



The 5th *Report of the National* *Eye Database* **2011**

Included reports on

Cataract surgery registry 2002, 2003, 2004, 2007, 2008, 2009 2010
and 2011

Ophthalmology service census 2002 to 2012

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The 5th Report of the National Eye Database 2011

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Disclaimer

There is a potential that data published for previous years in current reports may differ from annual reports published earlier. This is because analysis is based on latest dataset in NED database which may have been updated by source data producers.

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Thank you.

NED Steering Committee Members
April 2013

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ABOUT NATIONAL EYE DATABASE

Introduction

The National Eye Database (NED) is an eye health information system supported by MOH. It is a clinical database consisting of six patient registries and a monthly ophthalmology service census. The patient registries are Cataract Surgery Registry, Diabetic Eye Registry, Contact Lens-Related Corneal Ulcer Surveillance, Glaucoma Registry, Retinoblastoma Registry, and Age Related Macular Degeneration Registry. The source data producers are eye care providers, currently from the public. Information collected, both clinical and epidemiological, are very useful in assisting the MOH, Non-Governmental Organizations, private healthcare providers and industry in the planning, evaluation and continuous improvement of eye care services, leading to prevention and control of blindness in the nation.

Vision

An accessible eye health information.

General Objectives of the National Eye Databases

1. To establish and maintain a web based eye health information system on natural history of visual threatening eye diseases, which are of public health importance. The information is useful in the planning and evaluation of eye care service.
2. To determine the effectiveness of treatment, both clinical outcomes and cost, and to identify factors influencing outcomes. This serves the needs of outcome assessment.
3. To provide information necessary to evaluate ophthalmology services through census and key performance indicators, as well as on safety or harm of products and services used in the treatment of a disease. This contributes to continuous quality initiative.
4. To evaluate the accessibility and equity in health care provision. This information enhances accountability.
5. To provide a mean of prompt and wide dissemination of epidemiological and clinical information through web such as real time registries reports and notification of epidemic of contact lens-related corneal ulcer. This is essential for public health advocacy.
6. To stimulate and facilitate research on eye diseases.

Cataract Surgery Registry

The Cataract Surgery Registry (CSR) was initiated in 2002 and collects data pertaining to patients who have had cataract surgery. Data collected include demography, medical history, operative events, post-operative visual outcomes and probable causes for poor outcome. Since 2008, data on posterior capsular rupture, visual outcome and post-operative endophthalmitis were linked to online key performance indicator for monitoring centre performance while data on incidence of posterior capsular rupture and patients with poor visual outcome are linked to online cumulative sum (CUSUM) to monitor competency of individual surgeon. Annual reports for the year 2002, 2003, 2004 and 2007 are available at www.acrm.org.my/ned, under the section of publication.

Specific Objectives

1. To determine the frequency, distribution and practice pattern of cataract surgery in Malaysia.
2. To determine the outcomes and factors influencing outcomes of cataract surgery.
To evaluate cataract surgery services based on rate of posterior capsular rupture, post-operative infection, post-operative visual outcome and induced astigmatism.
3. To stimulate and facilitate research on cataract and its management.

Retinoblastoma Registry

Retinoblastoma registry collects data on the pattern of clinical presentation, mode of treatment and outcome of patients with retinoblastoma seen at ophthalmology clinics with paediatric ophthalmology service. The main SDP is Hospital Kuala Lumpur.

Specific Objectives

1. To determine the incidence and distribution of retinoblastoma in different states in Malaysia.
2. To determine the ethnic-specific prevalence of retinoblastoma in Malaysia.
To study characteristics of RB patients in terms of clinical presentation and stage of disease based on International Intraocular Retinoblastoma Classification.
3. To evaluate types of treatments and monitor treatment trends.
4. To evaluate treatment outcomes including complications related to treatment.

Age Related Macular Degeneration Registry

Age Related Macular Degeneration (AMD) registry collects data on demographics, risk factors, clinical features and methods of treatment used in newly diagnosed patients with AMD. Hospital Selayang is the only SDP in 2008.

Specific Objectives

1. To determine patients' characteristics, risk factors and clinical presentation of AMD.
2. To study types of AMD based on clinical and investigative examinations.
3. To evaluate quality of life among AMD patients.
4. To evaluate types of treatments given to patients.

Monthly Ophthalmology Service Census

Since 2002, Ophthalmology Service of MOH has been collecting annual census from all the hospitals with ophthalmology departments. Data include essential service census and key performance indicators for ophthalmology service. There are 13 sections in the census return, namely out-patients, inpatients, major eye operations, cataract service, diabetic service, glaucoma service, and optometry service, and subspecialty services which include vitreoretinal, corneal, paediatric ophthalmology, oculoplasty, medical retinal, and a public health ophthalmology, and data on training records and prevention of blindness activities. Data are entered monthly by staff at sites via on-line data entry. Heads of ophthalmology department can view their own and other hospitals' real-time reports.

Specific Objectives

1. To evaluate service output in all ophthalmology departments.
2. To study trends in service output and service patterns.
3. To get baseline and norm from services provided by MOH ophthalmology departments.
4. To determine norm and set standards for performance indicators for centres which differ in strength of physical and human resources.

CUSUM-Ophthalmology

Cataract surgery is the most common procedure done in ophthalmology departments. The procedure is quite consistent and outcome is measured by visual acuity. Cataract surgery outcome depends greatly on surgeons' skill. With advancement in technology and intraocular lens implantation, good visual outcome is almost certain among patients without pre-existing ocular co-morbidity. Hence, monitoring and evaluating surgeons' competency, especially trainees' performance, are essential in ensuring standard of care.

Cumulative Sum (CUSUM) software auto-mine data on occurrence of posterior capsular rupture and patients with post-operative vision worse than 6/12 from cataract surgery registry on surgery done by individual surgeon using unique surgeon ID. From 2008, by using individual unique username and password, surgeon can access his/her own CUSUM charts via eCUSUM web page. Consultant ophthalmologists can view their own as well as their trainees' charts. By doing so, monitoring on surgeons' competency in cataract surgery is made most effectively and easily.

Key Performance Indicator

The Ministry of Health (MOH) launched the implementation of Key Performance Indicators (KPIs) in February 2008 with the aim to assess the overall performance of services provided by Clinical Departments in MOH. The MOH Ophthalmology Service has identified eight KPIs which measure clinical performance of core ophthalmology service such as out-patient service, cataract surgery and diabetic eye screening.

From 2008 to 2011, there were 7 KPIs being measured in MOH Ophthalmology Service. However, the Quality Unit of MOH revised these KPIs in January 2012 and has 3 KPIs and 4 performance indicators (PIs). Rate of infectious endophthalmitis following cataract surgery and Percentage of patients with post-operative visual acuity of 6/12 or better within 3 months are both PIs and National Indicator Approach (NIA). Rate of Posterior Capsular Rupture during Cataract Surgery has been removed both from KPI and NIA lists.

MEASUREMENT			INDICATOR	STANDARD
PI 1			Percentage of patients with waiting time of ≤ 90 minutes to see the doctor at specialist clinic	$\geq 80\%$ of the patients are seen within ninety (90) minutes
PI 2	KPI 1		Percentage of diabetic patients who were given an appointment for first consultation within 6 weeks	$\geq 80\%$ of the patients are given an appointment for First Consultation within 6 weeks
PI 3			Percentage of patients with waiting time of within 16 weeks for cataract surgery	$\geq 80\%$ of patients have appointment given for cataract surgery within 16 weeks
PI 4	KPI 2	N/A	Rate of infectious endophthalmitis following cataract surgery (2 cases per 1000 operations)	$< 0.2\%$ (2 cases per 1000 operations)
PI 5	KPI 3	N/A	Percentage of patients with post-operative visual acuity of 6/12 or better within 3 months following cataract surgery in patients without ocular co-morbidity (850 cases 1000 operations)	$> 85\%$ (900 cases per 1000 operations)
PI 6			Cancellation rate of patients listed for cataract surgery under local Anaesthesia	$\leq 10\%$ cancellation
PI 7			Number of mortality/morbidity audits/meetings conducted in the Department (in 6 months)	At least 6 times in 6 months

Note:

PI = Performance Indicator

KPI = Key Performance Indicator

NIA = National Indicator Approach

The NED website also has interactive online registry charting that allows public users to review data captured in cataract surgery registry and adverse incident reporting to notify defect in intraocular lens (IOL) noted during or after cataract surgery by public and private eye care providers, an initiative to promote patient safety.

The new feature for NED launched in 2012 is an e-notification of patients with suspected post-operative infectious endophthalmitis

Methods of the National Eye Database

The National Eye Database is designed as a cohort study. It is an online clinical database hosted at the Association of Clinical Registry Malaysia website at www.acrm.org.my/ned. Its protocol was approved by the Medical Research Ethical Committee of MOH on 2nd September 2008 (reference number NMRR 08-552-1707) and is accessible at the NED website.

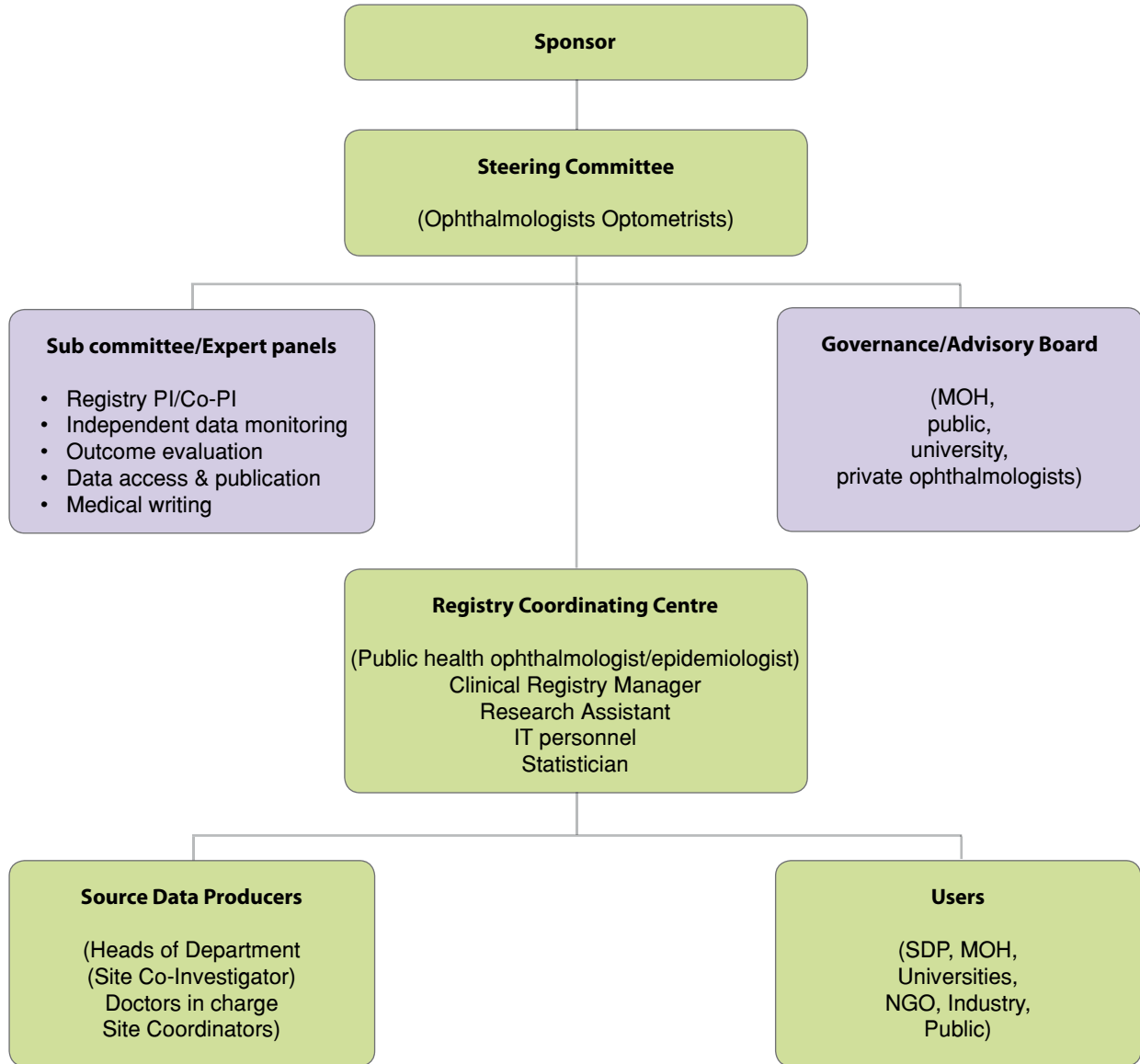
Data collection and data entry are done at SDP sites. Data are collected either using case report forms (CRF) which are later entered into the web application, or are directly entered into the web application during the course of clinical work.

Data management using data query are set in the web application to reduce inconsistency, out-of-range or missing values. Authorised staff at each SDP is given passwords to perform data entry. Individual SDP reports and aggregated reports based on cumulative data of all SDPs are available real-time at NED website. These reports are only accessible by heads of department, doctors-in-charge and site coordinators via authorised password. The web reports are descriptive analysis of data which have been entered. Annual statistical report will be produced based on data collected for a specific year. The statistical reports will be published yearly and distributed to users in MOH divisions and units, all the ophthalmology departments, universities, other relevant public agencies and non-governmental organisations.

The NED has high level of security for protection of its data. Data protection is ensured at all times through strict compliance with regulatory requirements such as authentications of users and web application owners, access control, encryption, audit trail, control of external communication links and access, as well as system backup and disaster recovery.

NED ORGANIZATION

Organisation Chart



NED SOURCE DATA PROVIDERS

List of doctors in charge & site coordinator for 2010

Northern Zone			
No.	SDP	Doctor-in-charge	Site Coordinator
1.	Hospital Kangar	Dr Noram Azian bin Ramli	Roslinda bt Rahman
2.	Hospital Sultanah Bahiyah	Dr Lee Annie	Nur Diana Mohd Zani
3.	Hospital Sungai Petani	Dr Nor'aini Ramlee	Juliana Md Desa
4.	Hospital Pulau Pinang	Dr Ang Ee Ling	Noor Asmah Md Azmi
5.	Hospital Bukit Mertajam	Dr Ng Seok Hui	Marhaini Othman
6.	Hospital Ipoh	Dr Ummy Kalsom	Noraini Harith
7.	Hospital Taiping	Dr Ng Sok Lin	Rohaiza bt Abdul Hamid
8.	Hospital Teluk Intan	Dr Mimi Marina	Adawiyah Ismail
9.	Hospital Sri Manjung	Dr Yushaniza Yaacob	Juhaida bt Zahri
Central Zone			
No.	SDP	Doctor-in-charge	Site Coordinator
10.	Hospital Kuala Lumpur	Dr Rohanah Alias	Intan Khusiah Abd Rahman
11.	Hospital Putrajaya	Dr Salmah Othman	Lily Muhanifa Mustafa
12.	Hospital Selayang	Dr Shelina Oli Mohamed	Nurul Aini Yusoff
13.	Hospital Tengku Ampuan Rahimah	Dr Fiona Chew Lee Min	Najihah Muhammad Sharif
14.	Hospital Serdang	Dr Zaida Mohd Kasim	Yusrina Mohamat Hata
15.	Hospital Sungai Buloh	Dr. Chan U-Teng	Majidah Zainal Abidin
16.	Hospital Ampang	Dr Zalifa Zakiah bt Asnir	Noriah binti Abdullah
Southern Zone			
No	SDP	Doctor in charge	Site Coordinator
17.	Hospital Tuanku Jaafar	Dr Norlelawati Abu	Normalisa Muhammad Som
18.	Hospital Tuanku Ampuan Najihah Kuala Pilah	Dr Khairul Husnaini binti Mohd Khalid	Nazura Selamat
19.	Hospital Melaka	Dr Juliana Jalaluddin	Eryanti Md Omar
20.	Hospital Sultanah Aminah	Dr Kevin Ong	Nurazilah Ismail
21.	Hospital Pakar Sultanah Fatimah	Dr Ngim You Siang	Roziana Sumardi
22.	Hospital Batu Pahat	Dr. Liu Han Seng	Nur Adilah Abdullah
23.	Hospital Sultan Ismail	Dr Hooi Siew Tong	Nursalinah bt Adam
24.	Hospital Tengku Ampuan Afzan	Dr. Mohamad Aziz Husni	Noor Azhari bin Ahmad

Southern Zone

No	SDP	Doctor in charge	Site Coordinator
25.	Hospital Temerloh	Dr Fatimah Suhaila Sukaimi	Nor Hanim Ahmad Adnan
26.	Hospital Kuala Terengganu	Dr Nor Anita Che Omar	Noor Hayati Mohammad
27.	Hospital Kota Bharu	Dr Azma Azalina Ahmad Alwi	Rossaidah bt Mustapa
28.	Hospital Kuala Krai	Dr. Hj Abdul Mutalib Othman	Farawahida Fakaruddin

East Malaysia Zone –Sarawak

No	SDP	Doctor-in-charge	Site Coordinator
29.	Hospital Umum Sarawak	Dr Mohamad Aziz Salowi	Nazirin bin Arshad
30.	Hospital Sibu	Dr Jakayah Daud	Mohammad Ridzwan Bihem
31.	Hospital Bintulu	Dr KM Reddy	Mohd Zharif Mohd Nor
32.	Hospital Miri	Dr Chieng Lee Ling	Nur Hafizah Mat Jalil

East Malaysia Zone –Sabah

No	SDP	Doctor-in-charge	Site Coordinator
33.	Hospital Queen Elizabeth	Dr Chin Kelvin	Iramayanah Ambo Mase
34.	Hospital Duchess Of Kent	Dr Suriana Suaibun	Norhafizah Abd Razik
35.	Hospital Tawau	Dr Ajit Majumder	Arni Rehny Ahmad Rakhli
36.	Hospital Keningau	Dr Christina Lee Lai Ling	Hr Shredznear

PREFACE

The 4th report of National Eye Database (NED) analyses data collected in the year 2011 as well as elaboratory on the census of Ophthalmology services from 2002 to 2012 in chapter 1 and 2 respectively.

By the year 2011, the CSR has registered 171,482 surgeries. These surgeries were mainly performed at the 36 Ministry of Health (MOH) hospital with Ophthalmologists. Data collected since 2002 showed an increasing ascertainment rate but further improvement in ensuring quality of data and less missing data is needed (Chapter 1.1).

The mean age of presentation (64 years) and clinical features of patients presented for cataract surgery remained similar. Only 1/3 of patients returned for the second eye surgery. Patients who had second eye surgery in the same year have declined, from 11.1% in 2009 to 7.2% in 2011. The time taken for them to come for second eye surgery has increased from 16 months in 2002 to 39 months in 2011. There is a need to find out the reasons for patients not coming forward for their second eye surgery and the delay that occurs. This is important as MOH aims to ensure accessible and affordable eye care to the public as well as achieve satisfactory cataract surgical rates (Chapter 1.2).

Since 2003, phacoemulsification (phaco) has been the commonest type of surgery performed at MOH. In 2011, phaco contributed to 78% of the total cataract surgery. The number of cataract surgery performed by medical officers (8.1%) was decreasing and that done by specialists was increasing (83.6%) i.e. in 2011, for every 10 cataract surgeries performed, 8 were done by specialists and 2 by MOs (Chapter 1.3). There is a need to review the opportunity for medical officers to do cataract surgery especially those in training.

Posterior capsular rupture (PCR) remains the commonest intra-operative complication and its rate has slightly increased in 2011 (3.1%). To address this, closer supervision and clinical audit should be a routine activity at each ophthalmology department so as to improve quality of care overall as well as improve on PCR rates.

Chapter 2 shows the census for ophthalmology services in 2002 to 2012. The number of inpatient has dropped 7%, from 43,589 in 2011 to 40,726 in 2012. The number of patients with DM referred for screening of diabetic retinopathy has increased 10%, from 66,354 in 2011 to 72,781 in 2012 and number of vitreoretinal surgery performed has increased 20%, from 3750 in 2011 to 4515 in 2012..

NED has applications for performance monitoring such eCUSUM and eKPI. However, it has been found that eCUSUM has not been widely utilized by supervisors and trainees themselves and thus could not achieve its full potential as a competency monitoring tool.

A new feature on NED website, an e-notification of patients with suspected post-operative infectious endophthalmitis was launched in 2012. It aims is to audit the occurrence of post-operative infectious endophthalmitis so that preventive and corrective measures can be taken promptly.

We are pleased to see data in NED, (especially the CSR) being used as evidence in eye care service planning and policy making for ophthalmology services. NED contributed data for the development of policies and proposals for the Satellite Cataract Services, Klinik Katarak 1 Malaysia (KK1M) mobile services and National Intraocular Lens Bank. Data has also been used in service to procure equipments and develop new sub-specialty services in certain hospitals.

At the international level, Dr. Mohamed Aziz Salowi and Dr. Goh Pik Pin have been invited by the International Consortium for Health Outcome Measures (ICHOM) to participate in discussions on global standards for cataract surgery outcome measures. They will be attending the seminar on 'Fine-tuning health care - improved outcomes and cost efficiency using quality registries', organised by the Ministry of Health and Social Affairs, Sweden, together with Datuk Dr. Noor Hisham the Director General of Health, MOH in May 2013.

We would like to invite all relevant stakeholders to fully utilize collected data for clinical audit, quality improvement projects for further research and publications in peer-reviewed journals. We would also appreciate any feedback you could give us on the report presented.

Thank you.

NED Advisor

NED Chairperson

NED Co-Chairperson

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ABBREVIATION

ADED	Advanced Diabetic Eye Disease
AMD	Age related Macular Degeneration
CAI	Carbonic Anhydrase Inhibitor
CF	Counting Finger
CLRCU	Contact Lens-Related Corneal Ulcer
CSMO	Clinically Significant Macular Odema
CMO	Cystoid Macular Oedema
CSR	Cataract Surgery Registry
DER	Diabetic Eye Registry
DM	Diabetes Mellitus
DR	Diabetic Retinopathy
ECCE	Extracapsular Cataract Extraction
FU	Follow Up
HM	Hand Movement
HPT	Hypertension
ICCE	Intracapsular Cataract Extraction
IOL	Intraocular Lens
MOH	Ministry Of Health
NED	National Eye Database
NPDR	Non Proliferative Diabetic Retinopathy
NPL	No Perception Of Light
OT	Operating Theatre
PCO	Posterior Capsule Opacification
PCR	Posterior Capsule Rapture
PDR	Proliferative Diabetic Retinopathy
Phaco	Phacoemulsification
PL	Perception Of Light
PI	Principal Investigator
RB	Retinoblastoma
RCC	Registry Coordinating Centre
SD	Standard Division
SDP	Source Data Producers
VA	Visual Acuity
VR	Vitreoretinal Surgery
ZD	Zonular Dialysis

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REPORT SUMMARY

CATARACT SURGERY REGISTRY 2002-2011

1. Stock and Flow

- From the year 2008 to 2011, all the 36 MOH Ophthalmology departments participated in CSR.
- The number of SDP increased from 25 SDPs in 2002 to 36 SDPs in 2008 onwards.
- The total number of cataract surgery registered to CSR increased from 12798 in 2002 to 30611 in 2011.
- The CSR ascertainment increased from 87.6 % in 2002 to 95.4% in 2011.

2. Characteristics of Patients

- The mean age of patients at the time of cataract surgery was maintained at 64 – 65 years old from 2002 to 2011. This age was younger than data published by the Swedish cataract surgery register (74 years old). This may be due to high proportion of our patients has diabetes mellitus (41.7%) which can contribute to earlier onset of cataract.
- Up to 1/3 of patients presented within the age group of 65-74 years old (37.5% in 2011).
- The proportion of patients with systemic co-morbidity has increased from 56.8% in 2002 to 72.0% in 2011.
- There was an increase in the proportion of patients who had hypertension (from 35.4% in 2002 to 56.3% in 2011) and diabetes mellitus (from 28.9% in 2002 to 41.7% in 2011).
- Senile cataract was the commonest cause of primary cataract (98.9% in 2011).
- Trauma was the commonest cause for secondary cataract (50.1% in 2011).
- The proportion of patients who returned for cataract surgery in the fellow eye remained the same from 2002 to 2009, i.e. only one third (33.0% in 2011).
- Majority of the eyes had no prior ocular surgery (96.7% in 2011). The commonest prior ocular surgery was vitreoretinal surgery (1.1% in 2011).
- One third of the eyes had ocular co-morbidity (41.7% in 2011). The commonest ocular co-morbidity was diabetic retinopathy in any forms (11.5% in 2011).
- About half of the eyes had unaided vision in the blindness category (2/60-NPL) (47.7% in 2011).
- Refraction was not done before cataract surgery in more than 2/3 of the eyes (74.1% in 2011).
- Bimodal pattern of pre-operative vision was consistently observed over the years with one peak at the range between 6/18 to 6/36 and another peak at CF-HM.
- In term of the choice of IOL power, majority of surgeons chose target refraction as emmetropic or slightly myopic. The mean target refractive power in 2011 was -0.4D (SD 0.3).

3. Cataract Surgery Practice Patterns

- The number of cataract surgery performed by SDPs varied. In 2011, out of the 36 SDPs, 10 performed less than 500 surgeries, 16 performed between 501 to 1000, and 10 performed more than 1000 cataract surgeries a year.
- The number of surgery performed was lower than average in the month of February and September.
- Kedah (2 SDPs), Selangor (5 SDPs), Perak (4 SDPs), Johor (4 SDPs), Penang (2 SDPs), and Sarawak (4 SDPs), performed higher number of cataract surgeries compared to other state. This is mainly because of population density and higher number of ophthalmology department in these states.
- More than 2/3 of the cataract surgery was performed by specialists (83.6% in 2011). The number of cataract surgery performed by medical officers decreased from 10.1% in 2010 to 8.1% in 2011.
- The mean duration taken to do a cataract surgery was 35.1 min for phaco and 47.1 min for ECCE in 2011.
- Though there is an increasing trend for day care surgery, from 39.3% in 2002 to 52.3% in 2011, the percentage varied among SDPs. In 2011, 3 SDPs did not perform any cataract surgery under day care, 20 SDPs performed less than 50.0% and only 10 SDPs performed more than 90.0% of cataract surgery as day care.
- Phaco was the preferred method of cataract surgery since 2004 and the proportion increased from 39.7% in 2002 to 78.0% in 2011. Percentage of ECCE decreased from 54.0% in 2002 to 17.3% in 2010.
- The preferred IOL material was acrylic and non-foldable type.
- The percentage of phaco converted to ECCE was 2.1% in 2011. It remained constant over the years.
- Among combined surgery, VR surgery showed an increasing trend (0.2% in 2002 to 2.2% in 2011) while filtering surgery showed a decreasing trend (1.2% in 2002 to 0.2% in 2011).
- Majority of cases were done under local anaesthesia (93.5% in 2011).
- The preferred type of local anesthesia was topical (58.8% in 2011) and the rate of topical anesthesia has increased from 11.7% in 2002 to 58.8% in 2010.
- The use of retrobulbar anesthesia has decreased from 25.9% in 2002 to 2.8% in 2011.
- There is a decrease in the use of oral sedation (33.3% in 2002 to 10.0% in 2011).
- Majority of the patients operated had IOL implantation (98.2% in 2011). Among these patients who had IOL, 96.3% had posterior chamber IOL.

4. Intra-operative Complications

- There is a slight increase in intra-operative complication from 5.6% in 2010 to 5.8% in 2011.
- PCR increased from 2.9% in 2010 to 3.1% in 2011.
- Intra-op complication was seen among 48.5% of patients who had phaco converted to ECCE and 43.1% who had ICCE in 2011.
- In 2011, the percentage of intra-op complication was higher if cataract surgery was combined with filtering surgery (7.8%), pterygium excision (5.3%) or vitreoretinal surgery (10.3%).
- In 2011, the rate of intra-operative complication was higher in surgeries performed by MO (8.2%), followed by gazetted specialists (7.3%) as compared to specialist (5.3%).

5. Cataract Surgery Outcome

- More than 80.0% of patient registered to CSR had cataract surgery outcome data and 88.9% of patients operated in 2011 had records on post-operative vision.
- The percentage of patients with post-operative endophthalmitis declined from 0.2% in 2002 (25 patients) to 0.04% in 2011 (11 patients).
- The percentage of patients with unplanned return to OT initially increased over the years, from 0.34% in 2004 to 0.53% in 2009, but it declined in 2010 onwards. The common reasons for the need to have re-operation were iris prolapse, wound dehiscence and IOL related problems.
- In eyes without ocular co-morbidity, less than 50.0% of eyes had post-op unaided visual acuity 6/12 or better and the patterns were consistent over the years. With refraction, more than 80.0% achieved post-op vision 6/12 or better (81.0% in 2002, 89.0% in 2003, 90.0% in 2004, 84.0% in 2007, 88.0% in 2008, 90.9% in 2009, 92.0% in 2010 and 92.4% in 2011). This observation suggested that poor post-op unaided vision was due to uncorrected refractive error or induced astigmatism. Though patients' vision could be improved with glasses.
- Patients who had phaco had better post-op visual outcome when compared to other type of surgeries. 94.3% of phaco patients had refracted vision of 6/12 or better in 2011 as compared to ECCE (85.6%), phaco convert to ECCE (72.2%), lens aspiration (74.9%) and ICCE (52.6%).
- Post-op visual outcome improved over the years. Refracted visual outcome of 6/12 or better among phaco patient improved from 87.0% in 2002 to 94.3% in 2011 and among ECCE patients from 78.0% in 2002 to 85.6% in 2011.
- In all type of surgeries, visual outcome became less favourable when there were intra-operative complications.
- The main contributing factor for eyes with post-operative refracted VA worse than 6/12 was pre-existing ocular co-morbidity followed by high astigmatism and posterior capsule opacification.
- When patients with preexisting ocular co-morbidity were excluded from analysis, high astigmatism followed by preexisting ocular co-morbidity (not detected preoperatively) were the major causes of poor visual outcome.
- In 2011, the choice of IOL power was aimed towards targeted refraction of -0.4D. However, post-operative actual refraction was -0.3D for all eyes, -0.7D for phaco eyes, and -1.0D for ECCE eyes. Thus, eyes which had undergone ECCE had more myopic shift than eyes which had phaco.
- The difference between targeted and post-op actual refraction was -0.3D for 2010 and 2011. Only 29.6% of eyes had a difference in target and actual refraction of between 0 and -0.5D, and 22.0% had a difference between 0 to +0.5D. The remaining 49% have disparity of more than +/- 1D. However, there are cases with up to -9.2D and +10.5D out of the target refraction. Up to 458 patients whose difference in refraction was more than +1D and we need to investigate if these patients were aphakic awaiting for secondary IOL implantation. Thus, Individual SDP must conduct clinical audit on patients who did not achieved the target refractive power especially those with hyperopic shift and those who need glasses to improve vision.

CHAPTER 1

CATARACT SURGERY REGISTRY 2011

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CHAPTER 1: CATARACT SURGERY REGISTRY

1.1 STOCK AND FLOW

The number of CSR source data provider (SDP) was maintained at 36 in 2011. The number of cataract surgeries being reported to CSR increased from 28506 in 2010 to 30611 in 2011.

From 2002-2004, CSR was a paper-based registry. During this period, there was a decrease in the percentage of eyes with post-operative visual outcome reported to CSR. When the web-based registry was introduced in 2007, there is an increasing trend of reported post-operative vision, except for the year 2009 (84.3%).

Table 1.1(a): Stock and Flow

Year	2002		2003		2004		2007		2008		2009		2010		2011	
Number of SDP	25*		32*		33*		32		36		36		36		36	
Total no. of cataract surgery registered to CSR	12798		16815		18392		18426		21496		24438		28506		30611	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Cataract surgery with visual outcome records	12512	97.7	14683	87.3	6228	33.9	15786	85.7	19063	88.7	20590	84.3	24521	86.0	27219	88.9

*2002, 2003 and 2004 included one private centre and one University Hospital

When comparing the number of cataract surgery performed and that reported to CSR, the ascertainment rate maintains at more than 80% since 2002. In the last 2 years, ascertainment rate has achieved 95.4%. Among the 36 SDPs, the lowest ascertainment rate is from Hospital I (71.2%).

As for percentage of patients with post-operative visual outcome reported to CSR, 35 SDPs reported >80.0% and the lowest reporting rate was from Hospital G (38.4%). As for percentage of patients with refracted post-operative vision, 31 SDPs reported >80% and 5 SDPs with <80.0% [Hospital A=78.6%, Hospital D=55.1%, Hospital AB=74.8%, Hospital AD=44.3%, Hospital AJ=70.6%].

Table 1.1(b): Ascertainment for MOH Hospitals, CSR 2002-2011

Year	2002	2003	2004	2007	2008	2009	2010	2011
Total number of cataract surgery performed at MOH Hospitals (Source: MOH census returns)	14316	16498	18884	22051	25393	26274	29873	32099
Total number of cataract surgery performed at MOH hospitals and registered to CSR	12552	16039	17536	18426	21496	24438	28506	30611
Ascertainment (%)	87.6%	97.2%	92.9%	83.6%	84.6%	93.0%	95.4%	95.4%

Figure 1.1(a): Stock and flow

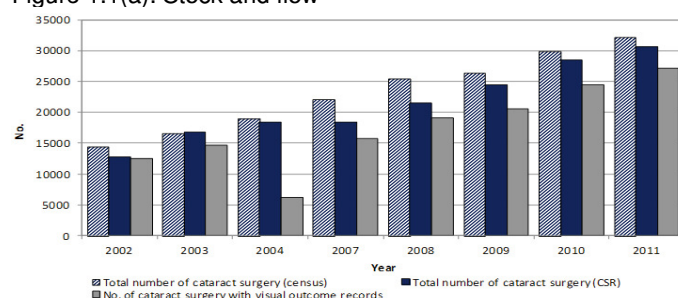
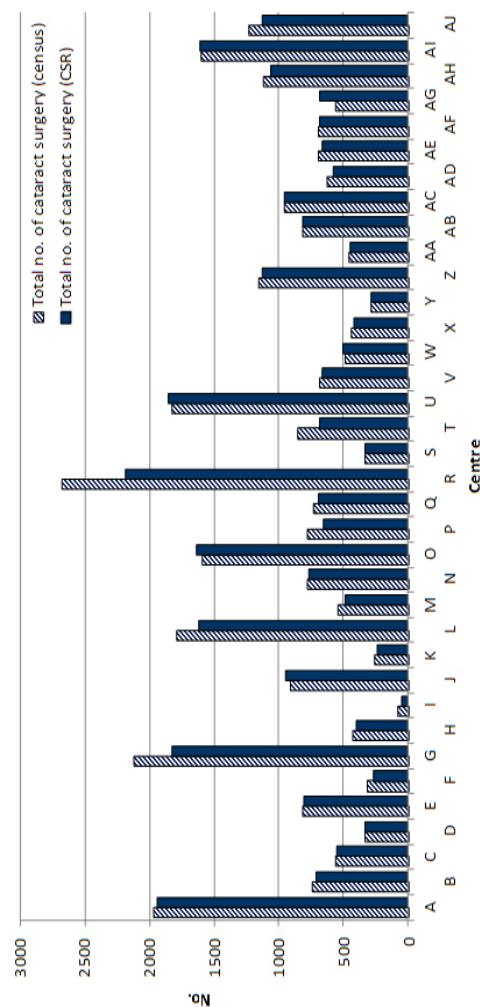


Table 1.1(c): Ascertainment for CSR by SDP in 2011

Ascertainment									
Total no. of cataract surgery (based on census) (a)	Total no. of cataract surgery registered to CSR (based on operative record) (b)	Total no. of outcome form submitted (c)	Total no. of outcome form with unaided vision (d)	Total no. of outcome form with refracted vision (e)	% Ascertainment for CSR (b/a*100)	% Ascertainment for Outcome form submitted (c/b*100)	% Ascertainment for Outcome with unaided vision (d/c*100)	% Ascertainment for Outcome with refracted vision (e/c*100)	
All Centres	32099	30611	28828	27219	24707	95.4	94.2	94.4	85.7
A	1967	1939	1939	1635	1525	98.6	100.0	84.3	78.6
B	738	708	707	684	634	95.9	99.9	96.7	89.7
C	553	554	553	461	457	100.2	99.8	83.4	82.6
D	330	332	332	268	183	100.6	100.0	80.7	55.1
E	815	803	803	690	685	98.5	100.0	85.9	85.3
F	313	271	270	266	245	86.6	99.6	98.5	90.7
G	2118	1826	702	641	569	86.2	38.4	91.3	81.1
H	421	403	396	392	374	95.7	98.3	99.0	94.4
I	73	52	52	50	52	71.2	100.0	96.2	100.0
J	911	946	804	800	794	103.8	85.0	99.5	98.8
K	255	240	226	217	190	94.1	94.2	96.0	84.1
L	1788	1622	1384	1338	1318	90.7	85.3	96.7	95.2
M	536	483	479	452	450	90.1	99.2	94.4	93.9
N	778	770	769	762	757	99.0	99.9	99.1	98.4
O	1588	1642	1641	1512	1400	103.4	99.9	92.1	85.3
P	774	657	657	657	655	84.9	100.0	100.0	99.7
Q	730	692	678	658	580	94.8	98.0	97.1	85.5
R	2672	2186	2185	2007	1848	81.8	100.0	91.9	84.6
S	329	329	329	328	309	100.0	100.0	99.7	93.9
T	854	686	685	677	614	80.3	99.9	98.8	89.6
U	1819	1859	1859	1819	1534	102.2	100.0	97.8	82.5
V	680	666	666	660	568	97.9	100.0	99.1	85.3
W	477	505	503	480	431	105.9	99.6	95.4	85.7
X	435	420	419	410	377	96.6	99.8	97.9	90.0

Ascertainment									
Total no. of cataract surgery (based on census) (a)	Total no. of cataract surgery registered to CSR (based on operative record) (b)	Total no. of outcome form submitted (c)	Total no. of outcome form with unaided vision (d)	Total no. of outcome form with refracted vision (e)	% Ascertainment for CSR (b/a*100)	% Ascertainment for Outcome form submitted (c/b*100)	% Ascertainment for Outcome with unaided vision (d/c*100)	% Ascertainment for Outcome with refracted vision (e/c*100)	
Y	285	283	277	274	99.3	100.0	97.9	96.8	
Z	1150	1127	937	883	98.0	89.3	93.1	87.8	
AA	449	450	438	409	100.2	100.0	97.3	90.9	
AB	811	811	800	607	100.0	100.0	98.6	74.8	
AC	953	953	941	896	100.0	100.0	98.7	94.0	
AD	623	575	524	255	92.3	100.0	91.1	44.3	
AE	691	663	613	600	95.9	99.5	92.9	90.9	
AF	688	681	637	600	99.0	97.2	96.2	90.6	
AG	557	680	653	590	122.1	99.4	96.6	87.3	
AH	1112	1061	1023	857	95.4	100.0	96.4	80.8	
AI	1598	1605	1475	1389	100.4	94.8	96.9	91.3	
AJ	1228	1131	1037	798	92.1	100.0	91.7	70.6	

Figure 1.1(c): Ascertainment for CSR by SDP in 2011



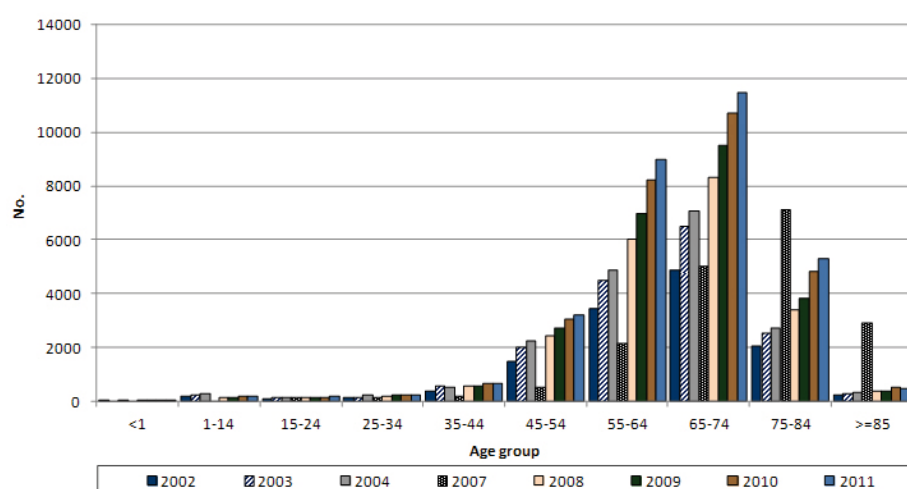
1.2.1 Patient Demography

A larger percentage of patients presented within the age group of 65-74 years old except for the year 2007 (75-84 years old). There was no marked gender difference over the years.

Table 1.2.1: Age and Gender Distributions, CSR 2002-2011

*2002, 2003 and 2004 included private centres and university hospitals

Figure 1.2.1: Age Distribution, CSR 2002-2011



1.2.2 Medical history

1.2.2.1 Systemic co-morbidity

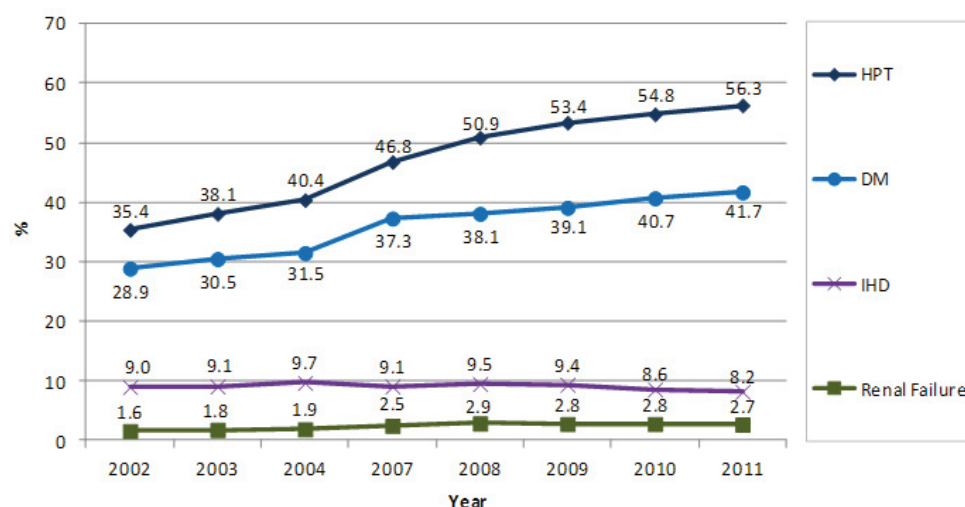
The 2 common systemic co-morbidities in patients who had cataract surgery were hypertension (56.3%) and diabetes mellitus (41.7%). The overall percentage of such patients showed an increasing trend over the years.

Table 1.2.2.1: Distribution of Systemic Co-Morbidity, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
Percentage of patients with any systemic co-morbidity	56.8		59.1		59.9		67.5		68.7		71.0		70.6		72.0	
Percentage of patients with specific systemic co-morbidity																
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
1. Hypertension	4529	35.4	6408	38.1	7425	40.4	8630	46.8	10932	50.9	13050	53.4	15630	54.8	17238	56.3
2. Diabetes Mellitus	3694	28.9	5136	30.5	5800	31.5	6869	37.3	8188	38.1	9556	39.1	11598	40.7	12778	41.7
3. Ischaemic Heart Disease	1148	9.0	1538	9.1	1782	9.7	1668	9.1	2037	9.5	2294	9.4	2441	8.6	2515	8.2
4. Renal Failure	211	1.6	303	1.8	351	1.9	461	2.5	624	2.9	679	2.8	804	2.8	814	2.7
5. Cerebrovascular accident	106	0.8	165	1.0	174	0.9	0	0.0	29	0.1	305	1.2	302	1.1	380	1.2
6. COAD/Asthma	669	5.2	907	5.4	955	5.2	798	4.3	955	4.4	1039	4.3	1024	3.6	1088	3.6
7. Others	935	7.3	2409	7.2	861	4.7	1399	7.6	1974	9.2	2460	10.1	2891	10.1	3538	11.6

Number or percentage may be more than total or 100% as patients might have more than one systemic co-morbidity

Figure 1.2.2.1: Percentage of Patients with Specific Ocular Co-morbidity, CSR 2002-2011



1.2.2.2 Causes of cataract

Majority of the patients presented with primary cataract (94.9%). In eyes with primary cataract, senile or age-related cataract was the commonest (98.9%). In eyes with secondary cataract, trauma was the commonest (50.1%). This pattern remained unchanged over the years.

Table 1.2.2.2: Causes of Cataract, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Primary cataract	12294	96.1	16161	96.1	17697	96.2	17410	94.4	20329	94.6	23117	94.6	26981	94.7	29050	94.9
Secondary cataract	499	3.9	654	3.9	695	3.8	557	3.0	530	2.5	587	2.4	660	2.3	764	2.5
Missing value	-	-	-	-	-	-	460	2.5	637	3.0	734	3.0	865	3.0	797	2.6
Primary Cataract (N)	12294		16161		17697		17410		20329		23117		26981		29050	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Senile/age related	11960	97.3	15623	96.7	17290	97.7	17075	98.1	19995	98.4	22782	98.6	26671	98.9	28736	98.9
Congenital	130	1.1	175	1.1	173	1.0	129	0.7	124	0.6	124	0.5	44	0.2	34	0.1
Development	155	1.3	317	2.0	209	1.2	169	1.0	156	0.8	166	0.7	236	0.9	249	0.9
Others	49	0.4	46	0.3	25	0.1	37	0.2	54	0.3	45	0.2	30	0.1	31	0.1
Secondary Cataract (N)	499		654		695		557		530		587		660		764	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Trauma	325	65.1	399	61	440	63.3	355	63.7	330	62.3	330	56.2	346	52.4	383	50.1
Drug induced	53	10.6	81	12.4	84	12.1	55	9.9	76	14.3	79	13.5	64	9.7	60	7.9
Surgery induced	23	4.6	67	10.2	56	8.1	82	14.7	39	7.4	107	18.2	93	14.1	101	13.2
Others	98	19.6	107	16.4	115	16.5	65	11.7	85	16.0	71	12.1	157	23.8	220	28.8

1.2.2.3 First or Fellow Eye Surgery

Two third of patients were operated for the first time. Only one third of the patients returned for surgery for the fellow eye. This pattern remained unchanged since 2002.

The low percentage of patient returned for second eye surgery might be due to occurrence of intra-operative complication during their first eye surgery. However, the percentage did not increase despite the declining percentage of intra-operative complications in the previous eye surgery (from 24.4% in 2002 to 3.0% in 2011).

Overall data showed that, the percentage of patients who had fellow eye surgery in the same year showed an initial increasing trend (from 4.5% in 2002 to 11.1% in 2009). But the percentage started to decline thereafter (7.5% in 2010 to 7.2% in 2011). The mean duration between the first and fellow eye has increased from 16 months in 2002 to 39 months in 2011.

Table 1.2.2.3: First or Fellow Eye Surgery, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
First eye surgery	8958	70.0	11851	70.5	12911	70.2	12810	69.5	14610	68.0	16446	67.3	18919	66.4	20466	66.9
Fellow eye surgery	3840	30.0	4964	29.5	5481	29.8	5559	30.2	6849	31.9	7938	32.5	9441	33.1	10088	33.0
Missing	NA	-	NA	-	NA	-	57	0.3	37	0.2	54	0.2	146	0.5	57	0.2
Patients who had second surgery in the same year	573	4.5	713	4.2	825	4.5	759	4.1	1135	5.3	2702	11.1	2129	7.5	2246	7.3
Period of time between first and fellow eye surgery (months)																
N	2716		3322		3673		4860		5953		7353		9378		10009	
Mean	16.7		16.3		16.9		23.4		22.0		24.4		36.1		39.2	
SD	18.0		17.1		18.8		24.3		22.8		31.5		43.6		49.3	
Median	10.3		10.1		10.5		13.3		13.1		12.1		15.1		15.4	
Patients who had cataract surgery before	3840		4964		5481		5559		6849		7938		9441		10008	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Eyes with intra-operative complications during surgery in the first eye	939	24.4	1179	23.8	1235	22.5	313	5.6	298	4.4	346	4.4	324	3.4	302	3.0

1.2.2.4 Past Ocular Surgery of the Operated Eye

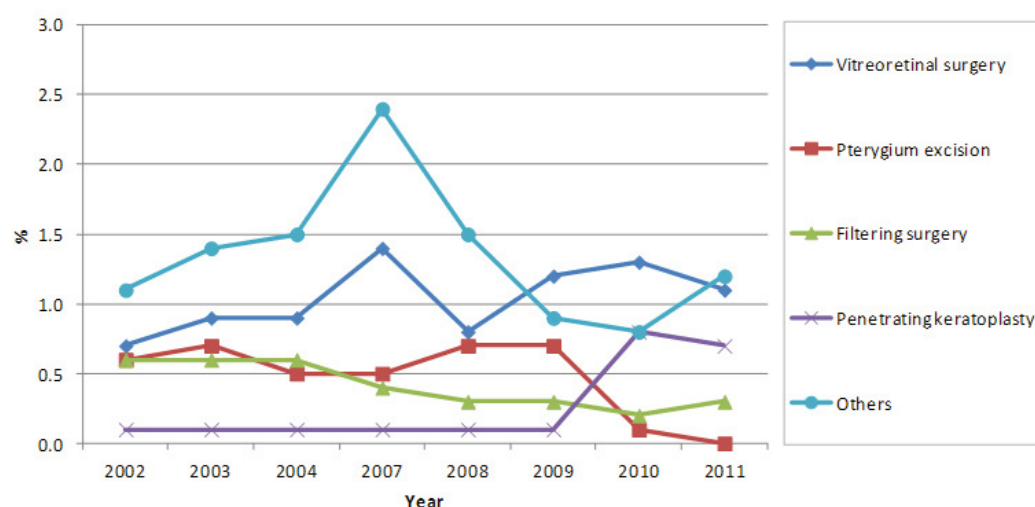
Most eyes to be operated had no prior ocular surgery. The commonest past ocular surgery was vitreoretinal (VR) surgery which appeared to be in increasing trend. Both pterygium excision and filtering surgery demonstrated a declining trend. The percentage of eyes with past history of penetrating keratoplasty which was initially low, showed an increase in 2010.

Table 1.2.2.4: Past Ocular Surgery of the Operated Eye, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No. of patients	12798		16815		18392		18426		21496		24438		28506		30611	
No. of eyes with past ocular surgery record (N)	12798		16782		18372		17379		20674		23109		26711		28349	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Patients with no past ocular surgery	12414	97.0	16178	96.4	17711	96.4	16545	95.2	20010	96.8	22387	96.9	25870	96.9	27400	96.7
Vitreoretinal surgery	8959	0.7	1510	0.9	1653	0.9	261	1.4	161	0.8	267	1.2	352	1.3	325	1.1
Pterygium excision	77	0.6	1177	0.7	92	0.5	869	0.5	140	0.7	164	0.7	21	0.1	11	0.0
Filtering surgery	77	0.6	1007	0.6	1102	0.6	1043	0.4	57	0.3	69	0.3	65	0.2	80	0.3
Penetrating keratoplasty	13	0.1	168	0.1	184	0.1	1738	0.1	14	0.1	18	0.1	212	0.8	207	0.7
Others	1408	1.1	235	1.4	276	1.5	417	2.4	304	1.5	216	0.9	203	0.8	332	1.2

Number or percentage may be more than total or 100% as patients might have more than one past ocular surgery

Figure 1.2.2.4 Percent Distribution of Past Ocular Surgery of the Operated Eye, CSR 2002-2011



1.2.2.5 Preexisting Ocular Co-morbidity

The percentage of eyes with ocular co-morbidities increased over the years. The commonest was diabetic retinopathy (DR) in any forms followed by glaucoma. The percentage of lens related complications has decreased over the years.

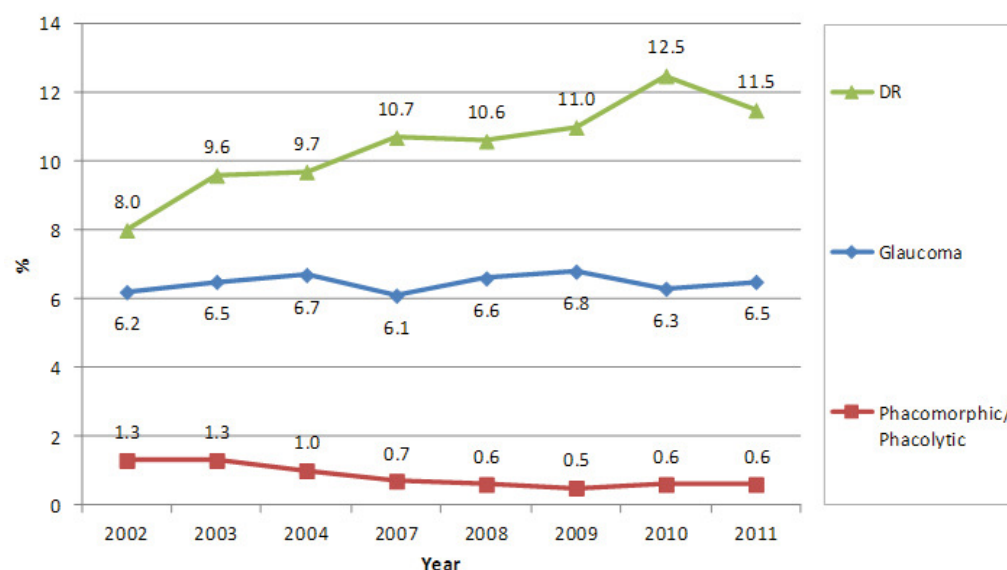
Table 1.2.2.5: Distribution of Pre-existing Ocular Co-Morbidity, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011			
No of patients (N)	12798	N	%	16815	n	%	18392	n	%	21496	n	%	24438	n	%	28506	n	%
Patients with any ocular co-morbidity	3691	28.8	6068	36.1	6993	38.0	5973	32.4	7269	33.8	9442	38.6	11977	42.0	12756	41.7		
Patients with specific ocular co-morbidity																		
Anterior segment																		
1. Glaucoma	795	6.2	1096	6.5	1238	6.7	1126	6.1	1408	6.6	1655	6.8	1799	6.3	1976	6.5		
2. Pterygium involving the cornea	342	2.7	393	2.3	349	1.9	288	1.6	319	1.5	345	1.4	387	1.4	405	1.3		
3. Pseudoexfoliation	184	1.4	254	1.5	209	1.1	221	1.2	253	1.2	318	1.3	289	1.0	312	1.0		
4. Corneal opacity	184	1.4	200	1.2	183	1.0	176	1.0	194	0.9	231	0.9	251	0.9	299	1.0		
5. Chronic uveitis	54	0.4	48	0.3	80	0.4	81	0.4	63	0.3	80	0.3	89	0.3	98	0.3		
Len related complication																		
1. Phacomorphic	106	0.8	152	0.9	118	0.6	89	0.5	85	0.4	83	0.3	120	0.4	114	0.4		
2. Phacolytic	61	0.5	63	0.4	79	0.4	44	0.2	45	0.2	47	0.2	59	0.2	69	0.2		
3. Subluxated/Dislocated	87	0.7	110	0.7	86	0.5	101	0.5	89	0.4	83	0.3	95	0.3	119	0.4		
Posterior segment																		
1. Diabetic Retinopathy: Non Proliferative	642	5.0	965	5.7	956	5.2	1125	6.1	1273	5.9	916	3.7	996	3.5	1783	5.8		
2. Diabetic Retinopathy: Proliferative	218	1.7	366	2.2	510	2.8	465	2.5	614	2.9	1307	5.3	1973	6.9	1031	3.4		
3. Diabetic Retinopathy: CSME*	96	0.8	177	1.1	163	0.9	198	1.1	221	1.0	278	1.1	346	1.2	384	1.3		
4. Diabetic Retinopathy: Vitreous haemorrhage	66	0.5	106	0.6	138	0.8	176	1.0	165	0.8	230	0.9	250	0.9	296	1.0		
5. ARMD	145	1.1	215	1.3	308	1.7	231	1.3	259	1.2	387	1.6	462	1.6	494	1.6		
6. Other macular disease (includes hole or scar)	77	0.6	106	0.6	140	0.8	118	0.6	148	0.7	188	0.8	277	1.0	251	0.8		
7. Optic nerve disease, any type	43	0.3	76	0.5	78	0.4	71	0.4	69	0.3	118	0.5	149	0.5	123	0.4		
8. Retinal detachment	70	0.5	177	1.1	247	1.3	218	1.2	204	0.9	294	1.2	308	1.1	432	1.4		
9. Cannot be assessed	884	6.9	1962	11.7	2290	12.5	1357	7.4	2092	9.7	3139	12.8	4457	15.6	5053	16.5		
Miscellaneous																		
1. Amblyopia	64	0.5	61	0.4	78	0.4	71	0.4	65	0.3	62	0.3	75	0.3	99	0.3		
2. Significant previous eye trauma	52	0.4	80	0.5	96	0.5	41	0.2	39	0.2	39	0.2	51	0.2	45	0.2		
3. Pre-existing non glaucoma field defect	2	0.0	3	0.0	4	0.0	4	0.0	2	0.0	6	0.0	3	0.0	4	0.0		
4. Others	380	3.0	827	4.9	1153	6.3	668	3.6	755	3.5	1053	4.3	1321	4.6	1505	4.9		

*CSME=Clinically Significant Macular Oedema

Number or percentage may be more than total or 100% as patients might have more than one ocular co-morbidity

Figure 1.2.2.5: Percent Distribution of Eyes with Diabetic Retinopathy, Glaucoma or Lens-induced Glaucoma, CSR 2002-2011



1.2.2.6 Pre-operative Vision

Only 25.9% of patients had refraction pre-operatively in 2011. This was possibly due to mature cataract making refraction impossible. In 2011, 41.2% of eyes with no refraction, were in category 6/18-3/60 while 53.5% were in category 2/60-NPL.

The proportion of eyes operated (with unaided vision) in the blindness category (2/60-NPL) appeared to be decreasing. Conversely, the proportion of these eyes operated in the category (6/18-3/60) was increasing.

The bimodal pattern of pre-operative vision remained the same over the years. The first peak was at 6/18 and the second peak was at CF/HM. There was a low proportion of patients between 5/60 to 1/60.

Table 1.2.2.6: Distribution of Pre-Operative Vision, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No. of patients (N)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Patients with unaided VA	12691	99.2	16723	99.4	18222	99.1	18356	99.6	21212	98.7	23796	97.4	27977	98.1	30018	98.1
Patients with refracted VA	700	5.5	2104	12.6	2319	12.7	5071	27.8	5683	26.4	5150	21.1	7895	27.7	7932	25.9
Patients with no refraction	12098	94.5	14711	87.5	16073	87.4	13355	72.5	15813	73.6	19288	78.9	20611	72.3	22679	74.1
6/5- Unaided	281	2.2	396	2.4	523	2.9	602	3.3	646	3.0	788	3.3	1016	3.6	1133	3.8
6/12 Refracted	155	22.1	327	15.5	396	17.1	678	13.3	935	16.4	944	18.3	1474	18.7	1712	21.6
6/18- Unaided	4465	35.2	6440	38.5	7235	39.7	7734	42.4	9375	44.2	10849	45.6	13073	46.7	14569	48.5
3/60 Refracted	374	53.4	1198	56.9	1315	56.7	2375	46.9	2892	50.9	2796	54.3	4324	54.8	4536	57.2
2/60- Unaided	7945	62.6	9887	59.1	10464	57.4	9920	54.3	11180	52.7	12159	51.1	13888	49.6	14316	47.7
NPL Refracted	171	24.4	579	27.5	608	26.2	2018	39.8	1845	32.5	1410	27.4	2097	26.6	1684	21.2
Unaided VA for patient with no refraction																
n																
6/5 – 6/12																
6/18 – 3/60																
2/60 – NPL																

Figure 1.2.2.6(a): Distribution of Pre-Operative Vision (Unaided/presenting and refracted), CSR 2002-2011

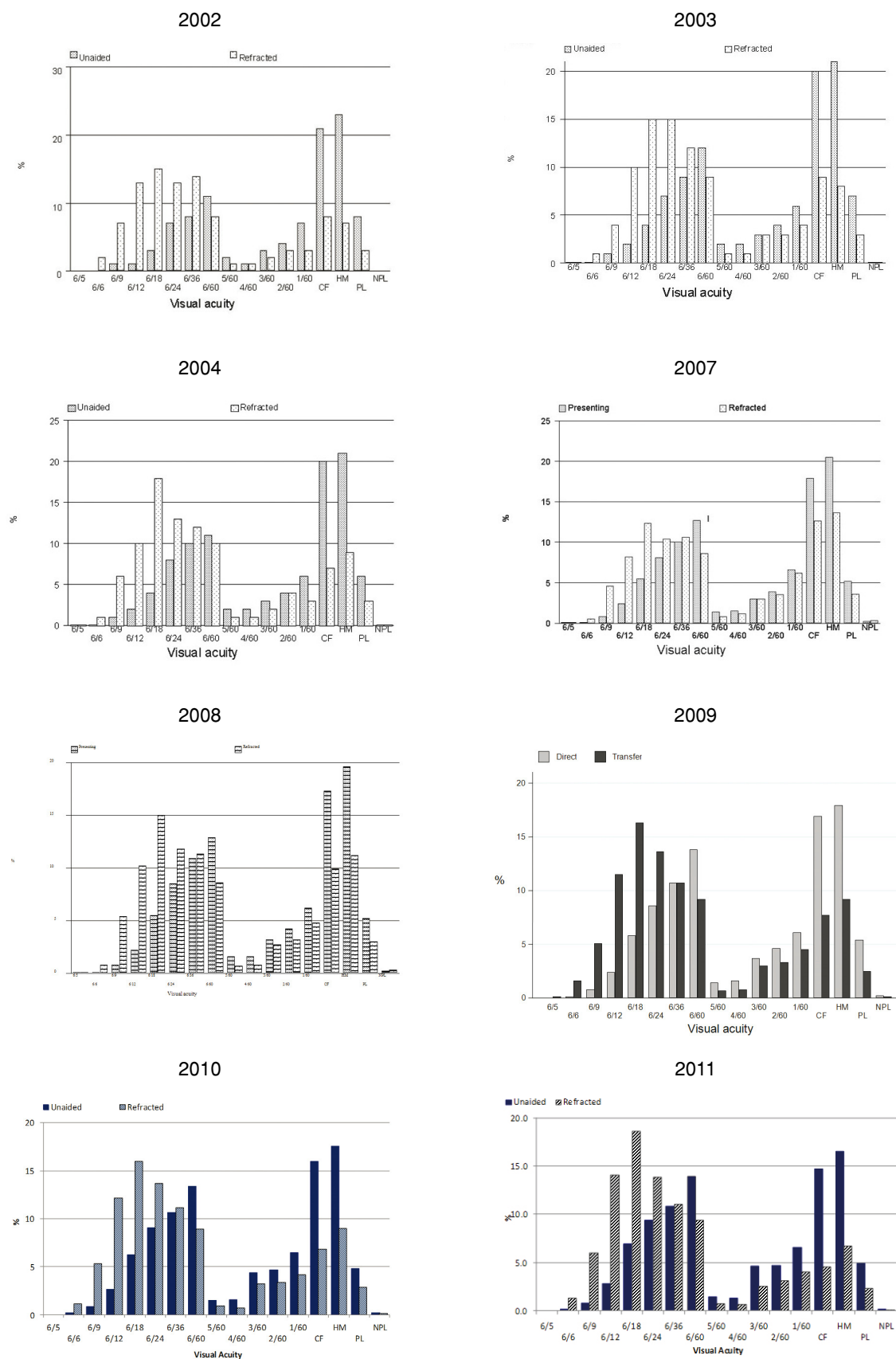


Figure 1.2.2.6(b): Distribution of Pre-Operative Vision (Unaided/presenting), CSR 2002-2011

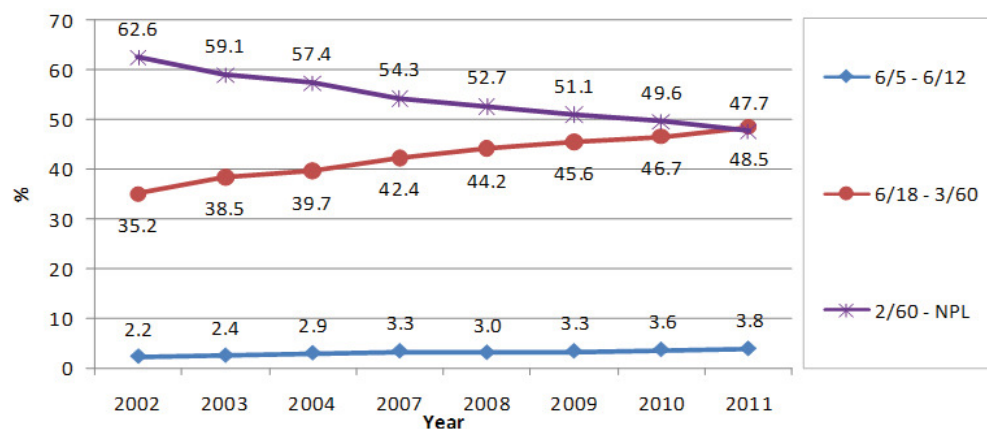
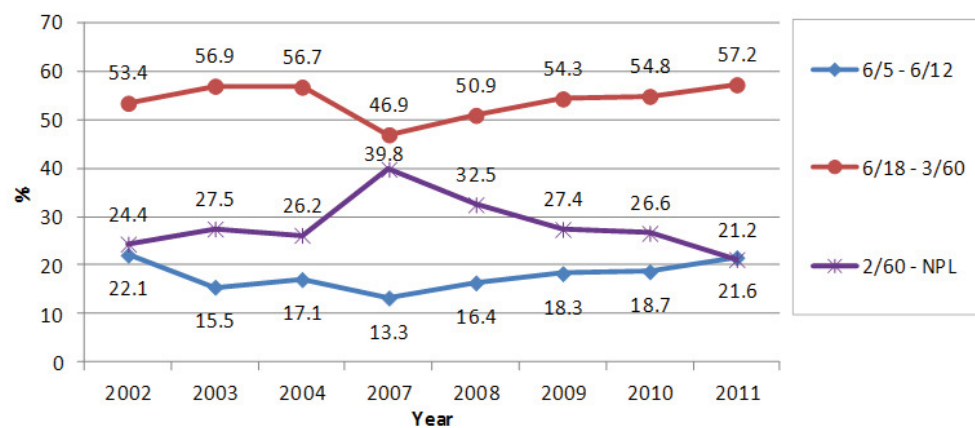


Figure 1.2.2.6(c): Distribution of Pre-Operative Vision (Refracted), CSR 2002-2011



1.2.2.7 Target Refractive Power

The mean target refractive power in 2011 was -0.4D (SD 0.3), with minimum at -9.1D and maximum at +4.8D. The percentage of eyes aimed to have target refraction within (-0.5 to 0 D) increased to 65.3% in 2011. Overall data demonstrated that most surgeons participated in CSR aimed to give patient either emmetropic or slightly myopic refraction post-operatively.

Table 1.2.2.7(a): Distribution of Target Refractive Power, CSR 2007-2011

Year	2007	2008	2009	2010	2011
Operated eye (N)	11876	15083	20279	24524	25885
Mean	-0.5	-0.1	-0.4	-0.4	-0.4
SD	0.4	0.4	0.4	0.4	0.3
Median	-0.5	-0.5	-0.5	-0.4	-0.4
Minimum	-9	-9.9	-9.9	-9.1	-9.1
Maximum	+5	+9.5	+5.9	+6.0	+4.8

Table 1.2.2.7(b): Distribution of Target Refractive Power, CSR 2007-2011

Year	2007		2008		2009		2010		2011	
Target refractive power (Dioptres)	Operated eye N=11876		Operated eye N=15083		Operated eye N=20279		Operated eye N=24524		Operated eye N=24524	
	n	%	n	%	n	%	n	%	n	%
-10-<(-9.5)	0	0	1	0	2	0	0	0	0	0.0
-9.5-<(-9)	2	0	1	0	1	0	2	0	1	0.0
-9-<(-8.5)	0	0	1	0	0	0	0	0	0	0.0
-8.5-<(-8)	1	0	1	0	0	0	0	0	0	0.0
-8-<(-7.5)	2	0	3	0	1	0	1	0	0	0.0
-7.5-<(-7)	1	0	0	0	1	0	1	0	0	0.0
-7-<(-6.5)	3	0	1	0	0	0	1	0	1	0.0
-6.5-<(-5)	1	0	2	0	7	0	4	0	10	0.0
-5-<(-4.5)	3	0	4	0	7	0	3	0	3	0.0
-4.5-<(-4)	1	0	3	0	5	0	10	0	3	0.0
-4-<(-3.5)	7	0.1	8	0.1	11	0.1	5	0	11	0.0
-3.5-<(-3)	6	0.1	7	0	11	0.1	15	0.1	12	0.1
-3-<(-2.5)	12	0.1	22	0.1	18	0.1	29	0.1	15	0.1
-2.5-<(-2)	26	0.2	21	0.1	29	0.1	33	0.1	26	0.1
-2-<(-1.5)	77	0.6	48	0.3	58	0.3	46	0.2	54	0.2
-1.5-<(-1)	414	3.5	373	2.5	260	1.3	292	1.2	201	0.8
-1-<(-0.5)	4299	36.2	6151	40.8	7972	39.3	7590	31.0	7507	29.0
-0.5-<0	6077	51.2	7480	49.6	10604	52.3	15218	62.1	16913	65.3
0-<0.5	821	6.9	731	4.8	977	4.8	920	3.8	849	3.3
0.5-<1	91	0.8	158	1	182	0.9	237	1.0	234	0.9
1-<1.5	8	0.1	31	0.2	17	0.1	23	0.1	20	0.1
1.5-<2	5	0	14	0.1	22	0.1	19	0.1	9	0.0
2-<2.5	13	0.1	10	0.1	85	0.4	69	0.3	12	0.1
2.5-<3	1	0	6	0	4	0	3	0	2	0.0
3-<3.5	1	0	2	0	2	0	0	0	1	0.0
3.5-<4	0	0	2	0	0	0	0	0	0	0.0
4-<4.5	2	0	0	0	0	0	0	0	0	0.0
4.5-<5	1	0	1	0	1	0	1	0	1	0.0
5-<5.5	1	0	0	0	0	0	1	0	0	0.0

5.5-<6	0	0	0	0	2	0	0	0	0	0.0
6-<6.5	0	0	0	0	0	0	1	0	0	0.0
6.5-<7	0	0	0	0	0	0	0	0	0	0.0
7-<7.5	0	0	0	0	0	0	0	0	0	0.0
7.5-<8	0	0	0	0	0	0	0	0	0	0.0
8-<8.5	0	0	0	0	0	0	0	0	0	0.0
8.5-<9	0	0	0	0	0	0	0	0	0	0.0
9-<9.5	0	0	0	0	0	0	0	0	0	0.0
9.5-10	0	0	1	0	0	0	0	0	0	0.0

Values outside the +10D and -10D were excluded from analysis as they would skew the mean.

1.3 CATARACT SURGICAL PRACTICES

1.3.1 Number of Cataract Surgery by SDP

Majority of SDPs performed between 100-1000 cataract surgeries per year.

Table 1.3.1: Range of Cataract Surgery Registered by SDP per year, Census versus CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR
No. of SDP	29	25	31	32	32	33	33	32	36	36	36	36	36	36	36	36
	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR	Census	CSR
<100	4	1	1	5	2	4	1	3	1	1	1	1	1	1	1	1
100-500	13	15	11	10	14	15	15	14	15	15	12	15	10	13	9	9
501-1000	7	5	15	14	8	9	8	8	11	11	14	12	14	12	16	16
>1000	5	4	4	3	8	5	9	7	9	9	9	8	11	10	10	10

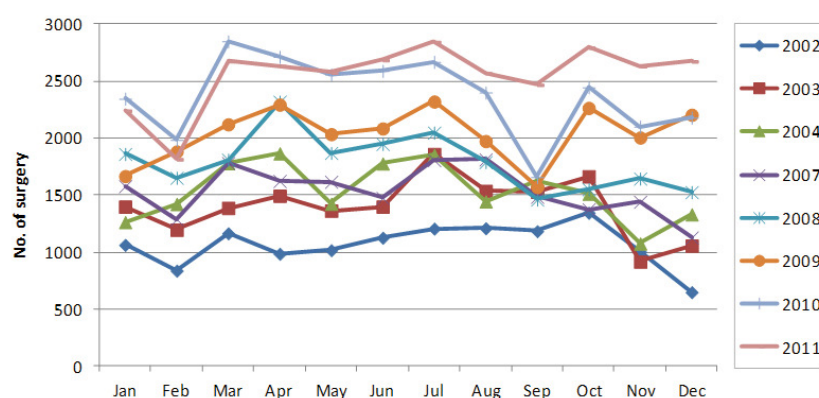
1.3.2 Number of Cataract Surgery by Month

The number was lower than average in February and September.

Table 1.3.2: Number of Cataract Surgery by Month, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No. of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
Month	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
January	1064	8.3	1399	8.3	1265	6.9	1579	8.6	1862	8.7	1668	6.8	2347	8.2	2241	7.3
February	838	6.5	1197	7.1	1424	7.7	1290	7.0	1653	7.7	1884	7.7	1985	7.0	1815	5.9
March	1166	9.1	1389	8.3	1782	9.7	1782	9.7	1812	8.4	2122	8.7	2850	10.0	2676	8.7
April	986	7.7	1495	8.9	1868	10.2	1625	8.8	2321	10.8	2295	9.4	2714	9.5	2634	8.6
May	1018	8.0	1364	8.1	1426	7.8	1618	8.8	1871	8.7	2036	8.3	2559	9.0	2576	8.4
June	1127	8.8	1400	8.3	1778	9.7	1476	8.0	1950	9.1	2086	8.5	2591	9.1	2686	8.8
July	1207	9.4	1862	11.1	1854	10.1	1808	9.8	2049	9.5	2322	9.5	2670	9.4	2845	9.3
August	1210	9.5	1538	9.1	1447	7.9	1814	9.8	1791	8.3	1975	8.1	2401	8.4	2570	8.4
September	1184	9.3	1530	9.1	1626	8.8	1486	8.1	1462	6.8	1572	6.4	1659	5.8	2468	8.1
October	1346	10.5	1666	9.9	1513	8.2	1376	7.5	1552	7.2	2266	9.3	2447	8.6	2794	9.1
November	1003	7.8	917	5.5	1077	5.9	1443	7.8	1646	7.7	2006	8.2	2102	7.4	2632	8.6
December	649	5.1	1058	6.3	1332	7.2	1129	6.1	1527	7.1	2206	9.0	2181	7.6	2674	8.7

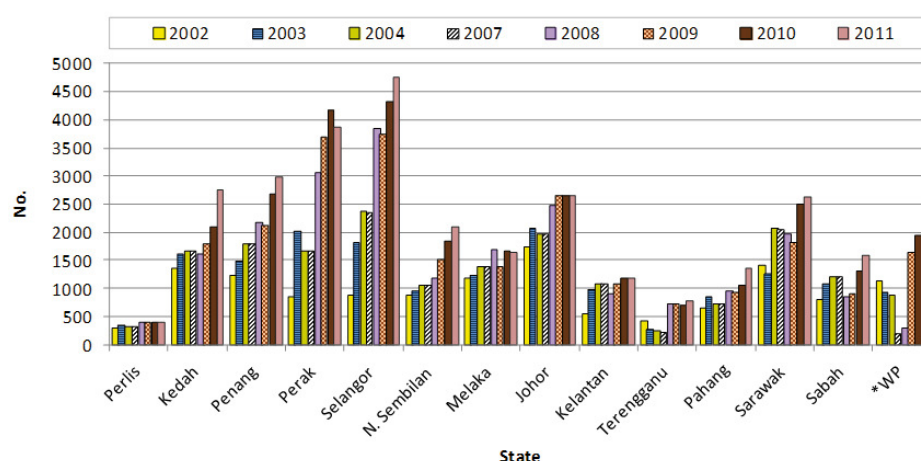
Figure 1.3.2: Number of Cataract Surgeries by Month, CSR 2002-2011



1.3.3 Number of Cataract Surgery Registered to CSR by State

The states which performed higher number of cataract surgeries were Penang, Perak, Selangor, Johor and Sarawak.

Figure 1.3.3: Number of Cataract Surgery Registered to CSR by State, CSR 2002-2011



*the figure for Wilayah Persekutuan in 2007 and 2008 was for Putrajaya Hospital only. While in other years, it included HKL and Hospital Putrajaya.

1.3.4 Surgeon Status

Specialists performed the highest number of cataract surgery followed by medical officers (MO) and gazetted specialists. This is because the number of gazetted specialists is much less than specialist and MO. The percentage of eyes operated by MOs is decreasing while that done by specialist is increasing.

Table 1.3.4: Surgeon Status, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No. of patients (N)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Specialist	8763	68.5	12072	71.8	13165	71.6	14327	77.8	16846	78.4	19400	79.4	24216	84.9	25590	83.6
Gazetting Specialist	1762	13.7	1510	9.0	1757	9.6	1276	6.9	1399	6.5	2053	8.4	1405	4.9	2487	8.1
Medical Officer	2273	17.8	3233	19.2	3470	18.8	2690	14.6	2697	12.5	2750	11.3	2871	10.1	2478	8.1
Missing/NA	0	0	0	0.0	0	0	133	1	554	2.6	235	1.0	14	0.1	56	0.2

1.3.5 Duration of Surgery

The average time taken to complete cataract surgery showed a decreasing trend, from 40.2 min in 2007 to 35.5 min in 2010. The mean duration appeared to be decreasing for phaco but increasing for ECCE. There was no difference in the mean duration of surgery for specialist/gazetting specialist and MOs.

Table 1.3.5(a): Duration of Surgery by Types of Cataract Surgery in minutes, CSR 2007-2011

Year	2007		2008		2009*		2010*		2011*	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Median	IQR
All eyes	40.2	20.6	38.2	19.6	38.2	20.4	35.5	19.3	30	20-40
Phaco	36.8	19.7	34.1	17.7	33.6	17.7	31.3	16.4	25	20-35
ECCE	45.3	19.7	45.8	19.5	49.1	20.9	47.4	20.2	43	31-60
Phaco ECCE	57.8	20.6	44.8	24.0	59.7	24.2	56.1	21.7	55	40-70
ICCE	57.6	23.7	57.5	23.7	58.1	24.4	57.6	28.3	55	45-71
Lens Aspiration	47.8	27.2	60.0	25.6	46.1	25.9	45.4	28.9	40	30-60

Data entered with extreme values i.e. more than 3 hours and less than 15 minutes were not analyzed as it would skew the data

Table 1.3.5(b): Duration of Surgery by Surgeon Status, CSR 2007-2011

Year		2007		2008		2009		2010		2011	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Median	IQR
Phaco	Specialist	36.0	19.8	35.4	17.9	32.6	17.3	30.7	16.3	25	20-35
	Gazetting Specialist	40.2	18.0	47.5	20.8	39.8	19.9	36.2	15.8	30	24-40
	Medical Officers	42.2	18.2	49.2	22.8	41.5	17.7	38.2	16.6	30	25-43.5
ECCE	Specialist	40.2	17.6	43.9	69.5	42.6	18.0	42.0	17.3	36	30-50
	Gazetting Specialist	45.9	17.8	54.0	71.5	48.4	19.1	48.6	16.1	46	39-60
	Medical Officers	53.9	20.2	63.0	89.8	60.5	21.4	57.4	22.0	55	45-70

1.3.6 Distribution of Cataract Surgery Performed Under Day Care Setting

The day care cataract surgery percentages were calculated by excluding eyes of children and combined surgeries because surgeries done in these eyes might require general anaesthesia therefore hospital admission.

The percentage of cataract surgery done as day care was increasing over the years and reached 51.5% in 2010 and 52.3% in 2011. However, the percentage varied among SDPs. In 2011, 3 SDPs did not perform any day care surgery, 20 SDPs performed less than 50.0% and only 10 SDPs performed more than 90.0%. Hospital P performed 100% of its cataract surgery as day care.

Table 1.3.6(a): Distribution of Cataract Surgery Performed Under Day Care Setting, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
Number of SDPs	25*		32*		33*		32		36		36		36		36	
Total number of cataract surgery registered to CSR	12798		16815		18392		18426		21496		24438		28506		30611	
Number of surgery excluding children and combined surgery	12445		15981		17336		17402		19835		22517		26514		28398	
	n	%	n	%	n	%	N	%	n	%	n	%	n	%	n	%
Number and % of day care surgery excluding children and combined surgery	4887	39.3	6089	38.1	6934	40.0	7297	41.9	8449	42.6	10633	47.2	13657	51.5	14842	52.3

*SDP in 2002, 2003 and 2004 included private centres and university hospitals

Table 1.3.6(b): Distribution of Cataract Surgery (Excluding Children and Combined Surgery) Performed as Day Care by SDP, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	N	%	n	%	n	%	n	%
All	4887	39.3	6089	38.0	6934	40.0	7297	41.9	8449	42.6	10633	47.2	13657	51.5	14842	52.3
A	218	24.0	262	26.0	30	70.0	91	27.6	74	8.0	3	0.3	186	13.8	206	11.9
B	-	-	-	-	-	-	3	100.0	181	99.5	412	97.4	574	93.6	685	98.8
C	207	98.0	519	85.0	85	15.0	317	62.2	311	56.9	303	52.0	246	61.3	353	65.2
D	-	-	-	-	-	-	-	0.0	2	7.7	1	0.9	9	3.8	18	6.1
E	20	16.0	139	26.0	24	76.0	82	12.4	25	5.5	650	88.8	714	90.8	719	93.5
F	0	0.0	0	0.0	2	98.0	-	0.0	0	0.0	0	0.0	0	0.0	0	0.0
G	1	4.0	27	3.0	3	97.0	672	48.2	896	58.1	1267	66.0	1487	75.4	1104	71.5
H	10	4.0	5	2.0	2	98.0	0	0.3	2	0.5	3	0.8	3	0.8	5	1.3
I	-	-	-	-	-	-	1	0.0	1	3.5	3	10.7	0	0.0	0	0.0
J	14	5.0	26	5.0	8	92.0	8	1.1	17	2.5	124	14.8	294	33.5	220	24.9
K	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	2	1.0	75	33.3
L	926	91.0	708	84.0	69.0	31.0	-	0.0	35	92.1	725	53.3	684	42.4	486	30.3
M	1	3.0	2	1.0	44	56.0	61	29.0	49	19.0	10	5.1	14	4.6	17	4.0
N	206	54.0	100	41.0	38	62.0	142	29.5	194	28.0	168	24.3	222	34.2	334	47.0
O	875	90.0	884	92.0	92	8.0	1420	98.2	1483	95.9	1121	89.3	1425	90.2	1530	95.7
P	-	-	NA	-	92	8.0	15	100.0	385	99.7	397	99.7	568	99.3	640	100.0
Q	10	2.0	0	0.0	4	96.0	2	0.6	0	0.0	1	0.2	0	0.0	1	0.1
R	759	69.0	759	82.0	82	18.0	960	93.5	1193	91.9	1232	92.0	1682	94.8	1946	97.1
S	26	63.0	68	79.0	91	9.0	182	95.3	201	81.7	191	76.7	254	90.7	299	92.3
T	51	11.0	55	8.0	31	69.0	124	67.2	212	64.8	384	97.0	500	98.4	640	97.3
U	NA	NA	733	84.0	88	12.0	1011	90.7	995	78.8	1026	86.8	1219	87.0	1305	91.1
V	-	-	-	-	-	-	313	55.0	382	57.4	388	67.2	310	60.5	291	46.5
W	0	0.0	0	0.0	0	100.0	0	0.0	1	0.4	1	0.3	2	0.4	3	0.6
X	-	-	-	-	-	-	10	7.0	45	13.1	83	25.9	194	51.2	224	53.8
Y	-	-	-	-	-	-	1	1.0	8	4.6	1	0.5	1	0.4	2	0.7
Z	100	10.0	47	6.0	4	96.0	48	3.2	44	3.3	42	3.5	45	3.7	14	1.4
AA	-	-	-	-	-	-	99	78.0	230	74.4	312	81.0	392	85.4	377	85.9
AB	48	12.0	130	24.0	3	97.0	5	1.0	2	0.4	3	0.5	59	11.0	377	47.3
AC	34	8.0	175	52.0	32	68.0	54	20.5	46	12.7	95	16.4	117	13.9	130	14.3
AD	0	0.0	1	0.4	1	99.0	1	0.6	0	0.0	0	0.0	0	0.0	0	0.0
AE	207	54.0	166	28.0	11	89.0	2	0.3	66	11.5	1	0.2	1	0.1	5	0.8
AF	-	-	-	-	-	-	1	0.2	5	1.0	2	0.3	1	0.2	151	22.3
AG	172	42.0	105	27.0	12	88.0	7	30.4	50	14.8	20	7.9	28	5.1	38	5.9
AH	21	3.0	8	1.0	2	98.0	11	1.1	22	1.9	65	7.5	87	9.6	159	17.9
AI	345	44.0	390	53.0	57	43.0	589	70.3	399	69.3	789	85.3	1241	89.4	1433	93.7
AJ	578	83.0	544	88.0	87	13.0	863	91.0	893	93.6	809	95.2	1096	95.0	1055	97.1

Figure 1.3.6(a): Distribution of Cataract Surgery Performed as Day Care by SDP, CSR 2011

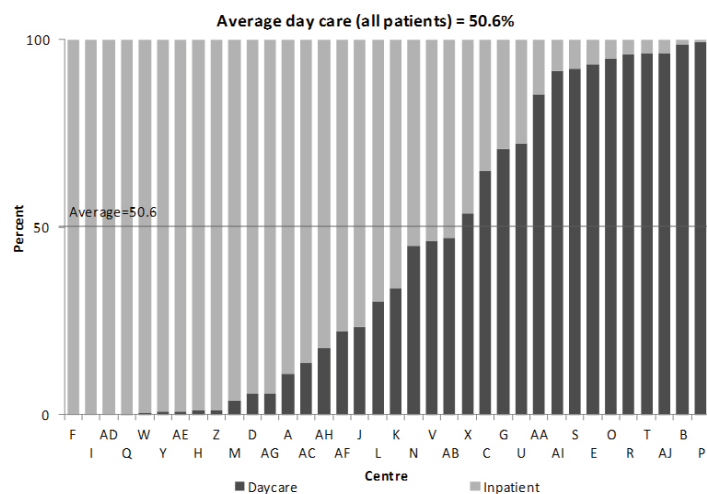


Figure 1.3.6(b): Distribution of Cataract Surgery Performed as Day Care and In-patient by SDP (Excluding Surgery Done in Children and Combined Surgery), CSR 2011

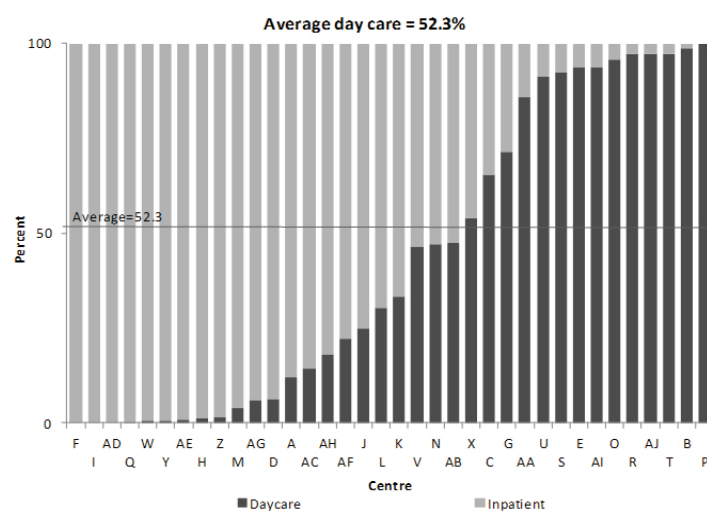
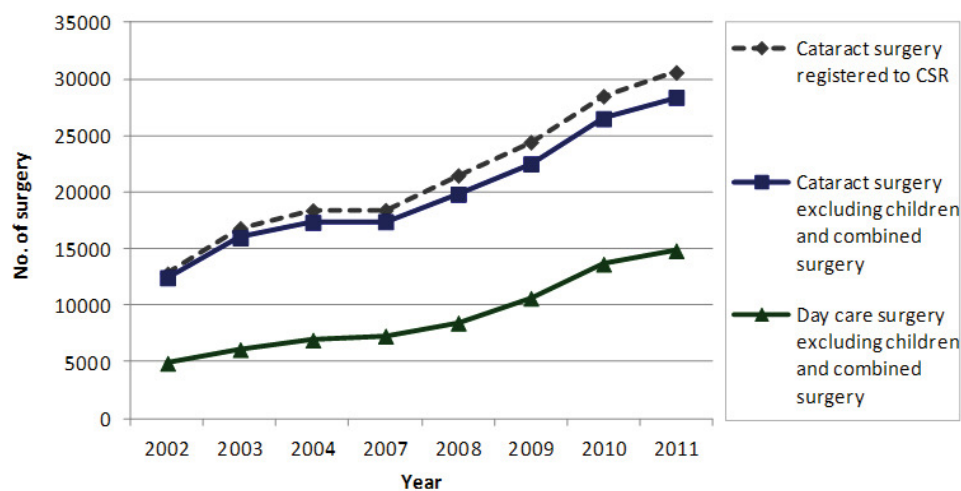


Figure 1.3.6(c): Distribution of Cataract Surgeries Performed as Day Care all SDPs (Excluding Surgery Done in Children and Combined Surgery), CSR 2002-2011



1.3.7 Distribution of Types of Cataract Surgery

There was a change from ECCE to phaco as the preferred method of performing cataract surgery. However, the percentage was still below 90.0%. In general, all SDP showed an increasing percentage of phaco performed throughout the years. The percentage of phaco converted to ECCE, the proxy indicator for competency in performing phaco surgery, remained constant over the years.

Table 1.3.7(a): Distribution of Types of Cataract Surgery, CSR 2002-2011

Year	2002		2003		2004		2007		2008*		2009		2010		2011	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Phaco	5085	39.7	7674	45.6	9282	50.5	11960	65.1	14781	69.1	17717	72.5	21810	76.5	23872	78.0
ECCE	6914	54.0	8012	47.6	7830	42.6	5524	30.1	5627	26.3	5457	22.3	5363	18.8	5291	17.3
Lens Aspiration	372	2.9	435	2.6	550	3.0	323	1.8	340	1.6	400	1.6	451	1.6	460	1.5
Phaco converted to ECCE	311	2.4	469	2.8	454	2.5	432	2.4	524	2.4	573	2.3	586	2.1	652	2.1
ICCE	81	0.6	94	0.6	103	0.6	141	0.8	129	0.6	134	0.5	143	0.5	123	0.4

Figure 1.3.7 Distribution of Phacoemulsification, ECCE and Phaco Converted to ECCE, CSR 2002-2011

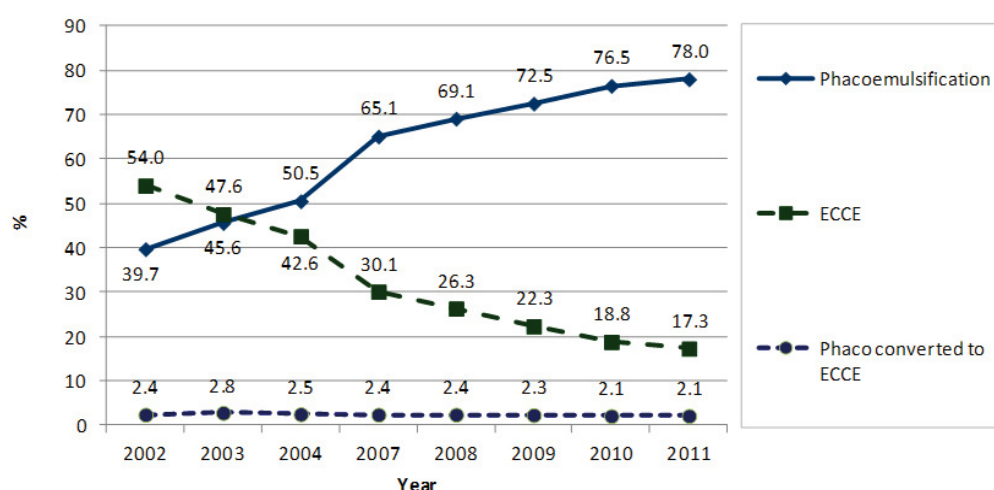


Table 1.3.7(b): Distribution of Types of Cataract Surgery by SDP, CSR 2011

	Type of Cataract Surgery											
	All Surgeries		Phaco		ECCE		Lens Aspiration		Phaco Converted to ECCE		ICCE	
	N	%	n	%	n	%	n	%	n	%	n	%
All SDP	30611	100.0	23872	78.0	5291	17.3	460	1.5	652	2.1	123	0.4
A	1939	100.0	1510	77.9	349	18.0	35	1.8	24	1.2	4	0.2
B	708	100.0	661	93.4	28	4.0	4	0.6	11	1.6	4	0.6
C	554	100.0	425	76.7	104	18.8	11	2.0	4	0.7	9	1.6
D	332	100.0	241	72.6	83	25.0	2	0.6	6	1.8	0	0.0
E	803	100.0	427	53.2	350	43.6	6	0.7	16	2.0	3	0.4
F	271	100.0	21	7.7	231	85.2	12	4.4	4	1.5	2	0.7
G	1826	100.0	1496	81.9	193	10.6	16	0.9	23	1.3	8	0.4
H	403	100.0	375	93.1	19	4.7	4	1.0	5	1.2	0	0.0
I	52	100.0	0	0.0	51	98.1	1	1.9	0	0.0	0	0.0
J	946	100.0	580	61.3	287	30.3	35	3.7	39	4.1	4	0.4
K	240	100.0	211	87.9	15	6.3	3	1.3	3	1.3	5	2.1
L	1622	100.0	1091	67.3	454	28.0	14	0.9	51	3.1	4	0.2
M	483	100.0	376	77.8	81	16.8	5	1.0	19	3.9	0	0.0
N	770	100.0	517	67.1	201	26.1	36	4.7	13	1.7	2	0.3
O	1642	100.0	1315	80.1	274	16.7	22	1.3	18	1.1	7	0.4
P	657	100.0	593	90.3	48	7.3	11	1.7	0	0.0	3	0.5
Q	692	100.0	616	89.0	38	5.5	18	2.6	17	2.5	0	0.0
R	2186	100.0	2077	95.0	68	3.1	5	0.2	29	1.3	5	0.2
S	329	100.0	263	79.9	42	12.8	6	1.8	16	4.9	2	0.6
T	686	100.0	534	77.8	96	14.0	13	1.9	21	3.1	13	1.9
U	1859	100.0	1619	87.1	116	6.2	45	2.4	42	2.3	5	0.3
V	666	100.0	466	70.0	156	23.4	14	2.1	26	3.9	4	0.6
W	505	100.0	376	74.5	96	19.0	3	0.6	21	4.2	6	1.2
X	420	100.0	344	81.9	65	15.5	0	0.0	10	2.4	1	0.2
Y	283	100.0	189	66.8	83	29.3	5	1.8	5	1.8	1	0.4
Z	1127	100.0	986	87.5	72	6.4	35	3.1	24	2.1	4	0.4
AA	450	100.0	371	82.4	54	12.0	8	1.8	17	3.8	0	0.0
AB	811	100.0	662	81.6	101	12.5	6	0.7	36	4.4	3	0.4
AC	953	100.0	618	64.8	315	33.1	11	1.2	8	0.8	1	0.1
AD	575	100.0	0	0.0	557	96.9	15	2.6	0	0.0	1	0.2
AE	663	100.0	571	86.1	72	10.9	4	0.6	11	1.7	4	0.6
AF	681	100.0	537	78.9	79	11.6	7	1.0	52	7.6	5	0.7
AG	680	100.0	533	78.4	98	14.4	11	1.6	34	5.0	3	0.4
AH	1061	100.0	907	85.5	120	11.3	13	1.2	12	1.1	2	0.2
AI	1605	100.0	1368	85.2	194	12.1	13	0.8	15	0.9	7	0.4
AJ	1131	100.0	996	88.1	101	8.9	11	1.0	20	1.8	1	0.1

Table 1.3.7(c): Distribution of Phacoemulsification by SDP, CSR 2002-2011

Years	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All SDP	5085	40	7674	46	9282	50	11960	65.1	14781	69.1	17717	72.5	21810	76.5	23872	78.0
A	263	28	351	33	467	41	240	58.4	715	72.9	702	63.2	1147	75.1	1510	77.9
B	-	-	-	-	-	-	3	75.0	75	36.1	308	71.1	558	89.0	661	93.4
C	-	-	240	39	276	49	453	81.6	451	79.1	443	73.6	307	74.7	425	76.7
D	-	-	-	-	-	-	-	-	9	31.0	75	60.5	183	70.9	241	72.6
E	-	-	350	65	529	78	403	59.2	163	33.5	462	62.2	503	62.6	427	53.2
F	0	0	0	0	0	0	NA	NA	0	0.0	0	0.0	4	1.9	21	7.7
G	22	7	339	32	293	36	1117	71.4	1434	83.6	1801	84.3	1913	87.0	1496	81.9
H	496	46	16	4	35	11	91	28.1	303	75.9	367	92.0	342	85.5	375	93.1
I	-	-	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0
J	43	20	209	35	259	41	406	49.9	383	51.8	538	59.1	604	62.9	580	61.3
K	-	-	-	-	-	-	0	0	78	45.9	85	48.6	168	77.4	211	87.9
L	157	37.0	440	51.0	387	51.0	NA	NA	25	62.5	925	65.8	1141	69.2	1091	67.3
M			2	1	1	1	24	11.4	58	20.6	73	25.2	149	46.3	376	77.8
N	488	66	74	27	70	30	242	46.5	429	59.4	473	63.7	453	63.4	517	67.1
O	255	49	630	61	742	61	1152	75.9	1335	80.3	1111	80.1	1295	78.1	1315	80.1
P	-	-	-	-	-	-	7	46.7	296	74.7	392	97.0	556	96.4	593	90.3
Q	509	45	398	66	277	76	281	80.1	236	70.7	452	83.4	526	85.3	616	89.0
R	273	57	432	46	577	51	751	68.1	1116	82.3	1208	87.9	1707	91.0	2077	95.0
S	96	41	9	10	13	11	93	45.8	166	64.8	186	74.1	200	70.9	263	79.9
T	169	20.0	406	58.0	630	71.0	346	65.4	260	74.3	331	76.4	481	77.1	534	77.8
U	-	-	671	68	1031	79	1305	92.4	1291	91.0	1255	88.5	1542	90.8	1619	87.1
V	-	-	-	-	-	-	412	68.1	521	75.0	483	80.8	371	71.3	466	70.0
W	519	51	1	0	6	2	0	0.0	0	0.0	126	32.6	386	84.8	376	74.5
X	-	-	-	-	-	-	14	9.3	111	31.7	203	62.1	314	81.1	344	81.9
Y	-	-	-	-	-	-	64	63.4	114	63.7	131	70.8	172	66.7	189	66.8
Z	133	32	484	57	579	56	1418	91.9	1293	94.0	1166	88.5	1274	92.5	986	87.5
AA	-	-	-	-	-	-	121	82.9	271	85.2	272	70.3	346	73.9	371	82.4
AB	153	36	321	58	381	72	410	82.5	483	76.4	580	84.8	455	81.5	662	81.6
AC	1	1	116	34	176	44	100	35.8	169	44.6	440	71.9	552	62.1	618	64.8
AD	205	52	1	0	14	7	0	0	3	1	0	0.0	0	0.0	0	0.0
AE	206	49	470	76	199	43	435	64.8	358	60.9	465	76.0	564	81.7	571	86.1
AF	-	-	-	-	-	-	210	47.3	354	67.0	393	61.4	317	70.4	537	78.9
AG	315	39.0	245	62.0	294	57	22	91.7	314	80.9	218	74.4	448	72.8	533	78.4
AH	19	7	323	46	462	57	570	55.0	655	53.8	486	53.8	617	61.3	907	85.5
AI	0	0	203	26	420	46	589	61.9	610	68.9	912	74.2	1249	82.2	1368	85.2
AJ	593	58	377	56	389	44	680	68.0	702	69.4	654	73.2	966	80.0	996	88.1

Table 1.3.7(d): Distribution of ECCE by SDP, CSR 2002-2011

Years	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All SDP	6914	54	8012	48	7830	43	5524	30.1	5627	26.3	5457	22.3	5363	18.8	5291	17.3
A	649	68	664	62	603	53	160	38.9	247	25.2	349	31.4	310	20.3	349	18.0
B	-	-	-	-	-	-	1	25.0	106	51.0	102	23.6	38	6.1	28	4.0
C	-	-	328	53	272	48	83	15.0	95	16.7	130	21.6	78	19.0	104	18.8
D	-	-	-	-	-	-	-	-	19	65.5	38	30.6	70	27.1	83	25.0
E	-	-	135	25	100	15	265	38.9	315	64.7	265	35.7	284	35.3	350	43.6
F	123	95	130	98	119	99	NA	NA	130	99.2	154	97.5	191	91.8	231	85.2
G	261	89	669	63	479	59	396	25.3	240	14.0	238	11.1	208	9.5	193	10.6
H	513	48	335	92	262	83	223	68.8	86	21.6	18	4.5	46	11.5	19	4.7
I	-	-	-	-	-	-	-	-	33	97.1	28	90.3	72	94.7	51	98.1
J	162	76	323	54	304	48	337	41.4	302	40.9	302	33.2	280	29.2	287	30.3
K	-	-	-	-	-	-	119	95.2	81	47.6	82	46.9	33	15.2	15	6.3
L	223	53.0	356	41.0	280	37.0	NA	NA	12	30.0	403	28.7	447	27.1	454	28.0
M			161	96	139	96	164	77.7	190	67.6	175	60.3	137	42.5	81	16.8
N	208	28	163	59	121	52	243	46.7	238	33.0	226	30.4	207	29.0	201	26.1
O	234	45	329	32	404	33	307	20.2	271	16.3	205	14.8	283	17.1	274	16.7
P	-	-	-	-	-	-	7	46.7	95	24.0	10	2.5	15	2.6	48	7.3
Q	557	49	177	29	69	19	49	14.0	81	24.3	52	9.6	44	7.1	38	5.5
R	161	34	466	49	486	43	270	24.5	177	13.1	124	9.0	127	6.8	68	3.1
S	123	53	75	86	103	86	104	51.2	79	30.9	57	22.7	65	23.0	42	12.8
T	606	73.0	230	33.0	180	20.0	155	29.3	74	21.1	62	14.3	117	18.8	96	14.0
U	NA	NA	248	25	197	15	44	3.1	70	4.9	106	7.5	80	4.7	116	6.2
V	-	-	-	-	-	-	151	25.0	133	19.1	79	13.2	113	21.7	156	23.4
W	449	44	288	93	272	91	372	97.1	257	97.7	258	66.7	48	10.5	96	19.0
X	-	-	-	-	-	-	134	88.7	233	66.6	122	37.3	71	18.3	65	15.5
Y	-	-	-	-	-	-	32	31.7	61	34.1	49	26.5	72	27.9	83	29.3
Z	244	59	326	39	385	37	53	3.4	30	2.2	55	4.2	27	2.0	72	6.4
AA	-	-	-	-	-	-	8	5.5	25	7.9	88	22.7	89	19.0	54	12.0
AB	232	54	187	34	109	21	57	11.5	99	15.7	58	8.5	70	12.5	101	12.5
AC	184	98	196	57	194	48	159	57.0	194	51.2	154	25.2	303	34.1	315	33.1
AD	176	45	252	96	176	86	196	97.5	305	97.1	292	98.0	380	94.8	557	96.9
AE	183	43	125	20	250	55	222	33.1	193	32.8	111	18.1	92	13.3	72	10.9
AF	-	-	-	-	-	-	210	47.3	138	26.1	204	31.9	104	23.1	79	11.6
AG	431	54.0	134	34.0	176	34.0	1	4.2	37	9.5	46	15.7	114	18.5	98	14.4
AH	219	82	323	46	292	36	403	38.9	499	41.0	368	40.7	341	33.9	120	11.3
AI	256	98	517	65	435	48	319	33.5	219	24.7	261	21.2	226	14.9	194	12.1
AJ	356	35	229	34	403	45	276	27.6	263	26.0	186	20.8	181	15.0	101	8.9

1.3.8 Distribution of Combined Surgery

The proportion of cataract surgery which was performed in combination with VR surgery showed an increasing trend over the years. The percentage when it was combined with filtering surgery or pterygium surgery showed a decreasing trend over the years. Cataract surgery combined with penetrating keratoplasty remained infrequently performed over the years.

Table 1.3.8(a): Distribution of Combined Surgery all SDP, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any types of combined surgeries	375	2.9	581	3.4	733	4.9	891	4.8	664	3.1	871	3.6	1082	3.8	1194	3.9
Specific types of combined surgery																
Pterygium Surgery	86	0.7	120	0.7	147	0.8	135	0.7	94	0.4	100	0.4	99	0.3	133	0.4
Filtering Glaucoma Surgery	148	1.2	210	1.2	235	1.3	131	0.7	142	0.7	132	0.5	121	0.4	64	0.2
Vitreoretinal Surgery	26	0.2	100	0.6	186	1.0	435	2.4	237	1.1	402	1.6	601	2.1	672	2.2
Penetrating Keratoplasty	1	0.007	0	0.0	3	0.02	0	0.0	3	0.0	6	0.0	2	0.0	1	0.0
Others	124	1.0	170	1.0	149	0.8	190	1.0	188	0.9	259	1.1	272	1.0	344	1.1

Figure 1.3.8(a): Distribution of Specific Combined Surgery, CSR 2002-2011

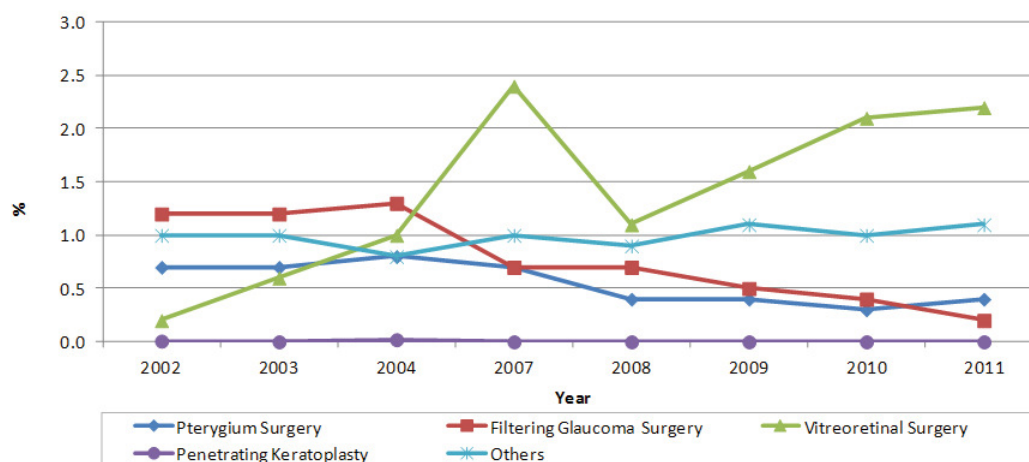


Table 1.3.8(b): Distribution of Combined Surgery by SDP, CSR 2011

	Combined Surgery												
	All Surgeries	Any Combined Surgery		Pterygium Surgery		Filtering Surgery		Vitreo-Retinal Surgery		Penetrating Keratoplasty		Others	
	N	n	%	n	%	n	%	n	%	n	%	n	%
All SDP	30611	1194	3.9	133	0.4	64	0.2	672	2.2	1	0.0	344	1.1
A	1939	160	8.3	21	1.1	9	0.5	104	5.4	0	0.0	28	1.4
B	708	8	1.1	1	0.1	1	0.1	1	0.1	0	0.0	5	0.7
C	554	10	1.8	7	1.3	0	0.0	0	0.0	0	0.0	3	0.5
D	332	33	9.9	22	6.6	6	1.8	2	0.6	0	0.0	3	0.9
E	803	21	2.6	2	0.2	3	0.4	1	0.1	0	0.0	15	1.9
F	271	8	3.0	0	0.0	2	0.7	0	0.0	0	0.0	6	2.2
G	1826	15	0.8	3	0.2	3	0.2	0	0.0	0	0.0	9	0.5
H	403	3	0.7	0	0.0	3	0.7	0	0.0	0	0.0	0	0.0
I	52	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
J	946	42	4.4	1	0.1	7	0.7	25	2.6	0	0.0	10	1.1
K	240	12	5.0	0	0.0	4	1.7	1	0.4	0	0.0	9	3.8
L	1622	1	0.1	0	0.0	0	0.0	1	0.1	0	0.0	0	0.0
M	483	9	1.9	0	0.0	0	0.0	0	0.0	0	0.0	9	1.9
N	770	43	5.6	7	0.9	1	0.1	18	2.3	1	0.0	19	2.5
O	1642	17	1.0	1	0.1	7	0.4	7	0.4	0	0.0	3	0.2
P	657	6	0.9	2	0.3	2	0.3	0	0.0	0	0.0	2	0.3
Q	692	6	0.9	1	0.1	1	0.1	0	0.0	0	0.0	4	0.6
R	2186	39	1.8	1	0.0	0	0.0	35	1.6	0	0.0	3	0.1
S	329	5	1.5	2	0.6	0	0.0	0	0.0	0	0.0	4	1.2
T	686	19	2.8	5	0.7	0	0.0	0	0.0	0	0.0	14	2.0
U	1859	380	20.4	0	0.0	7	0.4	332	17.9	0	0.0	43	2.3
V	666	4	0.6	1	0.2	0	0.0	1	0.2	0	0.0	2	0.3
W	505	3	0.6	1	0.2	0	0.0	0	0.0	0	0.0	2	0.4
X	420	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
Y	283	1	0.4	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4
Z	1127	115	10.2	1	0.1	5	0.4	55	4.9	0	0.0	56	5.0
AA	450	3	0.7	0	0.0	0	0.0	0	0.0	0	0.0	3	0.7
AB	811	3	0.4	0	0.0	0	0.0	0	0.0	0	0.0	3	0.4
AC	953	37	3.9	15	1.6	1	0.1	0	0.0	0	0.0	21	2.2
AD	575	55	9.6	27	4.7	0	0.0	0	0.0	0	0.0	28	4.9
AE	663	4	0.6	3	0.5	0	0.0	0	0.0	0	0.0	1	0.2
AF	681	4	0.6	0	0.0	0	0.0	0	0.0	0	0.0	4	0.6
AG	680	26	3.8	7	1.0	0	0.0	15	2.2	0	0.0	4	0.6
AH	1061	21	2.0	0	0.0	0	0.0	15	1.4	0	0.0	6	0.6
AI	1605	54	3.4	1	0.1	2	0.1	35	2.2	0	0.0	22	1.4
AJ	1131	26	2.3	1	0.1	0	0.0	24	2.1	0	0.0	1	0.1

1.3.9 Anaesthesia in Cataract Surgery

The number of eyes operated under local anaesthesia (LA) was maintained at more than 90.0% every year. Topical anaesthesia use has been increasing over the years and has achieved 58.8% in 2011. There was a decreasing use of peribulbar, retrobulbar and facial block anaesthesia. The percentage of surgeons using combined LA is increasing from 2008 onwards.

Among patients whose cataract surgeries were done under LA, a 10% of them was also given oral sedation. This practice was done at Hospital E, M, R, AB and AF and remained unchanged throughout the years.

In 2010, Hospital A, L, V, Y, AA, AC, AG and AH performed > 10.0% of cases under GA.

Table 1.3.9(a): Types of Anaesthesia all SDPs, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
General Anesthesia	818	6.4	1136	7.0	1379	7.3	1207	6.6	1223	5.7	1578	6.5	1884	6.6	1845	6.0
Local Anesthesia	11980	93.6	15679	93.2	17013	92.5	17143	93.4	20188	94.3	22776	93.2	26440	92.8	28634	93.5
Type of local anaesthesia																
Subtenon	5647	47.1	8076	51.5	9260	54.4	9990	58.3	11014	54.6	11525	50.6	10952	41.4	10512	36.7
Topical	1406	11.7	2819	18.0	3978	23.4	4853	28.3	6680	33.1	8382	36.8	13112	49.6	16825	58.8
Peribulbar	2601	21.7	2575	16.4	2940	1.3	1282	7.5	1227	6.1	1244	5.5	881	3.3	440	1.5
Retrobulbar	3100	25.9	2952	18.8	2186	12.8	1031	6.0	1182	5.9	1037	4.6	864	3.3	808	2.8
Intracameral	NA	NA	NA	NA	NA	NA	249	1.5	710	3.5	1596	7.0	2587	9.8	2933	10.2
Subconjunctival	28	0.2	141	0.9	139	0.8	232	1.4	251	1.2	437	1.9	898	3.4	771	2.7
Facial block	1348	11.3	865	5.5	226	1.3	20	0.1	143	0.7	95	0.4	40	0.2	43	0.2
Others	12	0.1	0	0.0	1	0.0	223	1.3	NA	NA	0	0.0	NA	NA	NA	NA
Combined local anaesthesia	1983	16.6	1685	10.7	1678	9.9	497	2.9	537	2.7	1918	8.4	3182	12.0	4038	14.1
Types of sedation for patients under LA																
No sedation	7507	62.7	12021	76.7	14031	82.5	9668	56.4*	11234	55.6	12809	56.2	15970	60.4	18646	65.1
Oral sedation alone	3995	33.3	3354	21.4	2729	16	2387	13.9	2923	14.5	3532	15.5	3171	12.0	2852	10.0
Intravenous alone	108	0.9	91	0.6	144	0.8	72	0.4	37	0.2	35	0.2	22	0.1	27	0.1
Intravenous plus oral	83	0.7	53	0.3	15	0.1	0	0.0	NA	NA	NA	NA	2	0.0	6	0.0
Intramuscular alone	426	3.6	261	1.7	104	0.6	3	0.02	121	0.6	52	0.2	0	0.0	3	0.0

* There was a significant percentage of missing values in sedation for 2007; these missing values may be in 'no sedation' category where data were not entered.

Figure 1.3.9: Types of Anaesthesia all SDPs, CSR 2002-2011

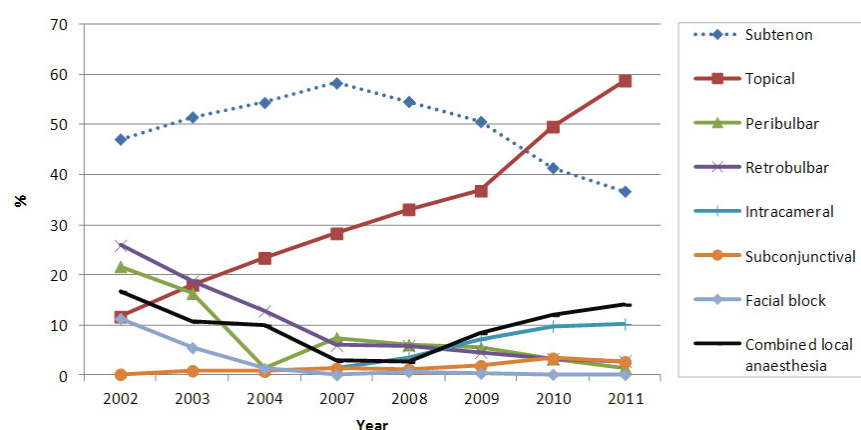


Table 1.3.9(b): Types of Anaesthesia by SDPs, CSR 2011

	Types of Anaesthesia				
	General			Local	
	N	n	%	n	%
All SDP	30611	1845	6.0	28634	93.5
A	1939	215	11.1	1716	88.5
B	708	5	0.7	703	99.3
C	554	18	3.2	536	96.8
D	332	4	1.2	328	98.8
E	803	21	2.6	779	97.0
F	271	18	6.6	252	93.0
G	1826	124	6.8	1649	90.3
H	403	6	1.5	397	98.5
I	52	8	15.4	44	84.6
J	946	52	5.5	893	94.4
K	240	5	2.1	234	97.5
L	1622	253	15.6	1365	84.2
M	483	14	2.9	466	96.5
N	770	50	6.5	720	93.5
O	1642	61	3.7	1571	95.7
P	657	10	1.5	647	98.5
Q	692	34	4.9	658	95.1
R	2186	18	0.8	2166	99.1
S	329	30	9.1	299	90.9
T	686	29	4.2	651	94.9
U	1859	65	3.5	1790	96.3
V	666	54	8.1	611	91.7
W	505	3	0.6	502	99.4
X	420	9	2.1	411	97.9
Y	283	102	36.0	181	64.0
Z	1127	66	5.9	1060	94.1
AA	450	48	10.7	402	89.3
AB	811	37	4.6	772	95.2
AC	953	123	12.9	830	87.1
AD	575	22	3.8	553	96.2
AE	663	15	2.3	645	97.3
AF	681	31	4.6	650	95.4
AG	680	87	12.8	591	86.9
AH	1061	113	10.7	927	87.4
AI	1605	67	4.2	1535	95.6
AJ	1131	28	2.5	1100	97.3

Table 1.3.9(c): Types of Local Anaesthesia by SDPs, CSR 2011

	Local Anaesthesia																
	All	Retrobulbar	Peribulbar	Subtenon		Sub-conjunctival		Facial block		Topical		Intracameral		Combined			
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All SDP	28634	808	2.8	440	1.5	10512	36.7	771	2.7	43	0.2	16825	58.8	2933	10.2	4038	14.1
A	1716	168	9.8	1	0.1	323	18.8	7	0.4	1	0.1	876	51.0	433	25.2	104	6.1
B	703	1	0.1	0	0.0	27	3.8	0	0.0	1	0.1	674	95.9	677	96.3	673	95.7
C	536	0	0.0	0	0.0	156	29.1	13	2.4	0	0.0	355	66.2	149	27.8	137	25.6
D	328	0	0.0	0	0.0	328	100.0	1	0.3	0	0.0	0	0.0	0	0.0	1	0.3
E	779	2	0.3	1	0.1	423	54.3	0	0.0	0	0.0	1	0.1	352	45.2	5	0.6
F	252	16	6.3	69	27.4	140	55.6	10	4.0	10	4.0	83	32.9	17	6.7	96	38.1
G	1649	0	0.0	30	1.8	387	23.5	71	4.3	0	0.0	1348	81.7	570	34.6	726	44.0
H	397	0	0.0	0	0.0	397	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
I	44	0	0.0	44	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
J	893	0	0.0	1	0.1	884	99.0	0	0.0	0	0.0	7	0.8	0	0.0	1	0.1
K	234	0	0.0	2	0.9	222	94.9	0	0.0	0	0.0	93	39.7	0	0.0	83	35.5
L	1365	25	1.8	240	17.6	829	60.7	12	0.9	3	0.2	202	14.8	127	9.3	69	5.1
M	466	0	0.0	6	1.3	371	79.6	1	0.2	0	0.0	38	8.2	0	0.0	2	0.4
N	720	1	0.1	0	0.0	274	38.1	0	0.0	0	0.0	445	61.8	0	0.0	2	0.3
O	1571	1	0.1	0	0.0	211	13.4	1	0.1	1	0.1	1549	98.6	2	0.1	200	12.7
P	647	0	0.0	0	0.0	161	24.9	1	0.2	1	0.2	478	73.9	0	0.0	0	0.0
Q	658	0	0.0	0	0.0	104	15.8	0	0.0	0	0.0	547	83.1	1	0.2	0	0.0
R	2166	26	1.2	0	0.0	76	3.5	14	0.6	2	0.1	2002	92.4	0	0.0	33	1.5
S	299	0	0.0	0	0.0	240	80.3	0	0.0	0	0.0	3	1.0	57	19.1	3	1.0
T	651	0	0.0	0	0.0	91	14.0	1	0.2	1	0.2	582	89.4	18	2.8	55	8.4
U	1790	347	19.4	1	0.1	211	11.8	5	0.3	2	0.1	1255	70.1	35	2.0	086	4.8
V	611	1	0.2	1	0.2	432	70.7	3	0.5	0	0.0	164	26.8	1	0.2	1	0.2
W	502	1	0.2	2	0.4	37	7.4	1	0.2	0	0.0	450	89.6	22	4.4	25	5.0
X	411	0	0.0	0	0.0	47	11.4	0	0.0	0	0.0	365	88.8	1	0.2	6	1.5
Y	181	1	0.6	0	0.0	0	0.0	134	74.0	13	7.2	58	32.0	0	0.0	26	14.4
Z	1060	52	4.9	14	1.3	436	41.1	467	44.1	3	0.3	1034	97.5	3	0.3	946	89.2
AA	402	0	0.0	1	0.2	319	79.4	6	1.5	0	0.0	76	18.9	1	0.2	1	0.2
AB	772	2	0.3	0	0.0	180	23.3	2	0.3	0	0.0	640	82.9	341	44.2	390	50.5
AC	830	0	0.0	0	0.0	402	48.4	5	0.6	0	0.0	431	51.9	0	0.0	8	1.0
AD	553	0	0.0	0	0.0	553	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	645	2	0.3	0	0.0	472	73.2	1	0.2	2	0.3	152	23.6	107	16.6	98	15.2
AF	650	1	0.2	0	0.0	611	94.0	5	0.8	0	0.0	39	6.0	18	2.8	29	4.5
AG	591	132	22.3	1	0.2	456	77.2	1	0.2	1	0.2	7	1.2	0	0.0	8	1.4
AH	927	20	2.2	1	0.1	67	7.2	2	0.2	1	0.1	751	81.0	0	0.0	3	0.3
AI	1535	4	0.3	23	1.5	591	38.5	4	0.3	1	0.1	1059	69.0	0	0.0	189	12.3
AJ	1100	5	0.5	2	0.2	54	4.9	3	0.3	0	0.0	1061	96.5	1	0.1	32	2.9

Table 1.3.9(d): Types of Local Anaesthesia by SDPs Excluding Combined Surgery, CSR 2011

	All	Local Anesthesia																Combined
		Retrobulbar		Peribulbar		Subtenon		Sub-conjunctival		Facial block		Topical		Intracameral				
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
All	27673	315	1.1	431	1.6	10193	36.8	752	2.7	42	0.2	16570	59.9	2904	10.5	3866	14.0	
A	1604	92	5.7	1	0.1	303	18.9	7	0.4	1	0.1	860	53.6	426	26.6	96	6.0	
B	695	1	0.1	0	0.0	27	3.9	0	0.0	1	0.1	668	96.1	669	96.3	667	96.0	
C	526	0	0.0	0	0.0	150	28.5	13	2.5	0	0.0	351	66.7	147	27.9	134	25.5	
D	295	0	0.0	0	0.0	295	100.0	1	0.3	0	0.0	0	0.0	0	0.0	1	0.3	
E	759	2	0.3	1	0.1	411	54.2	0	0.0	0	0.0	1	0.1	344	45.3	5	0.7	
F	244	16	6.6	66	27.0	135	55.3	10	4.1	10	4.1	82	33.6	16	6.6	94	38.5	
G	1637	0	0.0	30	1.8	378	23.1	71	4.3	0	0.0	1342	82.0	569	34.8	722	44.1	
H	394	0	0.0	0	0.0	394	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
I	44	0	0.0	44	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	
J	874	0	0.0	1	0.1	865	99.0	0	0.0	0	0.0	7	0.8	0	0.0	1	0.1	
K	223	0	0.0	2	0.9	211	94.6	0	0.0	0	0.0	88	39.5	0	0.0	78	35.0	
L	1365	25	1.8	240	17.6	829	60.7	12	0.9	3	0.2	202	14.8	127	9.3	69	5.1	
M	460	0	0.0	6	1.3	368	80.0	1	0.2	0	0.0	38	8.3	0	0.0	2	0.4	
N	698	1	0.1	0	0.0	257	36.8	0	0.0	0	0.0	440	63.0	0	0.0	2	0.3	
O	1562	1	0.1	0	0.0	205	13.1	1	0.1	1	0.1	1541	98.7	2	0.1	195	12.5	
P	641	0	0.0	0	0.0	157	24.5	1	0.2	1	0.2	476	74.3	0	0.0	0	0.0	
Q	653	0	0.0	0	0.0	102	15.6	0	0.0	0	0.0	544	83.3	1	0.2	0	0.0	
R	2127	1	0.0	0	0.0	75	3.5	14	0.7	2	0.1	1988	93.5	0	0.0	28	1.3	
S	296	0	0.0	0	0.0	237	80.1	0	0.0	0	0.0	3	1.0	57	19.3	3	1.0	
T	635	0	0.0	0	0.0	85	13.4	1	0.2	1	0.2	568	89.4	18	2.8	51	8.0	
U	1431	11	0.8	0	0.0	198	13.8	4	0.3	2	0.1	1240	86.7	35	2.4	80	5.6	
V	608	1	0.2	1	0.2	429	70.6	3	0.5	0	0.0	164	27.0	1	0.2	1	0.2	
W	499	1	0.2	2	0.4	37	7.4	1	0.2	0	0.0	447	89.6	22	4.4	25	5.0	
X	410	0	0.0	0	0.0	46	11.2	0	0.0	0	0.0	365	89.0	1	0.2	6	1.5	
Y	180	1	0.6	0	0.0	0	0.0	133	73.9	13	7.2	58	32.2	0	0.0	26	14.4	
Z	960	2	0.2	13	1.4	394	41.0	457	47.6	2	0.2	935	97.4	3	0.3	846	88.1	

All	Local Anesthesia																
	Retrobulbar		Peribulbar		Subtenon		Sub-conjunctival		Facial block		Topical		Intracameral		Combined		
N	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
AA	399	0	0.0	0	0.0	317	79.4	6	1.5	0	0.0	76	19.0	1	0.3	1	0.3
AB	771	2	0.3	0	0.0	180	23.3	2	0.3	0	0.0	639	82.9	341	44.2	390	50.6
AC	802	0	0.0	0	0.0	386	48.1	0	0.0	0	0.0	418	52.1	0	0.0	2	0.2
AD	503	0	0.0	0	0.0	503	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	642	2	0.3	0	0.0	470	73.2	1	0.2	2	0.3	151	23.5	106	16.5	97	15.1
AF	647	1	0.2	0	0.0	608	94.0	5	0.8	0	0.0	39	6.0	18	2.8	29	4.5
AG	582	131	22.5	1	0.2	448	77.0	1	0.2	1	0.2	7	1.2	0	0.0	8	1.4
AH	916	19	2.1	1	0.1	67	7.3	2	0.2	1	0.1	743	81.1	0	0.0	2	0.2
AI	1513	4	0.3	21	1.4	577	38.1	4	0.3	1	0.1	1049	69.3	0	0.0	185	12.2
AJ	1078	1	0.1	1	0.1	49	4.5	1	0.1	0	0.0	1040	96.5	0	0.0	20	1.9

Years	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All	5647	47.0	8076	52.0	9260	54.0	9990	58.3	11014	54.6	11525	50.6	10952	41.4	10512	36.7
A	86	9.0	101	10.0	394	37.0	35	9.5	109	12.1	239	25.3	274	20.7	323	18.8
B	-	-	-	-	-	-	3	75	162	78.3	110	27.1	70	11.5	27	3.8
C	-	-	599	99.0	556	99.0	545	99.6	567	99.5	562	94.8	280	69.5	156	29.1
D	-	-	-	-	-	-	-	-	24	0.0	118	99.2	255	99.6	328	100.0
E	-	-	371	73.0	405	66.0	422	69.5	294	64.1	239	32.7	399	50.8	423	54.3
F	0	0.0	0	0.0			NA	NA	0	0.0	86	57.7	116	61.4	140	55.6
G	283	99.0	627	68.0	463	64.0	702	47.1	921	56.2	872	43.5	567	27.3	387	23.5
H	604	60.0	344	100.0	294	99.0	313	98.4	389	98.5	383	98.5	383	98.7	397	100.0
I	-	-	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0
J	212	100	558	99.0	577	99.0	726	99.2	672	99.3	837	98.0	885	97.6	884	99.0
K	-	-	-	-	-	-	115	100	142	86.6	169	98.8	203	95.8	222	94.9
L	201	55.0	488	61.0	480	76.0	NA	NA	27	73.0	620	50.7	800	56.7	829	60.7

Table 1.3.9(e): Subtenon Anaesthesia by SDPs, CSR 2002-2011 (cont)

Years	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
M	-	-	24	15.0	55	39.0	208	99.5	270	97.8	252	89.7	237	79.5	371	79.6
N	98	14.0	140	59.0	120	63.0	419	85.2	590	84.8	417	59.7	267	39.8	274	38.1
O	507	99.0	400	41.0	531	47.0	443	30.1	463	28.9	376	28.5	310	19.5	211	13.4
P	-	-	-	-	2	1.0	1	6.3	352	90.0	187	46.9	90	15.7	161	24.9
Q	1004	95.0	585	100	350	99.0	166	49.7	326	98.5	528	99.2	460	77.7	104	15.8
R	2	0.0	883	99.0	1036	99.0	967	97.6	687	54.5	474	37.3	328	18.5	76	3.5
S	2	1.0	73	95.0	112	100	188	98.9	236	99.6	240	99.2	260	100.0	240	80.3
T	83	11.0	184	28.0	112	13.0	195	39.2	81	24.1	82	20.3	115	22.0	91	14.0
U	-	-	467	49.0	350	28.0	152	11.1	174	12.7	190	13.9	249	15.1	211	11.8
V	-	-	-	-	-	-	522	91.7	375	56.9	396	70.7	375	80.5	432	70.7
W	76	8.0	25	9.0	23	8.0	33	9.6	96	38.9	155	40.4	26	5.8	37	7.4
X	-	-	-	-	-	-	136	92.5	133	38.7	28	8.6	35	9.2	47	11.4
Y	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Z	3	1.0	40	5.0	197	21.0	1103	74.0	801	60.1	942	74.8	464	35.3	436	41.1
AA	-	-	-	-	-	-	98	80.3	221	90.2	325	99.4	374	91.2	319	79.4
AB	344	85.0	1	0.0	193	37.0	472	99.0	591	98.2	646	99.2	235	44.9	180	23.3
AC	0	0.0	240	74.0	216	58.0	156	71.2	166	54.2	121	22.4	328	41.4	402	48.4
AD	200	54.0	2	1.0	68	34.0	195	100	303	98.4	287	99.7	382	99.5	553	100.0
AE	47	12.0	184	33.0	249	57.0	190	28.6	406	72.0	397	66.4	386	58.2	472	73.2
AF	-	-	-	-	-	-	390	94.4	429	83.1	425	67.8	410	96.7	611	94.0
AG	633	90.0	63	19.0	196	46.0	9	47.4	162	54.9	143	63.8	358	78.9	456	77.2
AH	207	90.0	582	95.0	546	80.0	468	57.1	297	27.3	178	24.1	326	38.5	67	7.2
AI	0	0.0	175	25.0	215	26.0	210	24.1	294	35.4	356	30.7	563	38.3	591	38.5
AJ	510	53.0	292	46.0	616	73.0	404	42.7	254	26.3	145	17.1	142	12.5	54	4.9

Table 1.3.9(f): Topical Anaesthesia by SDPs, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All	1406	12.0	2819	18.0	3978	23.0	4853	28.3	6680	33.1	8382	36.8	13112	49.6	16825	58.8
A	7	1.0	1	0.0	72	7.0	1	0.3	95	10.6	124	13.1	676	51.2	876	51.0
B	-	-	-	-	-	-	3	75.0	64	30.9	248	61.1	500	81.8	674	95.9
C	-	-	0	0.0	-	-	1	0.2	0	0.0	25	4.2	85	21.1	355	66.2
D	-	-	-	-	-	-	-	-	0	0.0	0	0	0	0.0	0	0.0
E	-	-	0	0.0	1	0.0	0	0.0	2	0.4	62	8.5	0	0.0	1	0.1
F	0	0.0	0	0.0	1	1.0	NA	NA	12	9.2	34	22.8	86	45.5	83	32.9
G	0	0.0	183	20.0	156	21.0	573	38.5	594	36.2	1137	56.7	1521	73.3	1348	81.7
H	33	3.0	0	0.0	-	-	0	0.0	0	0.0	3	0.8	3	0.8	0	0.0
I	-	-	-	-	-	-	-	-	28	93.3	21	91.3	2	2.8	0	0.0
J	0	0.0	0	0.0	1	0.0	0	0.0	1	0.1	12	1.4	22	2.4	7	0.8
K	-	-	-	-	-	-	0	0.0	9	5.5	1	0.6	14	6.6	93	39.7
L	160	44.0	210	26.0	94	15.0	NA	NA	2	5.4	208	17.0	237	16.8	202	14.8
M	-	-	0	0.0	-	-	0	0.0	1	0.4	0	0.0	9	3.0	38	8.2
N	380	54.0	93	39.0	72	38.0	75	15.2	99	14.2	274	39.3	402	59.9	445	61.8
O	0	0.0	568	58.0	600	53.0	1075	73.1	1233	76.9	1014	76.9	1572	98.7	1549	98.6
P	-	-	-	-	80	36.0	0	0.0	12	3.1	211	52.9	483	84.3	478	73.9
Q	10	1.0	0	0.0	1	0.0	160	47.9	4	1.2	1	0.2	130	22.0	547	83.1
R	92	20.0	4	0.0	-	-	8	0.8	560	44.4	814	64.1	1387	78.4	2002	92.4
S	-	-	0	0.0	-	-	0	0.0	0	0.0	0	0.0	0	0.0	3	1.0
T	0	0.0	237	36.0	416	50.0	242	48.7	221	65.8	265	65.8	416	79.7	582	89.4
U	-	-	256	27.0	602	47.0	983	71.5	981	71.7	989	72.2	1142	69.4	1255	70.1
V	-	-	-	-	-	-	33	5.8	247	37.5	151	27.0	88	18.9	164	26.8
W	54	6.0	1	0.0	-	-	0	0.0	0	0.0	173	45.1	347	77.1	450	89.6
X	-	-	-	-	-	-	11	7.5	201	58.4	298	92.0	353	92.9	365	88.8
Y	-	-	-	-	-	-	0	0.0	0	0.0	1	0.8	10	5.7	58	32.0
Z	0	0.0	9	1.0	197	21.0	359	24.1	501	37.6	159	12.6	488	37.1	1034	97.5
AA	-	-	-	-	-	-	27	22.1	15	6.1	6	1.8	33	8.0	76	18.9
AB	62	15.0	94	17.0	111	21.0	0	0.0	0	0.0	0	0.0	240	45.9	640	82.9
AC	1	1.0	84	26.0	157	42.0	63	28.8	102	33.3	213	39.4	466	58.8	431	51.9
AD	148	40.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	4	1.0	386	69.0	219	50.0	469	70.6	152	27.0	287	48.0	258	38.9	152	23.6
AF	-	-	-	-	-	-	27	6.5	103	20.0	234	37.3	21	5.0	39	6.0
AG	1	0.0	18	5.0	26	6.0	4	21.1	40	13.6	2	0.9	9	2.0	7	1.2
AH	0	0.0	0	0.0	-	-	210	25.6	566	52.1	427	57.7	480	56.7	751	81.0
AI	1	0.0	1	0.0	2	0.0	1	0.1	102	12.3	273	23.5	632	43.0	1059	69.0
AJ	453	47.0	481	76.0	788	93.0	528	55.8	733	75.9	714	84.0	1000	88.3	1061	96.5

Table 1.3.9(g): Types of Sedation in Eyes Given Local Anaesthesia by SDPs, CSR 2011

	Types of sedation								
	All Local Anaesthesia	No Sedation		Oral Alone		Intravenous Alone		Intramuscular Alone	
	N	n	%	n	%	n	%	n	%
All	28634	18646	65.1	2852	10.0	27	0.1	3	0.0
A	1716	549	32.0	0	0.0	0	0.0	0	0.0
B	703	696	99.0	0	0.0	0	0.0	0	0.0
C	536	436	81.3	1	0.2	0	0.0	0	0.0
D	328	324	98.8	4	1.2	0	0.0	0	0.0
E	779	209	26.8	185	23.7	0	0.0	0	0.0
F	252	32	12.7	0	0.0	0	0.0	0	0.0
G	1649	895	54.3	11	0.7	4	0.2	0	0.0
H	397	226	56.9	0	0.0	0	0.0	0	0.0
I	44	14	31.8	2	4.5	6	13.6	0	0.0
J	893	888	99.4	1	0.1	0	0.0	0	0.0
K	234	140	59.8	0	0.0	1	0.4	0	0.0
L	1365	1350	98.9	2	0.1	1	0.1	0	0.0
M	466	22	4.7	211	45.3	0	0.0	0	0.0
N	720	689	95.7	15	2.1	13	1.8	0	0.0
O	1571	1548	98.5	0	0.0	0	0.0	0	0.0
P	647	616	95.2	3	0.5	0	0.0	0	0.0
Q	658	646	98.2	0	0.0	0	0.0	0	0.0
R	2166	169	7.8	1382	63.8	0	0.0	0	0.0
S	299	292	97.7	0	0.0	0	0.0	0	0.0
T	651	554	85.1	5	0.8	0	0.0	0	0.0
U	1790	1052	58.8	6	0.3	0	0.0	0	0.0
V	611	574	93.9	0	0.0	0	0.0	0	0.0
W	502	59	11.8	24	4.8	0	0.0	0	0.0
X	411	392	95.4	0	0.0	1	0.2	0	0.0
Y	181	96	53.0	0	0.0	0	0.0	0	0.0
Z	1060	1047	98.8	0	0.0	0	0.0	0	0.0
AA	402	396	98.5	1	0.2	0	0.0	0	0.0
AB	772	370	47.9	281	36.4	0	0.0	0	0.0
AC	830	677	81.6	1	0.1	0	0.0	0	0.0
AD	553	553	100.0	0	0.0	0	0.0	0	0.0
AE	645	137	21.2	95	14.7	0	0.0	0	0.0
AF	650	20	3.1	613	94.3	1	0.2	0	0.0
AG	591	584	98.8	5	0.8	0	0.0	0	0.0
AH	927	306	33.0	0	0.0	0	0.0	0	0.0
AI	1535	1003	65.3	4	0.3	0	0.0	0	0.0
AJ	1100	1085	98.6	0	0.0	0	0.0	3	0.3

Number or percentage may be more than total or 100% as patient might have more than one type of local Anaesthesia

Table 1.3.9(h): Oral Sedation Alone by SDPs, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All	3995	33.0	3354	21.0	2729	16.0	2387	13.9	2923	14.5	3532	15.5	3171	12.0	2852	10.0
A	450	50.0	601	61.0	106	10.0	4	1.1	9	1.0	23	2.4	4	0.3	0	0.0
B	-	-	-	-	-	-	0	0.0	0	0.0	1	0.2	3	0.5	0	0.0
C	-	-	1	0.0	5	1.0	0	0.0	1	0.2	3	0.5	1	0.2	1	0.2
D	-	-	-	-	-	-	-	-	7	24.1	29	24.4	32	12.5	4	1.2
E	-	-	0	0.0	2	0.0	204	33.6	356	77.6	466	63.8	308	39.2	185	23.7
F	0	0.0	0	0.0	-	-	-	-	0	0.0	0	0.0	1	0.5	0	0.0
G	119	41.0	90	10.0	126	17.0	7	0.5	6	0.4	9	0.4	13	0.6	11	0.7
H	194	19.0	202	59.0	202	68.0	4	1.3	0	0.0	0	0.0	0	0.0	0	0.0
I	-	-	-	-	-	-	-	-	1	3.3	0	0.0	1	1.4	2	4.5
J	2	1.0	7	1.0	30	5.0	5	0.7	5	0.7	15	1.8	5	0.6	1	0.1
K	-	-	-	-	-	-	3	2.6	11	6.7	0	0.0	0	0.0	0	0.0
L	4	1.0	32	4.0	10	2.0	NA	NA	0	0.0	1	0.1	1	0.1	2	0.1
M	-	-	5	3.0	24	17.0	99	47.4	97	35.1	205	73.0	77	25.8	211	45.3
N	2	0.0	9	4.0	-	-	16	3.3	2	0.3	72	10.3	104	15.5	15	2.1
O	3	1.0	3	0.0	6	1.0	0	0.0	2	0.1	7	0.5	0	0.0	0	0.0
P	-	-	-	-	14	6.0	0	0.0	0	0.0	0	0.0	1	0.2	3	0.5
Q	653	61.0	1	0.0	7	2.0	4	1.2	0	0.0	0	0.0	4	0.7	0	0.0
R	4	1.0	555	62.0	638	61.0	847	85.5	1124	89.2	1018	80.2	1339	75.6	1382	63.8
S	0	0.0	0	0.0	-	-	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0
T	620	79.0	1	0.0	2	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	0.8
U	-	-	19	2.0	10	1.0	13	0.9	2	0.1	10	0.7	13	0.8	6	0.3
V	-	-	-	-	-	-	2	0.4	0	0.0	0	0.0	3	0.6	0	0.0
W	894	95.0	30	11.0	98	36.0	323	94.2	57	23.1	141	36.7	39	8.7	24	4.8
X	-	-	-	-	-	-	3	2.0	0	0.0	0	0.0	0	0.0	0	0.0
Y	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Z	362	93.0	677	85.0	529	56.0	188	12.6	212	15.9	57	4.5	4	0.3	0	0.0
AA	-	-	-	-	-	-	1	0.8	1	0.4	4	1.2	0	0.0	1	0.2
AB	0	0.0	344	63.0	173	33.0	253	53.0	487	80.9	578	88.8	443	84.7	281	36.4
AC	173	97.0	1	0.0	1	0.0	7	3.2	20	6.5	0	0.0	0	0.0	1	0.1
AD	0	0.0	24	9.0	27	14.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	7	2.0	0	0.0	-	-	0	0.0	158	28.0	366	61.2	356	53.7	95	14.7
AF	-	-	-	-	-	-	400	96.9	357	69.2	511	81.5	414	97.6	613	94.3
AG	193	27.0	9	2.0	7	2.0	0	0.0	0	0.0	0	0.0	2	0.4	5	0.8
AH	92	40.0	2	0.0	3	0.0	1	0.1	2	0.2	0	0.0	0	0.0	0	0.0
AI	211	90.0	552	78.0	338	41.0	3	0.3	5	0.6	14	1.2	2	0.1	4	0.3
AJ	1	0.0	1	0.0	6	1.0	0	0.0	0	0.0	2	0.2	1	0.1	0	0.0

Table 1.3.9(i): Intravenous Sedation Alone by SDPs, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All	108	1.0	91	1.0	144	1.0	72	0.4	37	0.2	35	0.2	22	0.1	27	0.1
A	21	2.0	9	1.0	42	4.0	1	0.3	1	0.1	0	0.0	1	0.1	0	0.0
B	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0
C	-	-	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
D	-	-	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0
E	-	-	0	0.0	-	-	2	0.3	0	0.0	2	0.3	3	0.4	0	0.0
F	55	47.0	1	1.0	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0
G	0	0.0	43	5.0	22	3.0	6	0.4	8	0.5	6	0.3	1	0.0	4	0.2
H	12	1.0	0	0.0	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
I	-	-	-	-	-	-	-	-	0	0.0	0	0.0	3	4.2	6	13.6
J	0	0.0	0	0.0	-	-	5	0.7	2	0.3	6	0.7	2	0.2	0	0.0
K	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4
L	1	0.0	2	0.0	1	0.0	NA	NA	0	0.0	1	0.1	0	0.0	1	0.1
M	-	-	0	0.0	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
N	2	0.0	6	3.0	7	4.0	7	1.4	14	2.0	7	1.0	5	0.7	13	1.8
O	0	0.0	1	0.0	-	-	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0
P	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Q	3	0.0	0	0.0	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
R	0	0.0	4	0.0	7	1.0	3	0.3	4	0.3	0	0.0	0	0.0	0	0.0
S	1	0.0	0	0.0	-	-	0	0.0	0	0.0	2	0.8	0	0.0	0	0.0
T	4	1.0	0	0.0	-	-	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0
U	-	-	8	1.0	33	3.0	33	2.4	0	0.0	3	0.2	0	0.0	0	0.0
V	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
W	2	0.0	2	1.0	2	1.0	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0
X	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
Y	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Z	0	0.0	1	0.0	-	-	0	0.0	0	0.0	4	0.3	0	0.0	0	0.0
AA	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AB	0	0.0	2	0.0	-	-	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0
AC	0	0.0	0	0.0	-	-	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AD	1	0.0	0	0.0	-	-	0	0.0	1	0.3	0	0.0	0	0.0	0	0.0
AE	1	0.0	0	0.0	1	0.0	0	0.0	1	0.2	0	0.0	2	0.3	0	0.0
AF	-	-	-	-	-	-	0	0.0	2	0.4	1	0.2	0	0.0	1	0.2
AG	1	0.0	0	0.0	-	-	0	0.0	0	0.0	0	0.0	2	0.4	0	0.0
AH	3	1.0	0	0.0	7	1.0	11	1.3	3	0.3	2	0.3	0	0.0	0	0.0
AI	0	0.0	1	0.0	6	1.0	1	0.1	1	0.1	1	0.1	0	0.0	0	0.0
AJ	0	0.0	1	0.0	6	1.0	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0

1.3.10 Intraocular Lens Implantation

In 2011, the percentage of eyes with IOL implantation was 98.2%. Out of this proportion, 96.3% had posterior chamber IOL.

The material and type of IOL used demonstrated a change from PMMA to Acrylic and from non-foldable to foldable. This pattern was consistent with the change from ECCE to Phaco as the preferred method of cataract surgery. The use of silicone IOL was decreasing.

Table 1.3.10(a): Intraocular Lens Implantation, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506		30611	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
With IOL	12472	97.5	16396	97.5	17944	97.6	17873	97.0	21115	98.2	23982	98.1	27980	98.1	30061	98.2
Without IOL	326	2.5	419	2.5	448	2.4	553	3.0	375	1.7	423	1.7	502	1.8	487	1.6
Not Available	-		-		-		-		6	0.0	33	0.1	24	0.1	63	0.2
IOL Placement																
No of IOL	12472		16396		17944		17873		21115		23982		27980		30061	
PCIOL	12074	96.8	15957	97.3	17410	97.0	17350	97.1	20342	96.3	23032	96.0	26932	96.3	28963	96.3
ACIOL	386	3.1	404	2.5	497	2.8	482	2.7	454	2.2	570	2.4	543	1.9	573	1.9
Scleral Fixated IOL	11	0.1	34	0.2	34	0.2	35	0.2	36	0.2	21	0.1	20	0.1	21	0.1
Others		0.0		0.0	2	0.0	6	0.0	14	0.1	22	0.1	21	0.1	44	0.1
Not Available /missing	1	0.0	1	0.0	1	0.0	-		269	1.3	337	1.4	464	1.7	460	1.5
Materials of IOL																
No of IOL	12472		16396		17944		17873		21115		23982		27980		30061	
1. Acrylic	1641	13.2	4418	26.9	7105	39.6	11955	66.9	15382	72.8	19160	79.9	24270	86.7	26917	89.5
2. PMMA	9161	73.5	10203	62.2	9758	54.4	5547	31.0	5300	25.1	4313	18.0	3259	11.6	2603	8.7
3. Silicone	1670	13.4	1776	10.8	1078	6.0	97	0.5	113	0.5	137	0.6	75	0.3	110	0.4
4. Others	0	0.0	4	0.0	12	0.1	74	0.4	19	0.1	58	0.2	32	0.1	37	0.1
Not Available/missing	-		1	0.0	-		200	1.1	301	1.4	314	1.3	344	1.2	394	1.3
Types of IOL																
No of IOL	12472		16396		17944		17873		21115		23982		27980		30061	
1. Foldable	3311	26.5	6195	37.8	8186	45.6	11972	67	15320	72.6	19093	79.6	24036	85.9	26553	88.3
2. Non-foldable	9161	73.5	10201	62.2	9757	54.4	5590	31.3	5316	25.2	4280	17.8	3231	11.5	2694	9.0
Not Available/missing	-		-		1	0.0	311	1.7	479	2.3	609	2.5	713	2.5	814	2.7

Figure 1.3.10: Intraocular Lens Implantation, CSR 2002-2011

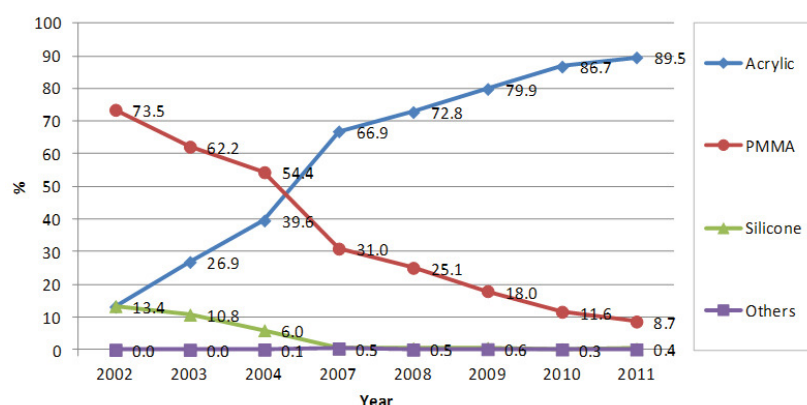


Table 1.3.10(b): Distribution of IOL Placement by SDP, CSR 2011

	N	Cataract Surgery With IOL					
		Posterior Chamber IOL		Anterior Chamber IOL		Scleral Fixated IOL	
		n	%	n	%	n	%
All	30061	28963	96.3	573	1.9	21	0.1
A	1884	1796	95.3	25	1.3	1	0.1
B	700	676	96.6	19	2.7	0	0.0
C	549	526	95.8	21	3.8	0	0.0
D	329	317	96.4	11	3.3	0	0.0
E	799	773	96.7	11	1.4	5	0.6
F	267	259	97.0	3	1.1	0	0.0
G	1750	1711	97.8	29	1.7	0	0.0
H	402	373	92.8	12	3.0	0	0.0
I	51	50	98.0	1	2.0	0	0.0
J	922	907	98.4	5	0.5	0	0.0
K	228	224	98.2	2	0.9	0	0.0
L	1608	1583	98.4	16	1.0	1	0.1
M	483	464	96.1	13	2.7	0	0.0
N	732	705	96.3	26	3.6	0	0.0
O	1631	1595	97.8	7	0.4	6	0.4
P	655	644	98.3	6	0.9	0	0.0
Q	674	659	97.8	12	1.8	0	0.0
R	2165	2066	95.4	11	0.5	0	0.0
S	327	315	96.3	11	3.4	0	0.0
T	667	643	96.4	18	2.7	0	0.0
U	1789	1675	93.6	62	3.5	0	0.0
V	658	632	96.0	19	2.9	0	0.0
W	494	477	96.6	5	1.0	0	0.0
X	412	399	96.8	9	2.2	0	0.0
Y	280	274	97.9	3	1.1	1	0.4
Z	1120	1062	94.8	29	2.6	2	0.2
AA	446	420	94.2	11	2.5	0	0.0
AB	793	744	93.8	28	3.5	0	0.0
AC	946	929	98.2	13	1.4	1	0.1
AD	561	534	95.2	20	3.6	0	0.0
AE	656	630	96.0	14	2.1	0	0.0
AF	665	625	94.0	34	5.1	0	0.0
AG	668	647	96.9	12	1.8	2	0.3
AH	1054	1021	96.9	19	1.8	1	0.1
AI	1587	1516	95.5	26	1.6	1	0.1
AJ	1109	1092	98.5	10	0.9	0	0.0

1.4 INTRA-OPERATIVE COMPLICATIONS

1.4.1 Intra-operative Complications by Years

The percentage of intra-operative complications increased from 5.6% in 2010 to 5.8% in 2011. Of these the commonest complication has been posterior capsular rupture (PCR). The occurrences of PCR increased from 2.9% in 2010 to 3.1% in 2011. The more serious complications such as drop nucleus and suprachoroidal haemorrhage were not frequent.

Table 1.4.1(a): Distribution of Type of Intra-operative Complications, CSR 2002-2011

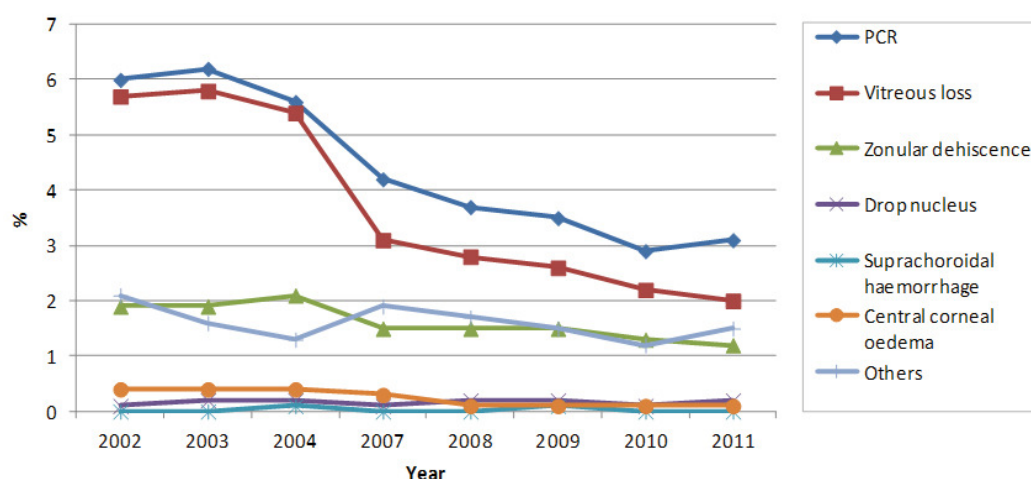
Year	2002		2003		2004		2007		2008		2009		2010		2011	
No. of patients (N)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Patient with intra-op complication	1328	10.4	1673	9.9	1730	9.4	1999	10.9	1636	7.6	1645	6.7	1610	5.6	1787	5.8
Types of complications																
PCR	773	6.0	1036	6.2	1025	5.6	764	4.2	798	3.7	858	3.5	840	2.9	936	3.1
Vitreous loss	734	5.7	979	5.8	994	5.4	569	3.1	608	2.8	642	2.6	639	2.2	611	2.0
Zonular dehiscence	246	1.9	327	1.9	380	2.1	275	1.5	322	1.5	372	1.5	377	1.3	362	1.2
Drop nucleus	13	0.1	27	0.2	34	0.2	21	0.1	33	0.2	40	0.2	38	0.1	58	0.2
Suprachoroidal haemorrhage	5	0.0	8	0.0	10	0.1	9	0.0	10	0.0	13	0.1	9	0.0	8	0.0
Central corneal oedema	56	0.4	73	0.4	78	0.4	58	0.3	27	0.1	22	0.1	26	0.1	36	0.1
Others	274	2.1	266	1.6	235	1.3	350	1.9	361	1.7	373	1.5	338	1.2	449	1.5

Table 1.4.1(b): Distribution of Type of Intra-operative Complications – Posterior Capsule Rupture, CSR 2002-2011

Year	2002*		2003*		2004*		2007*		2008	2009	2010	2011
No. of patients (N)	n	%	n	%	n	%	n	%	n	%	n	%
Patient with intra-op complication	1328	10.4	1673	9.9	1730	9.4	1999	10.9	1636	7.6	1645	6.7
Types of complications												
PCR and Others	773	6.0	1036	6.2	1025	5.6	764	4.2	798	3.7	858	3.5
PCR Only									347	1.6	403	1.6

*Data from 2002-2007 could not be analyzed due to improper organized old data.

Figure 1.4.1: Distribution of Specific Type of Intra-operative Complications, CSR 2002-2011



1.4.2 Intra-operative Complication by Type of Surgery

From 2002 to 2011, the lowest rate of intra-operative complication was in phacoemulsification, followed by ECCE and lens aspiration.

Table 1.4.2(a): Intra-operative Complications by Types of Cataract Surgery, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009			2010			2011		
	n	%	n	%	n	%	n	%	n	%	N	n	%	N	n	%	N	n	%
Phaco	438	8.6	667	8.7	747	8.0	969	8.1	753	5.1	17717	787	4.4	21810	798	3.7	23872	927	3.9
ECCE	684	9.9	697	8.7	680	8.7	691	12.5	532	9.5	5457	460	8.4	5363	442	8.2	5291	404	7.6
Lens Aspiration	51	13.7	50	11.5	58	10.5	51	15.8	31	9.1	400	38	9.5	451	34	7.5	460	29	6.3
ICCE	27	33.3	39	41.5	50	48.5	63	44.7	60	46.5	134	64	47.8	143	64	44.8	123	53	43.1
Phaco ECCE	128	41.2	206	43.9	177	39.0	225	52.1	240	45.8	573	276	48.2	586	249	42.5	652	316	48.5
Others	-	-	14	10.7	18	10.5	-	-	16	25.8	74	8	10.8	104	20	19.2	132	21	15.9
Missing	-	-	-	-	-	-	9	20.0	4	12.1	83	12	14.5	49	3	6.1	81	37	45.7

Figure 1.4.2: Intra-operative Complications by Types of Cataract Surgery, CSR 2002-2011

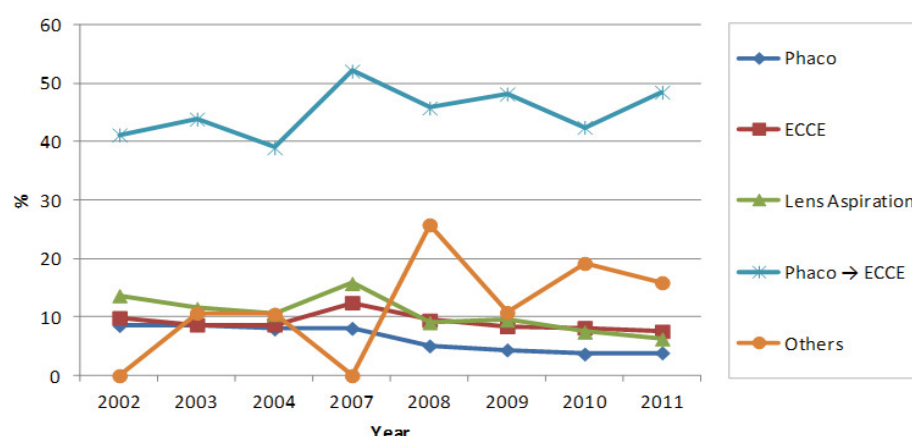


Table 1.4.2(b): Distribution of Types of Intra-operative Complications by Specific Types of Cataract Surgery, CSR 2011

	All Surgeries		Phaco		ECCE		Lens Aspiration		ICCE		Phaco converted to ECCE		Others	
Number of patients (N)	30611		23872		5291		460		123		652		132	
	n	%	n	%	n	%	n	%	N	%	n	%	n	%
Any intra-op complication	1787	5.8	927	3.9	404	7.6	29	6.3	53	43.1	316	48.5	21	15.9
Posterior capsule rupture	936	3.1	568	2.4	181	3.4	11	2.4	6	4.9	162	24.8	8	6.1
Vitreous loss	611	2.0	270	1.1	152	2.9	9	2.0	36	29.3	134	20.6	10	7.6
Zonular dehiscence	362	1.2	130	0.5	106	2.0	3	0.7	21	17.1	94	14.4	8	6.1
Drop nucleus	58	0.2	42	0.2	4	0.1	2	0.4	0	0.0	5	0.8	5	3.8
Suprachoroidal haemorrhage	8	0.0	1	0.0	3	0.1	0	0.0	2	1.6	2	0.3	0	0.0
Central corneal oedema	36	0.1	24	0.1	9	0.2	0	0.0	0	0.0	3	0.5	0	0.0
Others	449	1.5	213	0.9	104	2.0	8	1.7	10	8.1	74	11.3	3	2.3

Table 1.4.2(c): Distribution of Types of Intra-operative Complications by SDP, CSR 2011

	No. of patients (N)	Any intra-op complication		PCR		Vitreous loss		Zonular Dehiscence		Drop nucleus		Suprachoroidal Haemorrhage		Central Corneal Edema		Others	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All	30611	1787	5.8	936	3.1	611	2.0	362	1.2	58	0.2	8	0.0	36	0.1	449	1.5
A	1939	75	3.9	46	2.4	32	1.7	13	0.7	3	0.2	0	0.0	0	0.0	18	0.9
B	708	51	7.2	27	3.8	20	2.8	14	2.0	3	0.4	2	0.3	1	0.1	5	0.7
C	554	41	7.4	30	5.4	17	3.1	6	1.1	0	0.0	0	0.0	0	0.0	2	0.4
D	332	27	8.1	8	2.4	7	2.1	13	3.9	1	0.3	0	0.0	0	0.0	10	3.0
E	803	47	5.9	26	3.2	10	1.2	9	1.1	1	0.1	1	0.1	0	0.0	12	1.5
F	271	35	12.9	8	3.0	20	7.4	13	4.8	0	0.0	0	0.0	0	0.0	7	2.6
G	1826	130	7.1	56	3.1	29	1.6	18	1.0	3	0.2	0	0.0	1	0.1	55	3.0
H	403	23	5.7	15	3.7	0	0.0	2	0.5	1	0.2	0	0.0	4	1.0	1	0.2
I	52	2	3.8	0	0.0	1	1.9	2	3.8	0	0.0	0	0.0	0	0.0	0	0.0
J	946	80	8.5	40	4.2	12	1.3	9	1.0	2	0.2	0	0.0	13	1.4	15	1.6
K	240	20	8.3	11	4.6	8	3.3	2	0.8	2	0.8	0	0.0	0	0.0	7	2.9
L	1622	31	1.9	19	1.2	18	1.1	7	0.4	2	0.1	0	0.0	1	0.1	3	0.2
M	483	28	5.8	10	2.1	9	1.9	1	0.2	0	0.0	0	0.0	0	0.0	18	3.7
N	770	61	7.9	34	4.4	19	2.5	11	1.4	3	0.4	0	0.0	0	0.0	16	2.1
O	1642	83	5.1	61	3.7	37	2.3	10	0.6	1	0.1	0	0.0	0	0.0	10	0.6
P	657	9	1.4	4	0.6	0	0.0	0	0.0	3	0.5	0	0.0	0	0.0	3	0.5
Q	692	32	4.6	20	2.9	4	0.6	4	0.6	0	0.0	0	0.0	0	0.0	8	1.2
R	2186	83	3.8	42	1.9	28	1.3	19	0.9	1	0.0	1	0.0	0	0.0	24	1.1
S	329	16	4.9	11	3.3	14	4.3	7	2.1	0	0.0	0	0.0	0	0.0	0	0.0
T	686	68	9.9	46	6.7	17	2.5	13	1.9	2	0.3	1	0.1	1	0.1	7	1.0
U	1859	154	8.3	100	5.4	71	3.8	47	2.5	9	0.5	2	0.1	0	0.0	14	0.8
V	666	58	8.7	28	4.2	31	4.7	16	2.4	1	0.2	0	0.0	1	0.2	11	1.7
W	505	19	3.8	10	2.0	6	1.2	6	1.2	1	0.2	0	0.0	0	0.0	5	1.0
X	420	29	6.9	10	2.4	7	1.7	10	2.4	1	0.2	0	0.0	4	1.0	4	1.0
Y	283	9	3.2	7	2.5	2	0.7	2	0.7	0	0.0	0	0.0	0	0.0	2	0.7
Z	1127	53	4.7	29	2.6	32	2.8	19	1.7	3	0.3	0	0.0	0	0.0	3	0.3
AA	450	19	4.2	13	2.9	9	2.0	1	0.2	0	0.0	0	0.0	0	0.0	5	1.1
AB	811	85	10.5	35	4.3	31	3.8	18	2.2	3	0.4	0	0.0	1	0.1	34	4.2
AC	953	38	4.0	24	2.5	25	2.6	10	1.0	0	0.0	0	0.0	2	0.2	2	0.2
AD	575	24	4.2	16	2.8	5	0.9	4	0.7	0	0.0	0	0.0	0	0.0	3	0.5
AE	663	28	4.2	10	1.5	13	2.0	11	1.7	0	0.0	0	0.0	0	0.0	6	0.9
AF	681	126	18.5	31	4.6	20	2.9	18	2.6	0	0.0	0	0.0	5	0.7	78	11.5
AG	680	45	6.6	20	2.9	15	2.2	11	1.6	2	0.3	0	0.0	1	0.1	12	1.8
AH	1061	46	4.3	20	1.9	2	0.2	3	0.3	1	0.1	0	0.0	0	0.0	26	2.5
AI	1605	67	4.2	34	2.1	31	1.9	10	0.6	6	0.4	1	0.1	1	0.1	19	1.2
AJ	1131	45	4.0	35	3.1	9	0.8	3	0.3	3	0.3	0	0.0	0	0.0	4	0.4

Table 1.4.2(d): Distribution of Types of Intra-operative Complications in “Phaco Converted to ECCE” by SDP, CSR 2011

	No. of patients (N)	Any intra-op complication		PCR		Vitreous loss		Zonular Dehiscence		Drop nucleus		Suprachoroidal Haemorrhage		Central Corneal Edema		Others	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All	652	316	48.5	162	24.8	134	20.6	94	14.4	5	0.8	2	0.3	3	0.5	74	11.3
A	24	9	37.5	3	12.5	3	12.5	3	12.5	0	0.0	0	0.0	0	0.0	3	12.5
B	11	8	72.7	7	63.6	5	45.5	1	9.1	0	0.0	1	9.1	0	0.0	0	0.0
C	4	3	75.0	1	25.0	2	50.0	1	25.0	0	0.0	0	0.0	0	0.0	0	0.0
D	6	3	50.0	2	33.3	1	16.7	1	16.7	0	0.0	0	0.0	0	0.0	1	16.7
E	16	9	56.3	9	56.3	3	18.8	0	0.0	0	0.0	1	6.3	0	0.0	0	0.0
F	4	1	25.0	0	0.0	1	25.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
G	23	12	52.2	2	8.7	5	21.7	5	21.7	0	0.0	0	0.0	0	0.0	5	21.7
H	5	3	60.0	3	60.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
I	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
J	39	13	33.3	10	25.6	1	2.6	2	5.1	0	0.0	0	0.0	1	2.6	1	2.6
K	3	1	33.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	33.3
L	51	11	21.6	8	15.7	8	15.7	4	7.8	0	0.0	0	0.0	0	0.0	0	0.0
M	19	10	52.6	5	26.3	3	15.8	1	5.3	0	0.0	0	0.0	0	0.0	5	26.3
N	13	9	69.2	7	53.8	4	30.8	2	15.4	0	0.0	0	0.0	0	0.0	1	7.7
O	18	9	50.0	8	44.4	6	33.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
P	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Q	17	12	70.6	7	41.2	1	5.9	1	5.9	0	0.0	0	0.0	0	0.0	4	23.5
R	29	20	69.0	11	37.9	7	24.1	6	20.7	0	0.0	0	0.0	0	0.0	4	13.8
S	16	4	25.0	2	12.5	4	25.0	3	18.8	0	0.0	0	0.0	0	0.0	0	0.0
T	21	12	57.1	6	28.6	3	14.3	4	19.0	0	0.0	0	0.0	0	0.0	3	14.3
U	42	25	59.5	11	26.2	17	40.5	16	38.1	0	0.0	0	0.0	0	0.0	2	4.8
V	26	12	46.2	5	19.2	9	34.6	7	26.9	0	0.0	0	0.0	0	0.0	1	3.8
W	21	2	9.5	2	9.5	1	4.8	0	0.0	1	4.8	0	0.0	0	0.0	0	0.0
X	10	6	60.0	2	20.0	3	30.0	3	30.0	0	0.0	0	0.0	1	10.0	0	0.0
Y	5	1	20.0	0	0.0	0	0.0	1	20.0	0	0.0	0	0.0	0	0.0	0	0.0
Z	24	13	54.2	5	20.8	9	37.5	7	29.2	1	4.2	0	0.0	0	0.0	0	0.0
AA	17	3	17.6	2	11.8	3	17.6	0	0.0	0	0.0	0	0.0	0	0.0	1	5.9
AB	36	23	63.9	9	25.0	9	25.0	9	25.0	0	0.0	0	0.0	0	0.0	8	22.2
AC	8	7	87.5	6	75.0	5	62.5	1	12.5	0	0.0	0	0.0	1	12.5	0	0.0
AD	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	11	5	45.5	2	18.2	3	27.3	2	18.2	0	0.0	0	0.0	0	0.0	1	9.1
AF	52	42	80.8	13	25.0	10	19.2	7	13.5	0	0.0	0	0.0	0	0.0	26	50.0
AG	34	10	29.4	7	20.6	2	5.9	2	5.9	2	5.9	0	0.0	0	0.0	1	2.9
AH	12	6	50.0	2	16.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4	33.3
AI	15	8	53.3	3	20.0	5	33.3	5	33.3	0	0.0	0	0.0	0	0.0	2	13.3
AJ	20	4	20.0	2	10.0	1	5.0	0	0.0	1	5.0	0	0.0	0	0.0	0	0.0

1.4.3 Intra-operative Complications by Combined Surgery

The rate of intra-operative complication was higher in combined surgery when compared to cataract surgery performed alone. PCR and vitreous loss remained the commonest complications encountered.

Higher percentages of intra-operative complication were noted when cataract surgeries were combined with VR, filtering surgery and pterygium excision

For cataract surgery combined with VR surgery, the intra-operative complication percentages showed an initial decreasing trend but increased again in 2011. The percentage when cataract surgery is combined with filtering surgery also did not reveal any particular trend.

Table 1.4.3(a): Distribution of Intra-operative Complications by Any Combined Surgery, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
Number of combined surgery (N)	375		581		733		891		664		871		1082		1194	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-operative complication	64	17.1	105	18.1	120	16.4	131	14.7	89	10.0	113	13.0	121	11.2	222	18.6
Types of complications																
PCR	35	9.3	60	10.3	77	10.5	56	6.3	54	6.1	62	7.1	61	5.6	140	11.7
Vitreous loss	46	12.3	66	11.4	72	9.8	41	4.6	40	4.5	51	5.9	53	4.9	101	8.5
Zonular dehiscence	18	4.8	22	3.8	23	3.1	21	2.4	15	1.7	21	2.4	28	2.6	49	4.1
Drop nucleus	3	0.8	5	0.9	5	0.7	4	0.4	3	0.3	8	0.9	10	0.9	20	1.7
Suprachoroidal haemorrhage	0	0.0	0	0.0	4	0.5	0	0.0	0.0	0.0	4	0.5	1	0.1	2	0.2
Central corneal oedema	1	0.3	10	1.7	4	0.5	7	0.8	3	0.3	1	0.1	2	0.2	0	0.0
Others	12	3.2	18	3.1	16	2.2	30	3.4	14	1.6	21	2.4	24	2.2	29	2.4

Table 1.4.3(b): Distribution of Intra-operative Complications by Specific Combined Surgery, CSR 2011

	All Surgeries		Any Combined Surgery		Pterygium Surgery		Filtering Surgery		Vitreoretinal Surgery		Penetrating Keratoplasty		Others	
No. of patients (N)	30611		1194		133		64		672		1		344	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-op complication	1787	5.8	222	18.6	7	5.3	5	7.8	69	10.3	0	0.0	145	42.2
PCR	936	3.1	140	11.7	5	3.8	1	1.6	41	6.1	0	0.0	95	27.6
Vitreous loss	611	2.0	101	8.5	4	3.0	3	4.7	10	1.5	0	0.0	84	24.4
Zonular dehiscence	362	1.2	49	4.1	1	0.8	3	4.7	13	1.9	0	0.0	32	9.3
Drop nucleus	58	0.2	20	1.7	0	0.0	0	0.0	15	2.2	0	0.0	6	1.7
Suprachoroidal haemorrhage	8	0.0	2	0.2	0	0.0	0	0.0	2	0.3	0	0.0	0	0.0
Central corneal oedema	36	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Others	449	1.5	29	2.4	2	1.5	0	0.0	10	1.5	0	0.0	18	5.2

Table 1.4.3(c): Distribution of Intra-operative Complications when Combined with Filtering Surgery, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
N	148		210		235		131		142		132		121		64	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-op complication	20	14.0	18	9.0	24	10.0	24	18.3	9	6.3	16	12.1	8	6.6	5	7.8
Posterior capsule rupture	2	1.0	3	1.0	3	1.0	9	6.9	3	2.1	4	3.0	3	2.5	1	1.6
Vitreous loss	11	7.0	7	3.0	14	6.0	7	5.3	5	3.5	7	5.3	2	1.7	3	4.7
Zonular dehiscence	3	2.0	1	0.0	1	0.0	4	3.1	3	2.1	5	3.8	1	0.8	3	4.7
Drop nucleus	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Suprachoroidal haemorrhage	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	2	1.5	0	0.0	0	0.0
Central corneal oedema	0	0.0	3	1.0	1	0.0	3	2.3	2	1.4	0	0.0	0	0.0	0	0.0
Others	6	3.0	4	2.0	4	2.0	5	3.8	1	0.7	3	2.3	3	2.5	0	0.0

Table 1.4.3(d): Distribution of Intra-operative Complications when Combined with VR Surgery, CSR 2002-2011

Year	2002		2003		2004		2007		2008		2009		2010		2011	
N	26		100		186		435		237		402		601		672	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-op complication	9	35.0	24	24.0	25	13.0	45	10.3	21	8.9	32	8.0	35	5.8	69	10.3
Posterior capsule rupture	0	0.0	4	4.0	11	6.0	18	4.1	17	7.2	18	4.5	22	3.7	41	6.1
Vitreous loss	5	19.0	12	12.0	8	5.0	11	2.5	6	2.5	5	1.2	9	1.5	10	1.5
Zonular dehiscence	0	0.0	2	2.0	3	2.0	6	1.4	1	0.4	2	0.5	5	0.8	13	1.9
Drop nucleus	1	4.0	2	2.0	3	2.0	3	0.7	2	0.8	6	1.5	6	1.0	15	2.2
Suprachoroidal haemorrhage	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0	2	0.3
Central corneal oedema	0	0.0	2	2.0	1	1.0	3	0.7	0	0.0	0	0.0	0	0.0	0	0.0
Others	3	12.0	4	4.0	2	1.0	12	2.8	3	1.3	5	1.2	4	0.7	10	1.5

1.4.4 Intra-operative Complications by Types of Local Anaesthesia

The highest percentage of intra-operative complication occurred in eyes operated using retrobulbar and subtenon anaesthesia. However, for subtenon anaesthesia, the higher percentages in these eyes could also be due to the occurrence of complication prompting the use of subtenon injection as additional anaesthesia.

Table 1.4.4: Intra-operative Complications by Types of Local Anaesthesia, CSR 2011

	All Local Anaesthesia		Retrobulbar		Peribulbar		Subtenon		Sub-Conjunctival		Facial Block		Topical		Intracameral	
N	28634		808		440		10512		771		43		16825		2933	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-op complication	1628	5.7	67	8.3	29	6.6	873	8.3	31	4.0	5	11.6	713	4.2	171	5.8
Posterior capsule rupture	888	3.1	46	5.7	13	3.0	428	4.1	21	2.7	1	2.3	435	2.6	95	3.2
Vitreous loss	572	2.0	17	2.1	16	3.6	344	3.3	13	1.7	1	2.3	253	1.5	63	2.1
Zonular dehiscence	335	1.2	17	2.1	11	2.5	187	1.8	8	1.0	3	7.0	141	0.8	38	1.3
Drop nucleus	52	0.2	5	0.6	2	0.5	18	0.2	0	0.0	1	2.3	27	0.2	10	0.3
Suprachoroidal haemorrhage	8	0.0	1	0.1	0	0.0	4	0.0	1	0.1	0	0.0	4	0.0	2	0.1
Central corneal oedema	32	0.1	0	0.0	0	0.0	27	0.3	0	0.0	0	0.0	8	0.0	2	0.1
Other	379	1.3	7	0.9	5	1.1	225	2.1	4	0.5	0	0.0	140	0.8	31	1.1

Number or percentage may be more than total or 100% as patient might have more than one intra-operative complication

1.4.5 Intra-operative Complications by Surgeon Status

Intra-operative complications were highest in surgeries performed by the MOs. The complications were mainly PCR and vitreous loss.

Table 1.4.5(a): Percentage of Intra-operative Complications by Surgeon Status, CSR 2003-2011

(i) Specialist

Year	2003		2004		2007		2008*		2009		2010		2011	
N	12072		13165		14327		16846		19400		24216		25590	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-operative complication	1144	9.5	1170	8.9	1485	10.4	1144	6.8	1218	6.3	1248	5.2	1368	5.3
PCR	199	2.7	180	1.4	546	3.8	538	3.2	610	3.1	649	2.7	706	2.8
Vitreous loss	520	4.3	515	3.9	405	2.8	417	2.5	474	2.4	473	2.0	438	1.7
Zonular dehiscence	151	1.3	163	1.2	204	1.4	232	1.4	293	1.5	300	1.2	285	1.1
Drop nucleus	22	0.2	28	0.2	20	0.1	24	0.1	30	0.2	33	0.1	49	0.2
Suprachoroidal hemorrhage	6	0.1	8	0.1	5	0.0	3	0.0	10	0.1	6	0.0	7	0.0
Central corneal edema	42	0.4	40	0.3	50	0.4	19	0.1	13	0.1	19	0.1	33	0.1
Others	171	1.4	158	1.2	261	1.8	279	1.7	289	1.5	254	1.0	347	1.4

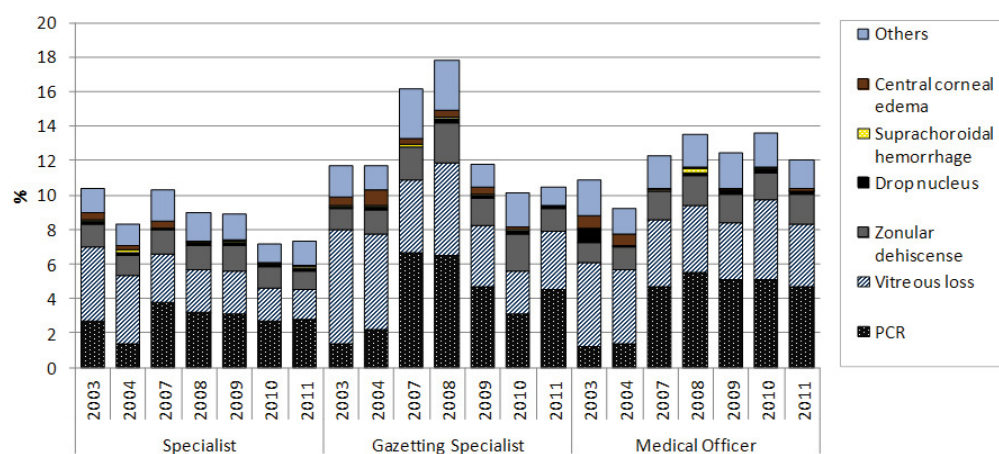
(ii) Gazetting Specialist

Year	2003		2004		2007		2008*		2009		2010		2011	
N	1510		1757		1276		1399		2053		1405		2487	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-operative complication	185	12.3	222	12.6	175	13.7	167	11.9	171	8.3	98	7.0	182	7.3
PCR	21	1.4	38	2.2	85	6.7	91	6.5	96	4.7	44	3.1	113	4.5
Vitreous loss	99	6.6	97	5.5	54	4.2	76	5.4	73	3.6	35	2.5	84	3.4
Zonular dehiscence	18	1.2	25	1.4	24	1.9	32	2.3	33	1.6	30	2.1	33	1.3
Drop nucleus	2	0.1	4	0.2	0	0.0	3	0.2	3	0.1	2	0.1	4	0.2
Suprachoroidal hemorrhage	2	0.1	1	0.1	1	0.1	1	0.1	2	0.1	1	0.1	0	0.0
Central corneal edema	7	0.5	16	0.9	5	0.4	5	0.4	7	0.3	3	0.2	0	0.0
Others	27	1.8	25	1.4	37	2.9	37	2.9	28	1.4	27	1.9	27	1.1

(iii) Medical Officer

Year	2003		2004		2007		2008*		2009		2010		2011	
N	3233		3470		2690		2697		2750		2871		2478	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-operative complication	344	10.6	338	9.7	330	12.3	264	9.8	242	8.8	263	9.2	202	8.2
PCR	40	1.2	47	1.4	126	4.7	148	5.5	139	5.1	147	5.1	116	4.7
Vitreous loss	157	4.9	148	4.3	105	3.9	105	3.9	92	3.3	131	4.6	89	3.6
Zonular dehiscence	34	1.1	46	1.3	43	1.6	46	1.7	45	1.6	47	1.6	43	1.7
Drop nucleus	3	0.9	2	0.1	1	0.0	4	0.2	7	0.3	3	0.1	5	0.2
Suprachoroidal hemorrhage	0	-	1	0.0	3	0.1	4	0.2	1	0.0	2	0.1	1	0.0
Central corneal edema	24	0.7	22	0.6	2	0.1	3	0.1	2	0.1	4	0.1	3	0.1
Others	68	2.1	52	1.5	51	1.9	51	1.9	56	2.0	56	2.0	42	1.7

Figure 1.4.5: Percentage Distribution of Intra-operative Complications by Surgeon Status, CSR 2003-2011



1.4.6 PCR

PCR among SDPs varied. Hospital T had the highest PCR among all the SDPs in 2011.

Table 1.4.6: PCR by SDP, CSR 2007-2011

Year	2007			2008			2009			2010			2011		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
A	652	10	1.5	986	29	2.9	1110	22	2.0	1527	25	1.6	1939	46	2.4
B	33	0	0.0	208	3	1.4	433	14	3.2	627	32	5.1	708	27	3.8
C	550	20	3.6	573	14	2.4	602	26	4.3	411	15	3.6	554	30	5.4
D	0	0	0	30	1	3.3	124	10	8.1	258	7	2.7	332	8	2.4
E	697	18	2.6	487	8	1.6	743	16	2.2	804	22	2.7	803	26	3.2
F	0	0	0.0	137	3	2.2	158	3	1.9	208	13	6.3	271	8	3.0
G	1556	77	4.9	1723	59	3.4	2137	48	2.2	2199	32	1.5	1826	56	3.1
H	318	8	2.5	400	3	0.8	399	11	2.8	400	13	3.3	403	15	3.7
I	0	0	0.0	34	1	2.9	31	1	3.2	76	1	1.3	52	0	0.0
J	807	38	4.7	739	33	4.5	911	33	3.6	960	31	3.2	946	40	4.2
K	125	2	1.6	170	7	4.1	175	4	2.3	217	3	1.4	240	11	4.6
L	0	0	0	40	3	7.5	1405	35	2.5	1648	46	2.8	1622	19	1.2
M	201	4	2.0	282	11	3.9	290	7	2.4	322	8	2.5	483	10	2.1
N	525	34	6.5	726	35	4.8	743	35	4.7	714	28	3.9	770	34	4.4
O	1518	87	5.7	1681	106	6.3	1387	84	6.1	1659	76	4.6	1642	61	3.7
P	18	2	11.1	396	7	1.8	404	5	1.2	577	8	1.4	657	4	0.6
Q	349	4	1.1	338	14	4.1	542	29	5.4	617	15	2.4	692	20	2.9
R	1102	92	8.3	1357	77	5.7	1374	46	3.3	1876	62	3.3	2186	42	1.9
S	199	8	4.0	256	8	3.1	251	9	3.6	282	8	2.8	329	11	3.3
T	565	20	3.5	351	3	0.9	433	16	3.7	624	24	3.8	686	46	6.7
U	1400	47	3.4	1429	56	3.9	1418	42	3.0	1699	71	4.2	1859	100	5.4
V	697	43	6.2	696	36	5.2	598	32	5.4	520	17	3.3	666	28	4.2
W	380	10	2.6	263	9	3.4	387	6	1.6	455	12	2.6	505	10	2.0
X	152	10	6.6	350	11	3.1	327	7	2.1	387	6	1.6	420	10	2.4
Y	100	3	3.0	180	9	5.0	185	2	1.1	258	10	3.9	283	7	2.5
Z	1520	28	1.8	1376	28	2.0	1318	57	4.3	1377	30	2.2	1127	29	2.6
AA	165	9	5.5	319	14	4.4	387	19	4.9	468	22	4.7	450	13	2.9
AB	497	23	4.6	633	14	2.2	684	9	1.3	558	8	1.4	811	35	4.3
AC	278	7	2.5	379	10	2.6	612	22	3.6	889	19	2.1	953	24	2.5
AD	189	5	2.6	317	10	3.2	298	9	3.0	401	15	3.7	575	16	2.8
AE	668	19	2.8	588	16	2.7	612	22	3.6	690	27	3.9	663	10	1.5
AF	443	27	6.1	531	28	5.3	640	28	4.4	450	10	2.2	681	31	4.6
AG	25	1	4.0	395	20	5.1	293	5	1.7	615	5	0.8	680	20	2.9
AH	1040	40	3.8	1217	34	2.8	904	27	3.0	1007	26	2.6	1061	20	1.9
AI	954	40	4.2	898	40	4.5	1229	79	6.4	1519	48	3.2	1605	34	2.1
AJ	998	33	3.3	1011	38	3.8	893	38	4.3	1207	45	3.7	1131	35	3.1

Figure 1.4.6(a): PCR by SDP, CSR 2011-Bar Chart (National KPI set at 5.0%)

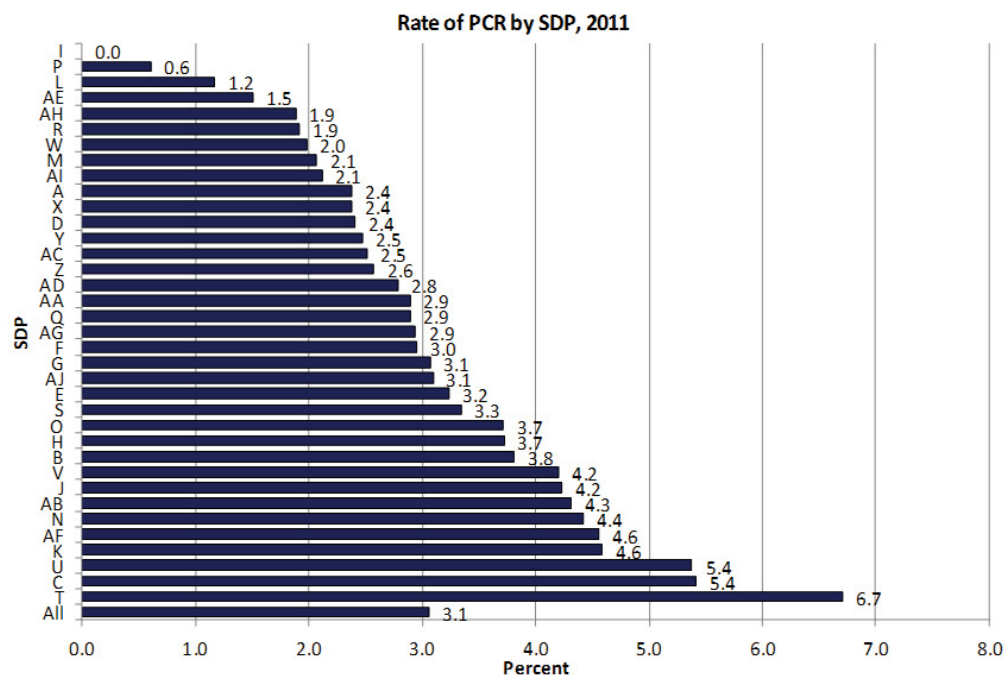
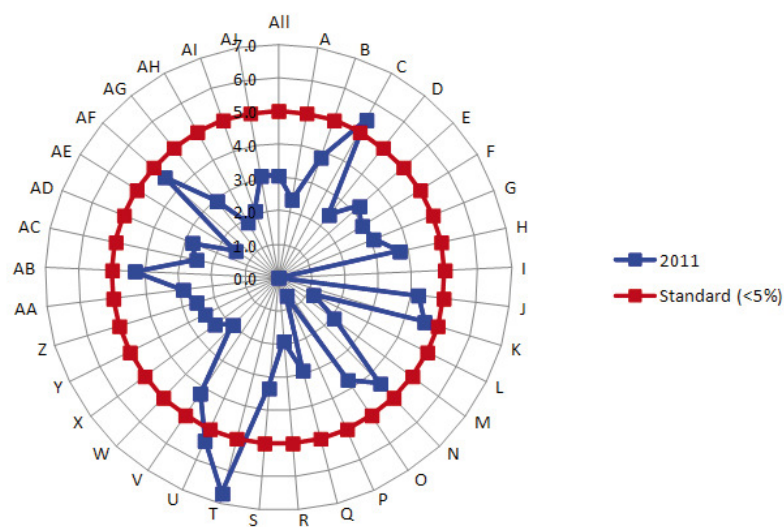


Figure 1.4.6(b): PCR by SDP, CSR 2011-Radar Chart (National standard set at <5%)



1.4.7 PCR by Type of Cataract Surgery

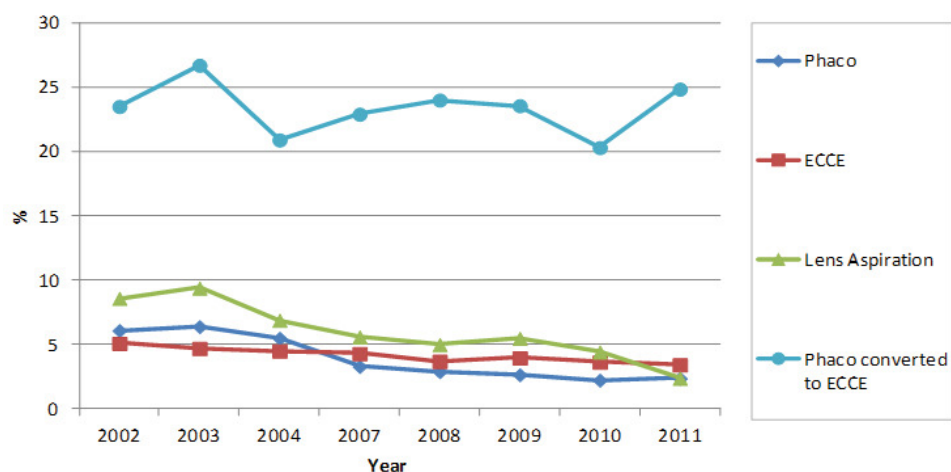
From the year 2002-2004, the percentage of PCR for phaco was higher than ECCE. From 2007 onwards, it demonstrated otherwise. In general, both the PCR percentages for phaco and ECCE were in downward trend over the years.

Table 1.4.7: PCR by Type of Cataract Surgery, CSR 2002-2011

Year	2002			2003			2004			2007		
No. of patients	12798			16815			18391			18380		
Total PCR	773			1036			1013			764		
	N	n	%	N	n	%	N	n	%	N	n	%
Phaco	5085	309	6.1	7674	489	6.4	9282	513	5.5	11960	393	3.3
ECCE	6914	356	5.1	8012	374	4.7	7830	356	4.5	5524	239	4.3
Lens Aspiration	372	32	8.6	435	41	9.4	550	38	6.9	323	18	5.6
ICCE	311	3	3.7	469	5	5.3	454	11	10.7	432	15	10.6
Phaco converted to ECCE	81	73	23.5	94	125	26.7	103	95	20.9	141	99	22.9

Year	2008			2009			2010			2011		
No. of patients	21496			24438			28506			30611		
Total PCR	790			858			840					
	N	n	%	N	n	%	N	n	%	N	n	%
Phaco	14781	432	2.9	17717	471	2.7	21810	489	2.2	23872	568	2.4
ECCE	5627	210	3.7	5457	216	4.0	5363	195	3.6	5291	181	3.4
Lens Aspiration	340	17	5.0	400	22	5.5	451	20	4.4	460	11	2.4
ICCE	524	7	5.4	134	8	6.0	143	9	6.3	123	6	4.9
Phaco converted to ECCE	129	124	24.0	573	135	23.6	586	119	20.3	652	162	24.8

Figure 1.4.7: PCR by Type of Cataract Surgery, CSR 2002-2011



1.5 CATARACT SURGERY OUTCOME

1.5.1 Post-operative Complications

In 2011, 94.2% of cataract surgery done had entered data on the post-operative complication form and 88.9% had post-operative vision.

Table 1.5.1: Distribution of Cataract Surgery with Post-operative Complication Record, CSR 2002-2011

Year	2002	2003	2004	2007	2008	2009	2010	2011
Total number of cataract surgery registered to CSR	12798	16815	18392	18426	21496	24438	28506	30611
Cataract surgery with post-operative complication record	12798	16815	15996	17604	20521	21851	26014	28834
Ascertainment on post-operative complication (%)	100	100	87.0	95.5	95.5	89.4	91.3	94.2
Cataract surgery with visual outcome record	12512	14683	6228	15786	19063	20590	24522	27219
Ascertainment on visual outcome (%)	97.7	87.3	33.9	85.7	88.7	84.3	86.0	88.9

1.5.1.1 Post-operative Infectious Endophthalmitis

The percentage of post-operative infectious endophthalmitis is decreasing over the years, from 0.2% in 2002 to 0.04% in 2011 or 4 cases in 10000 cataract surgeries performed.

Table 1.5.1.1(a): Post-operative Infectious Endophthalmitis, CSR 2002-2011

Year	2002	2003	2004	2007	2008	2009	2010	2011
Eyes with post-operative complication records (N)	12798	16815	15996	17604	20521	21851	26014	28834
Eyes with post-operative infectious endophthalmitis (n)	25	41	25	37	22	19	24	11
Percentage of eyes with post-operative endophthalmitis (%)	0.2	0.24	0.16	0.21	0.11	0.09	0.09	0.04

Figure 1.5.1.1(a): Rate of Post-operative Infectious Endophthalmitis, CSR 2002-2011

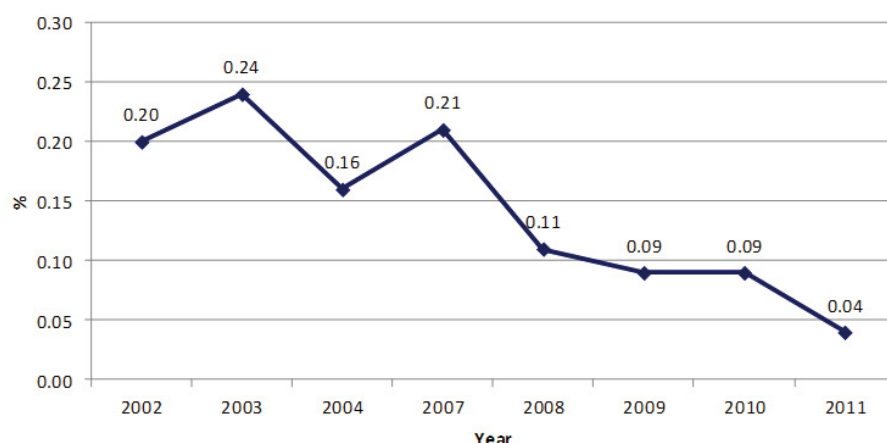


Figure 1.5.1.1(b-i): Post-operative Infectious Endophthalmitis, by SDP 2007

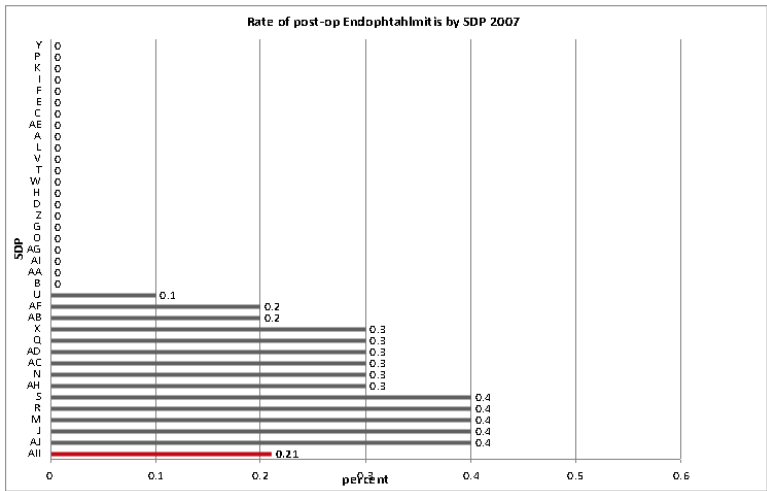


Figure 1.5.1.1(b-ii): Post-operative Infectious Endophthalmitis, by SDP CSR 2008

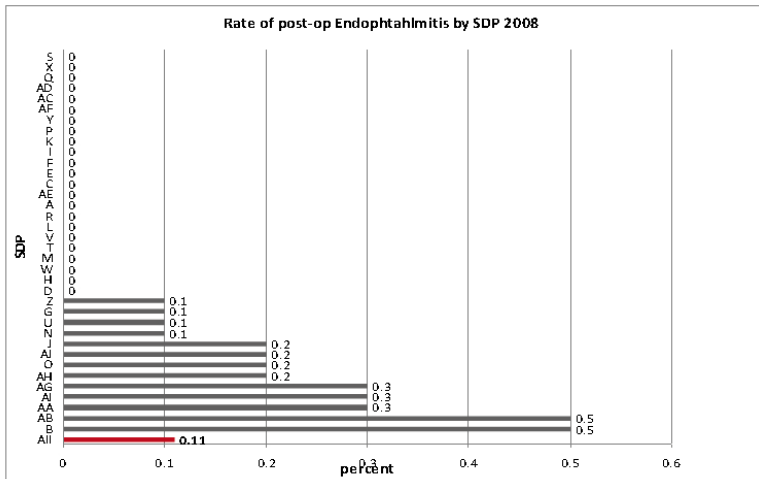


Figure 1.5.1.1(b-iii): Post-operative Infectious Endophthalmitis, by SDP CSR 2009

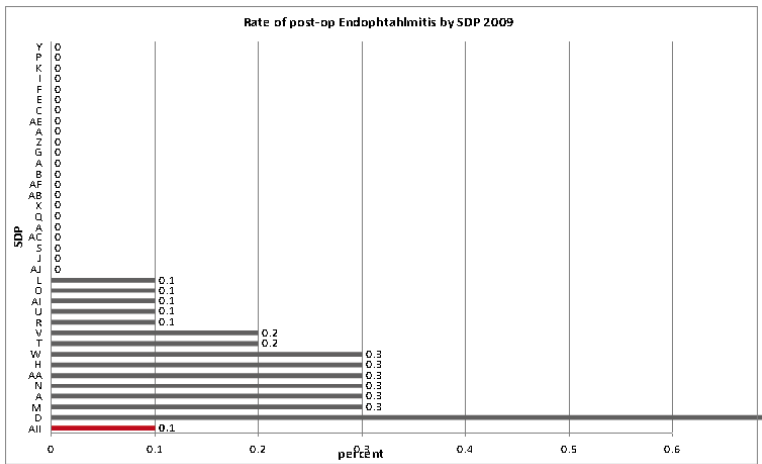


Figure 1.5.1.1(b-iv): Post-operative Infectious Endophthalmitis, by SDP CSR 2010

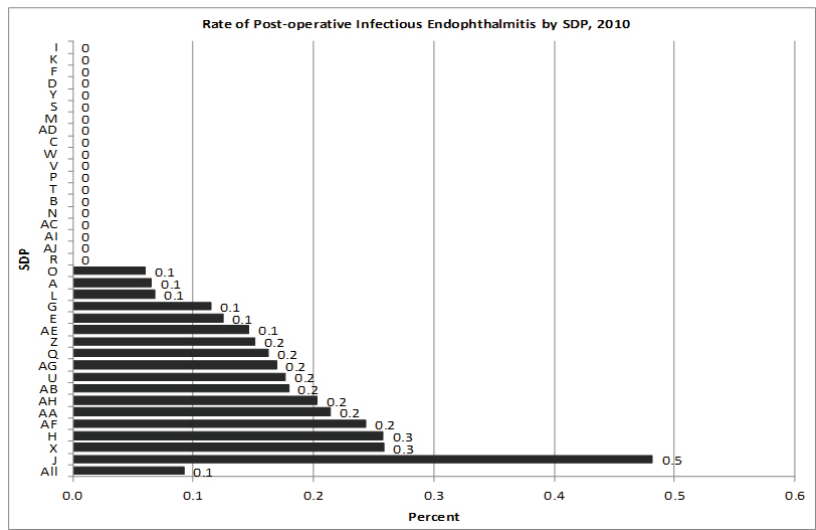


Figure 1.5.1.1(b-v): Post-operative Infectious Endophthalmitis, by SDP CSR 2011

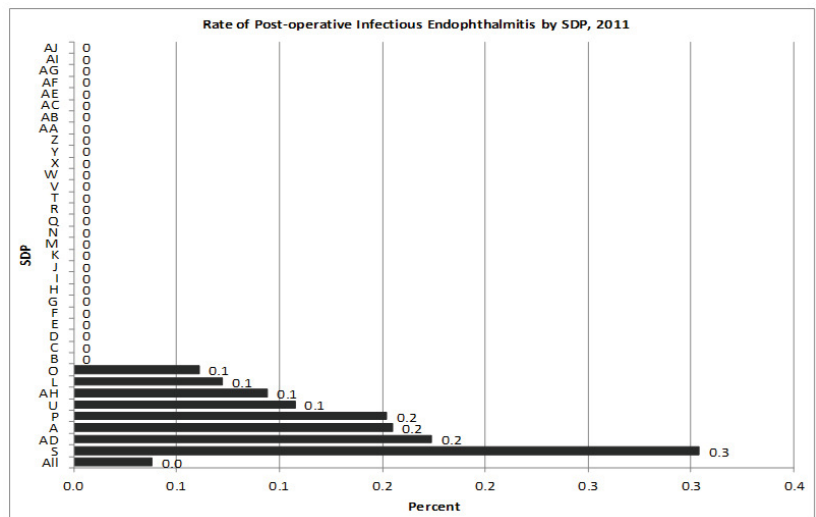


Figure 1.5.1.1(c-i): Post-operative Infectious Endophthalmitis, by SDP CSR 2007

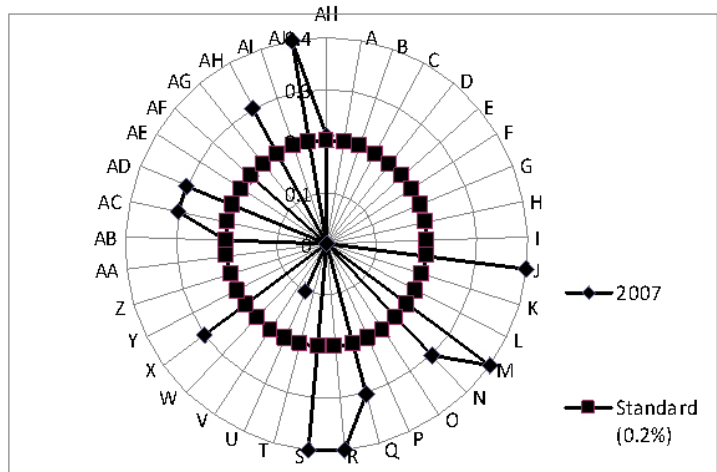


Figure 1.5.1.1(c-ii): Post-operative Infectious Endophthalmitis, by SDP CSR 2008

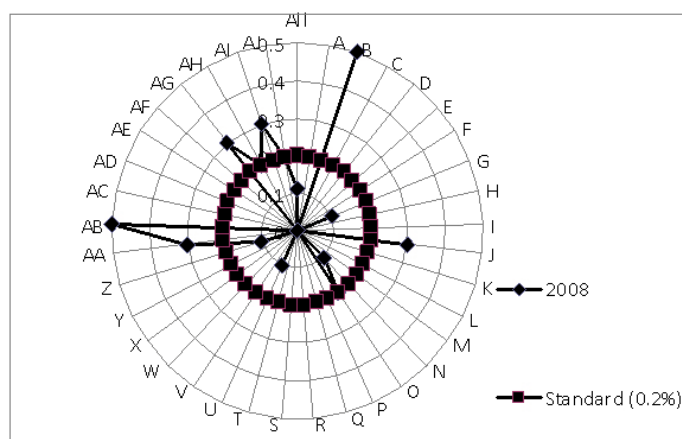


Figure 1.5.1.1(c-iii): Post-operative Infectious Endophthalmitis, by SDP CSR 2009

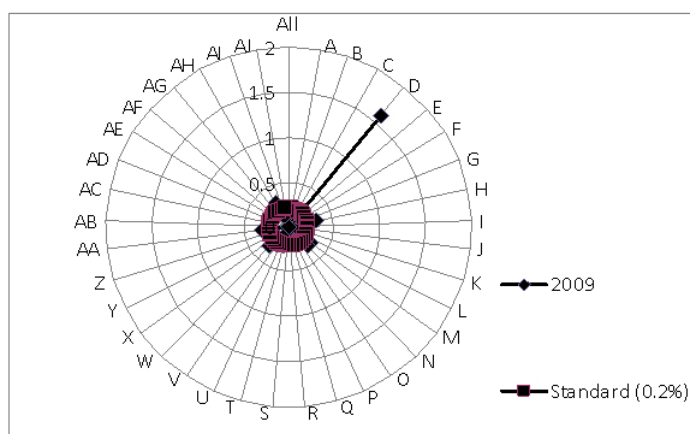


Figure 1.5.1.1(c-iv): Post-operative Infectious Endophthalmitis, by SDP CSR 2010

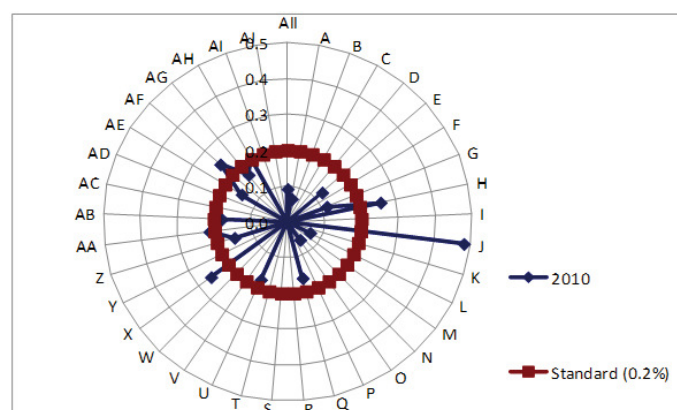


Figure 1.5.1.1(c-v): Post-operative Infectious Endophthalmitis, by SDP CSR 2011

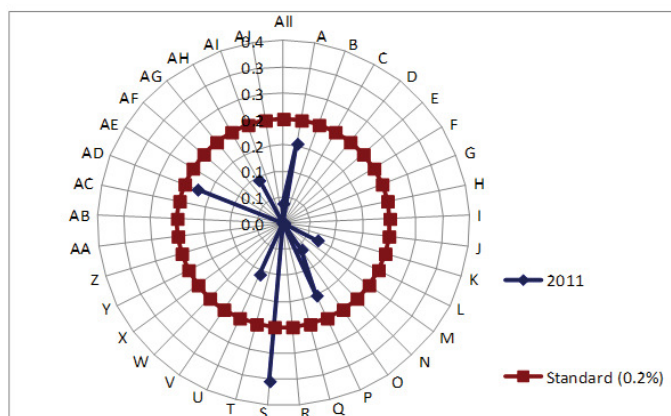


Table 1.5.1.1(b): Time from Surgery to Diagnosis of Post-operative Infectious Endophthalmitis, CSR 2007-2011

Year	2007	2008	2009	2010	2011
Number of patients with post-operative infective endophthalmitis	37	22	19	24	11
Time from surgery to diagnosis of infection (day)	Days				
Min	1	1	1	0	0
Max	92	76	103	141	391
Mean	21.6	20.6	20.4	22.7	43.7
Median					6
Distribution of patients	Number of Patients				
Less than 3 days	2	5	5	4	2
3-5 days	4	1	1	5	3
6-14 days	8	5	5	4	4
More than 14 days	12	9	7	10	2
Missing	11	2	1	1	0

1.5.1.2 Unplanned Return to Operating Theatre (OT)

In 2011, the percentage of unplanned return to OT was 0.42% or 4.2 cases per 1000 cataract surgeries.

The common causes for unplanned return to OT were Iris prolapse, wound dehiscence, high post-operative IOP and IOL related problem. In 2011, the average time from surgery to return to OT was in the third week post-operatively.

Table 1.5.1.2(a): Unplanned Return to OT, CSR 2004-2011

Year	*2004		2007		2008		2009		2010		2011	
Patients with outcome records (N)	9039		17604		20521		21851		26014		28834	
	n	%	n	%	n	%	n	%	n	%	n	%
Patients with unplanned return to OT (%)	31	0.34	87	0.50	88	0.43	116	0.53	123	0.47	122	0.42

*Data in 2004 available only from June-December

Table 1.5.1.2(b): Reasons for Unplanned Return to OT, CSR 2004-2011

Year	*2004		2007		2008		2009		2010		2011	
	n	%	n	%	n	%	n	%	n	%	n	%
Iris prolapse	10	32.3	20	23.0	12	13.6	18	15.5	20	16.3	24	19.7
Wound dehiscence	7	22.6	13	14.9	7	8.0	22	19.0	20	16.3	18	14.8
High IOP	4	12.9	5	5.7	2	2.3	9	7.8	3	2.4	4	3.3
IOL related	2	6.5	10	11.5	14	15.9	15	12.9	22	17.9	18	14.8
Infective endophthalmitis	7	22.6	12	13.8	6	6.8	6	5.2	9	7.3	2	1.6
Others	9	29.0	38	43.7	48	54.5	53	45.7	56	45.5	68	55.7

*Data in 2004 available only for June-December

Figure 1.5.1.2: Reasons for Unplanned Return to OT, CSR 2004-2011

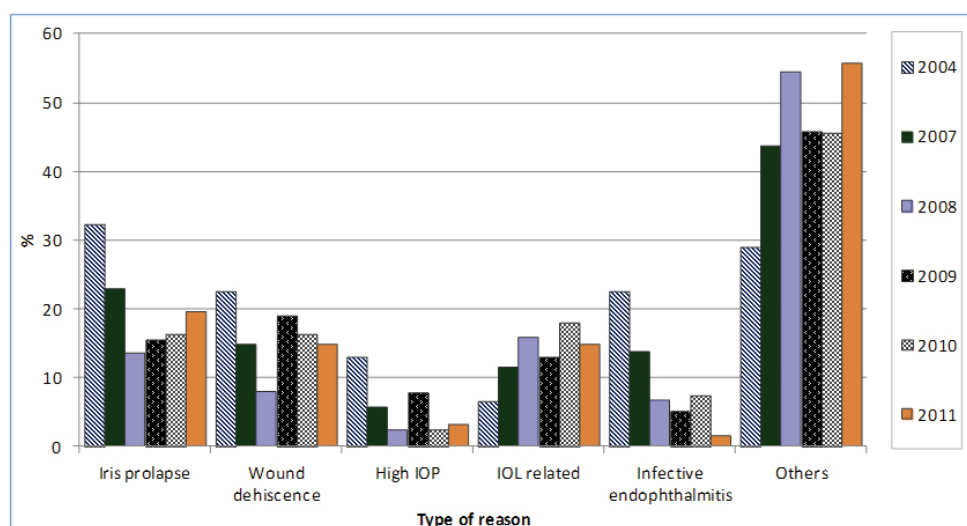


Table 1.5.1.2(c): Time from Surgery to Unplanned Return to OT, CSR 2011

Post-operative period (day)	N	n	Median	Min	Max	Mean
Iris prolapse	24	24	8.5	0	186	21.5
Wound dehiscence	18	18	5.5	1	58	12.5
High IOP	4	4	14.5	7	56	23.0
IOL related	18	18	9.0	1	138	24.2
Infective endophthalmitis	2	2	27.5	13	42	27.5
Others	68	68	7.0	0	380	18.4

n = No. of available information

1.5.1.3 Post-operative Follow-up Period

Most patients were followed up until 7 weeks post-operatively. Patients who had undergone 'phaco converted to ECCE' were followed up longer.

Table 1.5.1.3(a): Median Follow-up Period for Eyes with Unaided Vision (in weeks) by Types of Surgery, 2011

Types of surgery	N	n	Median	25th percentile	75th percentile
All surgeries	27202	27168	7	6	9
Phaco	21330	21302	7	6	9
ECCE	4695	4682	8	7	11
Phaco → ECCE	594	594	8	6	11
ICCE	101	101	7	5	9
Lens aspiration	384	383	7	5	10

n = No. of available information

Table 1.5.1.3(b): Median Follow-up Period for Eyes with Refracted Vision (in weeks) by Types of Surgery, 2011

Types of surgery	N	n	Median	25th percentile	75th percentile
All surgeries	24695	24693	7	6	10
Phaco	19542	19536	7	6	9
ECCE	4132	4129	9	7	11
Phaco → ECCE	548	548	9	6	11
ICCE	82	82	7	6	10
Lens aspiration	323	323	7	6	10

n = No. of available information

1.5.2 Post-operative Visual Acuity

1.5.2.1 Post-operative Visual Acuity (All Eyes)

40.0% of eyes had unaided VA of 6/12 or better.

Table 1.5.2.1: Post-operative Visual Acuity, All Eyes, CSR 2002-2011

Year	2002			2003			2004			2007			2008			2009			2010			2011										
	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%								
VA	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%								
6/5	9	0.1	60	0.6	16	0.1	91	0.7	2	0.0	17	0.3	3	0.0	35	0.2	9	0	51	0.3	10	0	46	0.2	12	0.0	119	0.5	15	0.1	124	0.5
6/6	598	4.8	2784	26.8	648	4.1	3795	27.8	318	4.7	1659	28.6	878	5.6	4409	30.5	1126	5.9	6072	35.2	1100	5.3	6555	34.7	1568	6.4	8362	37.0	1776	6.5	9239	37.4
6/9	1968	15.7	3773	36.3	2286	14.5	4857	35.6	1011	15.0	2170	37.4	2806	17.8	4961	34.3	3040	15.9	5714	33.1	3649	17.7	6550	34.7	4523	18.4	7369	32.6	5040	18.5	8162	33.0
6/12	2294	18.3	1759	16.9	2858	18.2	2303	16.9	1230	18.3	920	15.8	2717	17.2	2100	14.6	3351	17.6	2577	14.9	3837	18.6	2762	14.6	5054	20.6	3332	14.8	5499	20.2	3585	14.5
6/5-6/12	4869	38.9	8376	80.7	5808	36.9	11046	81.0	2561	38.0	4766	82.1	6404	40.6	11505	79.6	7526	39.4	14414	83.5	8596	41.7	15913	84.3	11157	45.5	19182	85.0	12330	45.3	21110	85.4
6/18	2308	18.5	735	7.1	3046	19.4	970	7.1	1244	18.5	414	7.1	2893	18.3	1055	7.3	3792	19.9	1012	5.9	4052	19.7	1050	5.6	4727	19.3	1131	5.0	5209	19.1	1218	4.9
6/24	1954	15.6	410	4.0	2484	15.8	540	4.0	1130	16.8	205	3.5	2315	14.7	573	4	2978	15.6	607	3.5	2958	14.4	616	3.3	3232	13.2	666	2.9	3689	13.6	738	3.0
6/36	1452	11.6	279	2.7	1935	12.3	359	2.6	761	11.3	169	2.9	1687	10.7	444	3.1	2018	10.6	421	2.4	2095	10.2	416	2.2	2211	9.0	497	2.2	2528	9.3	503	2.0
6/60	868	6.9	166	1.6	1097	7.0	240	1.8	489	7.3	77	1.3	1126	7.1	266	1.9	1300	6.8	261	1.5	1323	6.4	276	1.5	1456	5.9	350	1.6	1558	5.7	388	1.6
5/60	77	0.6	13	0.1	124	0.8	15	0.1	56	0.8	7	0.1	92	0.6	23	0.2	116	0.6	37	0.2	93	0.5	27	0.1	119	0.5	37	0.2	111	0.4	28	0.1
4/60	64	0.5	13	0.1	114	0.7	29	0.2	40	0.6	6	0.1	87	0.6	35	0.2	97	0.5	30	0.2	103	0.5	31	0.2	112	0.5	31	0.1	109	0.4	32	0.1
3/60	127	1.0	43	0.4	173	1.1	56	0.4	73	1.1	27	0.5	207	1.3	80	0.6	266	1.4	112	0.6	331	1.6	118	0.6	378	1.5	151	0.7	435	1.6	155	0.6
6/18-3/60	6850	54.8	1659	16.0	8973	57.0	2209	16.2	3793	56.3	905	15.6	8407	53.3	2476	17.3	10567	55.4	2480	14.3	10955	53.2	2534	13.4	12235	49.9	2863	12.7	13639	50.1	3062	12.4
2/60	128	1.0	59	0.6	154	1.0	43	0.3	50	0.7	26	0.5	158	1.0	73	0.5	186	1	70	0.4	199	1	77	0.4	227	0.9	97	0.4	249	0.9	113	0.5
1/60	146	1.2	54	0.5	116	0.7	45	0.3	76	1.1	23	0.4	155	1.0	76	0.5	159	0.8	60	0.3	168	0.8	66	0.3	196	0.8	93	0.4	213	0.8	99	0.4
CF	231	1.9	86	0.8	345	2.2	134	1.0	132	2.0	35	0.6	300	1.9	121	0.8	295	1.5	85	0.5	315	1.5	127	0.7	345	1.4	147	0.7	400	1.5	135	0.5
HM	203	1.6	105	1.0	219	1.4	115	0.8	87	1.3	40	0.7	253	1.6	149	1	230	1.2	84	0.5	269	1.3	126	0.7	280	1.1	155	0.7	294	1.1	150	0.6
PL	54	0.4	27	0.3	77	0.5	33	0.2	25	0.4	6	0.1	75	0.5	46	0.3	53	0.3	22	0.1	58	0.3	31	0.2	47	0.2	24	0.1	52	0.2	20	0.1
NPL	31	0.3	19	0.2	49	0.3	20	0.2	15	0.2	6	0.1	34	0.2	0	0	32	0.2	0	0	30	0.1	12	0.1	35	0.1	18	0.1	42	0.2	18	0.1
2/60-NPL	793	6.3	350	3.4	960	6.1	390	2.9	385	5.7	136	2.3	975	6.2	465	3.1	955	5	321	1.8	1039	5	439	2.3	1130	4.6	534	2.4	1250	4.6	535	2.2
TOTAL	12512	10385	15741	13645	6739	5807	15786	14446	19048	17215	20590	18886	100	24522	100	22579	100	27219	100	24707	100	24707	100	24707	100	24707	100	24707	100	24707	100	

Figure 1.5.2.1(a): Percent Distribution of Post-operative Unaided and Refracted Visual Acuity, CSR 2002-2011

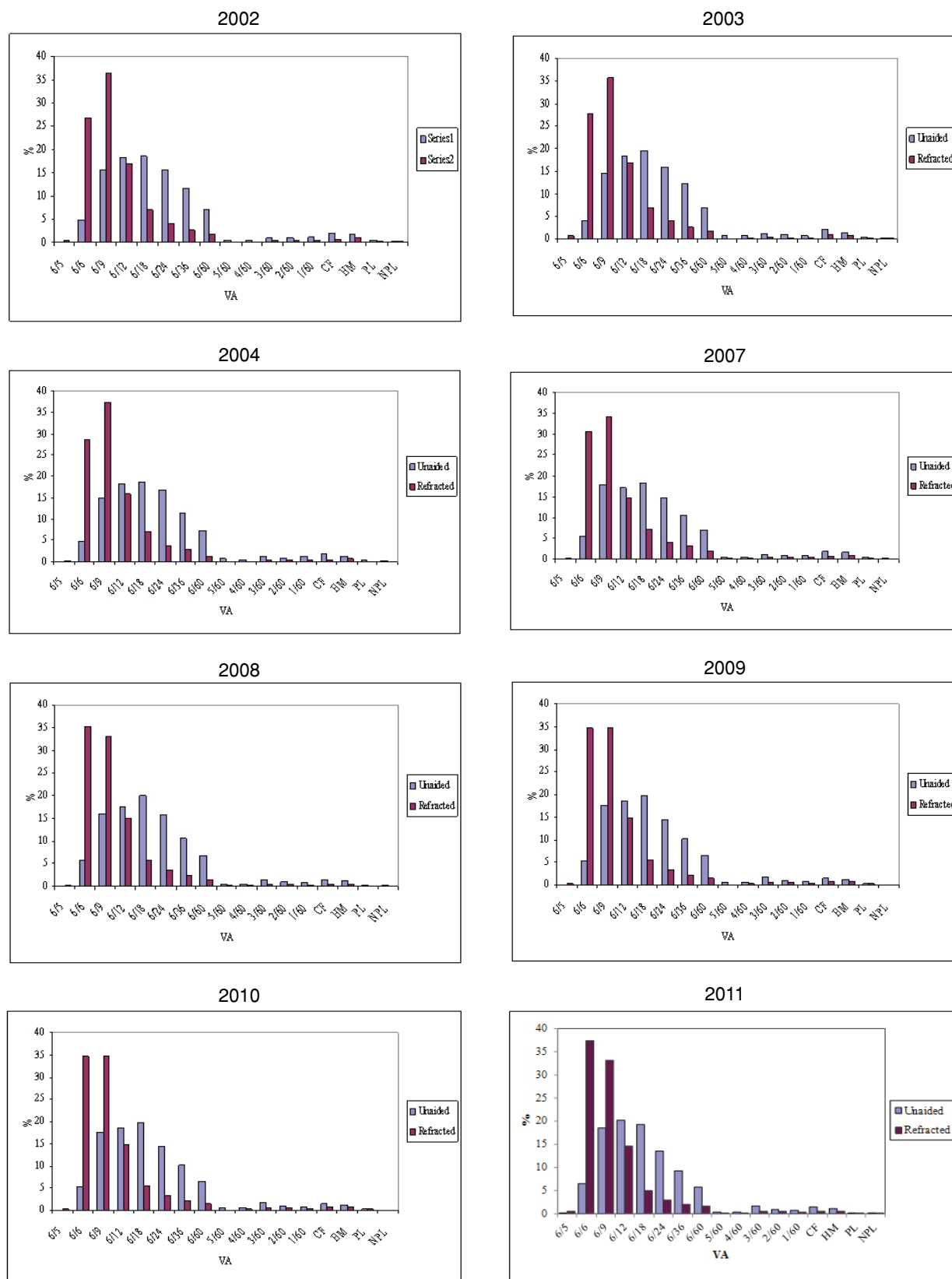
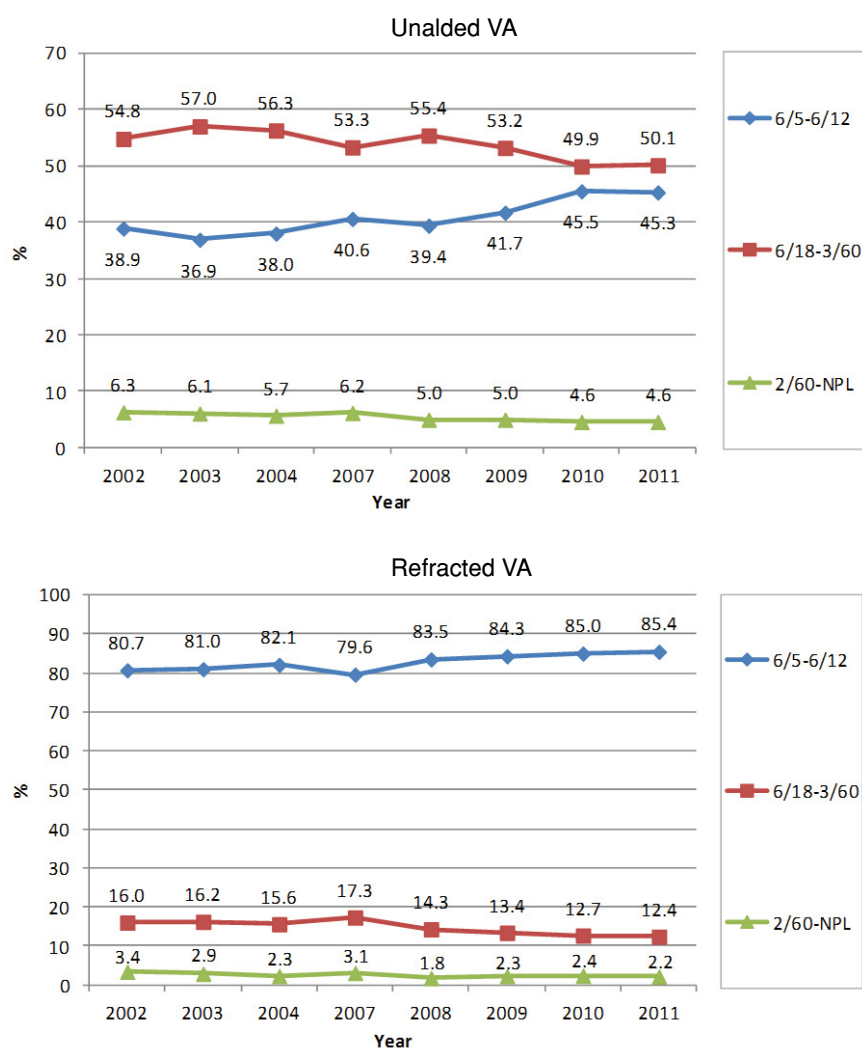


Figure 1.5.2.1(b-i): Post-operative Unaided and Refracted Visual Acuity by Visual Category for All Eyes, CSR 2002-2011



1.5.2.2 Post-operative Visual Acuity (Eyes without Ocular Co-morbidity)

The percentage of eyes with unaided VA 6/12 or better slightly increased but similar to eyes with ocular co-morbidity, this percentage increased double folds following refraction. This trend remained unchanged throughout the years.

Table 1.5.2.2: Post-Operative Visual Acuity for Eyes without Ocular Co-morbidity, CSR 2002-2010

Year	2002			2003			2004			2007			2008			2009			2010			2011										
	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%	Unaided	Refracted	%								
VA	n	%	n	n	%	n	n	%	n	n	%	n	n	%	n	n	%	n	n	%	n	n	%	n	n	%						
6/5	7	0.1	44	0.6	9	1.0	70	0.8	1	0.0	14	0.4	3	0.0	25	0.3	2	0	23	0.3	8	0.1	37	0.3	7	0.0	83	0.6	14	0.1	105	0.7
6/6	501	5.6	2229	29.9	511	5.0	2826	31.6	247	5.9	1196	32.1	667	6.2	3326	33.5	561	6.2	3061	36.4	802	6.4	4717	40	1127	8.0	5640	42.8	1249	7.9	6314	43.3
6/9	1568	17.6	2892	38.7	1710	16.8	3421	38.2	758	18.0	1505	40.5	2061	19.3	3574	36	1477	16.4	2939	35	2595	20.6	4348	36.9	2989	21.1	4550	34.5	3447	21.8	5167	35.4
6/12	1780	20.0	1260	16.9	2074	20.4	1595	17.8	871	20.7	608	16.3	2021	18.9	1473	14.8	1683	18.7	1377	16.4	2585	20.5	1602	13.6	3311	23.4	1842	14.0	3587	22.6	1882	12.9
6/5-6/12	3856	43.4	6425	86.1	4304	42.2	7912	88.4	1877	44.6	3323	89.3	4752	44.4	8398	84.6	3723	41.3	7400	88.1	5990	47.5	10704	90.9	7434	52.6	12115	92.0	8297	52.4	13468	92.4
6/18	1698	19.1	444	6.0	2072	20.3	485	5.4	813	19.3	216	5.8	2037	19.1	634	6.4	1882	20.9	411	4.9	2599	20.6	479	4.1	2777	19.6	445	3.4	3061	19.3	480	3.3
6/24	1403	15.8	240	3.2	1634	16.0	242	2.7	709	16.8	90	2.4	1619	15.1	351	3.5	1518	16.9	254	3	1772	14	251	2.1	1805	12.8	242	1.8	2098	13.2	267	1.8
6/36	1001	11.3	136	1.8	1162	11.4	140	1.6	443	10.5	55	1.5	1087	10.2	234	2.4	975	10.8	151	1.8	1170	9.3	152	1.3	1113	7.9	139	1.1	1253	7.9	132	0.9
6/60	514	5.8	74	1.0	593	5.8	74	0.8	240	5.7	12	0.3	650	6.1	113	1.1	536	6	71	0.8	651	5.2	61	0.5	586	4.1	83	0.6	651	4.1	107	0.7
5/60	39	0.4	6	0.1	61	0.6	3	0.0	26	0.6	2	0.1	52	0.5	8	0.1	52	0.6	10	0.1	38	0.3	8	0.1	50	0.4	11	0.1	40	0.3	5	0.0
4/60	30	0.3	3	0.0	45	0.4	4	0.0	13	0.3	1	0.0	48	0.4	13	0.1	25	0.3	7	0.1	33	0.3	5	0	31	0.2	6	0.0	39	0.2	8	0.1
3/60	64	0.7	18	0.2	71	0.7	14	0.2	20	0.5	5	0.1	94	0.9	26	0.3	79	0.9	29	0.3	114	0.9	37	0.3	105	0.7	33	0.3	131	0.8	26	0.2
6/18-3/60	4749	53.4	921	12.3	5638	55.3	962	10.7	2264	53.8	381	10.2	5587	52.3	1379	13.9	5067	56.4	933	11	6377	50.5	993	8.4	6467	45.7	959	7.3	7273	45.9	1025	7.0
2/60	60	0.7	22	0.3	65	0.6	10	0.1	18	0.4	6	0.2	62	0.6	25	0.3	54	0.6	16	0.2	60	0.5	15	0.1	56	0.4	16	0.1	71	0.4	22	0.2
1/60	43	0.5	18	0.2	28	0.3	8	0.1	14	0.3	1	0.0	68	0.6	23	0.2	33	0.4	8	0.1	46	0.4	16	0.1	40	0.3	18	0.1	51	0.3	15	0.1
CF	94	1.1	30	0.4	95	0.9	36	0.4	22	0.5	4	0.1	120	1.1	47	0.5	73	0.8	23	0.3	87	0.7	27	0.2	87	0.6	31	0.2	93	0.6	19	0.1
HM	64	0.7	30	0.4	37	0.4	14	0.2	11	0.3	5	0.1	69	0.6	42	0.4	31	0.3	12	0.1	46	0.4	20	0.2	48	0.3	26	0.2	46	0.3	23	0.2
PL	13	0.2	10	0.1	13	0.1	8	0.1	5	0.1	1	0.0	23	0.2	13	0.1	7	0.1	4	0	9	0.1	6	0.1	7	0.0	5	0.0	9	0.1	3	0.0
NPL	11	0.1	9	0.1	10	0.1	5	0.1	1	0.0	0	0.0	8	0.1	7	0.1	7	0.1	0	0	3	0	1	0	3	0.0	1	0.0	6	0.0	1	0.0
2/60-NPL	285	3.2	119	1.6	248	2.4	81	0.9	71	1.7	17	0.5	350	3.2	157	1.6	205	2.3	63	0.7	251	2	85	0.7	241	1.7	97	0.7	276	1.7	83	0.6
TOTAL	8890	100	7465	100	10190	100	8955	100	4212	100	3721	100	10689	100	9934	100	8995	100	8396	100	12618	100	11782	100	14142	100	13171	100	15846	100	14576	100

Figure 1.5.2.2(a): Post-Operative Visual Acuity for Eyes without Ocular Co-morbidity, CSR 2002-2011

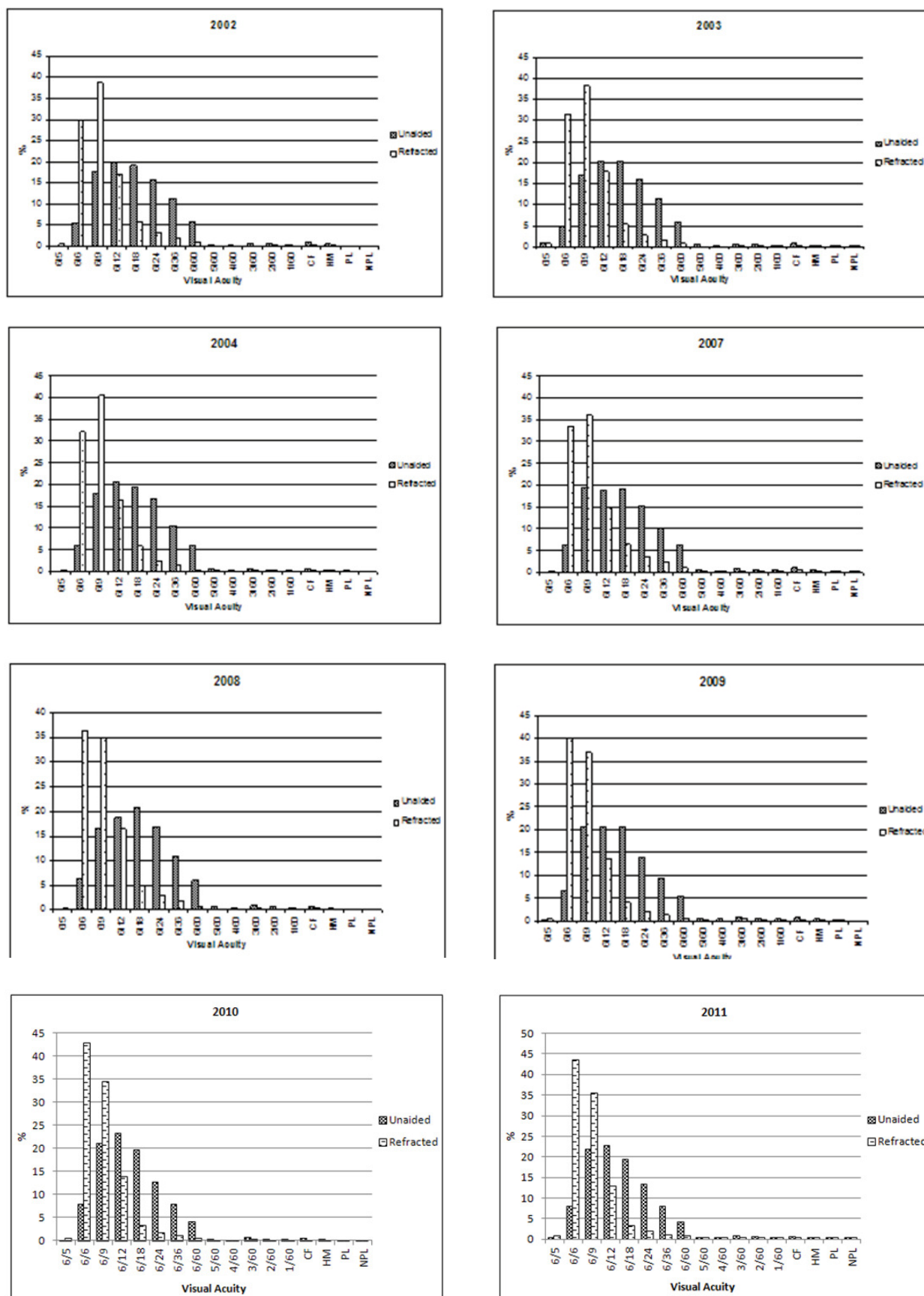
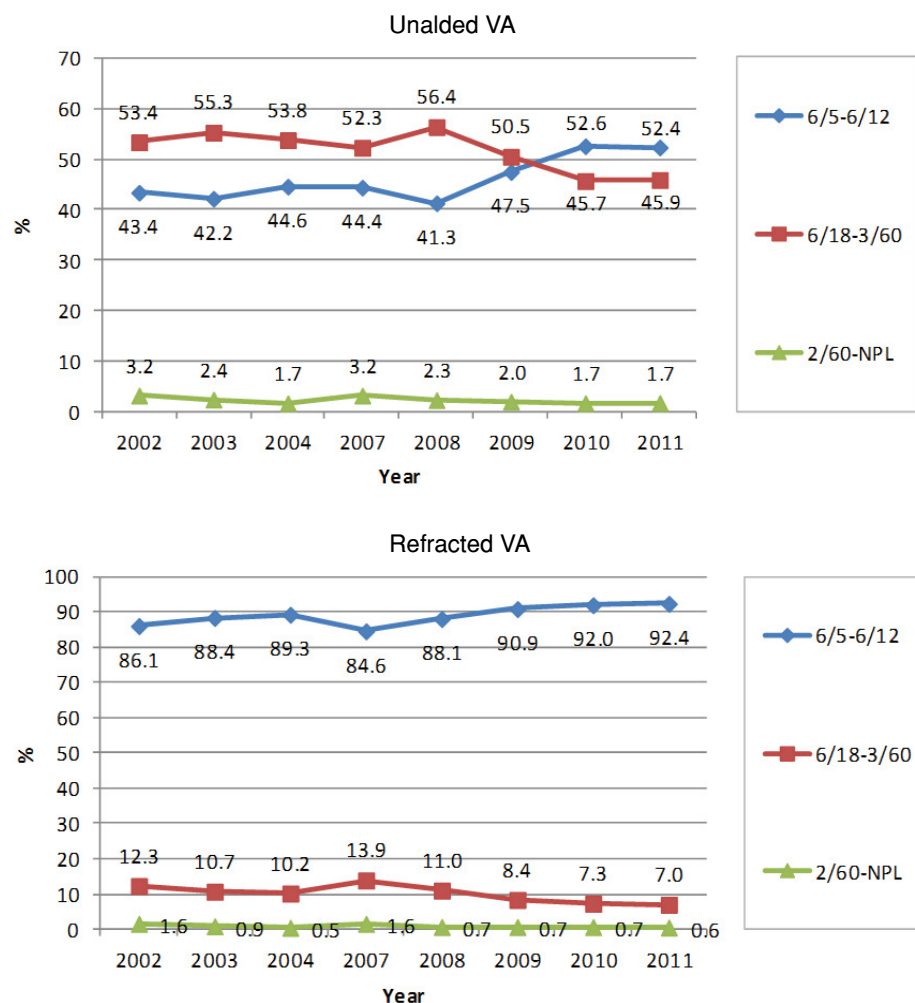


Figure 1.5.2.2(b): Post-operative Visual Acuity by Visual Category for Eyes without Ocular Co-morbidity, CSR 2002-2011



1.5.2.3 Post-operative Visual Acuity 6/12 or Better Among Eyes without Ocular Co-morbidity

The patients who had undergone phacoemulsification showed the highest proportion of achieving good visual outcome when compared with other surgeries. The percentage demonstrated an increasing trend (from 87.0% in 2002 to 94.3% in 2011). When complication occurred in phacoemulsification which necessitated conversion to ECCE, the visual outcome became less favorable.

The proportion of eyes with unaided VA 6/12 or better was poor in almost all types of surgery throughout the years. This percentage increased double folds following refraction. These findings indicated that a large number of patients required some forms of visual rehabilitation or correction post-operatively.

Table 1.5.2.3(a): Post-operative Visual Acuity 6/12 or Better for Eyes without Ocular Co-morbidities by Types of Surgery, CSR2002-2011

Year	2002						2003						2004						2007					
	Unaided			Refracted			Unaided			Refracted			Unaided			Refracted			Unaided			Refracted		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
All Surgeries	12517	4869	38.9	10392	8376	81.0	9861	4181	42.0	8683	7693	89.0	4058	1818	44.8	3604	3226	90.0	7130	3080	43.0	6632	5551	84.0
Phaco	5010	2490	49.7	4311	3746	87.0	4930	2524	51.0	4411	4111	93.0	4138	2226	53.8	1974	1852	94.0	4868	2332	48.0	4508	3890	86.0
ECCE	6761	2177	32.2	5490	4255	78.0	4445	1507	34.0	3840	3245	85.0	4823	1659	34.4	1479	1257	85.0	2033	675	33.0	1910	1520	80.0
Phaco ECCE	305	94	30.8	255	192	75.0	311	88	28.0	289	236	82.0	347	107	30.8	91	72	79.0	158	36	23.0	143	89	62.0
Lens Aspiration	315	86	27.3	237	129	54.0	123	52	42.0	100	75	75.0	145	40	27.5	31	23	74.0	62	33	53.0	59	46	78.0
ICCE	80	12	15.0	66	33	50.0	8	3	38.0	6	4	67.0	-	7	0.0	4	2	50.0	15	2	13.0	10	4	39.0
Secondary IOL	33	10	30.3	26	21	81.0	42	7	17.0	36	22	61.0	97	22	22.7	19	15	79.0	-	NA	-	-	NA	-

Year	2008						2009						2010						2011					
	Unaided			Refracted			Unaided			Refracted			Unaided			Refracted			Unaided			Refracted		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
All Surgeries	8983	3719	41.0	8390	7392	88.0	12618	5990	47.5	11782	10704	90.9	14142	7434	52.6	13171	12115	92.0	15846	8297	52.4	14576	13468	92.4
Phaco	6419	3017	47.0	5958	5440	91.0	9511	5038	53.0	9001	8397	93.3	11520	6589	57.2	10818	10151	93.8	13036	7454	57.2	12155	11465	94.3
ECCE	2263	629	28.0	2158	1744	81.0	2607	816	31.3	2329	1967	84.5	2089	672	32.2	1866	1596	85.5	2238	689	30.8	1901	1628	85.6
Phaco ECCE	201	40	20.0	184	140	76.0	270	53	19.6	259	200	77.2	268	67	25.0	253	198	78.3	311	59	19.0	291	210	72.2
Lens Aspiration	74	29	39.0	66	54	82.0	160	57	35.6	128	89	69.5	192	86	44.8	168	126	75.0	200	79	39.5	175	131	74.9
ICCE	24	4	17.0	19	11	58.0	29	7	24.1	25	15	60.0	28	4	14.3	25	13	52.0	20	3	15.0	19	10	52.6
Secondary IOL	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-

* Note: Secondary IOL was excluded from CSR from the year 2007

Figure 1.5.2.3(a): Post-operative Visual Acuity 6/12 or Better for Eyes without Ocular Co-morbidities by ECCE and Phaco, CSR 2002-2011

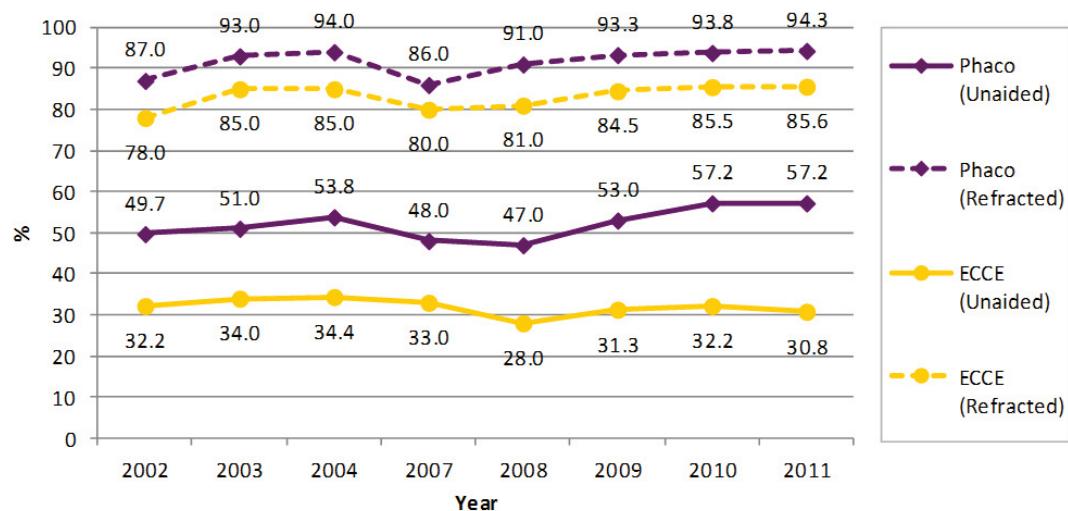


Table 1.5.2.3(b): Post-operative Refracted Visual Acuity 6/12 or Better in Eyes without Ocular Co-morbidities by Complications and Types of Surgery, CSR 2011

	Types of Cataract Surgery											
	All Surgeries			Lens Aspiration			ECCE			Phaco		
	N	n	%	N	n	%	N	n	%	N	n	%
	14568	13460	92.4	175	131	74.9	1901	1628	85.6	12155	11465	94.3
With intra-op complications	634	479	75.6	9	5	55.6	118	88	74.6	369	299	81.0
No intra-op complications	13934	12981	93.2	166	126	75.9	1783	1540	86.4	11786	11166	94.7
											164	129
											11	5
												5
												45.5

In phacoemulsification, the proportion of patients who could achieve post-operative VA better than 6/12 was initially increasing among all surgeons. However, it declined in the year 2007 before rising again from 2008 onwards. In general, better visual outcomes were observed in phaco and phaco converted to ECCE performed by the specialists.

Table 1.5.2.3(c): Post-operative Refracted Visual Acuity 6/12 or Better in Eyes without Ocular Co-morbidities by Surgeon Status and Types of Surgery, CSR 2011

	Types of Cataract Surgery											
	All Surgeries			Lens Aspiration			ECCE			Phaco		
	N	n	%	N	n	%	N	n	%	N	n	%
	14568	13460	92.4	175	131	74.9	1901	1628	85.6	12155	11465	94.3
Specialist	12183	11321	92.9	145	109	75.2	1171	1005	85.8	10583	10009	94.6
Gazetting Specialist	1287	1163	90.4	27	19	70.4	196	174	88.8	1030	946	91.8
Medical Officer	1092	971	88.9	3	3	100.0	533	449	84.2	538	506	94.1
											18	13
											0	0
												0
												0.0

Figure 1.5.2.3(b): Post-operative Refracted Visual Acuity 6/12 or Better in Eyes without Ocular Co-morbidities by Surgeon Status and Types of Surgery, CSR 2002-2011

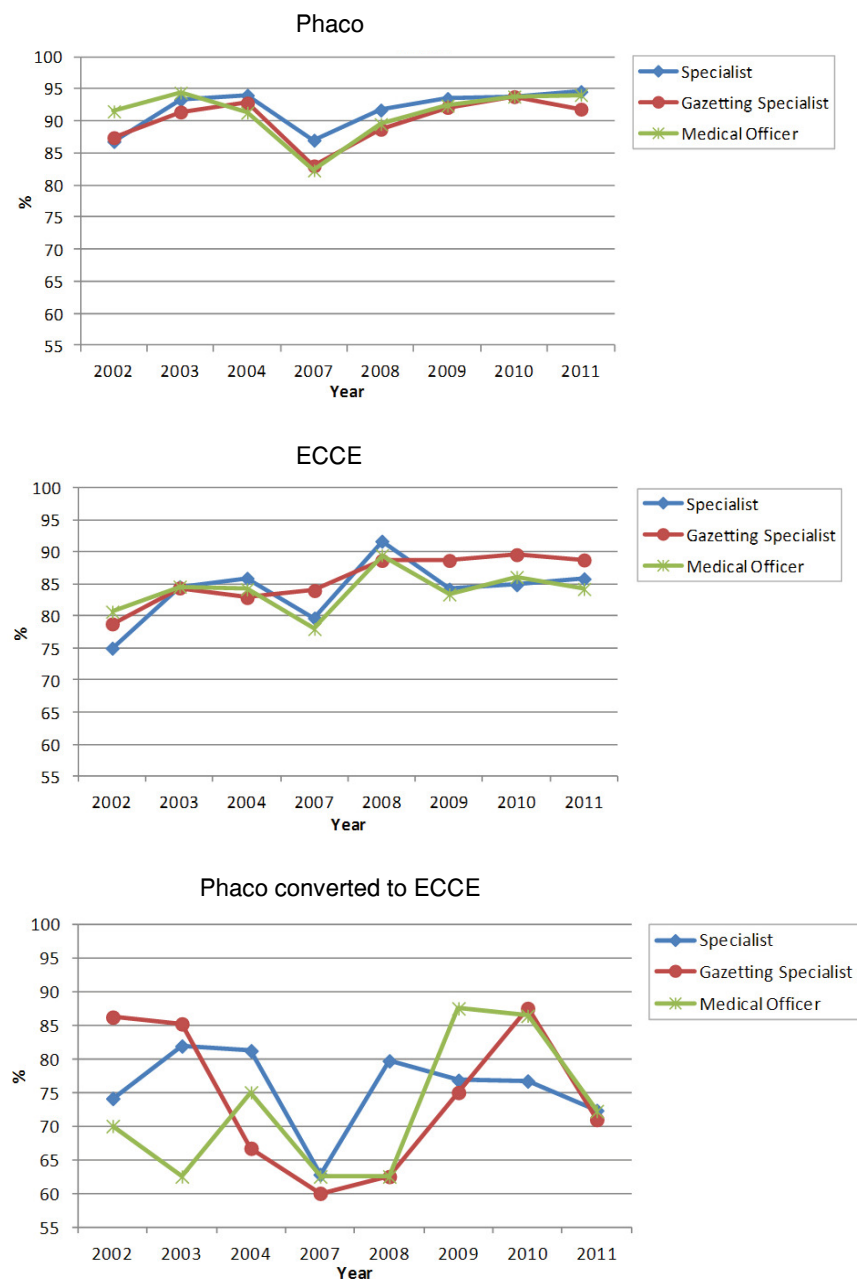


Table 1.5.2.3(d): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP and Types of Surgery, CSR 2011

	All Patients	All Surgeries			Lens Aspiration			Type of Cataract Surgery						Phaco			Phaco & ECCE			ICCE				
		N	n	%	N	n	%	N	n	%	ECCE	N	n	%	N	n	%	N	n	%	N	n	%	
All	14576	14568	13460	92.4	175	131	74.9	1901	1628	85.6	12155	11465	94.3	291	210	72.2	19	10	52.6					
A	811	811	746	92.0	6	4	66.7	99	74	74.7	692	658	95.1	11	9	81.8	1	0	0.0					
B	396	396	373	94.2	1	1	100.0	5	5	100.0	384	363	94.5	5	3	60.0	1	1	100.0					
C	91	91	83	91.2	1	1	100.0	7	5	71.4	82	77	93.9	1	0	0.0	0	0	0.0					
D	114	114	113	99.1	1	1	100.0	26	25	96.2	87	87	100.0	0	0	0.0	0	0	0.0					
E	289	289	269	93.1	3	3	100.0	52	46	88.5	221	209	94.6	12	10	83.3	1	1	100.0					
F	148	148	136	91.9	5	1	20.0	124	118	95.2	15	13	86.7	3	3	100.0	1	1	100.0					
G	406	399	374	93.7	1	1	100.0	58	51	87.9	330	314	95.2	7	7	100.0	1	0	0.0					
H	217	217	208	95.9	2	1	50.0	4	4	100.0	210	202	96.2	1	1	100.0	0	0	0.0					
I	50	50	47	94.0	1	1	100.0	49	46	93.9	0	0	0.0	0	0	0.0	0	0	0.0					
J	287	287	256	89.2	16	11	68.8	49	37	75.5	204	195	95.6	18	13	72.2	0	0	0.0					
K	110	110	100	90.9	0	0	0.0	8	4	50.0	99	94	94.9	2	2	100.0	0	0	0.0					
L	924	923	839	90.9	4	2	50.0	238	199	83.6	655	618	94.4	26	20	76.9	0	0	0.0					
M	288	288	269	93.4	2	2	100.0	36	33	91.7	239	227	95.0	10	6	60.0	0	0	0.0					
N	524	524	492	93.9	23	18	78.3	141	129	91.5	351	341	97.2	7	4	57.1	2	0	0.0					
O	1050	1050	955	91.0	11	10	90.9	136	110	80.9	889	823	92.6	8	7	87.5	3	3	100.0					
P	516	516	487	94.4	4	2	50.0	39	32	82.1	471	451	95.8	0	0	0.0	1	1	100.0					
Q	279	279	241	86.4	8	8	100.0	4	2	50.0	263	230	87.5	4	1	25.0	0	0	0.0					
R	996	996	930	93.4	3	3	100.0	10	8	80.0	973	911	93.6	9	7	77.8	0	0	0.0					
S	163	163	158	96.9	1	1	100.0	6	5	83.3	149	145	97.3	7	7	100.0	0	0	0.0					
T	348	348	304	87.4	8	6	75.0	24	19	79.2	301	267	88.7	7	6	85.7	2	1	50.0					
U	807	807	736	91.2	12	7	58.3	49	38	77.6	726	681	93.8	19	10	52.6	0	0	0.0					
V	348	348	314	90.2	1	1	100.0	55	49	89.1	277	255	92.1	15	9	60.0	0	0	0.0					
W	341	341	264	77.4	2	0	0.0	58	35	60.3	258	220	85.3	19	8	42.1	2	1	50.0					
X	292	292	276	94.5	0	0	0.0	43	37	86.0	242	234	96.7	6	5	83.3	1	0	0.0					
Y	143	143	143	100.0	3	3	100.0	33	33	100.0	105	105	100.0	2	2	100.0	0	0	0.0					
Z	558	558	510	91.4	16	11	68.8	22	16	72.7	513	478	93.2	6	5	83.3	0	0	0.0					

Table 1.5.2.3(d): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP and Types of Surgery, CSR 2011 (cont.)

	All Patients			All Surgeries			Lens Aspiration			Type of Cataract Surgery											
										ECCE				Phaco				Phaco → ECCE			
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
AA	339	312	92.0	5	5	100.0	39	32	82.1	283	268	94.7	12	7	58.3	0	0	0.0			
AB	342	320	93.6	2	2	100.0	27	21	77.8	296	285	96.3	16	11	68.8	0	0	0.0			
AC	343	340	99.1	4	4	100.0	47	46	97.9	290	288	99.3	2	2	100.0	0	0	0.0			
AD	203	192	94.6	5	3	60.0	197	189	95.9	0	0	0.0	0	0	0.0	0	0	0.0			
AE	310	298	96.1	4	4	100.0	18	16	88.9	285	277	97.2	3	1	33.3	0	0	0.0			
AF	243	224	92.2	0	0	0.0	7	2	28.6	227	215	94.7	9	7	77.8	0	0	0.0			
AG	409	397	97.1	7	6	85.7	51	46	90.2	327	322	98.5	23	22	95.7	0	0	0.0			
AH	631	599	94.9	4	2	50.0	68	63	92.6	549	527	96.0	7	6	85.7	1	0	0.0			
AI	741	699	94.3	4	3	75.0	42	32	76.2	690	660	95.7	4	4	100.0	1	0	0.0			
AJ	519	456	87.9	5	3	60.0	30	21	70.0	472	425	90.0	10	5	50.0	1	1	100.0			

Figure 1.5.2.3(c): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP and All Surgeries, CSR 2011

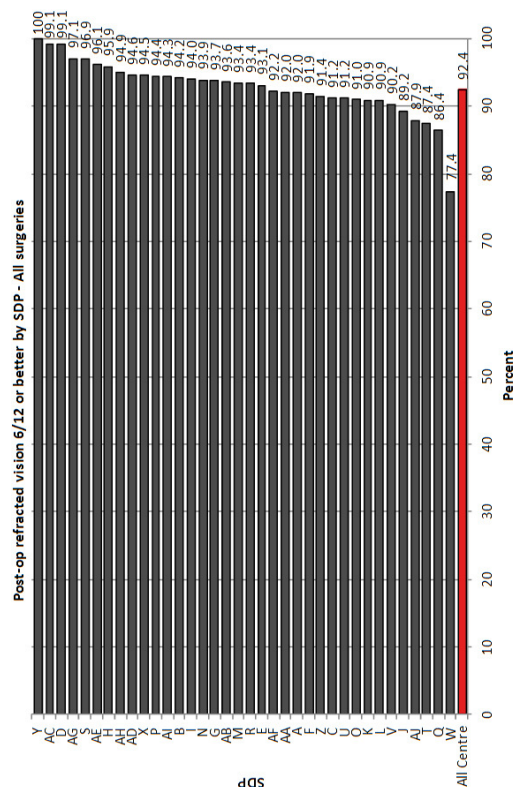


Figure 1.5.2.3(d): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP for Phacoemulsification, CSR 2011

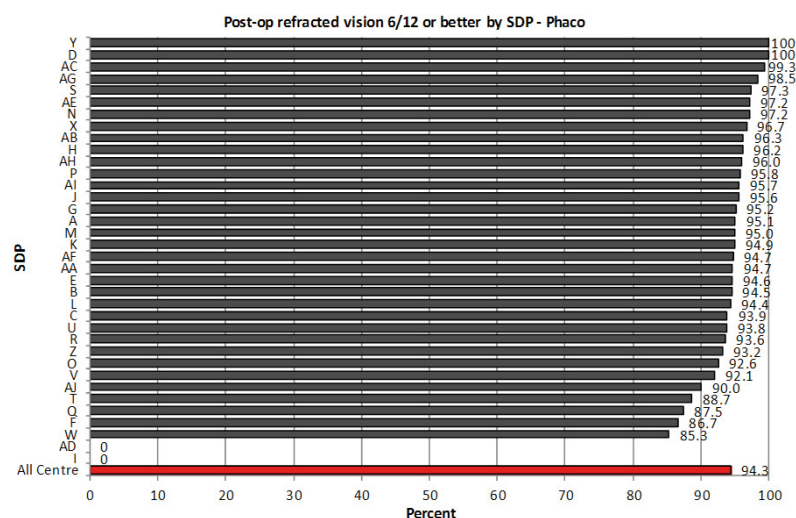
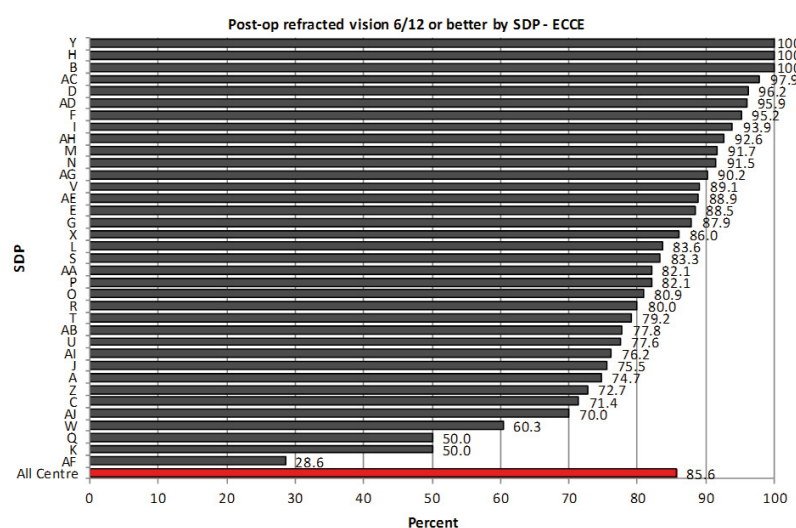


Figure 1.5.2.3(e): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP for ECCE, CSR 2011



1.5.3 Reasons for No Record of Visual Acuity

Of the 30611 eyes operated in 2011, 1607 eyes did not have record of visual acuity. The main reason for no record of VA was loss to follow up.

Table 1.5.3: Reasons for No Records of Visual Acuity, CSR 2002-2011

Years	2002		2003		2004		2007		2008		2009		2010		2011	
Reasons	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All cases	1940	100	1331	100	1872	100	1458	100	1463	100	1557	100	1359	100	1607	100
Loss to follow-up	1331	68.1	876	65.8	1177	62.9	1078	73.9	1230	84.1	1261	81.0	1078	79.3	1362	84.8
Discharged by doctor	396	20.4	212	15.9	306	1.6	32	2.2	13	0.9	44	2.8	38	2.8	32	2.0
Unable to take vision	69	3.6	33	40.3	108	5.8	49	3.4	26	1.8	30	1.9	33	2.4	27	1.7
Others	144	7.4	210	15.8	281	15.0	299	20.5	194	13.3	222	14.3	210	15.5	186	11.6

1.5.4 Factors Contributing to Post-operative Refracted Visual Acuity of Worse than 6/12

The main contributing factors for eyes with post-operative refracted VA worse than 6/12 were pre-existing ocular co-morbidity followed by high astigmatism and PCO. High astigmatism, PCO and CMO in particular showed a decreasing trend consistent with the shift towards phacoemulsification and improvement in other aspect of cataract surgery technique over the years

When eyes with preexisting ocular co-morbidity were excluded from analysis from the year 2004 onwards, high astigmatism contributed the highest number followed by preexisting ocular co-morbidity (not detected preoperatively).

Table 1.5.4(a): Factors Contributing to Post-operative Refracted VA of Worse than 6/12 in All Eyes, CSR 2002-2011

Years	2002		2003		2004		2007		2008		2009		2010		2011	
Factors	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
N (total no. of post-op refracted vision worse than 6/12)											2973		3397		3597	
Preexisting ocular co-morbidity	818	40.7	386	39.1	503	47.2	904	28.8	802	28.4	1016	34.2	1364	40.2	1412	39.3
High astigmatism	489	24.3	392	39.8	321	31.1	478	15.2	460	16.3	395	13.3	378	11.1	397	11.0
Posterior capsular opacity	198	9.9	152	15.4	53	5.0	140	4.5	112	4.0	136	4.6	112	3.3	111	3.1
Cystoid macular oedema	93	4.6	59	6.0	33	3.1	101	3.2	64	2.3	82	2.8	94	2.8	96	2.7
Endophthalmitis	16	0.8	10	1.0	6	0.6	14	0.4	6	0.2	6	0.2	5	0.1	2	0.1
Corneal decompensation	37	1.8	19	1.9	6	0.6	28	0.9	31	1.1	61	2.1	33	1.0	36	1.0
Decentered IOL	14	0.7	1	0.1	3	0.3	4	0.1	6	0.2	5	0.2	5	0.1	8	0.2
Retinal detachment	27	1.3	8	0.8	7	0.7	67	2.1	50	1.8	56	1.9	44	1.3	35	1.0
Others	302	15.0	202	20.5	134	12.6	620	19.8	603	21.3	794	26.7	857	25.2	927	25.8
Missing/Unavailable	14	0.7	49	5.0	0	0.0	-	-	NA	NA	NA	NA	NA	NA	NA	NA

Figure 1.5.4: Factors Contributing to Post-operative Refracted VA of Worse than 6/12 in All Eyes, CSR 2002-2011

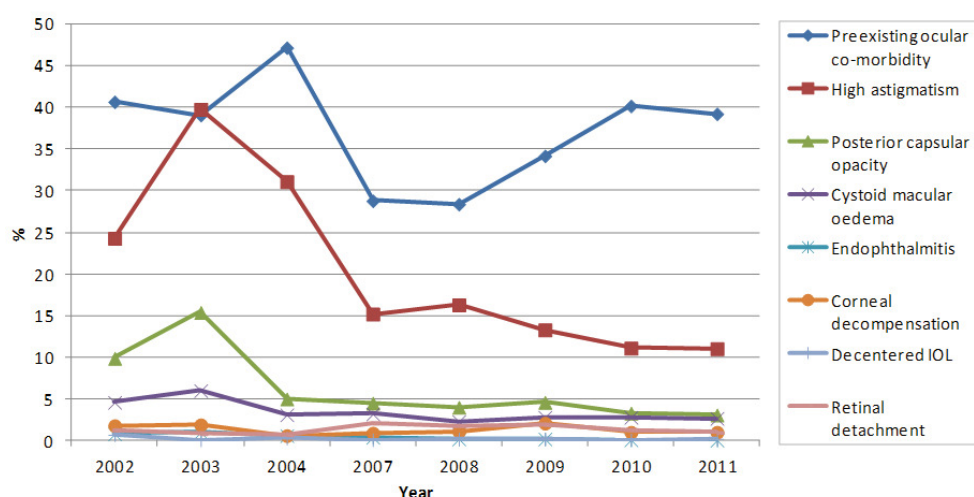


Table 1.5.4(b): Factors Contributing to Post-operative Refracted VA of Worse than 6/12 in Eyes without Preexisting Ocular co-morbidity, CSR 2004-2011

Years	2004		2007		2008		2009		2010		2011	
Factors	n	%	n	%	n	%	n	%	n	%	n	%
N							1078		1056		1108	
Preexisting ocular co-morbidity (not detected pre-operatively)	23	6.1	271	17.6	229	16.5	121	11.2	92	8.7	66	6.0
High astigmatism	197	52.0	303	19.7	286	20.6	178	16.5	180	17.0	175	15.8
Posterior capsular opacity	20	5.3	83	5.4	61	4.4	87	8.1	65	6.2	50	4.5
Cystoid macular oedema	20	5.3	52	3.4	26	1.9	32	3.0	42	4.0	38	3.4
Endophthalmitis	4	1.0	9	0.6	4	0.3	4	0.4	2	0.2	1	0.1
Corneal decompensation	3	0.8	15	1.0	13	0.9	36	3.3	21	2.0	18	1.6
Decentered IOL	2	0.5	4	0.3	2	0.1	1	0.1	0	0.0	4	0.4
Retinal detachment	1	0.3	18	1.2	11	0.8	11	1.0	6	0.6	1	0.1
Others	76	20.0	320	20.8	323	23.3	368	34.1	389	36.8	453	40.9
Missing/Unavailable	NA	-	461	30.0	NA	-	NA	-	NA	-	NA	-

1.5.5 Actual or Residual Refractive Power (Spherical Equivalent)

Target refractive power is the refractive power aimed by the surgeon for a patient while the actual or residual refractive power or spherical equivalent (SE) is the postoperative refraction results after surgery for the same eye. Myopic shift is the shift of the refraction status (actual refraction) towards more negative value as compared to the targeted refraction pre-operatively. It can be the results of surgery induced astigmatism or more anterior placement of IOL in the bag. It can also be due to indentation of eyeball during biometry resulting in shorter axial length.

Data from 2007 to 2011 demonstrated that ECCE produced more myopic shift as compared to phaco. The difference between the target and actual refraction remained a broad-based distribution curve indicating that a large percentage of eyes did not achieve the target refraction status post-operatively.

Table 1.5.5(a): Distribution of Target and Actual Refractive Power in ECCE and Phaco, CSR 2007-2011

Target Refraction			Actual Refraction										Actual-Target Refraction							
All Patient			ECCE					Phaco					All Patient							
Years	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011
N	11876	15083	20279	24528	25887	3624	4400	4013	3851	3714	8343	12085	12891	15485	17197	8738	12295	14670	17696	18813
Mean	-0.5	-0.1	-0.4	-0.4	-0.4	-1.1	-0.2	-1.0	-0.9	-1.0	-0.8	0.0	-0.7	-0.6	-0.7	-0.5	-0.4	-0.4	-0.3	-0.3
SD	+0.4	+0.4	+0.4	+0.4	+0.3	+1.4	+1.2	+1.4	+1.5	+1.4	+1.1	1.03	+1.0	+1.0	+0.9	+1.1	+1.2	+1.1	+1.1	+1.0
Median	-0.5	-0.5	-0.5	-0.4	-0.4	-1.0	-0.2	-1.0	-1.0	-1.0	-0.7	0.0	-0.7	-0.6	-0.6	-0.4	-0.4	-0.3	-0.3	-0.3
Minimum	-9.0	-9.9	-9.9	-9.1	-9.1	-10.0	-8.4	-10.0	-9.3	-7.3	-10.0	-10.0	-9.0	-10.0	-10.0	-9.5	-9.9	-8.8	-9.8	-9.2
Maximum	+5.0	+9.5	+5.9	+6.0	+4.8	+9.8	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+5.0	+9.0	+10.7	+10.7	+10.7

Note: Eyes with actual refractive power (SE) of more than +10.0D and -10.0D were excluded from analysis

Table 1.5.5(b): Percentage Distribution of Target and Actual Refractive Power in ECCE and Phaco, CSR 2007-2011

Years	Target Refraction										Actual Refraction										Phaco					
	All Patients										ECCE															
	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011	2007	2008	2009	2010	2011	
Dioptr (D)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
-10-<(-9.5)	0	0.0	1	0.0	2	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	2	0.0
-9.5-<(-9)	4	0.0	1	0.0	1	0.0	2	0.0	1	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	7	0.1	0	0.0
-9-<(-8.5)	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	2	0.0
-8.5-<(-8)	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	2	0.0	0	0.0
-8-<(-7.5)	2	0.0	3	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	3	0.1	1	0.0	0	0.0	0	0.0	3	0.0	0	0.0
-7.5-<(-7)	1	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	1	0.0	11	0.1	0	0.0
-7-<(-6.5)	3	0.0	1	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	1	0.0	3	0.1	0	0.0	3	0.0	6	0.0	3	0.0
-6.5-<(-5)	1	0.0	2	0.0	7	0.0	4	0.0	10	0.0	0	0.0	3	0.1	10	0.2	9	0.2	16	0.4	1	0.0	16	0.1	24	0.2
-5-<(-4.5)	3	0.0	4	0.0	7	0.0	3	0.0	3	0.0	1	0.0	1	0.0	12	0.3	15	0.4	8	0.2	1	0.0	15	0.1	14	0.1
-4.5-<(-4)	2	0.0	3	0.0	5	0.0	10	0.0	3	0.0	3	0.1	5	0.1	15	0.4	16	0.4	20	0.5	3	0.0	15	0.1	14	0.1
-4-<(-3.5)	7	0.1	8	0.1	11	0.1	5	0.0	11	0.0	8	0.2	7	0.2	52	1.3	38	1.0	30	0.8	5	0.1	19	0.2	42	0.3
-3.5-<(-3)	6	0.0	7	0.0	11	0.1	15	0.1	12	0.0	19	0.5	15	0.3	74	1.8	68	1.8	62	1.7	2	0.0	29	0.2	81	0.6
-3-<(-2.5)	13	0.1	22	0.1	18	0.1	29	0.1	15	0.1	26	0.6	41	0.9	183	4.6	128	3.3	131	3.5	7	0.1	58	0.5	208	1.6
-2.5-<(-2)	29	0.2	21	0.1	29	0.1	33	0.1	26	0.1	65	1.6	76	1.7	318	7.9	252	6.5	235	6.3	27	0.3	80	0.7	443	3.4

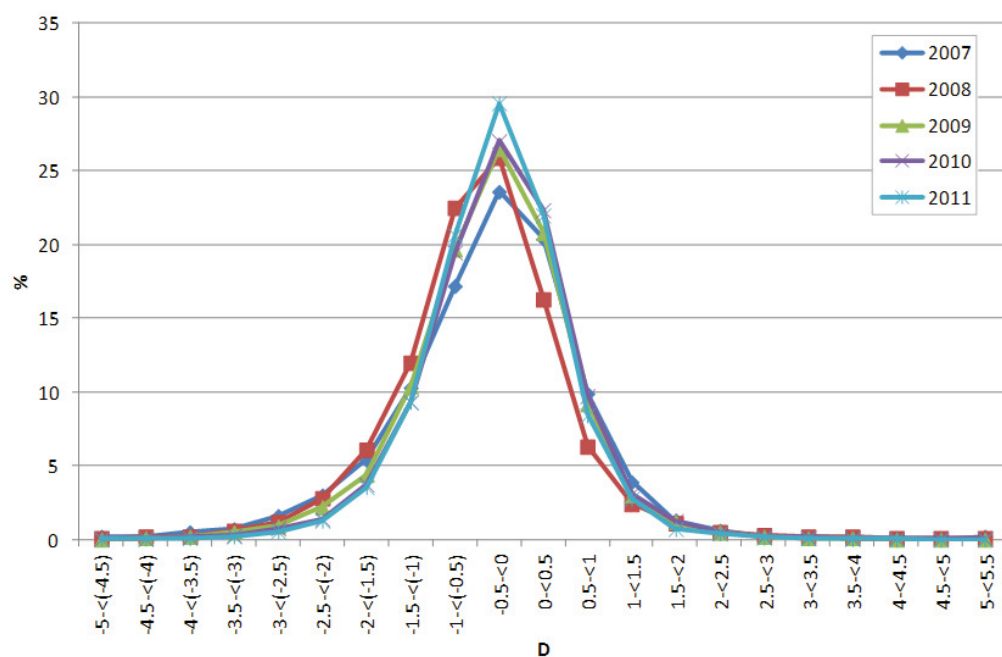
-2<(-1.5)	77	0.6	48	0.3	58	0.3	46	0.2	54	0.2	149	3.6	203	4.6	509	12.7	458	11.9	464	12.5	88	1.0	147	1.2	1045	8.1	1043	6.7	1138	6.6	
-1.5<(-1)	429	3.5	373	2.5	260	1.3	292	1.2	201	1.2	0.8	360	8.7	431	9.7	713	17.8	716	18.6	662	17.8	277	3.1	393	3.2	2093	16.2	2367	15.3	2693	15.7
-1<(-0.5)	4670	37.7	6155	40.9	7972	39.3	7590	30.9	7507	30.9	29.0	722	17.5	763	17.2	765	19.1	810	21.0	774	20.8	1022	11.4	1370	11.3	3206	24.9	3831	24.7	4452	25.9
-0.5<0	6631	53.5	7481	49.7	10604	52.3	15220	62.1	16915	62.1	65.3	956	23.2	956	21.6	654	16.3	612	15.9	640	17.2	2602	29.1	3152	26.0	3143	24.4	3926	25.4	4560	26.5
0<0.5	406	3.3	719	4.8	977	4.8	921	3.8	849	3.8	3.3	860	20.8	983	22.2	397	9.9	373	9.7	371	10.0	2551	28.5	3568	29.5	1697	13.2	2194	14.2	2358	13.7
0.5<1	77	0.6	145	1.0	182	0.9	238	1.0	234	1.0	0.9	444	10.8	460	10.4	151	3.8	161	4.2	148	4.0	1273	14.2	1738	14.3	535	4.2	801	5.2	771	4.5
1<1.5	12	0.1	28	0.2	17	0.1	23	0.1	20	0.1	0.1	236	5.7	228	5.1	60	1.5	80	2.1	68	1.8	546	6.1	780	6.4	179	1.4	285	1.8	257	1.5
1.5<2	5	0.0	14	0.1	22	0.1	19	0.1	9	0.1	0.0	129	3.1	98	2.2	35	0.9	25	0.6	31	0.8	268	3.0	367	3.0	79	0.6	112	0.7	91	0.5
2<2.5	15	0.1	10	0.1	85	0.4	69	0.3	12	0.3	0.0	50	1.2	48	1.1	20	0.5	19	0.5	17	0.5	117	1.3	160	1.3	26	0.2	48	0.3	43	0.3
2.5<3	0	0.0	6	0.0	4	0.0	3	0.0	2	0.0	0.0	24	0.6	22	0.5	5	0.1	7	0.2	3	0.1	59	0.7	56	0.5	14	0.1	27	0.2	20	0.1
3<3.5	1	0.0	2	0.0	2	0.0	0	0.0	1	0.0	0.0	15	0.4	16	0.4	3	0.1	9	0.2	5	0.1	28	0.3	32	0.3	11	0.1	11	0.1	13	0.1
3.5<4	1	0.0	2	0.0	0	0.0	0	0.0	0	0.0	0.0	10	0.2	8	0.2	6	0.1	5	0.1	0	0.0	17	0.2	23	0.2	5	0.0	10	0.1	4	0.0
4<4.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	3	0.1	3	0.1	0	0.0	5	0.1	0	0.0	12	0.1	12	0.1	5	0.0	9	0.1	2	0.0
4.5<5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0.0	3	0.1	2	0.0	3	0.1	3	0.1	1	0.0	11	0.1	4	0.0	2	0.0	3	0.0	4	0.0
5<5.5	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0.0	3	0.1	2	0.0	1	0.0	2	0.1	1	0.0	3	0.0	1	0.0	3	0.0	8	0.1	4	0.0
5.5<6	0	0.0	0	0.0	2	0.0	0	0.0	0	0.0	0.0	2	0.0	1	0.0	1	0.0	4	0.1	1	0.0	1	0.0	3	0.0	2	0.0	1	0.0	2	0.0
6<6.5	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	2	0.1	4	0.0	2	0.0	2	0.0	6	0.0	2	0.0
6.5<7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	2	0.0	1	0.0	0	0.0	4	0.1	3	0.1	4	0.0	1	0.0	2	0.0	2	0.0	1	0.0
7<7.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	1	0.0	3	0.1	1	0.0	5	0.1	0	0.0	0	0.0	1	0.0	0	0.0	3	0.0	2	0.0
7.5<8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	2	0.0	1	0.0	3	0.1	1	0.0	1	0.0	2	0.0	3	0.0	0	0.0	0	0.0	1	0.0
8<8.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	1	0.0	3	0.1	2	0.0	4	0.1	2	0.1	3	0.0	1	0.0	1	0.0	2	0.0	0	0.0
8.5<9	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	5	0.1	1	0.0	0	0.0	2	0.1	3	0.1	0	0.0	0	0.0	2	0.0	2	0.0	1	0.0
9<9.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.0	1	0.0	8	0.2	3	0.1	4	0.1	5	0.1	0	0.0	0	0.0	2	0.0	0	0.0	6	0.0
9.5<10	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0.0	5	0.1	2	0.0	10	0.2	12	0.3	6	0.2	4	0.0	6	0.0	6	0.0	7	0.0	5	0.0

Table 1.5.5(c): Difference in Target and Actual Refractive Power for Patients who had Phacoemulsification Only, CSR 2007-2011

Years	Target Refraction						Actual Refraction						Difference between Target and Actual Refraction																	
	2007	2008	2009	2010	2011		2007	2008	2009	2010	2011		2007	2008	2009	2010	2011													
Power (D)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
N	7975	100	10660	100	10837	100	13653	100	14901	100	8342	100	12154	100	12845	100	15485	100	17158	100	5782	100	8803	100	10812	100	13653	100	14874	100
-5-<(-4.5)	2	0.0	4	0.0	3	0.0	1	0.0	1	0.0	15	0.2	13	0.1	14	0.1	13	0.1	11	0.1	12	0.2	12	0.1	5	0.0	5	0.0	7	0.0
-4.5-<(-4)	1	0.0	3	0.0	2	0.0	6	0.0	2	0.0	30	0.4	19	0.2	14	0.1	16	0.1	19	0.1	14	0.2	19	0.2	8	0.1	7	0.1	10	0.1
-4-<(-3.5)	5	0.1	7	0.1	5	0.0	5	0.0	6	0.0	49	0.6	17	0.1	42	0.3	41	0.3	35	0.2	28	0.5	18	0.2	23	0.2	26	0.2	14	0.1
-3.5-<(-3)	5	0.1	6	0.1	4	0.0	10	0.1	8	0.1	97	1.2	20	0.2	81	0.6	78	0.5	74	0.4	43	0.7	51	0.6	52	0.5	37	0.3	32	0.2
-3-<(-2.5)	10	0.1	20	0.2	6	0.1	15	0.1	9	0.1	200	2.4	55	0.5	208	1.6	182	1.2	161	0.9	93	1.6	103	1.2	94	0.9	104	0.8	81	0.5
-2.5-<(-2)	18	0.2	16	0.2	12	0.1	22	0.2	14	0.1	405	4.9	85	0.7	443	3.4	426	2.8	448	2.6	176	3.0	245	2.8	238	2.2	189	1.4	191	1.3
-2-<(-1.5)	51	0.6	35	0.3	32	0.3	19	0.1	30	0.2	746	8.9	164	1.3	1045	8.1	1043	6.7	1138	6.6	311	5.4	541	6.1	473	4.4	510	3.7	529	3.6
-1.5-<(-1)	239	3.0	288	2.7	115	1.1	151	1.1	115	0.8	1382	16.6	423	3.5	2093	16.3	2367	15.3	2693	15.7	595	10.3	1052	12.0	1129	10.4	1270	9.3	1390	9.3
-1-<(-0.5)	2473	31.0	4065	38.1	3699	34.1	3721	27.3	3867	26.0	1771	21.2	1408	11.6	3206	25.0	3831	24.7	4452	25.9	994	17.2	1984	22.5	2126	19.7	2659	19.5	3073	20.7
-0.5-<0	4512	56.6	5498	51.6	6282	58.0	9087	66.6	10338	69.4	1884	22.6	3167	26.1	3143	24.5	3926	25.4	4560	26.6	1367	23.6	2278	25.9	2862	26.5	3691	27.0	4404	29.6
0-<0.5	583	7.3	563	5.3	494	4.6	443	3.2	379	2.5	1069	12.8	3534	29.1	1697	13.2	2194	14.2	2358	13.7	1179	20.4	1434	16.3	2245	20.8	3051	22.3	3270	22.0
0.5-<1	45	0.6	107	1.0	115	1.1	123	0.9	114	0.8	399	4.8	1740	14.3	535	4.2	801	5.2	771	4.5	573	9.9	558	6.3	994	9.2	1329	9.7	1253	8.4
1-<1.5	6	0.1	23	0.2	6	0.1	8	0.1	6	0.0	142	1.7	786	6.5	179	1.4	285	1.8	257	1.5	225	3.9	214	2.4	329	3.0	422	3.1	410	2.8
1.5-<2	2	0.0	7	0.1	8	0.1	6	0.0	1	0.0	55	0.7	365	3.0	79	0.6	112	0.7	91	0.5	73	1.3	97	1.1	132	1.2	173	1.3	106	0.7
2-<2.5	9	0.1	6	0.1	52	0.5	32	0.2	9	0.1	14	0.2	156	1.3	26	0.2	48	0.3	43	0.3	32	0.6	46	0.5	55	0.5	63	0.5	63	0.4
2.5-<3	1	0.0	4	0.0	2	0.0	1	0.0	1	0.0	15	0.2	55	0.5	14	0.1	27	0.2	20	0.1	14	0.2	26	0.3	18	0.2	31	0.2	20	0.1
3-<3.5	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	13	0.2	30	0.2	11	0.1	11	0.1	13	0.1	13	0.2	15	0.2	8	0.1	18	0.1	13	0.1
3.5-<4	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	4	0.0	22	0.2	5	0.0	10	0.1	4	0.0	8	0.1	15	0.2	11	0.1	14	0.1	4	0.0
4-<4.5	2	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.0	10	0.1	5	0.0	9	0.1	2	0.0	3	0.0	12	0.1	4	0.0	8	0.1	3	0.0
4.5-<5	0	0.0	1	0.0	0	0.0	0	0.0	1	0.0	4	0.0	4	0.0	2	0.0	3	0.0	4	0.0	3	0.0	12	0.1	3	0.0	4	0.0	0	0.0
5-<5.5	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	3	0.0	8	0.1	4	0.0	9	0.2	9	0.1	3	0.0	6	0.0	1	0.0

NOTE: Formula of $SE = Sp + (\frac{Sp}{2})$

Figure 1.5.5(b): Difference in Target and Actual Refractive Power for Patients who had Phacoemulsification Only, CSR 2007-2011



CHAPTER 2

OPHTHALMOLOGY SERVICE CENSUS
2002-2012

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CHAPTER 2: OPHTHALMOLOGY SERVICE CENSUS

The census was returned by hard copy form at the end of each year from 2002 to 2006. For 2007 to 2012, census data were entered monthly by the hospitals. Real time online reports both aggregated and by hospitals are available from 2007 onwards.

Table 2.1: Number of ophthalmology departments which have census return

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Number of Ophthalmology departments	29	32	32	32	34	36	36	36	36	36	36

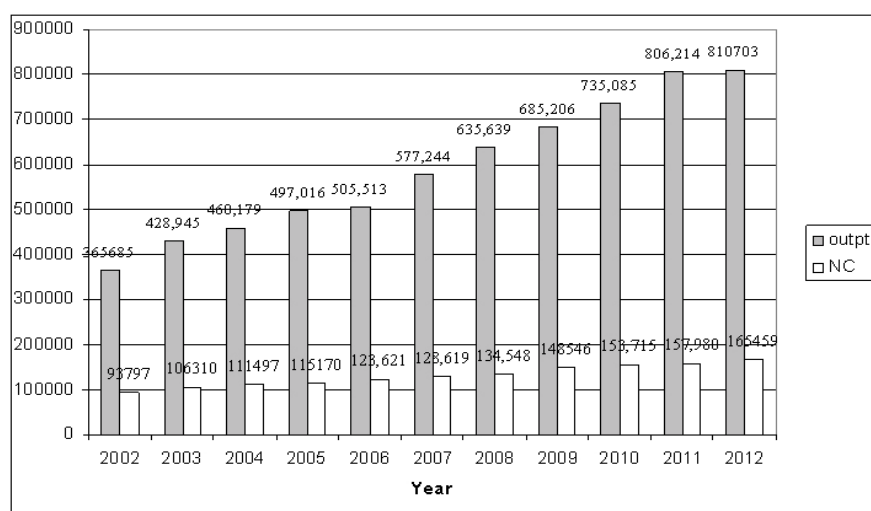


Figure 2.1: Number of out-patients visits at Ophthalmology clinics, 2002-2012.
NC = new case

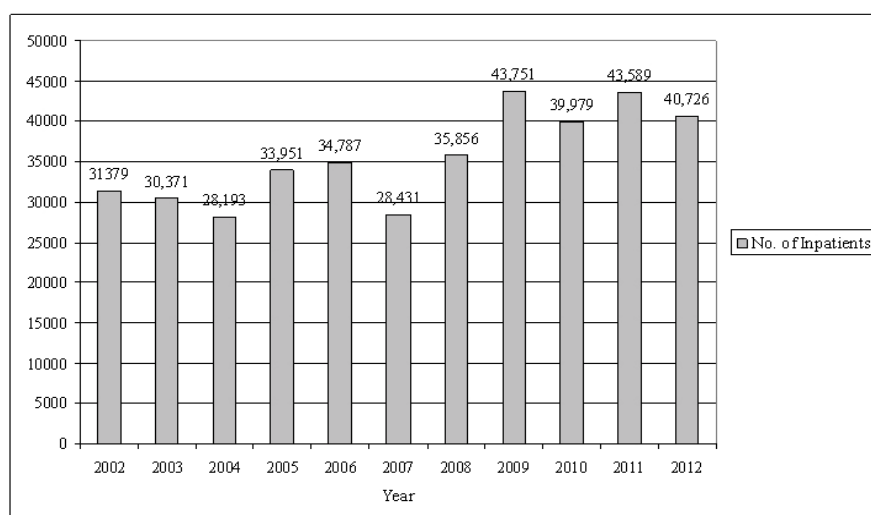


Figure 2.2: Number of in- patients admitted to eye wards, 2002-2012

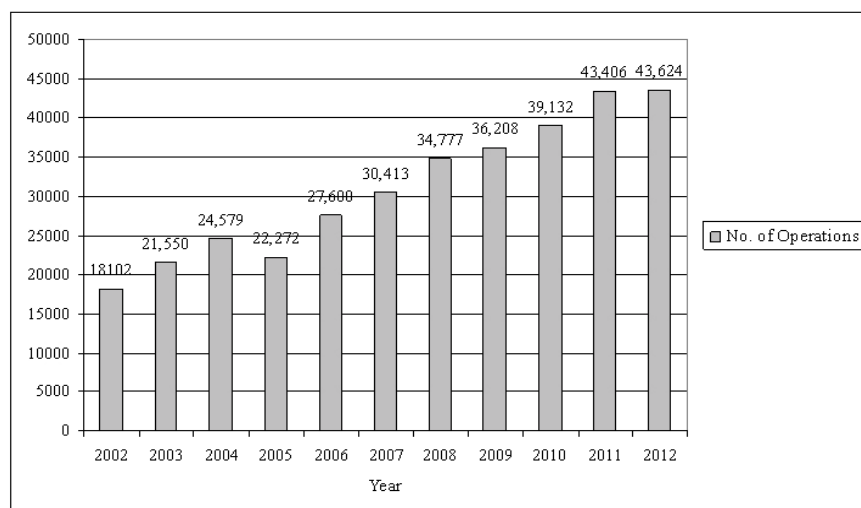


Figure 2.3: Number of ocular operation* performed, 2002-2012

*Ocular operations include surgery performed in operating theatre with grade B and C as classified in Fee Acts 1951.

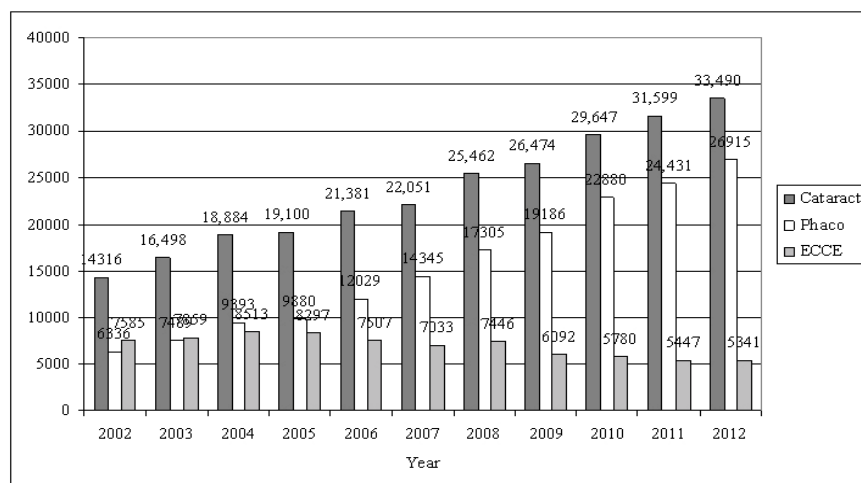


Figure 2.4 Number of cataract surgeries, ECCE and phacoemulsification performed, 2002-2012

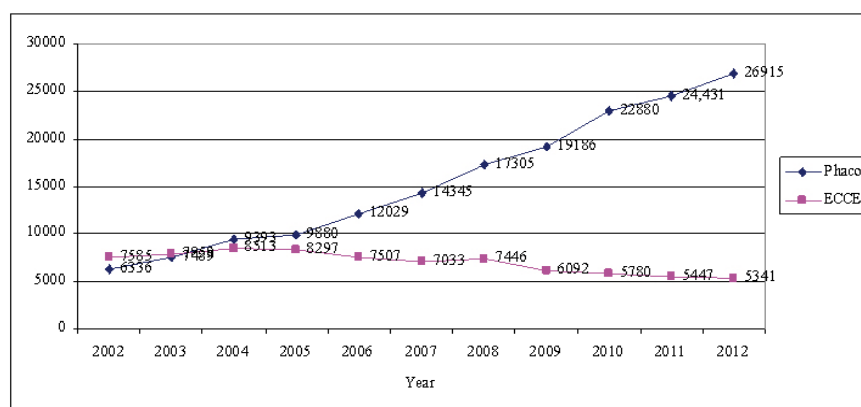


Figure 2.5: Trend of cataract surgeries performed by ECCE and phacoemulsification, 2002 - 2012

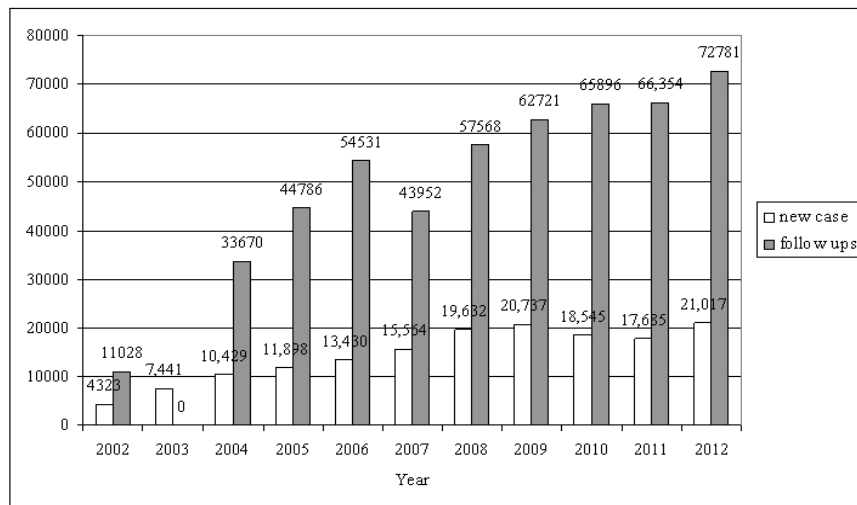


Figure 2.6: Diabetic patients seen at ophthalmology clinics, 2002-2012

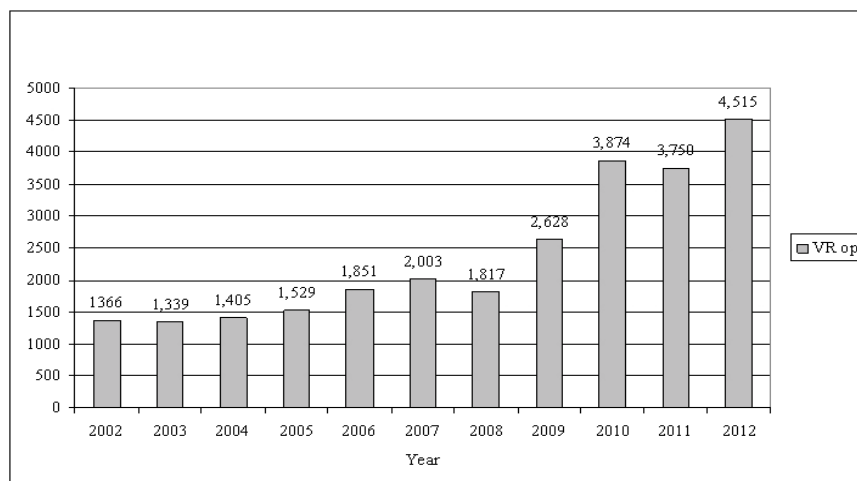


Figure 2.7: Number of vitreo-retinal surgery performed at hospitals with vitreoretinal surgeons, 2002-2012

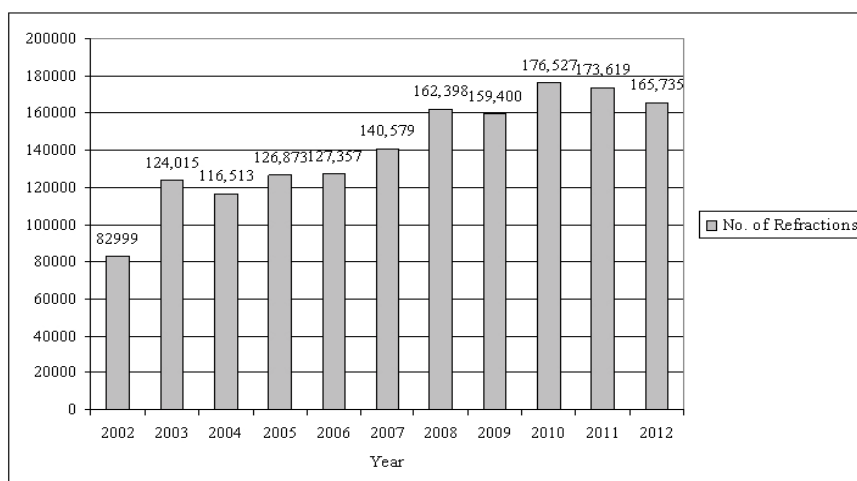


Figure 2.8: Number of refractions performed at ophthalmology clinics, 2002-2012

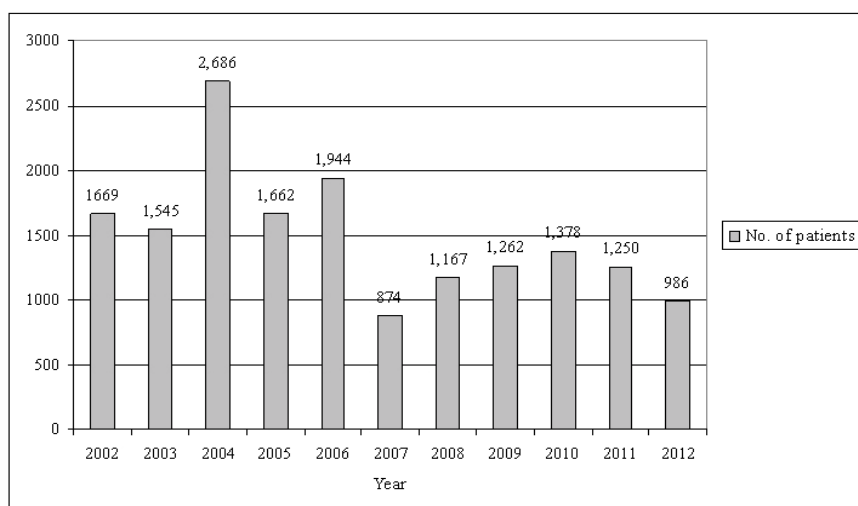


Figure 2.9: Number of patients with low vision assessments, 2002-2012

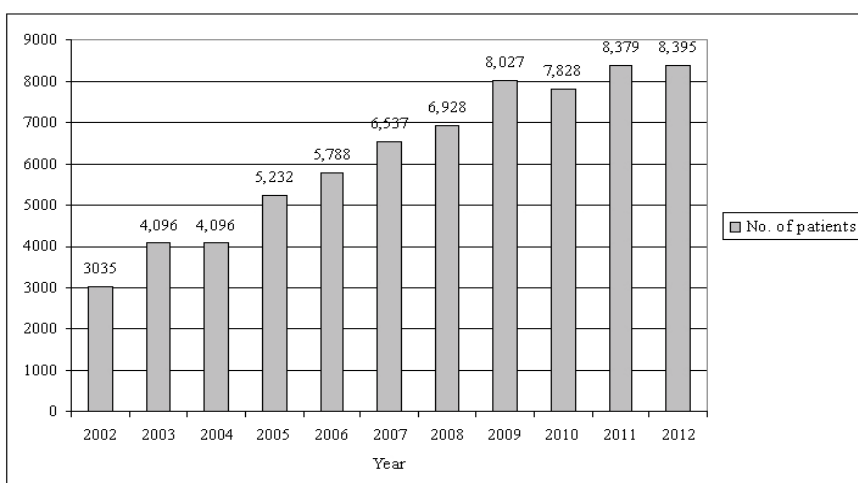


Figure 2.10: Number of premature infants screened for retinopathy of prematurity screening, 2002-2012

CHAPTER 3

OPHTHALMOLOGY SERVICES IN
MALAYSIAN HOSPITALS, 2011

CHAPTER 3: OPHTHALMOLOGY SERVICES IN MALAYSIAN HOSPITALS IN 2011

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Summary: This chapter analyses hospitals with ophthalmology services, its facilities (availability of dedicated operating rooms), distribution of ophthalmic workforces, number of surgeries (cataract, glaucoma, vitreoretinal surgeries) performed and some devices. There were a total of 348 hospitals in Malaysia. Ophthalmology services were available in 98 of these hospitals serving 28.96 million of the population in 2011. The total response rate to this survey was 91.8%, 100 % (39) in public hospitals responded followed by 86.4% (51) of the private hospitals.

FACILITIES

There were 36 Ministry of Health (MOH) hospitals, 3 University hospitals and 59 hospitals in the private sector providing Ophthalmology services in Malaysia in 2011.

Klang Valley (Wilayah Persekutuan Kuala Lumpur/WPKL, WP Putrajaya, Selangor) and Melaka had the highest density of hospitals providing ophthalmology services with 0.05 hospital per 10,000 population. The state with the lowest density of hospitals providing ophthalmology services is Terengganu and Sabah and WP Labuan with a density of 0.01 per 10,000 population. (Table 7.1)

All 39 public hospitals providing ophthalmology services had dedicated ophthalmology operating rooms. There were a total of 54 functioning dedicated operating rooms. (Table 7.2) On average, an ophthalmologist in the public sector had 26 elective operating hours per month. (Table 7.3) Klang Valley (18 hours), Perlis (19 hours), Melaka (18 hours) and Terengganu (18 hours) did not achieve the national average operating hours per ophthalmologist per month.

SERVICES

All 98 hospitals provided cataract surgical services (Table 7.4) whilst only 61 and 49 hospitals provided glaucoma (Table 7.5) and vitreoretinal (VR) surgical (Table 7.6) services respectively. A number of 51,887 cataract surgeries were performed in Malaysia, of which 36,068 (69.5%) and 15,819 (30.5%) were performed in public and private sector respectively. (Table 7.4) Of the total number, 52% were performed as day care surgery as compared to 48% as inpatient. In the MOH hospitals, 49% of cataract surgeries were performed as day care*.

A total of 49 out of 61 hospitals that provided glaucoma surgeries performed 10 or less cases per year. A sum of 1,250 surgeries were performed in Malaysia, of which 974 (78%) and 276 (22%) were performed in public and private sector, respectively. (Table 7.5) Of the total number, 321 (26%) were with glaucoma drainage implants. Twenty-one percent of glaucoma surgeries in the public sector as compared to 43% in the private sector were with glaucoma drainage implants.

A total of 24 out of 49 hospitals that provided VR surgeries performed 10 or less cases per year. A total of 4,327 VR surgeries were performed, of which 3,754 (87%) were performed in the public hospitals. (Table 7.6) A total of 1,632 (38%) VR surgeries were performed for complications of diabetic retinopathy. Of these, 92% were performed in the public sector.

Fourty three percent of all glaucoma surgeries and 49% of VR surgeries are performed in the Klang Valley. Of these, 70% and 78% of glaucoma and VR surgery respectively are performed in the public sector.

WORKFORCE

There were a total of 382 ophthalmologists; 218 (57%) were in public service and 164 (43%) in the private sector with a ratio of 1 ophthalmologist to a population of 76,923 (0.13 per 10,000 population). (Table 7.7) The Global Advisory Committee of Vision 2020 recommends a norm of 1 ophthalmologist per 50,000 population by the year 2020. Only 2 states, Melaka and WPKL, met this norm.

Most of the ophthalmologists were working in Selangor, WPKL and WP Putrajaya with a ratio of 1 ophthalmologist to a population of 41,666 (0.24 per 10,000 population). Sabah had the lowest ratio with 1 ophthalmologist to a population of 200,000 (0.05 per 10,000 population).

There were a total of 213 resident optometrists, of whom 189 (89%) were in the public sector. (Table 7.8)

A total of 144 of assistant medical officers served in the public sector, of which 66 (46%) had post basic ophthalmology training. (Table 7.9) A total of 347 nurses served in the public sector, of which 152 (44%) had post basic ophthalmology training. In total, there were 218 (1:133,333) ophthalmic assistants with post basic training in ophthalmology. (Table 7.10)

DEVICES

There were 166 operating microscopes in Malaysia with 77 (46%) and 89 (54%) in the public and private sector, respectively. A total number of 108 stand alone phacoemulsification machines were reported with 52 in the public sector and 56 in the private sector. There are 61 combined phacoemulsification and vitrectomy machines, 23 are in the public sector with 38 in the private. There are only 17 stand alone vitrectomy machines with 5 in the private sector. There are 82 automated perimetry devices, with 55 in the public sector and 27 in the private sector. (Table 7.11)

Table: Ratio of Phacoemulsification Machines (Stand Alone and Combined) to Cataract Surgeries

Sector	Cataract Surgeries	Phacoemulsification Machines	Ratio
Ministry of Health	33404	63	530:1
University	2664	12	222:1
Private	15819	94	168:1

**According to National Eye Database, 52.3% of surgeries are performed as day care. Day care surgery is defined as surgery done with the patient admitted and discharged on the same day.*

LIMITATIONS

- This survey did not include:
 - Ministry of Defence Hospitals
 - Private Centres not licensed as 'Hospitals' according to the Private Healthcare Facilities and Services Act 1998
 - Hospital Sarikei that started providing ophthalmological services in 2011.
- The surgical volume reported is an under estimation of the total ophthalmology services as a large volume of cataract surgery is done in the ambulatory care setting in private centres which do not fall under the definition of a "hospital".
- The volume of day care surgery could also be underestimated due to the difference in administrative and practice definition of day care in various institutions.

SUGGESTIONS

- Future surveys should include more variables namely:
 - Other subspecialty services and procedures
 - Other healthcare facilities that provide ophthalmology services which are not licensed as hospitals should be included
 - Age of devices
 - Facilities with optometrists without ophthalmologists

Table 1: Number and Density of Hospitals Providing Ophthalmology Services in Malaysia by State and Sector, 2011

State	Sector	2011	
		Number	Per 10,000 population
Malaysia	Public	39	-
Malaysia	Private	59	-
Malaysia	Total	98	0.03
Perlis	Public	1	-
Perlis	Private	na	na
Perlis	Total	1	0.04
Kedah	Public	2	-
Kedah	Private	4	-
Kedah	Total	6	0.03
Kedah & Perlis	Public	3	-
Kedah & Perlis	Private	4	-
Kedah & Perlis	Total	7	0.03
Pulau Pinang	Public	2	-
Pulau Pinang	Private	5	-
Pulau Pinang	Total	7	0.04
Perak	Public	4	-
Perak	Private	5	-
Perak	Total	9	0.04
Selangor & WP Putrajaya	Public	6	-
Selangor & WP Putrajaya	Private	14	-
Selangor & WP Putrajaya	Total	20	0.04
WP Kuala Lumpur	Public	3	-
WP Kuala Lumpur	Private	13	-
WP Kuala Lumpur	Total	16	0.09
Selangor & WP Putrajaya & WPKL	Public	9	-
Selangor & WP Putrajaya & WPKL	Private	27	-
Selangor & WP Putrajaya & WPKL	Total	36	0.05
Negeri Sembilan	Public	2	-
Negeri Sembilan	Private	2	-
Negeri Sembilan	Total	4	0.04
Melaka	Public	1	-
Melaka	Private	3	-
Melaka	Total	4	0.05
Johor	Public	4	-
Johor	Private	4	-
Johor	Total	8	0.02
Pahang	Public	2	-
Pahang	Private	1	-
Pahang	Total	3	0.02
Terengganu	Public	1	-
Terengganu	Private	0	-
Terengganu	Total	1	0.01
Kelantan	Public	3	-
Kelantan	Private	0	-
Kelantan	Total	3	0.02

Sabah & WP Labuan	Public	4	-
Sabah & WP Labuan	Private	1	-
Sabah & WP Labuan	Total	5	0.01
Sarawak	Public	4	
Sarawak	Private	7	-
Sarawak	Total	11	0.04

Table 2: Number and Density of Dedicated Ophthalmology Operating Rooms (ORs) in Public Hospitals in Malaysia by State and Sector, 2011

State	Hospitals with Dedicated Ophthalmology (ORs)	Total Dedicated Ophthalmology (ORs)		Total Functioning Dedicated Ophthalmology ORs	
	No.	No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	39	56	0.02	54	0.02
Perlis	1	1	0.04	1	0.04
Kedah	2	2	0.01	2	0.01
Kedah & Perlis	3	3	0.01	3	0.01
Pulau Pinang	2	3	0.02	3	0.02
Perak	4	7	0.03	7	0.03
Selangor & WP Putrajaya	6	11	0.02	9	0.02
WP Kuala Lumpur	3	7	0.04	7	0.04
Selangor & WP Putrajaya & WPKL	9	18	0.02	16	0.02
Negeri Sembilan	2	2	0.02	2	0.02
Melaka	1	1	0.01	1	0.01
Johor	4	5	0.01	5	0.01
Pahang	2	3	0.02	3	0.02
Terengganu	1	2	0.02	2	0.02
Kelantan	3	4	0.02	4	0.02
Sabah & WP Labuan	4	4	0.01	4	0.01
Sarawak	4	4	0.02	4	0.02

Table 3: Number and Density of Ophthalmology Elective Operating Hours in Public Hospitals in Malaysia by State and Sector, 2011

State	Ophthalmologists	Elective Operating Hours (EOH) per 4 week-month	
	No.	No. of Hours	EOH : Ophthalmologists Ratio
Malaysia	218	5,565	25.53
Perlis	3	56	18.67
Kedah	11	388	35.27
Kedah & Perlis	14	444	31.71
Pulau Pinang	9	227	25.22
Perak	8	690	86.25
Selangor & WP Putrajaya	55	922	16.76
WP Kuala Lumpur	44	837	19.02
Selangor & WP Putrajaya & WPKL	99	1,759	17.77
Negeri Sembilan	9	227	25.22
Melaka	7	128	18.29

Johor	13	357	27.46
Pahang	12	397	33.08
Terengganu	7	128	18.29
Kelantan	18	474	26.33
Sabah & WP Labuan	11	314	28.55
Sarawak	11	420	38.18

Table 4: Number and Density of Cataract Surgery Done as Daycare and Inpatient in Malaysia by State and Sector, 2011

State	Sector	Hospitals providing Cataract	Cataract Surgery Done as Daycare		Cataract Surgery Done as Inpatient		Total Cataract Surgery	
		No.	No.	Per 10,000 population	No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	Public	39	17,660	-	18,408	-	36,068	-
Malaysia	Private	59	9,475	-	6,344	-	15,819	-
Malaysia	Total	98	27,135	937	24,752	8.55	51,887	17.91
Perlis	Public	1	15	-	394	-	409	-
Perlis	Private	na	na	na	na	na	na	na
Perlis	Total	1	15	0.63	394	16.59	409	17.22
Kedah	Public	2	592	-	2,197	-	2,789	-
Kedah	Private	4	715	-	69	-	784	-
Kedah	Total	6	1,307	6.62	2,266	11.48	3,573	18.11
Kedah & Perlis	Public	3	607	-	2,591	-	3,198	-
Kedah & Perlis	Private	4	715	-	69	-	784	-
Kedah & Perlis	Total	7	1,322	5.98	2,660	12.03	3,982	18.01
Pulau Pinang	Public	2	3,178	-	361	-	3,539	-
Pulau Pinang	Private	5	2,245	-	527	-	2,772	-
Pulau Pinang	Total	7	5,423	34.03	888	5.57	6,311	39.60
Perak	Public	4	766	-	3,319	-	4,085	-
Perak	Private	5	523	-	718	-	1,241	-
Perak	Total	9	1,289	5.38	4,037	16.84	5,326	22.21
Selangor & WP Putrajaya	Public	6	3,379	-	1,732	-	5,111	-
Selangor & WP Putrajaya	Private	14	2,933	-	1,934	-	4,867	-
Selangor & WP Putrajaya	Total	20	6,312	11.16	3,666	6.48	9,978	17.65
WP Kuala Lumpur	Public	3	2,547	-	1,755	-	4,302	-
WP Kuala Lumpur	Private	13	1,045	-	1,391	-	2,436	-
WP Kuala Lumpur	Total	16	3,592	21.20	3,146	18.57	6,738	39.76
Selangor & WP Putrajaya & WPKL	Public	9	5,926	-	3,487	-	9,413	-
Selangor & WP Putrajaya & WPKL	Private	27	3,978	-	3,325	-	7,303	-
Selangor & WP Putrajaya & WPKL	Total	36	9,904	13.48	6,812	9.27	16,716	22.75
Negeri Sembilan	Public	2	1,594	-	978	-	2,572	-
Negeri Sembilan	Private	2	555	-	60	-	615	-
Negeri Sembilan	Total	4	2,149	20.61	1,038	9.95	3,187	30.56

Melaka	Public	1	1,533	-	97	-	1,630	-
Melaka	Private	3	347	-	1,113	-	1,460	-
Melaka	Total	4	1,880	22.57	1,210	14.53	3,090	37.09
Johor	Public	4	377	-	2,330	-	2,707	-
Johor	Private	4	219	-	447	-	666	-
Johor	Total	8	596	1.75	2,777	8.16	3,373	9.92
Pahang	Public	2	442	-	789	-	1,231	-
Pahang	Private	1	11	-	18	-	29	-
Pahang	Total	3	453	2.97	807	5.29	1,260	8.26
Terengganu	Public	1	371	-	407	-	778	-
Terengganu	Private	0	0	-	0	-	0	-
Terengganu	Total	1	371	3.45	407	3.79	778	7.24
Kelantan	Public	3	197	-	1,293	-	1,490	-
Kelantan	Private	0	0	-	0	-	0	-
Kelantan	Total	3	197	1.22	1,293	8.01	1,490	9.22
Sabah & WP Labuan	Public	4	723	-	1,870	-	2,593	-
Sabah & WP Labuan	Private	1	57	-	30	-	87	-
Sabah & WP Labuan	Total	5	780	2.29	1,900	5.58	2,680	7.87
Sarawak	Public	4	1,946	-	886	-	2,832	-
Sarawak	Private	7	825	-	37	-	862	-
Sarawak	Total	11	2,771	11.01	923	3.67	3,694	14.68

Abbreviation: na – not applicable; - – not available

Table 5: Number and Density of Glaucoma Surgery with and without Implant in Malaysia by State and Sector, 2011

State	Sector	Hospitals providing Glaucoma Surgery	Glaucoma Surgery with Implant		Glaucoma Surgery without Implant		Total Glaucoma Surgery	
		No.	No.	Per 10,000 population	No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	Public	29	202	-	772	-	974	-
Malaysia	Private	32	119	-	157	-	276	-
Malaysia	Total	61	321	0.11	929	0.32	1,250	0.43
Perlis	Public	1	8	-	16	-	24	-
Perlis	Private	na	na	na	na	na	na	na
Perlis	Total	1	8	0.34	16	0.67	24	1.01
Kedah	Public	2	12	-	73	-	85	-
Kedah	Private	1	0	-	3	-	3	-
Kedah	Total	3	12	0.06	76	0.39	88	0.45
Kedah & Perlis	Public	3	20	-	89	-	109	-
Kedah & Perlis	Private	1	0	-	3	-	3	-
Kedah & Perlis	Total	4	20	0.09	92	0.42	112	0.51
Pulau Pinang	Public	1	0	-	6	-	6	-
Pulau Pinang	Private	3	7	-	8	-	15	-
Pulau Pinang	Total	4	7	0.04	14	0.09	21	0.13
Perak	Public	4	6	-	61	-	67	-
Perak	Private	2	36	-	3	-	39	-
Perak	Total	6	42	0.18	64	0.27	111	0.44

Selangor & WP Putrajaya	Public	4	13	-	114	-	127	-
Selangor & WP Putrajaya	Private	10	28	-	105	-	133	-
Selangor & WP Putrajaya	Total	14	41	0.07	219	0.39	260	0.46
WP Kuala Lumpur	Public	3	151	-	94	-	245	-
WP Kuala Lumpur	Private	6	17	-	11	-	28	-
WP Kuala Lumpur	Total	9	168	0.99	105	0.62	273	1.61
Selangor & WP Putrajaya & WPKL	Public	7	164	-	208	-	372	-
Selangor & WP Putrajaya & WPKL	Private	16	45	-	116	-	161	-
Selangor & WP Putrajaya & WPKL	Total	23	209	0.28	324	0.44	533	0.73
Negeri Sembilan	Public	0	0	-	0	-	0	-
Negeri Sembilan	Private	1	1	-	1	-	2	-
Negeri Sembilan	Total	1	1	0.01	1	0.01	2	0.02
Melaka	Public	1	2	-	40	-	42	-
Melaka	Private	1	0	-	11	-	11	-
Melaka	Total	2	2	0.02	54	0.61	53	0.64
Johor	Public	2	1	-	46	-	47	-
Johor	Private	3	4	-	8	-	12	-
Johor	Total	5	5	0.01	54	0.16	59	0.17
Pahang	Public	1	1	-	18	-	19	-
Pahang	Private	0	0	-	0	-	0	-
Pahang	Total	1	1	0.01	18	0.12	19	0.12
Terengganu	Public	1	0	-	27	-	27	-
Terengganu	Private	0	0	-	0	-	0	-
Terengganu	Total	1	0	0.00	27	0.25	27	0.25
Kelantan	Public	3	8	-	116	-	124	-
Kelantan	Private	0	0	-	0	-	0	-
Kelantan	Total	3	8	0.05	116	0.72	124	0.77
Sabah & WP Labuan	Public	3	0	-	87	-	87	-
Sabah & WP Labuan	Private	1	1	-	6	-	7	-
Sabah & WP Labuan	Total	4	1	0.00	93	0.27	94	0.28
Sarawak	Public	3	0	-	74	-	74	-
Sarawak	Private	4	25	-	1	-	26	-
Sarawak	Total	7	25	0.10	75	0.30	100	0.40

Abbreviation: na – not applicable; - – not available

Table 6: Number and Density of Vitreoretinal Surgery and Vitreoretinal Surgery for Diabetic Retinopathy in Malaysia by State and Sector, 2011

State	Sector	Hospitals providing Vitreoretinal Surgery	Total Vitreoretinal Surgeries		Total Vitreoretinal Surgery for Diabetic Retinopathy	
		No.	No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	Public	16	3,754	-	1,496	-
Malaysia	Private	33	573	-	136	-
Malaysia	Total	49	4,327	1.49	1,632	0.56
Perlis	Public	0	0	-	0	-
Perlis	Private	na	na	na	na	na
Perlis	Total	0	0	0.00	0	0.00
Kedah	Public	1	452	-	110	-
Kedah	Private	0	0	-	0	-
Kedah	Total	1	452	2.29	110	0.56
Kedah & Perlis	Public	1	452	-	110	-
Kedah & Perlis	Private	0	0	-	0	-
Kedah & Perlis	Total	1	452	2.04	110	0.50
Pulau Pinang	Public	1	347	-	172	-
Pulau Pinang	Private	3	52	-	0	-
Pulau Pinang	Total	4	399	2.50	172	1.08
Perak	Public	0	0	-	0	-
Perak	Private	2	11	-	0	-
Perak	Total	2	11	0.05	0	0.00
Selangor & WP Putrajaya	Public	2	1,375	-	610	-
Selangor & WP Putrajaya	Private	11	268	-	121	-
Selangor & WP Putrajaya	Total	13	1,643	2.91	731	1.29
WP Kuala Lumpur	Public	3	272	-	70	-
WP Kuala Lumpur	Private	7	204	-	2	-
WP Kuala Lumpur	Total	10	476	2.81	72	0.42
Selangor & WP Putrajaya & WPKL	Public	5	1,647	-	680	-
Selangor & WP Putrajaya & WPKL	Private	18	472	-	123	-
Selangor & WP Putrajaya & WPKL	Total	23	2,119	2.88	803	1.09
Negeri Sembilan	Public	1	166	-	90	-
Negeri Sembilan	Private	1	23	-	0	-
Negeri Sembilan	Total	2	189	1.81	90	0.86
Melaka	Public	1	67	-	20	-
Melaka	Private	1	0	-	13	-
Melaka	Total	2	67	0.80	33	0.40
Johor	Public	1	349	-	190	-
Johor	Private	3	9	-	0	-0.56
Johor	Total	4	358	1.05	190	-
Pahang	Public	1	59	-	36	-

Pahang	Private	0	0	-	0	-
Pahang	Total	1	59	0.39	36	0.24
Terengganu	Public	1	70	-	17	-
Terengganu	Private	na	na	na	na	na
Terengganu	Total	1	70	0.65	17	0.16
Kelantan	Public	1	195	-	110	-
Kelantan	Private	na	na	na	na	na
Kelantan	Total	1	195	1.21	110	0.68
Sabah & WP Labuan	Public	1	74	-	0	-
Sabah & WP Labuan	Private	1	4	-	0	-
Sabah & WP Labuan	Total	2	78	0.23	0	0.00
Sarawak	Public	2	328	-	71	-
Sarawak	Private	4	2	-	0	-
Sarawak	Total	6	330	1.31	71	0.28

Abbreviation: na – not applicable; - – not available

Table 7: Number and Density of Ophthalmologists in Malaysia by State and Sector, 2011

State	Sector	Total Ophthalmologists		Permanent / Resident Ophthalmologists		Permanent / Resident Ophthalmologists	
		No.	Per 10,000 population	No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	Public	218	-	211	-	17	-
Malaysia	Private	164	-	86	-	88	-
Malaysia	Total	382	0.13	297	0.10	105	0.04
Perlis	Public	3	-	3	-	0	-
Perlis	Private	na	na	na	na	na	na
Perlis	Total	3	0.13	3	0.13	0	0.00
Kedah	Public	11	-	12	-	0	-
Kedah	Private	7	-	3	-	2	-
Kedah	Total	18	0.09	15	0.08	2	0.01
Kedah & Perlis	Public	14	-	15	-	0	-
Kedah & Perlis	Private	7	-	3	-	2	-
Kedah & Perlis	Total	21	0.09	18	0.08	2	0.01
Pulau Pinang	Public	9	-	9	-	0	-
Pulau Pinang	Private	20	-	11	-	2	-
Pulau Pinang	Total	29	0.18	20	0.13	2	0.01
Perak	Public	8	-	9	-	3	-
Perak	Private	14	-	7	-	2	-
Perak	Total	22	0.09	16	0.07	5	0.02
Selangor & WP Putrajaya	Public	55	-	49	-	3	-
Selangor & WP Putrajaya	Private	51	-	32	-	27	-
Selangor & WP Putrajaya	Total	106	0.19	81	0.14	30	0.05
WP Kuala Lumpur	Public	44	-	45	-	5	-
WP Kuala Lumpur	Private	30	-	15	-	32	-
WP Kuala Lumpur	Total	74	0.44	60	0.35	37	0.22

Selangor & WP Putrajaya & WPKL	Public	99	-	94	-	8	-
Selangor & WP Putrajaya & WPKL	Private	81	-	47	-	59	-
Selangor & WP Putrajaya & WPKL	Total	180	0.24	141	0.19	67	0.09
Negeri Sembilan	Public	9	-	8	-	0	-
Negeri Sembilan	Private	6	-	2	-	3	-
Negeri Sembilan	Total	15	0.14	10	0.10	3	0.03
Melaka	Public	7	-	7	-	0	-
Melaka	Private	11	-	6	-	6	-
Melaka	Total	18	0.22	13	0.16	6	0.07
Johor	Public	13	-	13	-	0	-
Johor	Private	9	-	4	-	2	-
Johor	Total	22	0.06	17	0.05	2	0.01
Pahang	Public	12	-	11	-	2	-
Pahang	Private	2	-	0	-	2	-
Pahang	Total	14	0.09	11	0.07	4	0.03
Terengganu	Public	7	-	6	-	0	-
Terengganu	Private	0	-	0	-	0	-
Terengganu	Total	7	0.07	6	0.06	0	0.00
Kelantan	Public	18	-	19	-	1	-
Kelantan	Private	1	-	0	-	0	-
Kelantan	Total	19	0.12	19	0.12	1	0.01
Sabah & WP Labuan	Public	11	-	10	-	2	-
Sabah & WP Labuan	Private	6	-	2	-	4	-
Sabah & WP Labuan	Total	17	0.05	12	0.04	6	0.02
Sarawak	Public	11	-	10	-	1	-
Sarawak	Private	7	-	4	-	6	-
Sarawak	Total	18	0.07	14	0.06	7	0.03

Abbreviation: na – not applicable; - – not available

Table 8: Number and Density of Optometrists in Malaysia by State and Sector, 2011

State	Sector	Permanent / Resident Optometrists		Visiting Optometrists	
		No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	Public	189	-	1	-
Malaysia	Private	24	-	20	-
Malaysia	Total	213	0.07	21	0.01
Perlis	Public	2	-	0	-
Perlis	Private	na	na	na	na
Perlis	Total	2	0.08	0	0.00
Kedah	Public	8	-	0	-
Kedah	Private	0	-	0	-
Kedah	Total	8	0.04	0	0.00
Kedah & Perlis	Public	10	-	0	-
Kedah & Perlis	Private	0	-	0	-
Kedah & Perlis	Total	10	0.05	0	0.00

Pulau Pinang	Public	11	-	0	-
Pulau Pinang	Private	2	-	0	-
Pulau Pinang	Total	13	0.08	0	0.00
Perak	Public	15	-	0	-
Perak	Private	1	-	3	-
Perak	Total	16	0.07	3	0.01
Selangor & WP Putrajaya	Public	37	-	0	-
Selangor & WP Putrajaya	Private	18	-	7	-
Selangor & WP Putrajaya	Total	55	0.10	7	0.01
WP Kuala Lumpur	Public	24	-	0	-
WP Kuala Lumpur	Private	2	-	2	-
WP Kuala Lumpur	Total	26	0.15	2	0.01
Selangor & WP Putrajaya & WPKL	Public	61	-	0	-
Selangor & WP Putrajaya & WPKL	Private	20	-	9	-
Selangor & WP Putrajaya & WPKL	Total	81	0.11	9	0.01
Negeri Sembilan	Public	8	-	0	-
Negeri Sembilan	Private	0	-	8	-
Negeri Sembilan	Total	8	0.08	8	0.08
Melaka	Public	7	-	0	-
Melaka	Private	0	-	0	-
Melaka	Total	7	0.08	0	0.00
Johor	Public	20	-	0	-
Johor	Private	0	-	0	-
Johor	Total	20	0.06	0	0.00
Pahang	Public	12	-	0	-
Pahang	Private	0	-	0	-
Pahang	Total	12	0.08	0	0.00
Terengganu	Public	8	-	0	-
Terengganu	Private	0	-	0	-
Terengganu	Total	8	0.07	0	0.00
Kelantan	Public	14	-	0	-
Kelantan	Private	0	-	0	-
Kelantan	Total	14	0.09	0	0.00
Sabah & WP Labuan	Public	12	-	1	-
Sabah & WP Labuan	Private	0	-	0	-
Sabah & WP Labuan	Total	12	0.04	1	0.00
Sarawak	Public	11	-	0	-
Sarawak	Private	1	-	0	-
Sarawak	Total	12	0.05	0	0.00

Abbreviation: na – not applicable; - – not available

Table 9: Number and Density of Assistant Medical Officers (AMOs) with and without Post-Basic in Ophthalmology Public Hospital in Malaysia by State and Sector, 2011

State	AMOs with Post-Basic in Ophthalmology		AMOs without Post-Basic in Ophthalmology	
	No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	66	0.02	78	0.03
Perlis	2	0.08	1	0.04
Kedah	3	0.02	7	0.04
Kedah & Perlis	5	0.02	8	0.04
Pulau Pinang	2	0.01	4	0.03
Perak	10	0.04	6	0.03
Selangor & WP Putrajaya	9	0.02	17	0.03
WP Kuala Lumpur	8	0.05	3	0.02
Selangor & WP Putrajaya & WPKL	17	0.02	20	0.03
Negeri Sembilan	4	0.04	4	0.04
Melaka	2	0.02	5	0.06
Johor	8	0.02	5	0.01
Pahang	2	0.01	9	0.06
Terengganu	6	0.03	2	0.02
Kelantan	2	0.01	4	0.02
Sabah & WP Labuan	6	0.02	7	0.02
Sarawak	5	0.02	4	0.02

Table 10: Number and Density of Nurses with and without Post-Basic in Ophthalmology in Public Hospital in Malaysia by State and Sector, 2011

State	Nurses with Post-Basic in Ophthalmology		Nurses without Post-Basic in Ophthalmology	
	No.	Per 10,000 population	No.	Per 10,000 population
Malaysia	152	0.05	195	0.07
Perlis	1	0.04	3	0.13
Kedah	5	0.03	14	0.07
Kedah & Perlis	6	0.03	17	0.08
Pulau Pinang	12	0.08	17	0.11
Perak	12	0.05	1	0.00
Selangor & WP Putrajaya	22	0.04	14	0.02
WP Kuala Lumpur	22	0.13	56	0.33
Selangor & WP Putrajaya & WPKL	44	0.06	70	0.10
Negeri Sembilan	3	0.03	4	0.04
Melaka	7	0.08	20	0.24
Johor	7	0.02	14	0.04
Pahang	5	0.03	5	0.03
Terengganu	3	0.03	3	0.03
Kelantan	20	0.12	16	0.10
Sabah & WP Labuan	17	0.05	12	0.04
Sarawak	16	0.06	16	0.06

Table 11: Number and Density of Ophthalmology Devices in Malaysia by State and Sector, 2011

State	Sector	Functioning Operating Microscope		Stand-Alone Phacoe-mulsification Machine		Combined Phacoe-mulsification and Vitrectomy Machine		Stand-Alone Vitrectomy Machine		Automated Perimetry Device	
		No.	PMP	No.	PMP	No.	PMP	No.	PMP	No.	PMP
Malaysia	Public	77	-	52	-	23	-	12	-	55	-
Malaysia	Private	89	-	56	-	38	-	5	-	27	-
Malaysia	Total	166	5.73	108	3.73	61	2.11	17	0.59	82	2.83
Perlis	Public	1	-	1	-	1	-	1	-	1	-
Perlis	Private	na	na	na	na	na	na	na	na	na	na
Perlis	Total	1	4.21	1	4.21	1	4.21	1	4.21	1	4.21
Kedah	Public	3	-	4	-	0	-	2	-	4	-
Kedah	Private	4	-	4	-	0	-	0	-	3	-
Kedah	Total	7	3.55	8	4.05	0	0.00	2	1.01	7	3.55
Kedah & Perlis	Public	4	-	5	-	1	-	3	-	5	-
Kedah & Perlis	Private	4	-	4	-	0	-	0	-	3	-
Kedah & Perlis	Total	8	3.62	9	4.07	1	0.45	3	1.36	8	3.62
Pulau Pinang	Public	3	-	2	-	0	-	1	-	3	-
Pulau Pinang	Private	13	-	10	-	9	-	0	-	3	-
Pulau Pinang	Total	16	10.04	12	7.53	9	5.65	1	1.63	6	3.77
Perak	Public	7	-	5	-	1	-	0	-	5	-
Perak	Private	4	-	2	-	4	-	0	-	0	-
Perak	Total	11	4.59	7	2.92	5	2.09	0	0.00	5	2.09
Selangor & WP Putrajaya	Public	16	-	14	-	2	-	2	-	8	-
Selangor & WP Putrajaya	Private	26	-	16	-	8	-	4	-	10	-
Selangor & WP Putrajaya	Total	42	7.43	30	5.31	10	1.77	6	1.06	18	3.18
WP Kuala Lumpur	Public	9	-	5	-	8	-	1	-	8	-
WP Kuala Lumpur	Private	18	-	8	-	4	-	0	-	3	-
WP Kuala Lumpur	Total	27	15.93	13	7.67	12	7.08	1	0.59	11	6.49
Selangor & WP Putrajaya & WPKL	Public	25	-	19	-	10	-	3	-	16	-
Selangor & WP Putrajaya & WPKL	Private	44	-	24	-	12	-	4	-	13	-
Selangor & WP Putrajaya & WPKL	Total	69	9.39	43	5.85	22	2.99	7	0.95	29	3.95
Negeri Sembilan	Public	3	-	2	-	1	-	1	-	3	-
Negeri Sembilan	Private	2	-	1	-	2	-	0	-	1	-
Negeri Sembilan	Total	5	4.79	3	2.88	3	2.88	1	0.96	4	3.84
Melaka	Public	2	-	1	-	1	-	0	-	1	-
Melaka	Private	4	-	4	-	2	-	0	-	0	-
Melaka	Total	6	7.20	5	6.00	3	3.60	0	0.00	1	1.20
Johor	Public	9	-	5	-	3	-	1	-	5	-
Johor	Private	6	-	3	-	3	-	0	-	3	-
Johor	Total	15	4.41	8	2.35	6	1.76	1	0.29	8	2.35
Pahang	Public	4	-	4	-	2	-	1	-	4	-

Pahang	Private	1	-	1	-	0	-	0	-	0	-
Pahang	Total	5	3.28	5	3.28	2	1.31	1	0.66	4	2.62
Terengganu	Public	2	-	0	-	1	-	0	-	2	-
Terengganu	Private	0	-	0	-	0	-	0	-	0	-
Terengganu	Total	2	1.86	0	0.00	1	0.93	0	0.00	2	1.86
Kelantan	Public	6	-	4	-	1	-	1	-	3	-
Kelantan	Private	0	-	0	-	0	-	0	-	0	-
Kelantan	Total	6	3.71	4	2.48	1	0.62	1	0.62	3	1.86
Sabah & WP Labuan	Public	8	-	2	-	1	-	1	-	5	-
Sabah & WP Labuan	Private	2	-	0	-	1	-	1	-	2	-
Sabah & WP Labuan	Total	10	2.94	2	0.59	2	0.59	2	0.59	7	2.06
Sarawak	Public	4	-	3	-	1	-	0	-	3	-
Sarawak	Private	9	-	7	-	5	-	0	-	2	-
Sarawak	Total	13	5.17	10	3.97	6	2.38	0	0.00	5	1.99

Abbreviation: na – not applicable; - – not available; PMP – per million population

APPENDIX:**CODING FOR SDP**

A	Hospital Alor Setar
B	Hospital Ampang
C	Hospital Batu Pahat
D	Hospital Bintulu
E	Hospital Bukit Mertajam
F	Hospital Duchess of Kent, Sandakan
G	Hospital Ipoh
H	Hospital Kangar
I	Hospital Keningau
J	Hospital Kota Bharu
K	Hospital Kuala Krai
L	Hospital Kuala Lumpur
M	Hospital Kuala Pilah
N	Hospital Kuala Terengganu
O	Hospital Melaka
P	Hospital Miri
Q	Hospital Pakar Sultanah Fatimah
R	Hospital Pulau Pinang
S	Hospital Putrajaya
T	Hospital Queen Elizabeth Kota Kinabalu
U	Hospital Selayang
V	Hospital Serdang
W	Hospital Sibu
X	Hospital Sri Manjung
Y	Hospital Sultan Ismail
Z	Hospital Sultanah Aminah Johor Bahru
AA	Hospital Sungai Buloh
AB	Hospital Sultan Abdul Halim , Sungai Petani
AC	Hospital Taiping
AD	Hospital Tawau
AE	Hospital Teluk Intan
AF	Hospital Temerloh
AG	Hospital Tengku Ampuan Afzan Kuantan
AH	Hospital Tengku Ampuan Rahimah Klang
AI	Hospital Tuanku Jaafar, Seremban
AJ	Hospital Umum Sarawak Kuching

CATARACT SURGERY REGISTRY OPERATIVE RECORD

Instruction: Where check boxes ☐ are provided, check (v) one or more boxes. Where radio buttons ☐ are provided, check (v) one box only. *indicates compulsory field.

Office use:

Centre:

i) Hospital / Clinic:

ii) Patient Name:

iii) Identification

Card Number:

MyKad/

MyKid:

Other ID

document No:

Old IC:

Specify type (eg. passport,
armed force ID)

If MyKad/MyKid is not available, please complete the Old IC or Other ID document No.

1a. Surgeon status: ☐ Specialist ☐ Gazetting specialist ☐ Medical officer

3. Date Of Cataract Operation (dd/mm/yy):

1b. Name of Surgeon:

4. Time: Start:

(24 hours)

2. Type of Admission: ☐ Day Care ☐ Not Day Care

End:

(24 hours)

5. Surgery

a) Operated Eye:

b) Type:

c) Combined:

- ☐ Right
☐ Left

- ☐ Lens aspiration
☐ ECCE
☐ Phaco
☐ Phaco converted to ECCE

- ☐ ICCE
☐ Others, specify: _____

(check ☒ one or more boxes below if perform)

- ☐ None ☐ Vitreo-retinal surgery
☐ Pterygium surgery ☐ Penetrating keratoplasty
☐ Filtering surgery ☐ Others, specify: _____

6. Anaesthesia

☐ General

☐ Local

check (v) one or more boxes below if perform

(i) Type:

- ☐ Retrobulbar ☐ Facial block
☐ Peribulbar ☐ Topical
☐ Subtenon ☐ Intracameral
☐ Subconjunctival

(ii) Type of sedation

- ☐ None
☐ Oral
☐ Intravenous
☐ Intramuscular

7. IOL

a) IOL:

If Yes ☒ Posterior chamber IOL
☐ Anterior chamber IOL

☐ Scleral fixated PCIOL
☐ Others, specify _____

If No ☒ IOL planned, but not implanted
☐ No IOL was planned or implanted
☐ Others, specify _____

b) Material

- ☐ PMMA
☐ Silicone
☐ Acrylic
☐ Others, specify: _____

c) Type

- ☐ Foldable ☐ Non-Foldable
If Foldable / Non-Foldable, specify ☐ Hydrophobic ☐ Hydrophilic ☐ Mixed
Brand _____

8. Vascoelastics Agent

(**Mandatory field for >= data year 2012)

- ☐ Viscoat ☐ Physiovisc
☐ Provisc ☐ Ophthalmol Plus
☐ Discovisc ☐ Z hyalcoat
☐ Healon 5 ☐ Others, specify _____
☐ Healon GV
☐ Amvisc ☐ Not Available

9. Phacoemulsification machine

(**Mandatory field for >= data year 2012)

- ☐ Legacy ☐ Signature
☐ Infiniti ☐ Others, specify _____
☐ Laureate
☐ Millenium ☐ Not Applicable
☐ Stellaris
☐ Protégé

10. Wound

(**Mandatory field for >= data year 2012)

a) **Wound placement

- ☐ Superior ☐ Temporal ☐ NA

b) **Wound Type

- ☐ Corneal ☐ Scleral ☐ Limbal ☐ NA

11. Intra-Operative Complications (check (v) one or more boxes below if present)

- ☐ None ☐ Zonular dehiscence
☐ Posterior capsule rupture ☐ Drop nucleus
☐ Vitreous Loss ☐ Suprachoroidal haemorrhage
☐ Central corneal oedema ☐ Others, specify: _____

CATARACT SURGERY REGISTRY (CSR):

CATARACT SURGERY OUTCOMES THROUGH 12 WEEKS POST-OP

Instruction: Where check boxes ☐ are provided, check (✓) one or more boxes. Where radio buttons ☐ are provided, check (✓) one box only. * indicates compulsory field.

Office use:
Centre:

i) Hospital / Clinic :

ii) Patient Name

iii) Identification Card Number : MyKad / MyKid: - - Old IC:

Other ID document No:

Specify type (eg. passport, armed force ID):

If MyKad/MyKid is not available, please complete the Old IC or Other ID document No.

iv) Date of outcome notification (dd/mm/yy) :

v) Date of Cataract Operation (dd/mm/yy) :

auto

SECTION 1 : POST-OP COMPLICATIONS

(check ☒ if the following complication are noted during the first 12 weeks post-operative period)

a) ☐ None

b) ☐ Infective endophthalmitis

c) ☐ Unplanned Return To OT

(If Yes)



Date of Diagnosis (dd/mm/yy):

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(If Yes)



Reasons	Check ☒ one or more boxes below	Date (dd/mm/yy)
a) Iris prolapse	☐	
b) Wound dehiscence	☐	
c) High IOP	☐	
d) IOL related	☐	
e) Infective endophthalmitis	☐	
f) Other, specify:	☐	

SECTION 2 : POST-OP VISUAL ACUITY MEASUREMENT

(Last recorded visual acuity within 12 weeks post-op period operated eye only)

a. Post Operative Period	b. UNAIDED VISION		c. WITH GLASSES/ PIN HOLE		d. REFRACTED VISION (Record of refractive power in diopter is mandatory for operated eye (right/left), if refraction is performed)					
	(i) Right	(ii) Left	(i) Right	(ii) Left	(i) Right			(ii) Left		
					Sp	Cy	Axis	Sp	Cy	Axis
Date: dd mm yy										
Post-op weeks (auto calculated)					☐ +	☐ -		☐ +	☐ -	

e. No record of post-operative visual acuity ☐	Reason for no post-op visual acuity record	☐ lost to follow-up ☐ discharged by doctor ☐ unable to take vision ☐ others, specify:
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f. Factor if post-op refracted VA worse than 6/12 (for operated eye only)

(check ☒ one or more boxes below if present)

- | | |
|---|---|
| ☐ High astigmatism | ☐ Cornea decompensation |
| ☐ Posterior capsular opacity | ☐ IOL decentration / dislocation |
| ☐ Cystoid macular edema | ☐ Retinal detachment |
| ☐ Infective endophthalmitis | |
| ☐ Preexisting ocular comorbidity, state what: <input type="text"/> | |
| ☐ Other, specify: <input type="text"/> | |

