov.my/nec2/</a></p> <p></p>
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Volume 2, Issue 2

August 2014

# NED NEWSLETTER

## - special issue on NES II

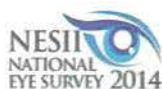
MOHS/CRC/30.13(NS)

National Eye Survey II: September—December 2014



### Special points of interest:

- NES II data collection is done from end of September 2014 to end of December 2014
- NES II is conducted separately by different zones but simultaneously throughout the country
- NES II involves subjects 50 years and above only
- NES II aims to estimate prevalence of blindness/low vision, assess cataract surgical coverage and identify barriers to service



### About National Eye Survey II

National Eye Survey II (NES II) is a population based eye survey conducted by the Ophthalmology Service in collaboration with the Institute of Public Health (IKU) and Center of Clinical Research (CRC), Ministry of Health Malaysia. The objective of this survey is to estimate the prevalence of blindness and low vision in Malaysia. It also aims to assess the coverage and identify barriers to access of cataract surgical service in the country.

This survey is part of our country's commit-

ment towards the WHO Global Action Plan for the Prevention of Avoidable Blindness and Visual Impairment 2014-2019 (<http://www.who.int/blindness/actionplan/en/>). It will be done separately in different zones but simultaneous throughout the country.

Information from this survey will be used as country's baseline eye health data. Findings can be compared with data from other countries in the region and countries in other parts of the world as data are collected and analysed

using standard protocol. In future, this survey can be replicated and be used to evaluate the effectiveness of Prevention of Blindness programmes and monitor any ongoing blindness intervention programme.

Survey will be conducted through door-to-door interview in randomly selected locations within each zone from end of September to end of December 2014. Brief interview followed by simple eye examination will be done on eligible individuals.

### Inside this issue:

About NES II	1
Purpose of NES	1
NES II Method	2
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### Previous NES

The last eye population survey was conducted in 1996. It was a conventional population survey using stratified two stage cluster sampling method involving individuals of all age group. This survey was based on the National Health and Morbidity

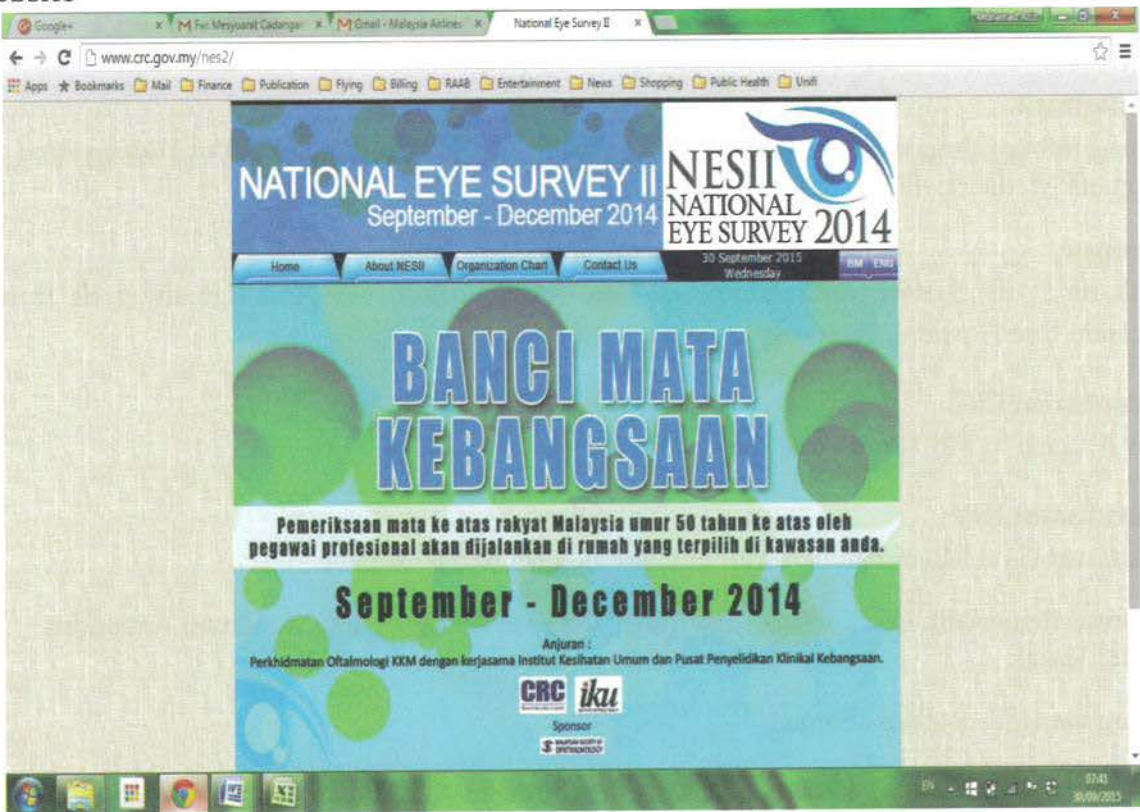
Survey platform where interviews and examination were done by randomised Living Quarters (LQ).

The main findings were Prevalence of bilateral blindness was 0.29%, prevalence of low vision was 2.44%, the main cause of blindness

was cataract (39.1%) and the main cause for low vision was refractive error (48.3%).

These results were country representative but not zone representative therefore could not be used for regional planning.

## Website



## **Thank you**

### **Consultant**

Hans Limburg, International Center of Eye Health, ICEH, London School of Hygiene and Tropical Medicine, UK

### **Trainer**

Mohamad Aziz Salowi with contribution from Aldiana Halim and Nina Ratnaningsih from Cicendo Eye Hospital, Bandung

### **Secretariat CRC**

Nor Azlinda bt Md Nordin and Aminah bt Salleh

### **Secretariat IKU**

Jururawat U41: Muslimah bt Yusof and Noraida Mohamad Kasim

Pegawai Penyelidik Q41: \_Chan Ying Ying, Norhafizah Sahril and Mohamad Aznuddin Abdul Razak

Jururawat U32: Rahama Samad

Pembantu Tadbir N17: Marsita bt Yahaya, Nor Intan bt Abd Rasid, Norlaili binti Salamon, Fekerri bin Shamsudin, Hisyamsul Akmar bin Ali

Pegawai Penyelidik Sambilan Q41:Haszreen bin Shariff, Afiq bin Awang

Penolong Pegawai Penyelidik Sambilan Q27: Mohd Firdaus bin Daud



## Coordinators and Assistant Zone Coordinators

Name	Hospital	Duty
<b>NORTHERN ZONE</b>		
Zaharidah Abdul Kadir	Hospital Sultan Abdul Halim	Coordinator
Rohana Taharin	Hospital Bukit Mertajam	Assistant Coordinator 1
Mimi Marina Mior Ibrahim	Hospital Telok Intan	Assistant Coordinator 2
<b>EASTERN ZONE</b>		
Nor Anita binti Che Omar	Hospital Sultanah Nur Zahirah	Coordinator
Azma Azalina Ahmad Alwi	Hospital Raja Perempuan Zainab II	Assistant Coordinator 1
Wan Norliza Wan Muda	Hospital Tengku Ampuan Afzan	Assistant Coordinator 2
<b>CENTRAL ZONE</b>		
Salmah Othman	Hospital Putrajaya	Coordinator
Siti Aishah Sahar	Hospital Tengku Ampuan Rahimah	Assistant Coordinator
<b>SOUTHERN ZONE</b>		
Juliana Bt Jalaluddin	Hospital Pakar Sultanah Fatimah	Coordinator
Francesca Martina Vendargon	Hospital Sultanah Nora Ismail	Assistant Coordinator
<b>SABAH</b>		
Anis Farhad Bin Murshid	Hospital Queen Elizabeth	Coordinator
<b>SARAWAK</b>		
Chieng Lee Ling	Hospital Miri	Coordinator

## Data Collectors

<b>NORTHERN ZONE</b>	
<b>Name</b>	<b>Hospital</b>
Muhammad Ruzaini B Abd Hamid	Hospital Tunku Fauziah
Hasyimah Hamdan	Hospital Tunku Fauziah
Maisarah bt Ishhiak	Hospital Tunku Fauziah
Tan Jin Hoe	Hospital Sultanah Bahiyah
Khairil Ridzwan B. Kamalul Khusus	Hospital Sultan Abdul Halim
Kalatheran A/L Saishoo	Hospital Sultan Abdul Halim
Mohd Fadzli bin Mohd Yussof	Hospital Sultan Abdul Halim
Uthayarany a/p Murty	Hospital Kulim
Mohd Firdaus b Mokhtar	Hospital Kulim
Thilakavatty a/p Tharmalingam	Hospital Ipoh
Rathika a/p Murugiah	Hospital Ipoh
Alison Lau Hui Yin	Hospital Sri Manjung
Iu Kwang Kwok	Hospital Teluk Intan
Sruban a/l Suparmaniam	Hospital Teluk Intan
Wan Ahmad Hisham	Hospital Teluk Intan
<b>EASTERN ZONE</b>	
Thamarainathaselvi a/p Loganathan	Hospital Sultan Ahmad Shah
Aisyah Mahfuzah binti Hassan	Hospital Sultan Ahmad Shah
Azhan bin Azman	Hospital Tengku Ampuan Afzan
Muhamad Amin bin Ramli	Hospital Tengku Ampuan Afzan
Muhammad Fadhli bin Abd Hamid	Hospital Tengku Ampuan Afzan
Nor Aidah binti Ismail	Hospital Tengku Ampuan Afzan
Mohd Hazwani Firdaus bin Kamaruddin	Hospital Sultanah Nur Zahirah
Muhammad Aizuddin bin Ahmad	Hospital Sultanah Nur Zahirah
Zuwati binti Mat Ali	Hospital Sultanah Nur Zahirah
Nor Hasnida binti AB Gani	Hospital Raja Perempuan Zainab II
Nazrina binti Hassan	Hospital Raja Perempuan Zainab II
Irwan Razani bin Mohd Asri	Hospital Raja Perempuan Zainab II
Nur Asiah binti Jasney	Hospital Raja Perempuan Zainab II
Nurul Zulaikha binti Wahab	Hospital Raja Perempuan Zainab II
Wan Yusoff bin Wan Ismail@Wan Yahya	Hospital Raja Perempuan Zainab II

<b>CENTRAL ZONE</b>	
Andrea Lillianne Barr	Hospital Ampang
Minaksisundram A/L Muthappan	Hospital Sg. Buloh
Ahmad Zurrahim Mohd Karim	Hospital Sg. Buloh
Mohamad Shamsudin Bahtiar	Hospital Kuala Lumpur
Kenneth Teow Kheng Leong	Hospital Kuala Lumpur
Muhammad Syafiq Mat Rais	Hospital Kuala Lumpur
Nur Athirah bt Imran	Hospital Selayang
Gurpreet Singh a/l Jageer Singh	Hospital Selayang
Rohana Saho Hamid	Hospital Selayang
Joanne Shalini A/P Chewa Raja	Hospital Tengku Ampuan Rahimah
Zairizan Bin Alias	Hospital Tengku Ampuan Rahimah
Tanusha a/p Dorairaja	Hospital Selayang
Goh Ee Pian	Hospital Tengku Ampuan Rahimah
Effendy Hashim	Hospital Putrajaya
Nadziad Bin Nor Majid	Hospital Tuanku Jaafar
<b>SOUTHERN ZONE</b>	
Tan Shao Sze	Hospital Melaka
Lee Hong Nien	Hospital Melaka
Ilham Bin Basiran	Hospital Melaka
Mohd. Jamal Bin Ahmad	Hospital Pakar Sultanah Fatimah
Mohamed Fuad Bin Haidzir	Hospital Pakar Sultanah Fatimah
Ungku Noor Aqilla Bt Ungku Hassan	Hospital Segamat
Nor Zilawati Bt. Abu Sari	Hospital Sultanah Nora Ismail
Mohd Norifasyah B Mad Supandi	Hospital Sultanah Nora Ismail
Ridzuan Bin Md. Ali	Hospital Sultanah Nora Ismail
Anjah Anifah Bt. Ahmad	Hospital Sultanah Aminah
Siti Nurhuda Bt. Sharudin	Hospital Sultanah Aminah
Earif Abdillah Bin Abd. Razak	Hospital Sultanah Aminah
Saraswathy A/P Ramasamy	Hospital Sultan Ismail
She Poh Fong	Hospital Sultan Ismail
Ahmad Rohaizi Bin Ghazali	Hospital Sultan Ismail

<b>SABAH</b>	
Lindfay Laura Lau	Hospital Queen Elizabeth
Toksin Toki	Hospital Queen Elizabeth
Mohd Akmal Hafiz Bin Mohamad Ariff	Hospital Queen Elizabeth
Edmund Shin Chin Vui	Hospital Queen Elizabeth
Ali Hassan Bin Andamit	Hospital Keningau
Thercy Langiton	Hospital Keningau
Matthew Tong	Hospital Queen Elizabeth
Sylves Bin Patrick	Hospital Queen Elizabeth
Cyrinus Linus	Hospital Kota Marudu
Majuntin Bin Mondog	Hospital Kudat
Lim Zi Di	Hospital Sandakan
Linjabat Mandasah	Hospital Sandakan
<u>Nipah@Hanipah Tamah</u>	Hospital Sandakan
Tan Mei Tshe	Hospital Tawau
Norhidayah Bt. Mohammad Zulkifli Hashim	Hospital Tawau
Hasmah Bt Mahmud	Hospital Tawau
<b>SARAWAK</b>	
Lu Sing Hui	Hospital Umum Sarawak
Nur Aimi Bt Jaddil	Hospital Umum Sarawak
Fabian Ak Igmong	Hospital Umum Sarawak
Wendy See Yen Nee	Hospital Umum Sarawak
Michael Chan Jian Jiun	Hospital Umum Sarawak
Abg. Mohammad Salimin B Abg. Suhaili	Hospital Umum Sarawak
Chua Lausanne	Hospital Umum Sarawak
Michael Ngu Dau Bing	Hospital Umum Sarawak
Victor Valentine ak Harry	Hospital Umum Sarawak
Suraya Bt Hashim	Hospital Sibu
Yong Geng Yi	Hospital Sibu
Awaluddin B. Abdul Rahman	Hospital Sibu
Tiong Lik Wei	Hospital Miri
Irene Cho	Hospital Miri
Haizan Farah bt Hamzah	Hospital Miri





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