The 4th Report of the National Eye Database 2010

Included reports on

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

Age-related macular degeneration 2008, 2009

Retinoblastoma registry 2008, 2009

Ophthalmology service census 2002 to 2010

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The 4th Report of the National Eye Database 2010

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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 2012

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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.
3. To evaluate cataract surgery services based on rate of posterior capsular rupture, post-operative infection, post-operative visual outcome and induced astigmatism.
4. 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.
3. To study characteristics of RB patients in terms of clinical presentation and stage of disease based on International Intraocular Retinoblastoma Classification.
4. To evaluate types of treatments and monitor treatment trends.
5. 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 then 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.

Key Performance Indicators related to cataract surgery such as rate of infectious endophthalmitis following cataract surgery, posterior capsular rupture and postoperative visual acuity better than 6/12 in patients without ocular co-morbidity are data mined from cataract surgery registry.

Ophthalmology Service KPIs:

Aspect of Performance : QUALITY & SAFETY		
Dimension : Patient-focused Care		**Optimal Target / Standard**
No. 1	Waiting time to see a doctor at the Specialist Clinic	> 90% of the patients are seen within ninety (90) minutes
No. 2	Waiting Time to get an appointment for First Consultation for Diabetic Patients at the Specialist Clinic	> 80% of the patients are given an appointment for First Consultation within 6 weeks
No. 3	Waiting Time for Cataract Surgery	> 80% of patients have appointment given for cataract surgery within 16 weeks
Dimension : Clinical Effectiveness & Risk Management		
No. 4	Rate of Infectious Endophthalmitis following Cataract Surgery	< 0.2% (2 cases per 1000 operations)
No. 5	Rate of Posterior Capsular Rupture during Cataract Surgery	< 3 % (50 cases per 1000 operations)
No. 6	Rate of Post-operative Visual Acuity of 6/12 or better within 3 months following Cataract Surgery in Patients without Ocular Co-morbidity	> 85 % (850 cases per 1000 operations)*
No. 7	Average Frequency of Mortality / Morbidity Review being Conducted in Ophthalmology Department Monthly	At least 6 times in 6 months
Aspect Of Performance : PRODUCTIVITY		
Dimension : Workload		
No. 8	Percentage of Out-patients seen by Specialist in specialist clinic per Month	To be decided

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.

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.

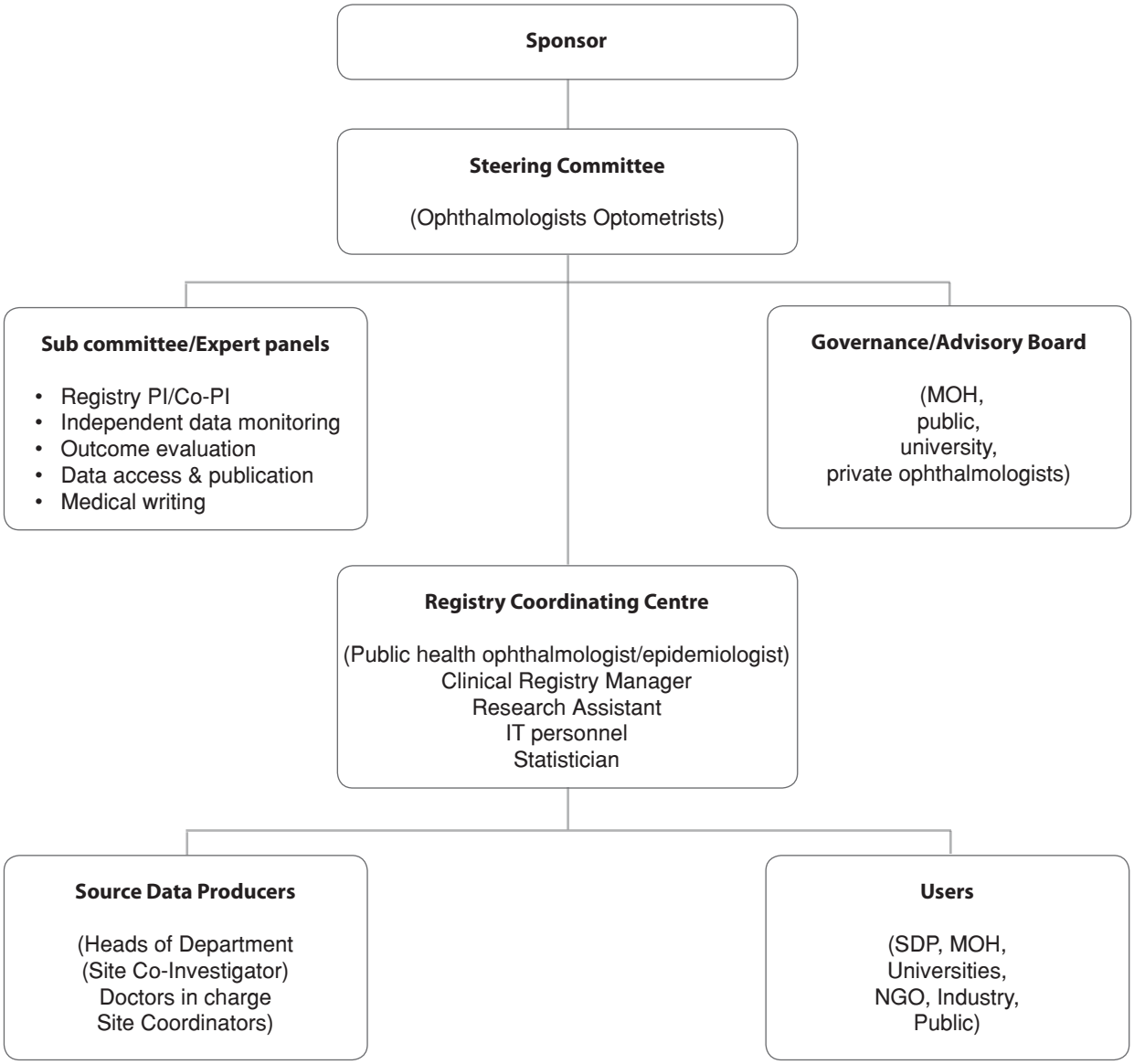
Data collection and data entry are done at SDP sites. Data are collected either using case report forms (CRF) which are later entered into the web application, or are directly entered into the web application during the course of clinical work.

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 Ummi 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 Haireen Kamaruddin	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		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

FOREWORD

The fourth National Eye Database (NED) report for the year 2010 has finally been published. The 7-year results in the key registry in particular the cataract surgery registry (CSR) showed an encouraging trend. This hopefully represented the actual parallel improvement in the provision of cataract services by the participating source data producers (SDPs). The percentage of intra-operative complication such as posterior capsular rupture (PCR) and the occurrence of post-operative infectious endophthalmitis were decreasing.

As in past reports, we would like to reemphasize the importance of ascertainment in NED. Although the cumulative results were improving, poor ascertainment was still the major issue in certain SDP. Besides producing inaccurate data due to missing or underreported denominators, poor ascertainment might have resulted in the possible underreporting of important intra-operative complication for example PCR or poor visual outcome to NED.

In the year 2010, NED continued to play its role as the main ophthalmology database in the country. But in future, NED will expand its role as a platform for research and publication to be done not only by the MOH staff but by other eye care providers from academic institutions and private centre as well. Hence we would sincerely like to invite the participation of the universities and the private sectors, especially to the cataract surgery registry. The reason is that participation by all ophthalmology centres in the country will give a better representation of national status of eye diseases captured in this NED such as aged-related macular degeneration and retinoblastoma and also cataract surgery practice pattern and outcome.

Data in NED have increasingly been used to formulate healthcare plan and policy of ophthalmology services in the country. The satellite cataract services and the Klinik Rawatan Katarak Bergerak 1Malaysia (KRKB1M) used data from cataract surgery registry in their proposal. We also foresee that NED data will be used in the prevention of blindness activities in the country.

We would like to emphasize that the rich data collected in NED can be utilized by all level of users for many purposes. People who want to access the data just need to write to NED steering committee for approval. We appeal to all ophthalmologists to join us as editor to the annual report and encourage them to do further research on the data collected and publish the findings at peer-reviewed journals.

Thank you.

NED Advisor

.....

Dr Elias Hussein
Head,
Ophthalmology service (2010- till date)

NED Chairperson

.....

Dr Goh Pik Pin
Director,
Clinical research Centre
Hospital Selayang
National Institute of Health

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

1. Stock and Flow

- From the year 2008 to 2010, all the 36 MOH Ophthalmology departments participated in CSR.
- The number of SDP increased from 25 SDPs in 2002 to 36 SDPs in 2010.
- The total number of cataract surgery registered to CSR increased from 12798 in 2002 to 28506 in 2010.
- The CSR ascertainment rate increased from 87.6 % in 2002 to 95.4% in 2010.

2. Characteristics of Patients

- The mean age of patients at the time of cataract surgery maintained at 64 – 65 years old from 2002 to 2010. This age was younger than data published by the Swedish cataract surgery register (74 years old).
- Up to 1/3 of patients presented within the age group of 65-74 years old (37.6% in 2010).
- The proportion of patients with systemic co-morbidity increased from 56.8% in 2002 to 70.6% in 2010
- There was an increase in the proportion of patients presented for cataract surgery who had hypertension (from 35.4% in 2002 to 54.8% in 2010) and diabetes mellitus (from 28.9% in 2002 to 40.7% in 2010).
- Senile cataract was the commonest cause of primary cataract (98.9% in 2010).
- Trauma was the commonest cause for secondary cataract (52.4% in 2010).
- 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 (33.1% in 2010).
- Majority of the eyes had no prior ocular surgery (96.9% in 2010).The commonest prior ocular surgery was vitreoretinal surgery (1.3% in 2010).
- One third of the eyes had ocular co-morbidity (42.0% in 2010). The commonest ocular co-morbidity was diabetic retinopathy in any forms (12.5% in 2009).
- About half of the eyes had unaided vision in the blindness category (2/60-NPL) (49.6% in 2010). With refracted vision, the proportion decreased to less than 30% (26.6% in 2010). This trend was consistent over the years.
- Refraction was not done in more than 2/3 of the eyes (72.3% in 2010).
- 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 emmetropia or slightly myopic. The mean target refractive power in 2010 was -0.4D (SD 0.4).

3. Cataract Surgery Practice Patterns

- The number of cataract surgery performed by SDPs varied. IN 2010, of the 36 SDPs, 14 performed less than 500 surgeries, 12 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.
- 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 (84.9% in 2010).
- The mean duration taken to do a cataract surgery was 31.3 min for phaco and 47.4 min for ECCE in 2010.
- Though there is an increasing trend for day care surgery, from 39.3% in 2002 to 51.5% in 2010, the percentage varied among SDPs. In 2010, 4 SDPs did not perform any cataract surgery under day care, 17 SDPs performed less than 50.0% and only 8 SDPs performed more than 90.0% of cataract surgery as day care.
- Phaco was the preferred method of cataract surgery and the proportion increased from 39.7% in 2002 to 76.5% in 2010. Percentage of ECCE decreased from 54.0% in 2002 to 18.8% in 2010.
- The preferred IOL material was acrylic and non-foldable type.
- The percentage of phaco converted to ECCE was 2.1% in 2010. It remained constant over the years.
- Among combined surgery, VR surgery showed an increasing trend (0.2% in 2002 to 2.1% in 2010) while filtering surgery showed a decreasing trend (1.2% in 2002 to 0.4% in 2010).
- Majority of cases were done under local anaesthesia (92.8% in 2010). The preferred type of local anesthesia was topical (49.6% in 2010).
- The use of topical anesthesia has increased from 11.7% in 2002 to 49.6% in 2010.
- The use of retrobulbar anesthesia has decreased from 25.9% in 2002 to 3.3% in 2010.
- There is a decrease in the use of oral sedation (33.3% in 2002 to 12.0% in 2010).
- Majority of the patient operated had IOL implantation (98.1% in 2010). Among these patients who had IOL, 96.3% had posterior chamber IOL.

4. **Intra-operative Complications**
   - There is a reduction in intra-operative complication from 10.4% in 2002 to 5.6% in 2010.
   - The rate of PCR decreased from 6.0% in 2002 to 2.9% in 2010 and vitreous loss decreased from 5.7% in 2002 to 2.2% in 2010.
   - Intra-op complication was seen among 42.5% of patients who had phaco converted to ECCE and 44.8% who had ICCE in 2010.
   - In 2010, the percentage of intra-op complication was higher if cataract surgery was combined with filtering surgery (6.6%) pterygium excision (8.1%) or vitreoretinal (5.8%). For cataract surgery combined with VR surgery, the intra-operative complication rate dropped from 35.0% in 2002 to 5.8% in 2010 and rate of vitreous loss reduced from 19.0% in 2002 to 1.5% in 2010.
   - In 2010, the rate of intra-operative complication was higher in surgeries performed by MO (9.2%), followed by gazetting specialists (7.0%) as compared to specialist (5.2%).
   - In 2010, 34 out of 36 SDPs achieved the national KPI standard of PCR below 5%.

5. **Cataract Surgery Outcome**
   - Up to 80% of patient registered to CSR had cataract surgery outcome data.
   - The percentage of patients with post-operative endophthalmitis declined from 0.2% in 2002 (25 patients) to 0.09% in 2010 (24 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 (0.47%). 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% 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% 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 and 92.0% in 2010). This observation suggested that poor post- op unaided vision was due to refractive error and patients' vision could be improved with glasses.
   - Patients who had phaco had better post-op visual outcome when compared to other type of surgeries. 93.8% of phaco patients had refracted vision of 6/12 or better in 2010 as compared to ECCE (85.5%), phaco convert to ECCE (78.3%), lens aspiration (75.0%) and ICCE (52.0%).
   - 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 93.8% in 2010 and among ECCE patients from 78.0% in 2002 to 85.5% in 2010.
   - In all type of surgeries, visual outcome became less favourable when there were intra-operative complications.
   - The post-op visual outcomes within 1 week to 3 months was better in eyes with IOL implantation compared to non IOL, in eyes with foldable IOL and IOL made of acrylic.
   - 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 2010, the choice of IOL power was aimed towards targeted refraction of -0.4D and post-operative actual refraction was -0.3D for all eyes, -0.6D for phaco eyes, and -0.9D for ECCE eyes. Thus, eyes which had undergone ECCE had more myopic shift than eyes which had phaco.
   - In 2010, there was disparity between the targeted and the actual refraction. 27.0% of eyes had a different in target and actual refraction of between 0 and -0.5D, and 22.3% had a different of between 0 to +0.5D.

AGE RELATED MACULAR DEGENERATION REGISTRY

1. **Stock and Flow**
   - A total of 169 patients registered with 289 affected eyes.

2. **Patient Demography and Vision**
   - Mean age was 65.7 years
   - Mean duration of symptom was 11.5 months (1 week to 120 months)
   - Proportion of eye with VA 6/6-6/12 was 20.1%, VA 6/18-4/60 was 49.8% and VA 3/60 or worse was 26.0%.

3. **Status of AMD**
   - Majority of patients present late to the tertiary referral centre.
   - 2/3 of the eyes had advance AMD
   - Disciform scar was present in 1/3 of eyes.
   - Only 50% of cases were treatable of which 48.0% were polypoidal choroidal vasculopathy and 57.0 % were choroidal neovascularisation.
   - Approximately 11.2% of patients had past history of ischemic heart disease and stroke which shows that majority of patients do not have contraindications to anti VEGF therapy

- Anti VEGF therapy was the main form of therapy in 36.1% of cases followed by photodynamic therapy (20.2%).
- Only a small number of patients received combination therapy with PDT and anti VEGF in view of the financial constraints.

RETINOBLASTOMA REGISTRY

1. **Stock and Flow**
   - A total of 101 patients registered, of which 17 patient were diagnosed in 2010.

2. **Patients Demography**
   - Mean age at presentation was 2.2 years.
   - Youngest age was 3 weeks and the oldest was 10.2 years.
   - About a third (30.7%) of these patients was in the age group of 13 to 24 months and 25.7% were less than 12 months at presentation.
   - More boys (60.4%) than girls were affected.
   - Majority were of Malay ethnicity (52.5%), followed by Chinese (18.8%) and Indians (9.9%).

3. **Ocular History and Presentation**
   - The most common presentation was leukocoria.
   - Mean duration of disease from onset of symptoms to presentation was 4.8 months with the majority (77.9%) within 1 to 6 months.
   - 30 patients (33.4%) had bilateral disease.
   - 1 patient had positive family history of retinoblastoma.

4. **Investigation and Classification**
   - The presence of calcified mass was detected in 83.0% by CT scan.
   - In patients who underwent MRI, 10.4% showed presence of mass but only 8.1% had calcification.
   - Extraocular extension detected by CT scan in 12.6% of eyes and by MRI in 3.7% of eyes, the majority involved the optic pathway.
   - Two-thirds (65.9%) of the patients presented with Group E Retinoblastoma.

5. **Management**
   - 63.4% of patients had systemic chemotherapy with a mean of 7 cycles (maximum 15 chemotherapy cycles).
   - 5 patients had subtenon injection of chemotherapy combined with systemic chemotheraphy
   - 57 affected eyes out of 67 eyes (85.1%) with unilateral RB were enucleated with 46.3% of these eyes showed histopathological extension outside eyeball.
   - Among eyes with bilateral involvement, 45.6% of eyes were enucleated
   - 5 (7.4%) patients had external beam radiotherapy.

CHAPTER 1

CATARACT SURGERY REGISTRY 2010

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CHAPTER 1: CATARACT SURGERY REGISTRY

1.1 STOCK AND FLOW

The number of CSR source data provider (SDP) maintained at 36 in 2010. The number of cataract surgeries being registered to CSR increased from 12798 in 2002 to 28506 in 2010.

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

Table 1.1(a): Stock and Flow

Year	2002		2003		2004		2007		2008		2009		2010	
Number of SDP	25*		32*		33*		32		36		36		36	
Total number of cataract surgery registered to CSR	12798		16815		18392		18426		21496		24438		28506	
	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

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

The ascertainment was maintained at more than 80% for the year 2002-2004 and 2007-2010. The reduced ascertainment which was observed in 2007 was possibly due to the change from a paper-based to a web-based registry. The percentage increased from 2007 onwards. In the year 2010, Hospital T and AH only reported 72.1% and 71.2% of cataract surgery performed to CSR respectively. Other hospital with poor percentage of outcome form submitted were Hospital D (6.6%), Hospital W (79.9%), Hospital AB (77.8%), Hospital AD (53.6%) and Hospital AG (76.5%).

Table 1.1(b): Ascertainment for MOH Hospitals, CSR 2002-2010

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

Figure 1.1(a): Stock and flow

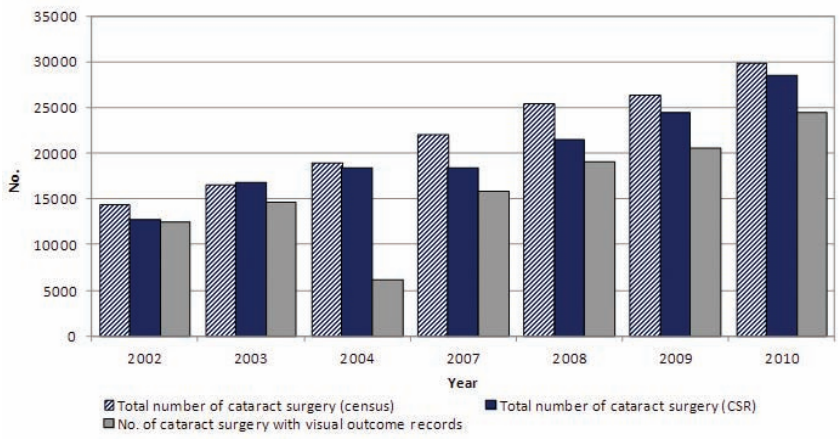
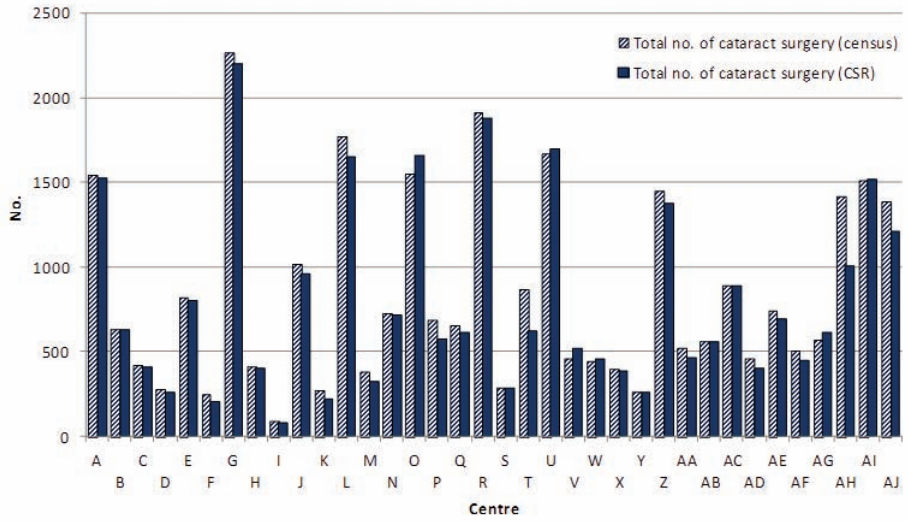


Table 1.1(c): Ascertainment for CSR by SDP in 2010

	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 refrac ted 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	29873	28506	26009	24521	22579	95.4	91.2	94.3	86.8
A	1536	1527	1527	1325	1251	99.4	100.0	86.8	81.9
B	630	627	626	617	565	99.5	99.8	98.6	90.3
C	417	411	410	349	343	98.6	99.8	85.1	83.7
D	269	258	258	253	17	95.9	100.0	98.1	6.6
E	811	804	804	791	683	99.1	100.0	98.4	85.0
F	240	208	207	202	192	86.7	99.5	97.6	92.8
G	2258	2199	874	837	719	97.4	39.7	95.8	82.3
H	404	400	388	374	368	99.0	97.0	96.4	94.8
I	83	76	76	73	76	91.6	100.0	96.1	100.0
J	1010	960	831	815	797	95.0	86.6	98.1	95.9
K	264	217	201	199	171	82.2	92.6	99.0	85.1
L	1764	1648	1470	1431	1346	93.4	89.2	97.3	91.6
M	375	322	320	294	292	85.9	99.4	91.9	91.3
N	719	714	712	708	673	99.3	99.7	99.4	94.5
O	1548	1659	1659	1501	1391	107.2	100.0	90.5	83.8
P	685	577	577	577	576	84.2	100.0	100.0	99.8
Q	649	617	616	600	534	95.1	99.8	97.4	86.7
R	1910	1876	1780	1626	1570	98.2	94.9	91.3	88.2
S	281	282	277	275	263	100.4	98.2	99.3	94.9
T	865	624	615	575	539	72.1	98.6	93.5	87.6
U	1662	1699	1699	1673	1530	102.2	100.0	98.5	90.1
V	455	520	520	510	439	114.3	100.0	98.1	84.4
W	438	455	452	447	361	103.9	99.3	98.9	79.9
X	393	387	387	380	358	98.5	100.0	98.2	92.5

	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	258	258	258	255	251	100.0	100.0	98.8	97.3
Z	1443	1377	1324	1254	1195	95.4	96.2	94.7	90.3
AA	513	468	468	451	382	91.2	100.0	96.4	81.6
AB	558	558	558	552	434	100.0	100.0	98.9	77.8
AC	889	889	889	879	840	100.0	100.0	98.9	94.5
AD	452	401	401	277	215	88.7	100.0	69.1	53.6
AE	733	690	683	622	615	94.1	99.0	91.1	90.0
AF	501	450	411	388	380	89.8	91.3	94.4	92.5
AG	566	615	592	563	453	108.7	96.3	95.1	76.5
AH	1414	1007	985	967	843	71.2	97.8	98.2	85.6
AI	1503	1519	947	758	894	101.1	62.3	80.0	94.4
AJ	1377	1207	1207	1123	1023	87.7	100.0	93.0	84.8

Figure 1.1(c): Ascertainment for CSR by SDP in 2010



1.2 CHARACTERISTICS OF PATIENT

1.2.1 Patient Demography

The mean age for patients presented for cataract surgery showed an increasing trend over the years. In 2010, the minimum age, increased to 1.8 months old and the maximum age maintained at 99 years old.

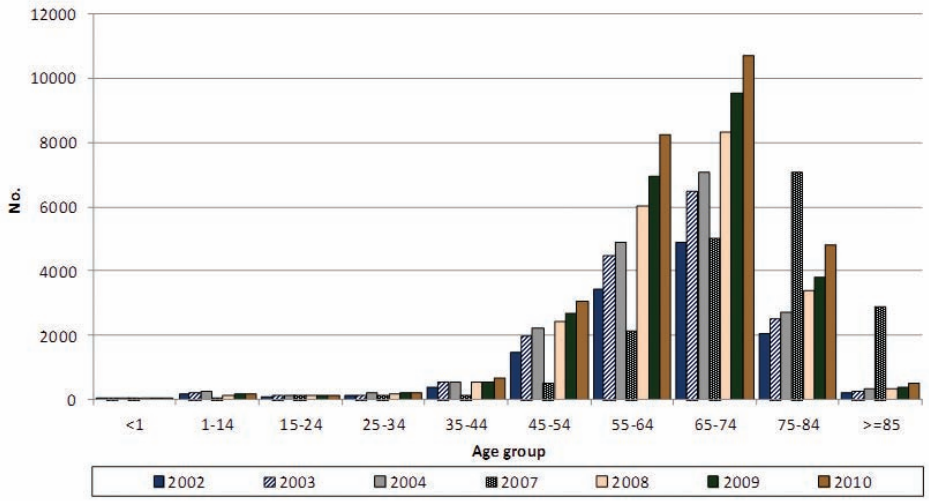
A larger percentage of patients presented within the age group of 65-74 years old except for the year 2007. There was no marked gender difference over the years. The slight female preponderance reflected higher female ratio in the aging population.

Table 1.2.1: Age and Gender Distributions, CSR 2002-2010

Year	2002*		2003*		2004*		2007		2008		2009		2010	
Total number of cataract surgery	12798		16815		18392		18426		21496		24438		28506	
Age														
Mean (years)	64.0		63.7		63.5		64.3		64.6		64.7		65.0	
Median (years)	66		66		66		66		66		66		66	
Minimum (month)	1.0		1.0		1.0		1.0		1.0		1.2		1.8	
Maximum (years)	97		100		104		97		102		99		99	
% Distribution														
Age group, years	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**N**	**%**	**n**	**%**
<1	21	0.2	23	0.1	50	0.3	18	0.1	34	0.2	17	0.1	7	0.0
1-14	171	1.3	202	1.2	266	1.5	50	0.3	116	0.5	148	0.6	170	0.6
15-24	101	0.8	139	0.8	134	0.7	141	0.8	133	0.6	129	0.5	143	0.5
25-34	115	0.9	147	0.9	207	1.1	120	0.7	167	0.8	210	0.9	227	0.8
35-44	376	2.9	575	3.4	526	2.9	157	0.9	539	2.5	557	2.3	655	2.3
45-54	1472	11.5	1974	11.7	2238	12.2	499	2.7	2407	11.2	2697	11.0	3043	10.7
55-64	3415	26.7	4496	26.7	4882	26.5	2135	11.6	6037	28.1	6956	28.5	8225	28.9
65-74	4880	38.1	6480	38.5	7051	38.3	5031	27.3	8307	38.6	9534	39.0	10720	37.6
75-84	2041	16.0	2511	14.9	2722	14.8	7103	38.6	3391	15.8	3802	15.6	4805	16.9
>=85	206	1.6	264	1.6	316	1.7	2889	15.7	344	1.6	388	1.6	509	1.8
Missing	NA	-	4	0.0	NA	-	283	1.5	21	0.1	0	0.0	2	0.0
Gender														
Male	6308	49.3	8397	49.9	9034	49.1	8820	47.9	10295	47.9	11829	48.4	13631	47.8
Female	6490	50.7	8418	50.1	9358	50.9	9606	52.1	11168	52.0	12609	51.6	14871	52.2
Missing	0	0	0	0	0	0	0	0	33	0.2	0	0	4	0.0

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

Figure 1.2.1: Age Distribution, CSR 2002-2010



1.2.2 Medical history

1.2.2.1 Systemic co-morbidity

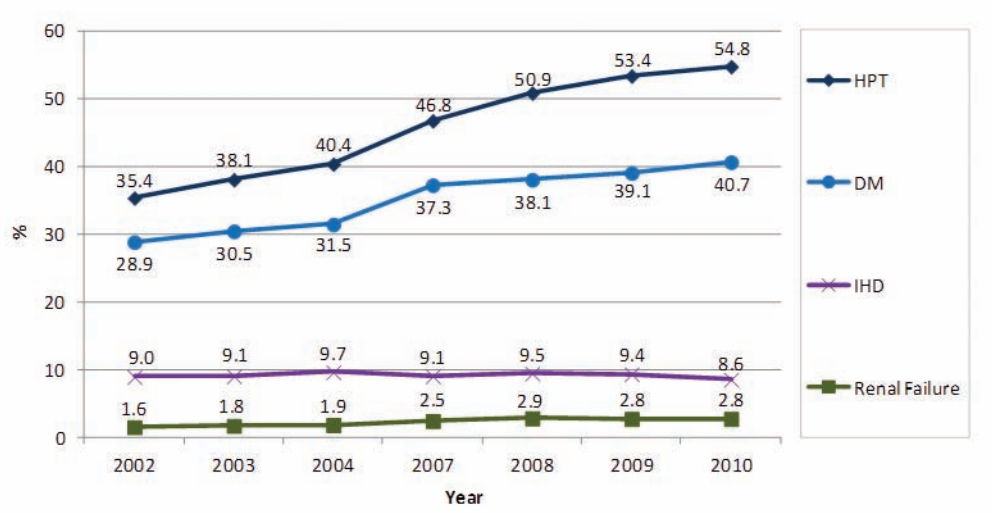
The common systemic co-morbidity encountered in patients who came for cataract surgery were hypertension, diabetes mellitus, ischemic heart disease and renal failure The overall percentage of such patients showed an increasing trend over the years. The percentages of patients with hypertension and diabetes mellitus were increasing.

Table 1.2.2.1: Distribution of Systemic Co-Morbidity, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
No of patients (N)	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
Percentage of patients with any systemic co-morbidity	56.8		59.1		59.9		67.5		68.7		71.0		70.6	
Percentage of patients with specific systemic co-morbidity														
	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
2. Diabetes Mellitus	3694	28.9	5136	30.5	5800	31.5	6869	37.3	8188	38.1	9556	39.1	11598	40.7
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
4. Renal Failure	211	1.6	303	1.8	351	1.9	461	2.5	624	2.9	679	2.8	804	2.8
5. Cerebrovascular accident	106	0.8	165	1.0	174	0.9	0	0.0	29	0.1	305	1.2	302	1.1
6. COAD/Asthma	669	5.2	907	5.4	955	5.2	798	4.3	955	4.4	1039	4.3	1024	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

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 2002-2010



1.2.2.2 Causes of cataract

Majority of the patients presented with primary cataract. In eyes with primary cataract, senile or age-related cataract was the commonest. In eyes with secondary cataract, trauma was the commonest. 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**	
No of patients (N)	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
	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
Secondary cataract	499	3.9	654	3.9	695	3.8	557	3.0	530	2.5	587	2.4	660	2.3
Missing value	-	-	-	-	-	-	460	2.5	637	3.0	734	3.0	865	3.0
Primary Cataract (N)	12294		16161		17697		17410		20329		23117		26981	
	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
Congenital	130	1.1	175	1.1	173	1.0	129	0.7	124	0.6	124	0.5	44	0.2
Development	155	1.3	317	2.0	209	1.2	169	1.0	156	0.8	166	0.7	236	0.9
Others	49	0.4	46	0.3	25	0.1	37	0.2	54	0.3	45	0.2	30	0.1
Secondary Cataract (N)	499		654		695		557		530		587		660	
	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
Drug induced	53	10.6	81	12.4	84	12.1	55	9.9	76	14.3	79	13.5	64	9.7
Surgery induced	23	4.6	67	10.2	56	8.1	82	14.7	39	7.4	107	18.2	93	14.1
Others	98	19.6	107	16.4	115	16.5	65	11.7	85	16.0	71	12.1	157	23.8

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 second surgery (for the fellow eye). This pattern remained unchanged since 2002. This was despite the declining percentage of eyes with intra-operative complications during surgery in the previous eye surgery (from 24.4% in 2002 to 3.4% in 2010).

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 reduced to 7.5% in 2010. The mean duration between the first and fellow eye showed an increasing trend, from 16 months in 2002 to 36 months in 2010.

Table 1.2.2.3: First or Fellow Eye Surgery, CSR 2002-2010

Year	**2002**		**2003**		**2004**		**2007**		**2008**		**2009**		**2010**	
No of patients (N)	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
	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
Fellow eye surgery	3840	30.0	4964	29.5	5481	29.8	5559	30.2	6849	31.9	7938	32.5	9441	33.1
Missing	NA	-	NA	-	NA	-	57	0.3	37	0.2	54	0.2	146	0.5
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
Period of time between first and fellow eye surgery (Months)														
N	2716		3322		3673		4860		5953		7353		9378	
Mean	16.7		16.3		16.9		23.4		22.0		24.4		36.1	
SD	18.0		17.1		18.8		24.3		22.8		31.5		43.6	
Median	10.3		10.1		10.5		13.3		13.1		12.1		15.1	
Patients who had cataract surgery before	3840		4964		5481		5559		6849		7938		9441	
	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

1.2.2.4 Past Ocular Surgery of the Operated Eye

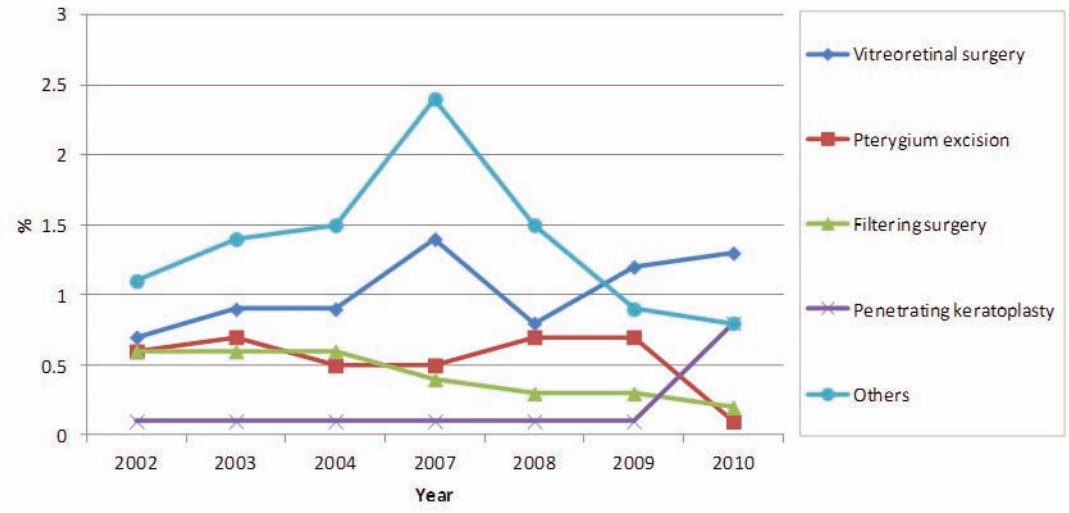
Most eyes to be operated had no prior ocular surgery. The commonest past ocular surgery was vitreoretinal (VR) surgery which appeared to be in increasing trend. Both pterygium excision and filtering surgery demonstrated a declining trend. The percentage of eyes with past history of penetrating keratoplasty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

Table 1.2.2.4: Past Ocular Surgery of the Operated Eye, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
No. of patients	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
No. of eyes with past ocular surgery record (N)	12798		16782		18372		17379		20674		23109		26711	
	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
Vitreoretinal surgery	8959	0.7	1510	0.9	1653	0.9	261	1.4	161	0.8	267	1.2	352	1.3
Pterygium excision	77	0.6	1177	0.7	92	0.5	869	0.5	140	0.7	164	0.7	21	0.1
Filtering surgery	77	0.6	1007	0.6	1102	0.6	1043	0.4	57	0.3	69	0.3	65	0.2
Penetrating keratoplasty	13	0.1	168	0.1	184	0.1	1738	0.1	14	0.1	18	0.1	212	0.8
Others	1408	1.1	235	1.4	276	1.5	417	2.4	304	1.5	216	0.9	203	0.8

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 2002-2010



1.2.2.5 Preexisting Ocular Co-morbidity

One third of the eyes to be operated had ocular co-morbidities. The percentage appeared to be increasing over the years. The commonest was diabetic retinopathy (DR) in any forms then followed by glaucoma. The percentage of eyes with DR appeared to be increasing over the years. However these figures might not be accurate because the posterior segment could not be assessed in 1/10 of the eyes. Therefore the percentage of eyes with DR might be underestimated. The percentage of eyes presented with lens related complications (phacolytic and phacomorphic) appeared to be decreasing.

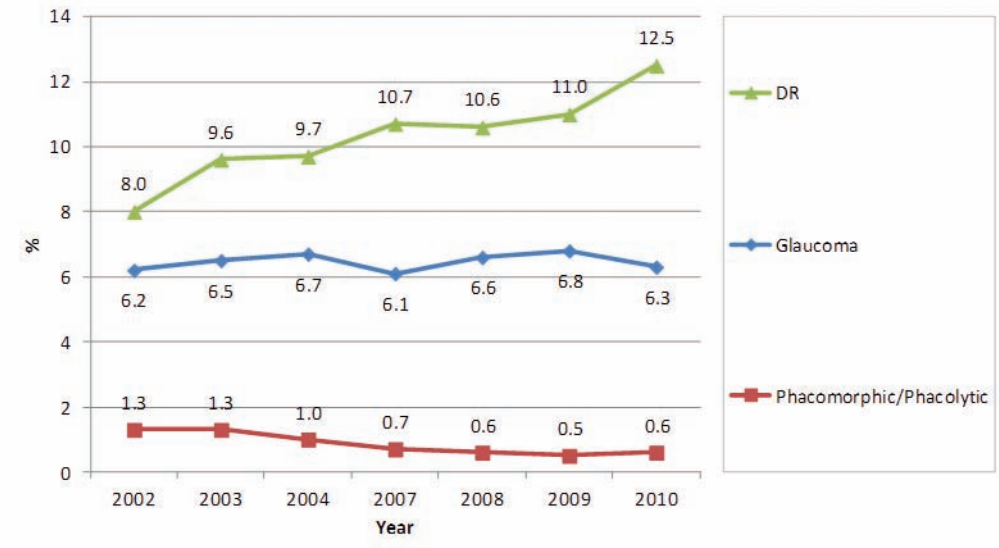
Table 1.2.2.5: Distribution of Pre-existing Ocular Co-Morbidity, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
No of patients (N)	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
	N	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**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
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
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
3. Pseudoexfoliation	184	1.4	254	1.5	209	1.1	221	1.2	253	1.2	318	1.3	289	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
5. Chronic uveitis	54	0.4	48	0.3	80	0.4	81	0.4	63	0.3	80	0.3	89	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
2. Phacolytic	61	0.5	63	0.4	79	0.4	44	0.2	45	0.2	47	0.2	59	0.2
3. Subluxated/Disclosed	87	0.7	110	0.7	86	0.5	101	0.5	89	0.4	83	0.3	95	0.3
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
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
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
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
5. ARMD	145	1.1	215	1.3	308	1.7	231	1.3	259	1.2	387	1.6	462	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
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
8. Retinal detachment	70	0.5	177	1.1	247	1.3	218	1.2	204	0.9	294	1.2	308	1.1
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
Miscellaneous														
1. Amblyopia	64	0.5	61	0.4	78	0.4	71	0.4	65	0.3	62	0.3	75	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
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. Others	380	3.0	827	4.9	1153	6.3	668	3.6	755	3.5	1053	4.3	1321	4.6

**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 2002-2010



1.2.2.6 Pre-operative Vision

The proportion of eyes with unaided vision in the blindness category (2/60-NPL) appeared to be decreasing. Conversely, the proportion of these eyes in the low vision category (6/18-3/60) was in an upward trend. However, the proportion of eyes with refracted vision in each category of vision remained unchanged.

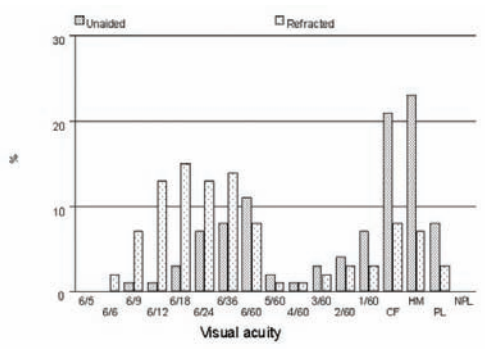
In each year, more than 70% of all patients did not have refraction pre-operatively. The bimodal pattern of pre-operative vision remained the same over the years. The first peak was at 6/18 and the second peak was at CF/HM. There was a low proportion of patients between 5/60 to1/60.

Table 1.2.2.6: Distribution of Pre-Operative Vision, CSR 2002-2010

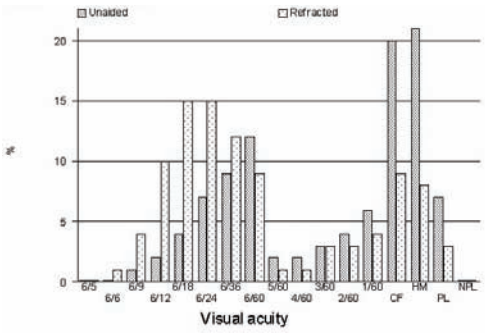
Year		**2002**		**2003**		**2004**		**2007**		**2008**		**2009**		**2010**	
No. of patients (N)		**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**N**	**%**	**n**	**%**
Patients with unaided VA		12691	99.2	16723	99.4	18222	99.1	18356	99.6	21212	98.7	23796	97.4	27977	98.1
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
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
6/5-6/12	Unaided	281	2.2	396	2.4	523	2.9	602	3.3	646	3.0	788	3.3	1016	3.6
	Refracted	155	22.1	327	15.5	396	17.1	678	13.3	935	16.4	944	18.3	1474	18.7
6/18-3/60	Unaided	4465	35.2	6440	38.5	7235	39.7	7734	42.4	9375	44.2	10849	45.6	13073	46.7
	Refracted	374	53.4	1198	56.9	1315	56.7	2375	46.9	2892	50.9	2796	54.3	4324	54.8
2/60-NPL	Unaided	7945	62.6	9887	59.1	10464	57.4	9920	54.3	11180	52.7	12159	51.1	13888	49.6
	Refracted	171	24.4	579	27.5	608	26.2	2018	39.8	1845	32.5	1410	27.4	2097	26.6

Figure 1.2.2.6(a): Distribution of Pre-Operative Vision (Unaided/presenting and refracted), CSR 2002-2010

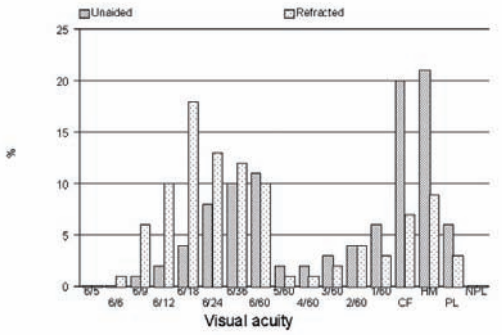
2002



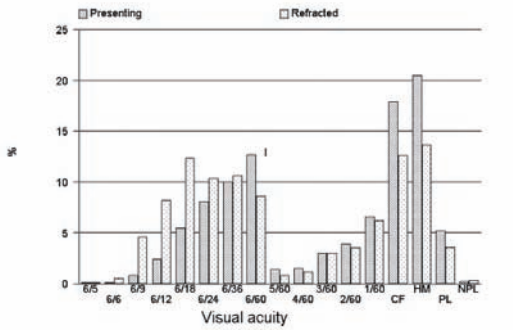
2003



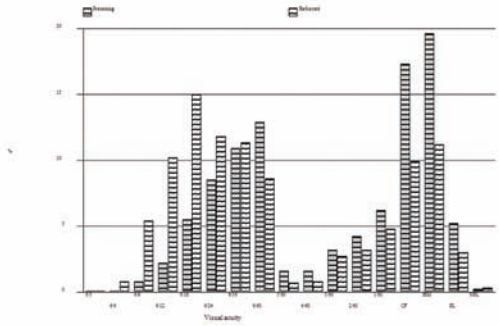
2004



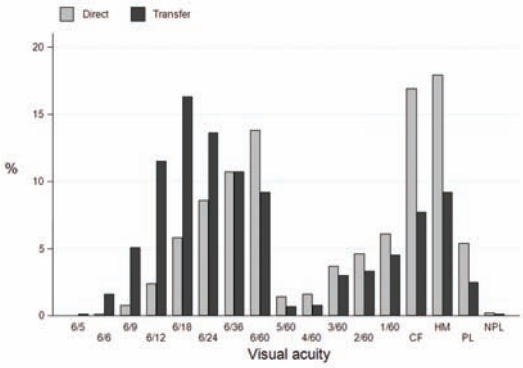
2007



2008



2009



2010

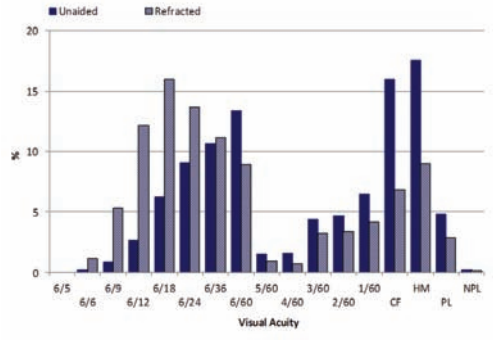


Figure 1.2.2.6(b): Distribution of Pre-Operative Vision (Unaided/presenting), CSR 2002-2010

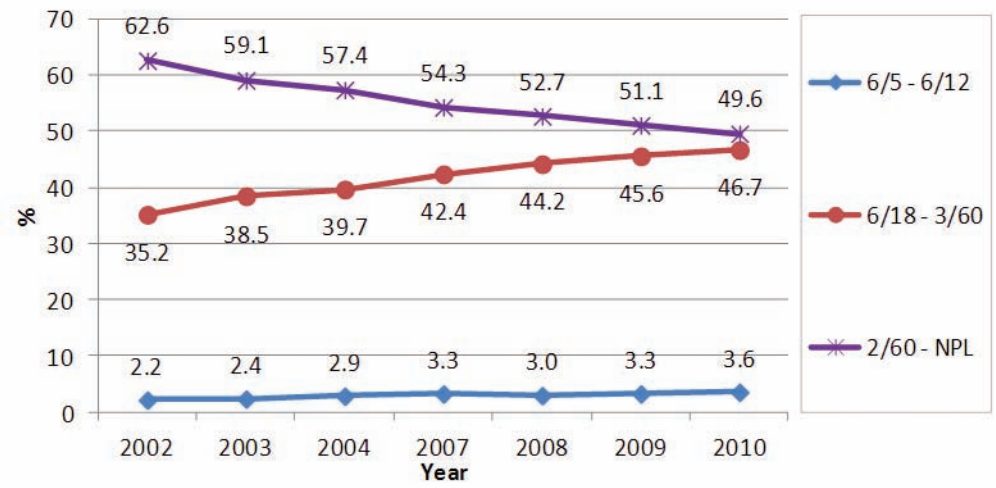
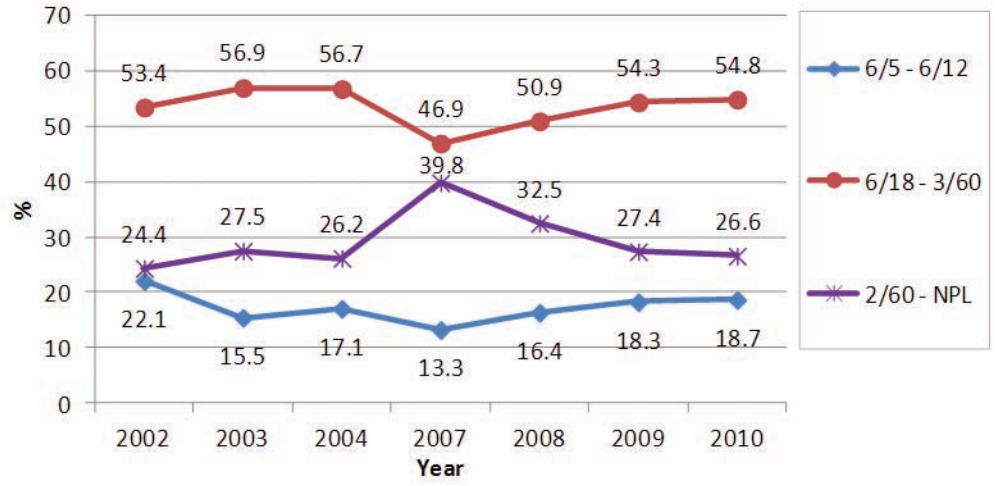


Figure 1.2.2.6(c): Distribution of Pre-Operative Vision (Refracted), CSR 2002-2010



1.2.2.7 Target Refractive Power

The mean target refractive power in 2010 was -0.4D (SD 0.4), with minimum at -9.1D and maximum at +6.0D. The percentage of eyes aimed to have target refraction within (-0.5 to 0 D) increased slightly to 62.1% in 2010. 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 2007-2010

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

Table 1.2.2.7(b): Distribution of Target Refractive Power, CSR 2007-2010

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

5.5-<6	0	0	0	0	2	0	0	0
6-<6.5	0	0	0	0	0	0	1	0
6.5-<7	0	0	0	0	0	0	0	0
7-<7.5	0	0	0	0	0	0	0	0
7.5-<8	0	0	0	0	0	0	0	0
8-<8.5	0	0	0	0	0	0	0	0
8.5-<9	0	0	0	0	0	0	0	0
9-<9.5	0	0	0	0	0	0	0	0
9.5-10	0	0	1	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 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
	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
	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
100-500	13	15	11	10	14	15	15	14	15	15	12	15	10	13
501-1000	7	5	15	14	8	9	8	8	11	11	14	12	14	12
>1000	5	4	4	3	8	5	9	7	9	9	9	8	11	10

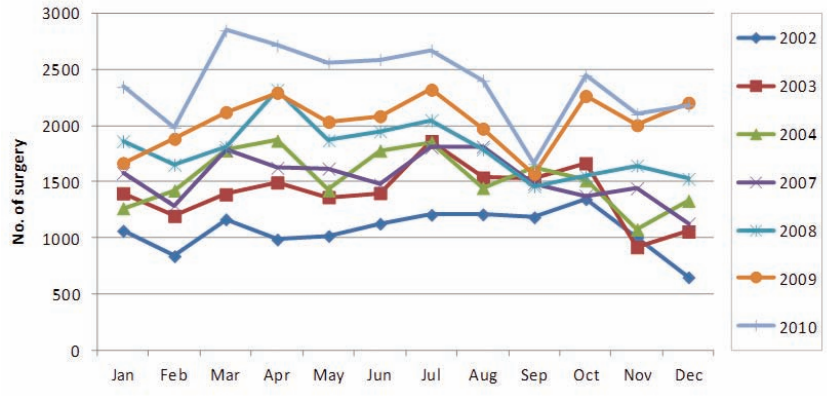
1.3.2 Number of Cataract Surgery by Month

The number was lower than average in February and September.

Table 1.3.2: Number of Cataract Surgery by Month, CSR 2002-2010

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

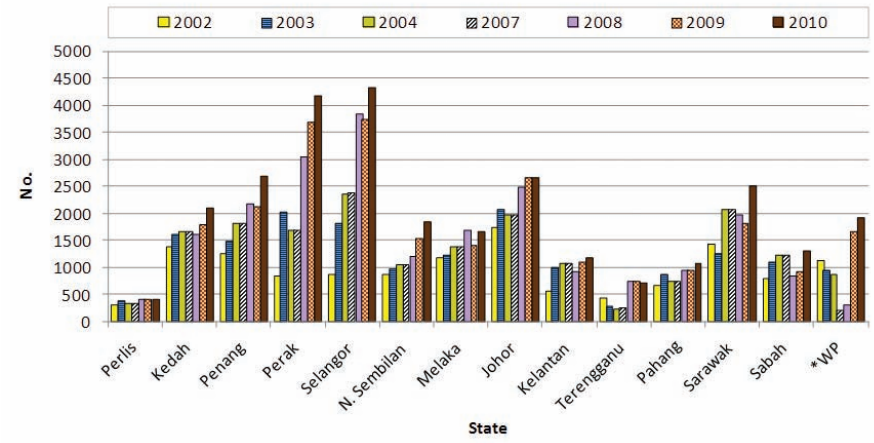
Figure 1.3.2: Number of Cataract Surgeries by Month, CSR 2002-2010



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 2002-2010



**Wilayah Persekutuan in 2007 and 2008 for Putrajaya Hospital only*

1.3.4 Surgeon Status

Specialists performed the highest number of cataract surgery followed by the medical officers (MO) and the gazetting specialists. This trend remained unchanged throughout the years. The percentage of eyes operated by the specialists appeared to be increasing corresponding to the decrease in the percentage operated by the Gazetting Specialists and MOs.

Table 1.3.4: Surgeon Status, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
No. of patients (N)	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
	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
Gazetting Specialist	1762	13.7	1510	9.0	1757	9.6	1276	6.9	1399	6.5	2053	8.4	1405	4.9
Medical Officer	2273	17.8	3233	19.2	3470	18.8	2690	14.6	2697	12.5	2750	11.3	2871	10.1
Missing/NA	0	0	0	0.0	0	0	133	1	554	2.6	235	1.0	14	0.1

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 2007-2010

Year	2007		2008		2009*		2010*	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
All eyes	40.2	20.6	38.2	19.6	38.2	20.4	35.5	19.3
Phaco	36.8	19.7	34.1	17.7	33.6	17.7	31.3	16.4
ECCE	45.3	19.7	45.8	19.5	49.1	20.9	47.4	20.2
Phaco ECCE	57.8	20.6	44.8	24.0	59.7	24.2	56.1	21.7
ICCE	57.6	23.7	57.5	23.7	58.1	24.4	57.6	28.3
Lens Aspiration	47.8	27.2	60.0	25.6	46.1	25.9	45.4	28.9

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 2007-2010

Year		2007		2008		2009		2010	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Phaco	Specialist	36.0	19.8	35.4	17.9	32.6	17.3	30.7	16.3
	Gazetting Specialist	40.2	18.0	47.5	20.8	39.8	19.9	36.2	15.8
	Medical Officers	42.2	18.2	49.2	22.8	41.5	17.7	38.2	16.6
ECCE	Specialist	40.2	17.6	43.9	69.5	42.6	18.0	42.0	17.3
	Gazetting Specialist	45.9	17.8	54.0	71.5	48.4	19.1	48.6	16.1
	Medical Officers	53.9	20.2	63.0	89.8	60.5	21.4	57.4	22.0

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 total number of eyes (excluding children and combined surgeries) and the total number of eyes operated as day care were increasing corresponding to the increasing numbers of cataract surgery registered to CSR. The percentages appeared to be increasing over the years and reached 50.0% in 2010. However, the percentage varied among the SDPs. In 2010, 4 SDPs did not perform surgery under day care at all, 17 SDPs performed less than 50.0% and only 8 SDPs performed more than 90.0%.

Table 1.3.6(a): Distribution of Cataract Surgery Performed Under Day Care Setting, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
Number of SDPs	25*		32*		33*		32		36		36		36	
Total number of cataract surgery registered to CSR	12798		16815		18392		18426		21496		24438		28506	
Number of surgery excluding children and combined surgery	12445		15981		17336		17402		19835		22517		26514	
	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

**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 2002-2010

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

Figure 1.3.6(a): Distribution of Cataract Surgery Performed as Day Care by SDP, CSR 2010

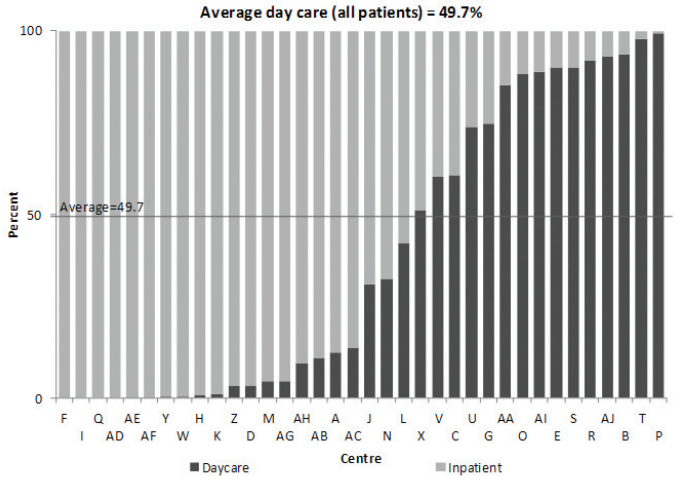


Figure 1.3.6(b): Distribution of Cataract Surgery Performed as Day Care and In-patient by SDP (Excluding Surgery Done in Children and Combined Surgery), CSR 2010

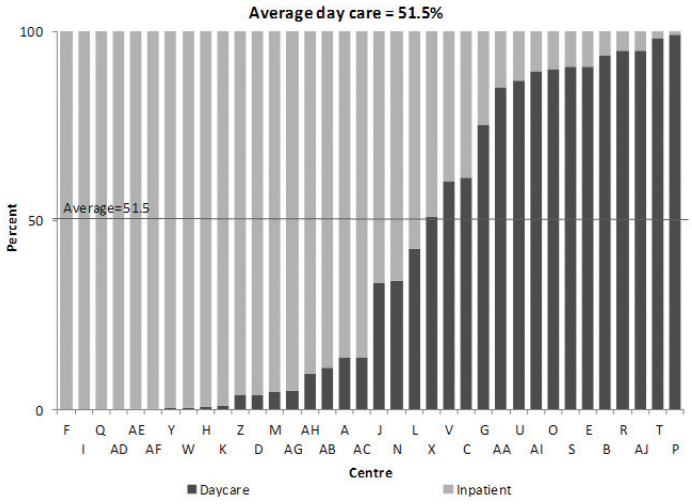
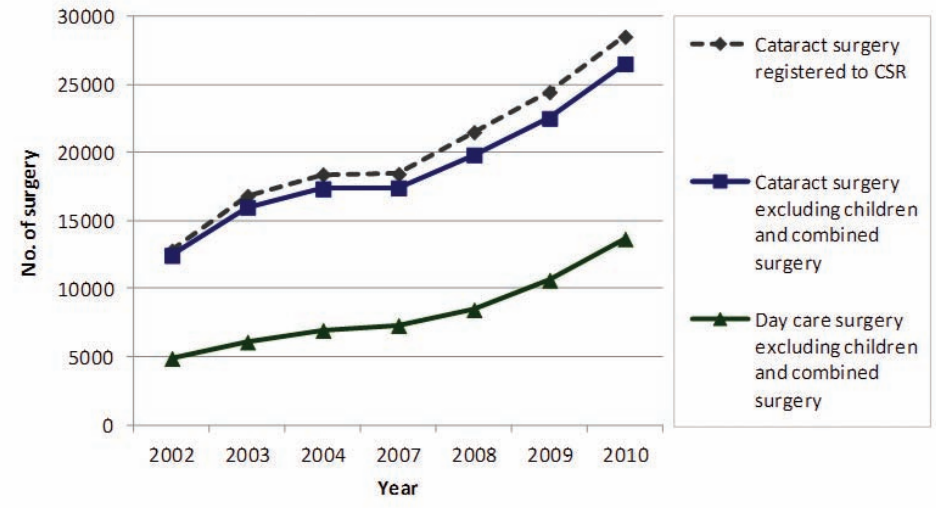


Figure 1.3.6(c): Distribution of Cataract Surgeries Performed as Day Care all SDPs (Excluding Surgery Done in Children and Combined Surgery), CSR 2002-2010



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%. 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 2002-2010

Year	2002		2003		2004		2007		2008*		2009		2010	
No of patients (N)	12798		16815		18392		18426		21496		24438		28506	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Phacoemulsification	5085	39.7	7674	45.6	9282	50.5	11960	65.1	14781	69.1	17717	72.5	21810	76.5
ECCE	6914	54.0	8012	47.6	7830	42.6	5524	30.1	5627	26.3	5457	22.3	5363	18.8
Lens Aspiration	372	2.9	435	2.6	550	3.0	323	1.8	340	1.6	400	1.6	451	1.6
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
ICCE	81	0.6	94	0.6	103	0.6	141	0.8	129	0.6	134	0.5	143	0.5

Figure 1.3.7 Distribution of Phacoemulsification, ECCE and Phaco Converted to ECCE, CSR 2002-2010

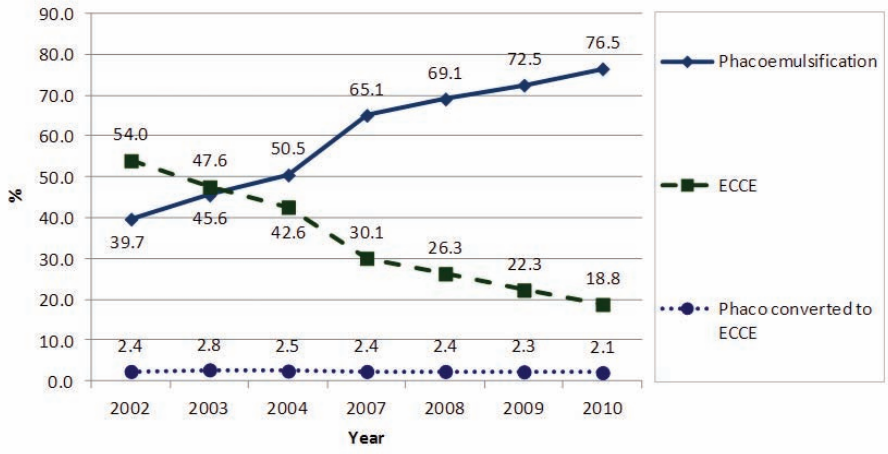


Table 1.3.7(b): Distribution of Types of Cataract Surgery by SDP, CSR 2010

	Type of Cataract Surgery											
	All Surgeries		Phaco		ECCE		Lens Aspiration		Phaco Converted to ECCE		ICCE	
	N	%	n	%	n	%	n	%	n	%	n	%
All Centres	28506	100.0	21810	76.5	5363	18.8	451	1.6	586	2.1	143	0.5
A	1527	100.0	1147	75.1	310	20.3	34	2.2	20	1.3	2	0.1
B	627	100.0	558	89.0	38	6.1	7	1.1	18	2.9	5	0.8
C	411	100.0	307	74.7	78	19.0	6	1.5	14	3.4	5	1.2
D	258	100.0	183	70.9	70	27.1	2	0.8	1	0.4	1	0.4
E	804	100.0	503	62.6	284	35.3	4	0.5	8	1.0	3	0.4
F	208	100.0	4	1.9	191	91.8	11	5.3	1	0.5	1	0.5
G	2199	100.0	1913	87.0	208	9.5	12	0.5	10	0.5	12	0.5
H	400	100.0	342	85.5	46	11.5	6	1.5	6	1.5	0	0.0
I	76	100.0	0	0.0	72	94.7	3	3.9	0	0.0	0	0.0
J	960	100.0	604	62.9	280	29.2	45	4.7	22	2.3	5	0.5
K	217	100.0	168	77.4	33	15.2	5	2.3	8	3.7	2	0.9
L	1648	100.0	1141	69.2	447	27.1	10	0.6	39	2.4	5	0.3
M	322	100.0	149	46.3	137	42.5	6	1.9	27	8.4	2	0.6
N	714	100.0	453	63.4	207	29.0	30	4.2	17	2.4	5	0.7
O	1659	100.0	1295	78.1	283	17.1	22	1.3	44	2.7	11	0.7
P	577	100.0	556	96.4	15	2.6	3	0.5	0	0.0	3	0.5
Q	617	100.0	526	85.3	44	7.1	14	2.3	20	3.2	7	1.1
R	1876	100.0	1707	91.0	127	6.8	7	0.4	28	1.5	5	0.3
S	282	100.0	200	70.9	65	23.0	6	2.1	11	3.9	0	0.0
T	624	100.0	481	77.1	117	18.8	7	1.1	9	1.4	2	0.3
U	1699	100.0	1542	90.8	80	4.7	25	1.5	28	1.6	8	0.5
V	520	100.0	371	71.3	113	21.7	8	1.5	26	5.0	2	0.4
W	455	100.0	386	84.8	48	10.5	6	1.3	15	3.3	0	0.0
X	387	100.0	314	81.1	71	18.3	1	0.3	0	0.0	1	0.3
Y	258	100.0	172	66.7	72	27.9	6	2.3	8	3.1	0	0.0
Z	1377	100.0	1274	92.5	27	2.0	39	2.8	21	1.5	4	0.3
AA	468	100.0	346	73.9	89	19.0	5	1.1	26	5.6	2	0.4
AB	558	100.0	455	81.5	70	12.5	11	2.0	15	2.7	7	1.3
AC	889	100.0	552	62.1	303	34.1	15	1.7	12	1.3	7	0.8
AD	401	100.0	0	0.0	380	94.8	10	2.5	8	2.0	0	0.0
AE	690	100.0	564	81.7	92	13.3	11	1.6	18	2.6	4	0.6
AF	450	100.0	317	70.4	104	23.1	2	0.4	24	5.3	2	0.4
AG	615	100.0	448	72.8	114	18.5	22	3.6	19	3.1	11	1.8
AH	1007	100.0	617	61.3	341	33.9	8	0.8	16	1.6	6	0.6
AI	1519	100.0	1249	82.2	226	14.9	11	0.7	22	1.4	9	0.6
AJ	1207	100.0	966	80.0	181	15.0	31	2.6	25	2.1	4	0.3

Table 1.3.7(c): Distribution of Phacoemulsification by SDP, CSR 2002-2010

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

Table 1.3.7(d): Distribution of ECCE by SDP, CSR 2002-2010

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

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 2002-2010

Year	**2002**		**2003**		**2004**		**2007**		**2008**		**2009**		**2010**	
No of patients (N)	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
	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
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
Filtering Glaucoma Surgery	148	1.2	210	1.2	235	1.3	131	0.7	142	0.7	132	0.5	121	0.4
Vitreoretinal Surgery	26	0.2	100	0.6	186	1.0	435	2.4	237	1.1	402	1.6	601	2.1
Penetrating Keratoplasty	1	0.007	0	0.0	3	0.02	0	0.0	3	0.0	6	0.0	2	0.0
Others	124	1.0	170	1.0	149	0.8	190	1.0	188	0.9	259	1.1	272	1.0

Figure 1.3.8(a): Distribution of Specific Combined Surgery, CSR 2002-2010

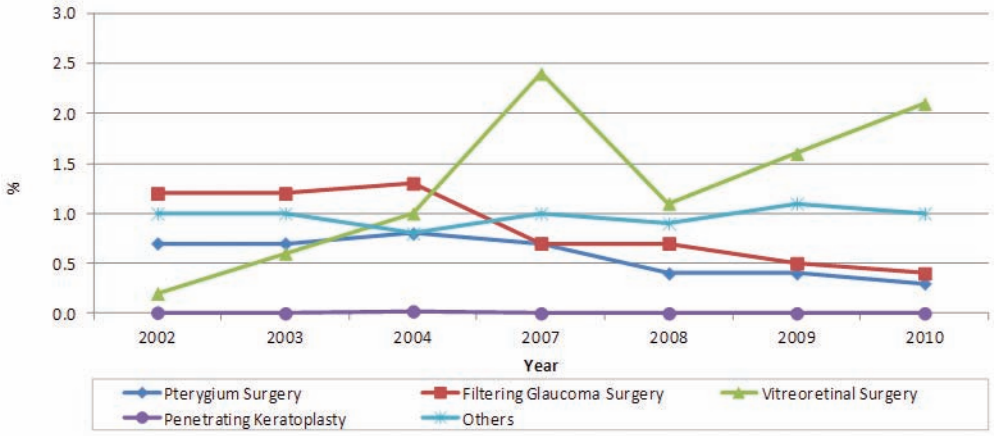


Table 1.3.8(b): Distribution of Combined Surgery by SDP, CSR 2010

		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 Centres	28506	1082	3.8	99	0.3	121	0.4	601	2.1	2	0.0	272	1.0
A	1527	147	9.6	13	0.9	7	0.5	99	6.5	0	0.0	31	2.0
B	627	5	0.8	1	0.2	1	0.2	0	0.0	0	0.0	3	0.5
C	411	9	2.2	5	1.2	0	0.0	0	0.0	0	0.0	4	1.0
D	258	15	5.8	5	1.9	6	2.3	0	0.0	0	0.0	4	1.6
E	804	11	1.4	2	0.2	1	0.1	0	0.0	0	0.0	8	1.0
F	208	12	5.8	4	1.9	4	1.9	0	0.0	0	0.0	4	1.9
G	2199	23	1.0	4	0.2	18	0.8	0	0.0	0	0.0	2	0.1
H	400	4	1.0	0	0.0	4	1.0	0	0.0	0	0.0	0	0.0
I	76	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
J	960	58	6.0	2	0.2	8	0.8	24	2.5	0	0.0	26	2.7
K	217	10	4.6	0	0.0	2	0.9	2	0.9	0	0.0	7	3.2
L	1648	19	1.2	0	0.0	0	0.0	2	0.1	0	0.0	17	1.0
M	322	4	1.2	0	0.0	1	0.3	0	0.0	0	0.0	3	0.9
N	714	52	7.3	13	1.8	8	1.1	8	1.1	0	0.0	24	3.4
O	1659	56	3.4	5	0.3	34	2.0	13	0.8	0	0.0	4	0.2
P	577	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
Q	617	2	0.3	0	0.0	2	0.3	0	0.0	0	0.0	0	0.0
R	1876	85	4.5	3	0.2	5	0.3	75	4.0	0	0.0	2	0.1
S	282	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
T	624	5	0.8	1	0.2	0	0.0	0	0.0	0	0.0	4	0.6
U	1699	259	15.2	3	0.2	6	0.4	216	12.7	0	0.0	34	2.0
V	520	2	0.4	0	0.0	0	0.0	0	0.0	0	0.0	2	0.4
W	455	3	0.7	2	0.4	0	0.0	0	0.0	0	0.0	1	0.2
X	387	1	0.3	1	0.3	0	0.0	0	0.0	0	0.0	0	0.0
Y	258	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Z	1377	117	8.5	1	0.1	6	0.4	82	6.0	0	0.0	30	2.2
AA	468	3	0.6	2	0.4	0	0.0	0	0.0	0	0.0	1	0.2
AB	558	4	0.7	1	0.2	0	0.0	0	0.0	0	0.0	3	0.5
AC	889	37	4.2	10	1.1	0	0.0	0	0.0	0	0.0	27	3.0
AD	401	20	5.0	10	2.5	0	0.0	0	0.0	0	0.0	10	2.5
AE	690	5	0.7	4	0.6	1	0.1	0	0.0	0	0.0	0	0.0
AF	450	1	0.2	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
AG	615	43	7.0	2	0.3	0	0.0	36	5.9	0	0.0	5	0.8
AH	1007	8	0.8	0	0.0	0	0.0	4	0.4	0	0.0	4	0.4
AI	1519	25	1.6	1	0.1	7	0.5	16	1.1	1	0.1	3	0.2
AJ	1207	36	3.0	4	0.3	0	0.0	24	2.0	1	0.1	7	0.6

1.3.9 Anaesthesia in Cataract Surgery

The number of eyes operated under local anaesthesia (LA) maintained at more than 90.0% every year. Unlike previous years, the preferred type of LA in 2010 was topical anaesthesia. There was also an increasing use of topical anaesthesia and a decreasing use of peribulbar, retrobulbar and facial block for anaesthesia. The percentage of surgeons using combined LA was initially decreasing but started to increase again from 2008 onwards.

Among eyes where the surgeries were done under LA, a large percentage was also given oral sedation (Hospital D, E, M, N, R, W, AB, AE and AF). This practice 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 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
No of patients (N)	**12798**		**16815**		**18392**		**18426**		**21496**		**24438**		**28506**	
	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
Local Anesthesia	11980	93.6	15679	93.2	17013	92.5	17143	93.4	20188	94.3	22776	93.2	26440	92.8
Type of local anesthesia														
Subtenon	5647	47.1	8076	51.5	9260	54.4	9990	58.3	11014	54.6	11525	50.6	10952	41.4
Topical	1406	11.7	2819	18.0	3978	23.4	4853	28.3	6680	33.1	8382	36.8	13112	49.6
Peribulbar	2601	21.7	2575	16.4	2940	1.3	1282	7.5	1227	6.1	1244	5.5	881	3.3
Retrobulbar	3100	25.9	2952	18.8	2186	12.8	1031	6.0	1182	5.9	1037	4.6	864	3.3
Intracameral	NA	NA	NA	NA	NA	NA	249	1.5	710	3.5	1596	7.0	2587	9.8
Subconjunctival	28	0.2	141	0.9	139	0.8	232	1.4	251	1.2	437	1.9	898	3.4
Facial block	1348	11.3	865	5.5	226	1.3	20	0.1	143	0.7	95	0.4	40	0.2
Others	12	0.1	0	0.0	1	0.0	223	1.3	NA	NA	0	0.0	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
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
Oral sedation alone	3995	33.3	3354	21.4	2729	16	2387	13.9	2923	14.5	3532	15.5	3171	12.0
Intravenous alone	108	0.9	91	0.6	144	0.8	72	0.4	37	0.2	35	0.2	22	0.1
Intravenous plus oral	83	0.7	53	0.3	15	0.1	0	0.0	NA	NA	NA	NA	2	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

** 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 2002-2010

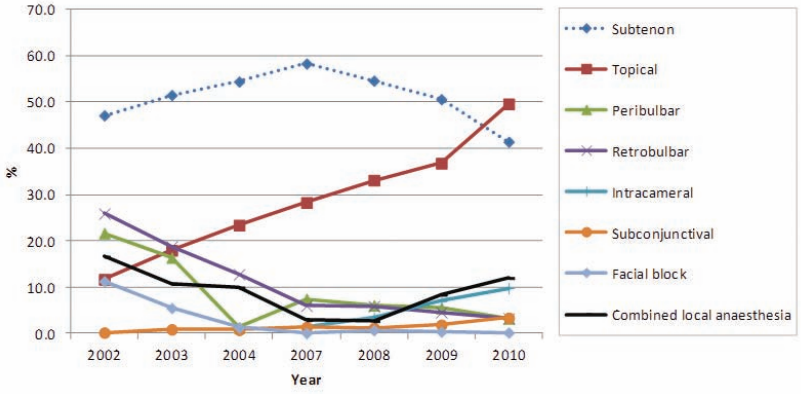


Table 1.3.9(b): Types of Anaesthesia by SDPs, CSR 2010

		Types of Anaesthesia			
		General		Local	
	N	n	%	n	%
All Centre	28506	1884	6.6	26440	92.8
A	1527	191	12.5	1321	86.5
B	627	16	2.6	611	97.4
C	411	7	1.7	403	98.1
D	258	1	0.4	256	99.2
E	804	19	2.4	785	97.6
F	208	19	9.1	189	90.9
G	2199	109	5.0	2076	94.4
H	400	10	2.5	388	97.0
I	76	4	5.3	71	93.4
J	960	53	5.5	907	94.5
K	217	5	2.3	212	97.7
L	1648	236	14.3	1411	85.6
M	322	12	3.7	298	92.5
N	714	43	6.0	671	94.0
O	1659	62	3.7	1593	96.0
P	577	4	0.7	573	99.3
Q	617	25	4.1	592	95.9
R	1876	88	4.7	1770	94.3
S	282	22	7.8	260	92.2
T	624	10	1.6	522	83.7
U	1699	49	2.9	1645	96.8
V	520	54	10.4	466	89.6
W	455	4	0.9	450	98.9
X	387	7	1.8	380	98.2
Y	258	83	32.2	175	67.8
Z	1377	59	4.3	1315	95.5
AA	468	57	12.2	410	87.6
AB	558	33	5.9	523	93.7
AC	889	97	10.9	792	89.1
AD	401	17	4.2	384	95.8
AE	690	26	3.8	663	96.1
AF	450	26	5.8	424	94.2
AG	615	161	26.2	454	73.8
AH	1007	158	15.7	846	84.0
AI	1519	44	2.9	1471	96.8
AJ	1207	73	6.0	1133	93.9

Table 1.3.9(c): Types of Local Anaesthesia by SDPs, CSR 2010

		Local Anaesthesia															
	All	Retrobulbar		Peribulbar		Subtenon		Sub-conjunctival		Facial block		Topical		Intracameral		Combined	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All	26440	864	3.3	881	3.3	10952	41.4	898	3.4	40	0.2	13112	49.6	2587	9.8	3182	12.0
A	1321	248	18.8	2	0.2	274	20.7	2	0.2	0	0.0	676	51.2	186	14.1	70	5.3
B	611	0	0.0	1	0.2	70	11.5	0	0.0	0	0.0	500	81.8	492	80.5	452	74.0
C	403	0	0.0	0	0.0	280	69.5	28	6.9	0	0.0	85	21.1	45	11.2	35	8.7
D	256	0	0.0	0	0.0	255	99.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	785	2	0.3	0	0.0	399	50.8	1	0.1	0	0.0	0	0.0	381	48.5	5	0.6
F	189	19	10.1	44	23.3	116	61.4	3	1.6	6	3.2	86	45.5	17	9.0	98	51.9
G	2076	0	0.0	1	0.0	567	27.3	103	5.0	7	0.3	1521	73.3	591	28.5	760	36.6
H	388	0	0.0	0	0.0	383	98.7	1	0.3	0	0.0	3	0.8	0	0.0	0	0.0
I	71	1	1.4	70	98.6	0	0.0	0	0.0	0	0.0	2	2.8	0	0.0	2	2.8
J	907	0	0.0	0	0.0	885	97.6	0	0.0	0	0.0	22	2.4	0	0.0	2	0.2
K	212	0	0.0	0	0.0	203	95.8	0	0.0	0	0.0	14	6.6	3	1.4	8	3.8
L	1411	24	1.7	231	16.4	800	56.7	8	0.6	4	0.3	237	16.8	268	19.0	157	11.1
M	298	0	0.0	10	3.4	237	79.5	2	0.7	0	0.0	9	3.0	0	0.0	2	0.7
N	671	2	0.3	0	0.0	267	39.8	5	0.7	0	0.0	402	59.9	2	0.3	7	1.0
O	1593	0	0.0	0	0.0	310	19.5	0	0.0	2	0.1	1572	98.7	0	0.0	300	18.8
P	573	0	0.0	0	0.0	90	15.7	1	0.2	0	0.0	483	84.3	0	0.0	1	0.2
Q	592	0	0.0	0	0.0	460	77.7	0	0.0	0	0.0	130	22.0	0	0.0	0	0.0
R	1770	72	4.1	1	0.1	328	18.5	5	0.3	0	0.0	1387	78.4	2	0.1	63	3.6
S	260	0	0.0	0	0.0	260	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
T	522	1	0.2	2	0.4	115	22.0	1	0.2	4	0.8	416	79.7	46	8.8	95	18.2
U	1645	249	15.1	3	0.2	249	15.1	0	0.0	4	0.2	1142	69.4	11	0.7	44	2.7
V	466	0	0.0	0	0.0	375	80.5	0	0.0	0	0.0	88	18.9	1	0.2	1	0.2
W	450	37	8.2	45	10.0	26	5.8	0	0.0	0	0.0	347	77.1	251	55.8	261	58.0
X	380	0	0.0	0	0.0	35	9.2	0	0.0	0	0.0	353	92.9	2	0.5	12	3.2
Y	175	5	2.9	0	0.0	0	0.0	167	95.4	10	5.7	10	5.7	0	0.0	18	10.3
Z	1315	94	7.1	0	0.0	464	35.3	549	41.7	1	0.1	488	37.1	1	0.1	285	21.7
AA	410	0	0.0	1	0.2	374	91.2	1	0.2	0	0.0	33	8.0	0	0.0	0	0.0
AB	523	1	0.2	0	0.0	235	44.9	1	0.2	0	0.0	240	45.9	270	51.6	223	42.6
AC	792	1	0.1	1	0.1	328	41.4	7	0.9	0	0.0	466	58.8	4	0.5	17	2.1
AD	384	0	0.0	0	0.0	382	99.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	663	1	0.2	127	19.2	386	58.2	0	0.0	0	0.0	258	38.9	1	0.2	115	17.3
AF	424	2	0.5	1	0.2	410	96.7	0	0.0	0	0.0	21	5.0	0	0.0	11	2.6
AG	454	92	20.3	0	0.0	358	78.9	0	0.0	0	0.0	9	2.0	0	0.0	7	1.5
AH	846	5	0.6	53	6.3	326	38.5	2	0.2	0	0.0	480	56.7	5	0.6	46	5.4
AI	1471	8	0.5	287	19.5	563	38.3	10	0.7	1	0.1	632	43.0	2	0.1	57	3.9
AJ	1133	0	0.0	1	0.1	142	12.5	1	0.1	1	0.1	1000	88.3	6	0.5	28	2.5

Table 1.3.9(d): Types of Local Anaesthesia by SDPs Excluding Combined Surgery, CSR 2010

		Local Anesthesia															
	All	Retrobulbar		Peribulbar		Subtenon		Sub-conjunctival		Facial block		Topical		Intracameral		Combined	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All Centre	25608	417	1.6	864	3.4	10688	41.7	876	3.4	38	0.1	12942	50.5	2569	10.0	3070	12.0
A	1237	185	15.0	0	0.0	262	21.2	1	0.1	0	0.0	670	54.2	185	15.0	68	5.5
B	608	0	0.0	1	0.2	68	11.2	0	0.0	0	0.0	498	81.9	491	80.8	450	74.0
C	395	0	0.0	0	0.0	274	69.4	27	6.8	0	0.0	84	21.3	44	11.1	34	8.6
D	241	0	0.0	0	0.0	240	99.6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
E	774	1	0.1	0	0.0	391	50.5	1	0.1	0	0.0	0	0.0	378	48.8	4	0.5
F	178	17	9.6	40	22.5	113	63.5	3	1.7	5	2.8	83	46.6	14	7.9	93	52.2
G	2056	0	0.0	1	0.0	555	27.0	103	5.0	7	0.3	1509	73.4	587	28.6	753	36.6
H	384	0	0.0	0	0.0	379	98.7	1	0.3	0	0.0	3	0.8	0	0.0	0	0.0
I	71	1	1.4	70	98.6	0	0.0	0	0.0	0	0.0	2	2.8	0	0.0	2	2.8
J	871	0	0.0	0	0.0	849	97.5	0	0.0	0	0.0	22	2.5	0	0.0	2	0.2
K	202	0	0.0	0	0.0	193	95.5	0	0.0	0	0.0	13	6.4	3	1.5	7	3.5
L	1399	24	1.7	230	16.4	792	56.6	8	0.6	4	0.3	235	16.8	267	19.1	157	11.2
M	294	0	0.0	10	3.4	236	80.3	2	0.7	0	0.0	9	3.1	0	0.0	2	0.7
N	637	2	0.3	0	0.0	239	37.5	0	0.0	0	0.0	396	62.2	2	0.3	2	0.3
O	1553	0	0.0	0	0.0	281	18.1	0	0.0	2	0.1	1532	98.6	0	0.0	271	17.5
P	572	0	0.0	0	0.0	89	15.6	1	0.2	0	0.0	483	84.4	0	0.0	1	0.2
Q	590	0	0.0	0	0.0	458	77.6	0	0.0	0	0.0	130	22.0	0	0.0	0	0.0
R	1689	4	0.2	1	0.1	326	19.3	4	0.2	0	0.0	1367	80.9	2	0.1	53	3.1
S	260	0	0.0	0	0.0	260	100.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
T	517	1	0.2	2	0.4	114	22.1	1	0.2	4	0.8	413	79.9	46	8.9	95	18.4
U	1398	21	1.5	2	0.1	239	17.1	0	0.0	3	0.2	1134	81.1	10	0.7	42	3.0
V	465	0	0.0	0	0.0	374	80.4	0	0.0	0	0.0	88	18.9	1	0.2	1	0.2
W	447	37	8.3	44	9.8	26	5.8	0	0.0	0	0.0	344	77.0	250	55.9	259	57.9
X	379	0	0.0	0	0.0	34	9.0	0	0.0	0	0.0	353	93.1	2	0.5	12	3.2
Y	175	5	2.9	0	0.0	0	0.0	167	95.4	10	5.7	10	5.7	0	0.0	18	10.3
Z	1210	11	0.9	0	0.0	447	36.9	543	44.9	1	0.1	456	37.7	1	0.1	252	20.8

Table 1.3.9(d): Types of Local Anaesthesia by SDPs Excluding Combined Surgery, CSR 2010 (*cont*)

		Local Anesthesia															
	All	Retrobulbar		Peribulbar		Subtenon		Sub-conjunctival		Facial block		Topical		Intracameral		Combined	
	N	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
AA	407	0	0.0	1	0.2	371	91.2	1	0.2	0	0.0	33	8.1	0	0.0	0	0.0
AB	520	1	0.2	0	0.0	233	44.8	1	0.2	0	0.0	239	46.0	269	51.7	222	42.7
AC	763	1	0.1	1	0.1	309	40.5	0	0.0	0	0.0	456	59.8	4	0.5	10	1.3
AD	366	0	0.0	0	0.0	364	99.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	658	1	0.2	126	19.1	386	58.7	0	0.0	0	0.0	253	38.4	1	0.2	114	17.3
AF	424	2	0.5	1	0.2	410	96.7	0	0.0	0	0.0	21	5.0	0	0.0	11	2.6
AG	448	90	20.1	0	0.0	354	79.0	0	0.0	0	0.0	9	2.0	0	0.0	7	1.6
AH	845	5	0.6	53	6.3	325	38.5	2	0.2	0	0.0	480	56.8	5	0.6	46	5.4
AI	1460	8	0.5	281	19.2	557	38.2	9	0.6	1	0.1	632	43.3	1	0.1	54	3.7
AJ	1115	0	0.0	0	0.0	140	12.6	1	0.1	1	0.1	985	88.3	6	0.5	28	2.5

Table 1.3.9(e): Subtenon Anaesthesia by SDPs, CSR 2002-2010

Years	2002		2003		2004		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All Centre	5647	47.0	8076	52.0	9260	54.0	9990	58.3	11014	54.6	11525	50.6	10952	41.4
A	86	9.0	101	10.0	394	37.0	35	9.5	109	12.1	239	25.3	274	20.7
B	-	-	-	-	-	-	3	75	162	78.3	110	27.1	70	11.5
C	-	-	599	99.0	556	99.0	545	99.6	567	99.5	562	94.8	280	69.5
D	-	-	-	-	-	-	-	-	24	0.0	118	99.2	255	99.6
E	-	-	371	73.0	405	66.0	422	69.5	294	64.1	239	32.7	399	50.8
F	0	0.0	0	0.0			NA	NA	0	0.0	86	57.7	116	61.4
G	283	99.0	627	68.0	463	64.0	702	47.1	921	56.2	872	43.5	567	27.3
H	604	60.0	344	100.0	294	99.0	313	98.4	389	98.5	383	98.5	383	98.7
I	-	-	-	-	-	-	-	-	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
K	-	-	-	-	-	-	115	100	142	86.6	169	98.8	203	95.8
L	201	55.0	488	61.0	480	76.0	NA	NA	27	73.0	620	50.7	800	56.7

Table 1.3.9(e): Subtenon Anaesthesia by SDPs, CSR 2002-2010 (*cont*)

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

Table 1.3.9(f): Topical Anaesthesia by SDPs, CSR 2002-2010

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

Table 1.3.9(g): Types of Sedation in Eyes Given Local Anaesthesia by SDPs, CSR 2010

		Types of sedation							
	All Local Anaesthesia	No Sedation		Oral Alone		Intravenous Alone		Intramuscular Alone	
	N	n	%	n	%	n	%	n	%
All Centre	26440	15970	60.4	3171	12.0	22	0.1	0	0.0
A	1321	549	41.6	4	0.3	1	0.1	0	0.0
B	611	587	96.1	3	0.5	1	0.2	0	0.0
C	403	307	76.2	1	0.2	0	0.0	0	0.0
D	256	135	52.7	32	12.5	0	0.0	0	0.0
E	785	195	24.8	308	39.2	3	0.4	0	0.0
F	189	76	40.2	1	0.5	0	0.0	0	0.0
G	2076	1301	62.7	13	0.6	1	0.0	0	0.0
H	388	354	91.2	0	0.0	0	0.0	0	0.0
I	71	42	59.2	1	1.4	3	4.2	0	0.0
J	907	898	99.0	5	0.6	2	0.2	0	0.0
K	212	151	71.2	0	0.0	0	0.0	0	0.0
L	1411	1386	98.2	1	0.1	0	0.0	0	0.0
M	298	0	0.0	77	25.8	0	0.0	0	0.0
N	671	560	83.5	104	15.5	5	0.7	0	0.0
O	1593	1569	98.5	0	0.0	0	0.0	0	0.0
P	573	8	1.4	1	0.2	0	0.0	0	0.0
Q	592	584	98.6	4	0.7	0	0.0	0	0.0
R	1770	33	1.9	1339	75.6	0	0.0	0	0.0
S	260	259	99.6	0	0.0	0	0.0	0	0.0
T	522	341	65.3	0	0.0	1	0.2	0	0.0
U	1645	970	59.0	13	0.8	0	0.0	0	0.0
V	466	377	80.9	3	0.6	0	0.0	0	0.0
W	450	12	2.7	39	8.7	0	0.0	0	0.0
X	380	379	99.7	0	0.0	0	0.0	0	0.0
Y	175	173	98.9	0	0.0	0	0.0	0	0.0
Z	1315	1223	93.0	4	0.3	0	0.0	0	0.0
AA	410	405	98.8	0	0.0	0	0.0	0	0.0
AB	523	5	1.0	443	84.7	0	0.0	0	0.0
AC	792	524	66.2	0	0.0	0	0.0	0	0.0
AD	384	349	90.9	0	0.0	0	0.0	0	0.0
AE	663	60	9.0	356	53.7	2	0.3	0	0.0
AF	424	1	0.2	414	97.6	0	0.0	0	0.0
AG	454	419	92.3	2	0.4	2	0.4	0	0.0
AH	846	76	9.0	0	0.0	0	0.0	0	0.0
AI	1471	559	38.0	2	0.1	0	0.0	0	0.0
AJ	1133	1103	97.4	1	0.1	1	0.1	0	0.0

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 2002-2010

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

Table 1.3.9(i): Intravenous Sedation Alone by SDPs, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
All Centres	108	1.0	91	1.0	144	1.0	72	0.4	37	0.2	35	0.2	22	0.1
A	21	2.0	9	1.0	42	4.0	1	0.3	1	0.1	0	0.0	1	0.1
B	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	1	0.2
C	-	-	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
D	-	-	-	-	-	-	-	-	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
F	55	47.0	1	1.0	-	-	-	-	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
H	12	1.0	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
J	0	0.0	0	0.0	-	-	5	0.7	2	0.3	6	0.7	2	0.2
K	-	-	-	-	-	-	0	0.0	0	0.0	0	0.0	0	0.0
L	1	0.0	2	0.0	1	0.0	NA	NA	0	0.0	1	0.1	0	0.0
M	-	-	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
O	0	0.0	1	0.0	-	-	1	0.1	0	0.0	0	0.0	0	0.0
P	-	-	-	-	-	-	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
R	0	0.0	4	0.0	7	1.0	3	0.3	4	0.3	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
T	4	1.0	0	0.0	-	-	0	0.0	0	0.0	0	0.0	1	0.2
U	-	-	8	1.0	33	3.0	33	2.4	0	0.0	3	0.2	0	0.0
V	-	-	-	-	-	-	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
X	-	-	-	-	-	-	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
Z	0	0.0	1	0.0	-	-	0	0.0	0	0.0	4	0.3	0	0.0
AA	-	-	-	-	-	-	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
AC	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
AE	1	0.0	0	0.0	1	0.0	0	0.0	1	0.2	0	0.0	2	0.3
AF	-	-	-	-	-	-	0	0.0	2	0.4	1	0.2	0	0.0
AG	1	0.0	0	0.0	-	-	0	0.0	0	0.0	0	0.0	2	0.4
AH	3	1.0	0	0.0	7	1.0	11	1.3	3	0.3	2	0.3	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
AJ	0	0.0	1	0.0	6	1.0	0	0.0	0	0.0	0	0.0	1	0.1

1.3.10 Intraocular Lens Implantation

In 2010, the percentage of eyes with IOL implantation was 98.1%. 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 2002-2010

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

Figure 1.3.10: Intraocular Lens Implantation, CSR 2002-2010

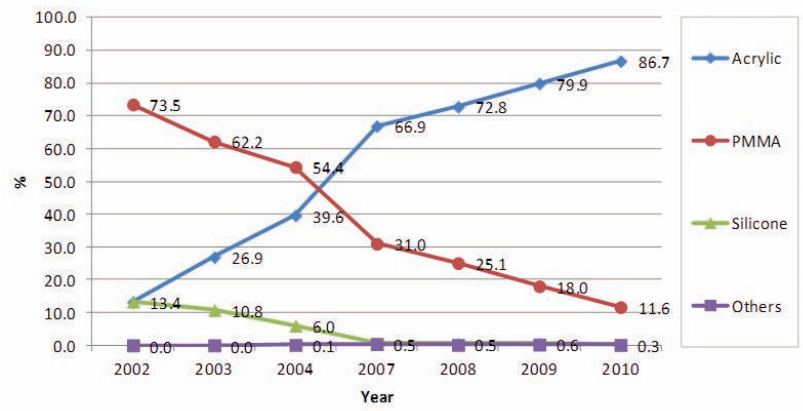


Table 1.3.10(b): Distribution of IOL Placement by SDP, CSR 2010

		Cataract Surgery With IOL					
		Posterior Chamber IOL		Anterior Chamber IOL		Scleral Fixated IOL	
	N	n	%	n	%	n	%
All Centre	27980	26932	96.3	543	1.9	20	0.1
A	1473	1410	95.7	17	1.2	3	0.2
B	622	593	95.3	20	3.2	0	0.0
C	405	396	97.8	9	2.2	0	0.0
D	258	246	95.3	8	3.1	0	0.0
E	797	767	96.2	15	1.9	0	0.0
F	199	184	92.5	9	4.5	0	0.0
G	2168	2109	97.3	38	1.8	0	0.0
H	394	369	93.7	15	3.8	0	0.0
I	76	74	97.4	1	1.3	0	0.0
J	921	909	98.7	5	0.5	1	0.1
K	208	205	98.6	1	0.5	0	0.0
L	1627	1608	98.8	12	0.7	0	0.0
M	319	307	96.2	9	2.8	0	0.0
N	678	654	96.5	20	2.9	3	0.4
O	1640	1579	96.3	23	1.4	5	0.3
P	576	570	99.0	3	0.5	0	0.0
Q	607	584	96.2	19	3.1	2	0.3
R	1860	1814	97.5	14	0.8	2	0.1
S	279	272	97.5	6	2.2	0	0.0
T	613	564	92.0	13	2.1	0	0.0
U	1660	1544	93.0	48	2.9	0	0.0
V	514	495	96.3	13	2.5	0	0.0
W	445	422	94.8	18	4.0	0	0.0
X	382	371	97.1	10	2.6	0	0.0
Y	249	242	97.2	3	1.2	0	0.0
Z	1351	1290	95.5	23	1.7	0	0.0
AA	464	447	96.3	3	0.6	0	0.0
AB	548	513	93.6	14	2.6	0	0.0
AC	882	863	97.8	11	1.2	1	0.1
AD	386	366	94.8	13	3.4	0	0.0
AE	684	654	95.6	22	3.2	0	0.0
AF	442	422	95.5	11	2.5	0	0.0
AG	595	571	96.0	13	2.2	3	0.5
AH	996	946	95.0	35	3.5	0	0.0
AI	1501	1438	95.8	34	2.3	0	0.0
AJ	1161	1134	97.7	15	1.3	0	0.0

1.4 INTRA-OPERATIVE COMPLICATIONS

1.4.1 Intra-operative Complications by Years

The percentage of intra-operative complications declined further to 5.6% in 2010. The cumulative percentage throughout the years was 8.6%. The occurrences of PCR, vitreous loss and central corneal edema were decreasing. The occurrence of zonular dehiscence was initially decreasing then later leveled off. The more serious complications such as drop nucleus and suprachoroidal haemorrhage were not frequent and the trend remained unchanged.

Table 1.4.1(a): Distribution of Type of Intra-operative Complications, CSR 2002-2010

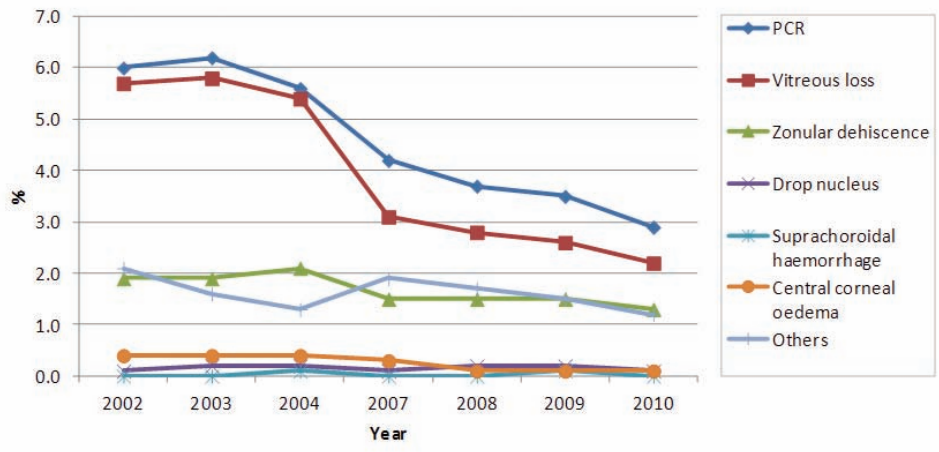
Year	2002		2003		2004		2007		2008		2009		2010	
No. of patients (N)	**12798**		**16815**		**18391**		**18380**		**21496**		**24438**		**28506**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Patient with intra-op complication	1328	10.4	1673	9.9	1730	9.4	1999	10.9	1636	7.6	1645	6.7	1610	5.6
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
Vitreous loss	734	5.7	979	5.8	994	5.4	569	3.1	608	2.8	642	2.6	639	2.2
Zonular dehiscence	246	1.9	327	1.9	380	2.1	275	1.5	322	1.5	372	1.5	377	1.3
Drop nucleus	13	0.1	27	0.2	34	0.2	21	0.1	33	0.2	40	0.2	38	0.1
Suprachoroidal haemorrhage	5	0.0	8	0.0	10	0.1	9	0.0	10	0.0	13	0.1	9	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
Others	274	2.1	266	1.6	235	1.3	350	1.9	361	1.7	373	1.5	338	1.2

Table 1.4.1(b): Distribution of Type of Intra-operative Complications – Posterior Capsule Rupture, CSR 2002-2010

Year	2002*		2003*		2004*		2007*		2008		2009		2010	
No. of patients (N)	**12798**		**16815**		**18391**		**18380**		**21496**		**24438**		**28506**	
	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
Types of complications														
PCR and Others	773	6.0	1036	6.2	1025	5.6	764	4.2	798	3.7	858	3.5	840	2.9
PCR Only									347	1.6	403	1.6	402	1.4

**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 2002-2010



1.4.2 Intra-operative Complication by Type of Surgery

Similar to previous years, phacoemulsification demonstrated the lowest rate of intra-operative complication in 2010. It was followed by ECCE and lens aspiration. The percentage of intra-operative complications in Phaco, ECCE and lens aspiration showed improvement over the years.

Table 1.4.2(a): Intra-operative Complications by Types of Cataract Surgery, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009			2010		
	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
ECCE	684	9.9	697	8.7	680	8.7	691	12.5	532	9.5	5457	460	8.4	5363	442	8.2
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
ICCE	27	33.3	39	41.5	50	48.5	63	44.7	60	46.5	134	64	47.8	143	64	44.8
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
Others	-	-	14	10.7	18	10.5	-	-	16	25.8	74	8	10.8	104	20	19.2
Missing	-	-	-	-	-	-	9	20.0	4	12.1	83	12	14.5	49	3	6.1

Figure1.4.2: Intra-operative Complications by Types of Cataract Surgery, CSR 2002-2010

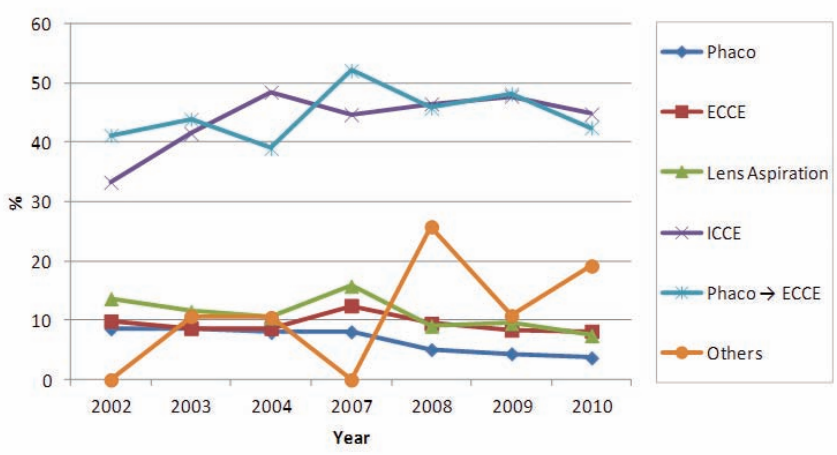


Table 1.4.2(b): Distribution of Types of Intra-operative Complications by Specific Types of Cataract Surgery, CSR 2010

	All Surgeries		Phaco		ECCE		Lens Aspiration		ICCE		Phaco converted to ECCE		Others	
Number of patients (N)	**28506**		**21810**		**5363**		**451**		**143**		**586**		**104**	
	n	%	n	%	n	%	n	%	N	%	n	%	n	%
Any intra-op complication	1610	5.6	798	3.7	442	8.2	34	7.5	64	44.8	249	42.5	20	19.2
Posterior capsule rupture	840	2.9	489	2.2	195	3.6	20	4.4	9	6.3	119	20.3	8	7.7
Vitreous loss	639	2.2	262	1.2	178	3.3	18	4.0	43	30.1	129	22.0	8	7.7
Zonular dehiscene	377	1.3	133	0.6	118	2.2	4	0.9	26	18.2	87	14.8	8	7.7
Drop nucleus	38	0.1	31	0.1	0	0.0	1	0.2	0	0.0	3	0.5	3	2.9
Suprachoroidal haemorrhage	9	0.0	4	0.0	4	0.1	0	0.0	1	0.7	0	0.0	0	0.0
Central corneal oedema	26	0.1	19	0.1	3	0.1	1	0.2	0	0.0	3	0.5	0	0.0
Others	338	1.2	153	0.7	114	2.1	4	0.9	12	8.4	50	8.5	3	2.9

Table 1.4.2(c): Distribution of Types of Intra-operative Complications by SDP, CSR 2010

	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 Centre	28506	1610	5.6	840	2.9	639	2.2	377	1.3	38	0.1	9	0.0	26	0.1	338	1.2
A	1527	41	2.7	25	1.6	11	0.7	6	0.4	1	0.1	0	0.0	2	0.1	10	0.7
B	627	56	8.9	32	5.1	26	4.1	15	2.4	0	0.0	0	0.0	0	0.0	4	0.6
C	411	21	5.1	15	3.6	14	3.4	3	0.7	0	0.0	0	0.0	0	0.0	4	1.0
D	258	11	4.3	7	2.7	4	1.6	1	0.4	1	0.4	0	0.0	0	0.0	3	1.2
E	804	51	6.3	22	2.7	10	1.2	0	0.0	2	0.2	0	0.0	0	0.0	31	3.9
F	208	43	20.7	13	6.3	27	13.0	7	3.4	1	0.5	0	0.0	0	0.0	14	6.7
G	2199	63	2.9	32	1.5	26	1.2	21	1.0	0	0.0	1	0.0	0	0.0	9	0.4
H	400	15	3.8	13	3.3	0	0.0	2	0.5	0	0.0	0	0.0	1	0.3	0	0.0
I	76	2	2.6	1	1.3	1	1.3	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
J	960	48	5.0	31	3.2	14	1.5	11	1.1	1	0.1	0	0.0	4	0.4	3	0.3
K	217	10	4.6	3	1.4	5	2.3	2	0.9	0	0.0	0	0.0	0	0.0	4	1.8
L	1648	89	5.4	46	2.8	31	1.9	26	1.6	3	0.2	0	0.0	0	0.0	18	1.1
M	322	19	5.9	8	2.5	4	1.2	0	0.0	0	0.0	0	0.0	0	0.0	12	3.7
N	714	68	9.5	28	3.9	12	1.7	9	1.3	1	0.1	0	0.0	0	0.0	32	4.5
O	1659	130	7.8	76	4.6	69	4.2	19	1.1	3	0.2	0	0.0	2	0.1	35	2.1
P	577	14	2.4	8	1.4	0	0.0	1	0.2	0	0.0	0	0.0	1	0.2	4	0.7
Q	617	51	8.3	15	2.4	7	1.1	24	3.9	0	0.0	0	0.0	0	0.0	14	2.3
R	1876	105	5.6	62	3.3	52	2.8	30	1.6	1	0.1	0	0.0	0	0.0	16	0.9
S	282	13	4.6	8	2.8	9	3.2	4	1.4	0	0.0	0	0.0	0	0.0	0	0.0
T	624	35	5.6	24	3.8	9	1.4	6	1.0	1	0.2	0	0.0	1	0.2	7	1.1
U	1699	124	7.3	71	4.2	60	3.5	34	2.0	8	0.5	0	0.0	0	0.0	16	0.9
V	520	39	7.5	17	3.3	21	4.0	11	2.1	0	0.0	0	0.0	2	0.4	7	1.3
W	455	24	5.3	12	2.6	9	2.0	5	1.1	0	0.0	0	0.0	1	0.2	3	0.7
X	387	24	6.2	6	1.6	10	2.6	11	2.8	1	0.3	0	0.0	0	0.0	5	1.3
Y	258	15	5.8	10	3.9	7	2.7	5	1.9	0	0.0	0	0.0	0	0.0	0	0.0
Z	1377	49	3.6	30	2.2	27	2.0	13	0.9	4	0.3	1	0.1	0	0.0	7	0.5
AA	468	31	6.6	22	4.7	9	1.9	4	0.9	0	0.0	1	0.2	0	0.0	5	1.1
AB	558	24	4.3	8	1.4	13	2.3	10	1.8	0	0.0	0	0.0	0	0.0	6	1.1
AC	889	42	4.7	19	2.1	24	2.7	17	1.9	3	0.3	1	0.1	1	0.1	3	0.3
AD	401	20	5.0	15	3.7	1	0.2	4	1.0	0	0.0	0	0.0	0	0.0	1	0.2
AE	690	59	8.6	27	3.9	24	3.5	9	1.3	1	0.1	1	0.1	0	0.0	14	2.0
AF	450	46	10.2	10	2.2	8	1.8	12	2.7	0	0.0	0	0.0	5	1.1	20	4.4
AG	615	21	3.4	5	0.8	4	0.7	5	0.8	0	0.0	0	0.0	2	0.3	10	1.6
AH	1007	55	5.5	26	2.6	17	1.7	18	1.8	2	0.2	1	0.1	1	0.1	10	1.0
AI	1519	93	6.1	48	3.2	48	3.2	28	1.8	1	0.1	2	0.1	3	0.2	9	0.6
AJ	1207	59	4.9	45	3.7	26	2.2	4	0.3	3	0.2	1	0.1	0	0.0	2	0.2

Table 1.4.2(d): Distribution of Types of Intra-operative Complications in "Phaco Converted to ECCE" by SDP, CSR 2010

	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 Centre	586	249	42.5	119	20.3	129	22.0	87	14.8	3	0.5	0	0.0	3	0.5	50	8.5
A	20	6	30.0	2	10.0	2	10.0	1	5.0	0	0.0	0	0.0	1	5.0	2	10.0
B	18	13	72.2	4	22.2	3	16.7	6	33.3	0	0.0	0	0.0	0	0.0	2	11.1
C	14	1	7.1	1	7.1	1	7.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
D	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
E	8	6	75.0	3	37.5	2	25.0	0	0.0	0	0.0	0	0.0	0	0.0	4	50.0
F	1	1	100.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	0	0.0	0	0.0
G	10	5	50.0	2	20.0	2	20.0	3	30.0	0	0.0	0	0.0	0	0.0	0	0.0
H	6	2	33.3	1	16.7	0	0.0	1	16.7	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	22	6	27.3	1	4.5	1	4.5	4	18.2	0	0.0	0	0.0	1	4.5	1	4.5
K	8	3	37.5	1	12.5	1	12.5	1	12.5	0	0.0	0	0.0	0	0.0	1	12.5
L	39	12	30.8	5	12.8	8	20.5	5	12.8	0	0.0	0	0.0	0	0.0	3	7.7
M	27	5	18.5	4	14.8	2	7.4	0	0.0	0	0.0	0	0.0	0	0.0	2	7.4
N	17	10	58.8	4	23.5	2	11.8	3	17.6	0	0.0	0	0.0	0	0.0	3	17.6
O	44	27	61.4	16	36.4	15	34.1	4	9.1	1	2.3	0	0.0	0	0.0	10	22.7
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	20	5	25.0	0	0.0	1	5.0	5	25.0	0	0.0	0	0.0	0	0.0	0	0.0
R	28	15	53.6	6	21.4	12	42.9	6	21.4	0	0.0	0	0.0	0	0.0	3	10.7
S	11	4	36.4	2	18.2	4	36.4	1	9.1	0	0.0	0	0.0	0	0.0	0	0.0
T	9	4	44.4	3	33.3	1	11.1	1	11.1	0	0.0	0	0.0	0	0.0	0	0.0
U	28	19	67.9	7	25.0	15	53.6	11	39.3	0	0.0	0	0.0	0	0.0	3	10.7
V	26	13	50.0	5	19.2	9	34.6	6	23.1	0	0.0	0	0.0	0	0.0	3	11.5
W	15	2	13.3	1	6.7	0	0.0	1	6.7	0	0.0	0	0.0	0	0.0	0	0.0
X	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Y	8	3	37.5	1	12.5	1	12.5	2	25.0	0	0.0	0	0.0	0	0.0	0	0.0
Z	21	16	76.2	11	52.4	12	57.1	7	33.3	1	4.8	0	0.0	0	0.0	0	0.0
AA	26	8	30.8	5	19.2	4	15.4	3	11.5	0	0.0	0	0.0	0	0.0	0	0.0
AB	15	6	40.0	2	13.3	4	26.7	6	40.0	0	0.0	0	0.0	0	0.0	0	0.0
AC	12	3	25.0	3	25.0	3	25.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AD	8	3	37.5	2	25.0	1	12.5	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
AE	18	12	66.7	5	27.8	7	38.9	4	22.2	0	0.0	0	0.0	0	0.0	4	22.2
AF	24	9	37.5	1	4.2	2	8.3	1	4.2	0	0.0	0	0.0	0	0.0	5	20.8
AG	19	5	26.3	3	15.8	1	5.3	1	5.3	0	0.0	0	0.0	0	0.0	2	10.5
AH	16	7	43.8	5	31.3	4	25.0	1	6.3	0	0.0	0	0.0	0	0.0	1	6.3
AI	22	9	40.9	5	22.7	6	27.3	3	13.6	0	0.0	0	0.0	1	4.5	1	4.5
AJ	25	9	36.0	8	32.0	3	12.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

1.4.3 Intra-operative Complications by Combined Surgery

The intra-operative complications were 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. It was noted that the percentage when combined with penetrating keratoplasty was 50.0%. This was probably inaccurate because there were only 2 cases performed in 2010.

For cataract surgery combined with VR surgery, the intra-operative complication percentages were declining but did not reveal any particular trend when analysed separately. 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 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
Number of combined surgery (N)	375		581		733		891		664		871		1082	
	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
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
Vitreous loss	46	12.3	66	11.4	72	9.8	41	4.6	40	4.5	51	5.9	53	4.9
Zonular dehiscence	18	4.8	22	3.8	23	3.1	21	2.4	15	1.7	21	2.4	28	2.6
Drop nucleus	3	0.8	5	0.9	5	0.7	4	0.4	3	0.3	8	0.9	10	0.9
Suprachoroidal haemorrhage	0	0.0	0	0.0	4	0.5	0	0.0	0.0	0.0	4	0.5	1	0.1
Central corneal oedema	1	0.3	10	1.7	4	0.5	7	0.8	3	0.3	1	0.1	2	0.2
Others	12	3.2	18	3.1	16	2.2	30	3.4	14	1.6	21	2.4	24	2.2

Table 1.4.3(b): Distribution of Intra-operative Complications by Specific Combined Surgery, CSR 2010

	All Surgeries		Any Combined Surgery		Pterygium Surgery		Filtering Surgery		Vitreo-Retinal Surgery		Penetrating Keratoplasty		Others	
No. of patients (N)	28506		1082		99		121		601		2		272	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-op complication	1610	5.6	121	11.2	8	8.1	8	6.6	35	5.8	1	50.0	73	26.8
PCR	840	2.9	61	5.6	0	0.0	3	2.5	22	3.7	1	50.0	39	14.3
Vitreous loss	639	2.2	53	4.9	2	2.0	2	1.7	9	1.5	0	0.0	40	14.7
Zonular dehiscene	377	1.3	28	2.6	2	2.0	1	0.8	5	0.8	0	0.0	20	7.4
Drop nucleus	38	0.1	10	0.9	0	0.0	0	0.0	6	1.0	0	0.0	5	1.8
Suprachoroidal haemorrhage	9	0.0	1	0.1	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4
Central corneal oedema	26	0.1	2	0.2	1	1.0	0	0.0	0	0.0	0	0.0	1	0.4
Others	338	1.2	24	2.2	4	4.0	3	2.5	4	0.7	0	0.0	13	4.8

Table 1.4.3(c): Distribution of Intra-operative Complications when Combined with Filtering Surgery, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
N	148		210		235		131		142		132		121	
	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
Posterior capsule rupture	2	1.0	3	1.0	3	1.0	9	6.9	3	2.1	4	3.0	3	2.5
Vitreous loss	11	7.0	7	3.0	14	6.0	7	5.3	5	3.5	7	5.3	2	1.7
Zonular dehiscence	3	2.0	1	0.0	1	0.0	4	3.1	3	2.1	5	3.8	1	0.8
Drop nucleus	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
Central corneal oedema	0	0.0	3	1.0	1	0.0	3	2.3	2	1.4	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

Table 1.4.3(d): Distribution of Intra-operative Complications when Combined with VR Surgery, CSR 2002-2010

Year	2002		2003		2004		2007		2008		2009		2010	
N	26		100		186		435		237		402		601	
	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
Posterior capsule rupture	0	0.0	4	4.0	11	6.0	18	4.1	17	7.2	18	4.5	22	3.7
Vitreous loss	5	19.0	12	12.0	8	5.0	11	2.5	6	2.5	5	1.2	9	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
Drop nucleus	1	4.0	2	2.0	3	2.0	3	0.7	2	0.8	6	1.5	6	1.0
Suprachoroidal haemorrhage	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	2	0.5	0	0.0
Central corneal oedema	0	0.0	2	2.0	1	1.0	3	0.7	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

1.4.4 Intra-operative Complications by Types of Local Anaesthesia

Patients who underwent cataract surgery using peribulbar anaesthesia had the highest percentage of intra-operative complications. This was different from data in previous years which showed that subconjunctival anaesthesia was associated with higher percentages of intra-operative complications (except for the year 2002 and 2004), The complications were mainly PCR and vitreous loss.

Table 1.4.4: Intra-operative Complications by Types of Local Anaesthesia, CSR 2010

	All Local Anaesthesia		Retrobulbar		Peribulbar		Subtenon		Sub-Conjunctival		Facial Block		Topical		Intracameral	
N	26440		864		881		10952		898		40		13112		2587	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Any intra-op complication	1473	5.6	32	3.7	72	8.2	817	7.5	29	3.2	6	15.0	622	4.7	128	4.9
Posterior capsule rupture	781	3.0	19	2.2	34	3.9	407	3.7	18	2.0	4	10.0	352	2.7	67	2.6
Vitreous loss	576	2.2	10	1.2	31	3.5	328	3.0	13	1.4	2	5.0	266	2.0	45	1.7
Zonular dehiscene	335	1.3	10	1.2	16	1.8	186	1.7	9	1.0	1	2.5	151	1.2	35	1.4
Drop nucleus	37	0.1	1	0.1	2	0.2	13	0.1	1	0.1	0	0.0	20	0.2	2	0.1
Suprachoroidal haemorrhage	8	0.0	0	0.0	1	0.1	5	0.0	0	0.0	0	0.0	3	0.0	0	0.0
Central corneal oedema	24	0.1	0	0.0	1	0.1	19	0.2	0	0.0	0	0.0	6	0.0	0	0.0
Other	318	1.2	3	0.3	14	1.6	200	1.8	3	0.3	0	0.0	109	0.8	22	0.9

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 Gazetting Specialists. The percentages which were initially increasing appeared to decline from 2009 onwards. The percentages of intra-operative complications were in downward trend for the Specialists and in upward trend for the MOs. The complications were mainly PCR and vitreous loss.

Table 1.4.5(a): Percentage of Intra-operative Complications by Surgeon Status, CSR 2003-2010

(i) Specialist

Year	2003		2004		2007		2008*		2009		2010	
N	12072		13165		14327		16846		19400		24216	
	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
PCR	199	2.7	180	1.4	546	3.8	538	3.2	610	3.1	649	2.7
Vitreous loss	520	4.3	515	3.9	405	2.8	417	2.5	474	2.4	473	2.0
Zonular dehiscense	151	1.3	163	1.2	204	1.4	232	1.4	293	1.5	300	1.2
Drop nucleus	22	0.2	28	0.2	20	0.1	24	0.1	30	0.2	33	0.1
Suprachoroidal hemorrhage	6	0.1	8	0.1	5	0.0	3	0.0	10	0.1	6	0.0
Central corneal edema	42	0.4	40	0.3	50	0.4	19	0.1	13	0.1	19	0.1
Others	171	1.4	158	1.2	261	1.8	279	1.7	289	1.5	254	1.0

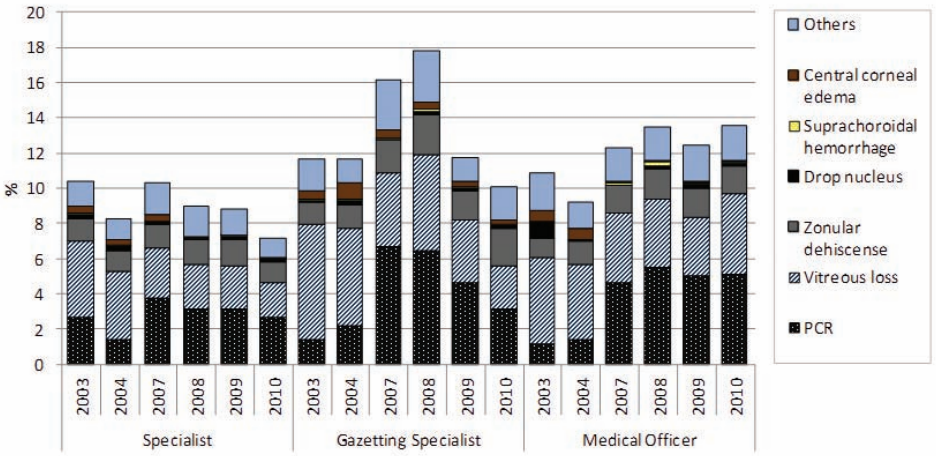
(ii) Gazetting Specialist

Year	2003		2004		2007		2008*		2009		2010	
N	1510		1757		1276		1399		2053		1405	
	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
PCR	21	1.4	38	2.2	85	6.7	91	6.5	96	4.7	44	3.1
Vitreous loss	99	6.6	97	5.5	54	4.2	76	5.4	73	3.6	35	2.5
Zonular dehiscense	18	1.2	25	1.4	24	1.9	32	2.3	33	1.6	30	2.1
Drop nucleus	2	0.1	4	0.2	0	0.0	3	0.2	3	0.1	2	0.1
Suprachoroidal hemorrhage	2	0.1	1	0.1	1	0.1	1	0.1	2	0.1	1	0.1
Central corneal edema	7	0.5	16	0.9	5	0.4	5	0.4	7	0.3	3	0.2
Others	27	1.8	25	1.4	37	2.9	37	2.9	28	1.4	27	1.9

(iii) Medical Officer

Year	2003		2004		2007		2008*		2009		2010	
N	3233		3470		2690		2697		2750		2871	
	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
PCR	40	1.2	47	1.4	126	4.7	148	5.5	139	5.1	147	5.1
Vitreous loss	157	4.9	148	4.3	105	3.9	105	3.9	92	3.3	131	4.6
Zonular dehiscense	34	1.1	46	1.3	43	1.6	46	1.7	45	1.6	47	1.6
Drop nucleus	3	0.9	2	0.1	1	0.0	4	0.2	7	0.3	3	0.1
Suprachoroidal hemorrhage	0	-	1	0.0	3	0.1	4	0.2	1	0.0	2	0.1
Central corneal edema	24	0.7	22	0.6	2	0.1	3	0.1	2	0.1	4	0.1
Others	68	2.1	52	1.5	51	1.9	51	1.9	56	2.0	56	2.0

Figure 1.4.5: Percentage Distribution of Intra-operative Complications by Surgeon Status, CSR 2003-2010



1.4.6 PCR

PCR among SDPs varied. Hospital F had the highest PCR among all the SDPs in 2010.

Table 1.4.6: PCR by SDP, CSR 2007-2010

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

Figure 1.4.6(a): PCR by SDP, CSR 2010-Bar Chart (National KPI set at 5.0%)

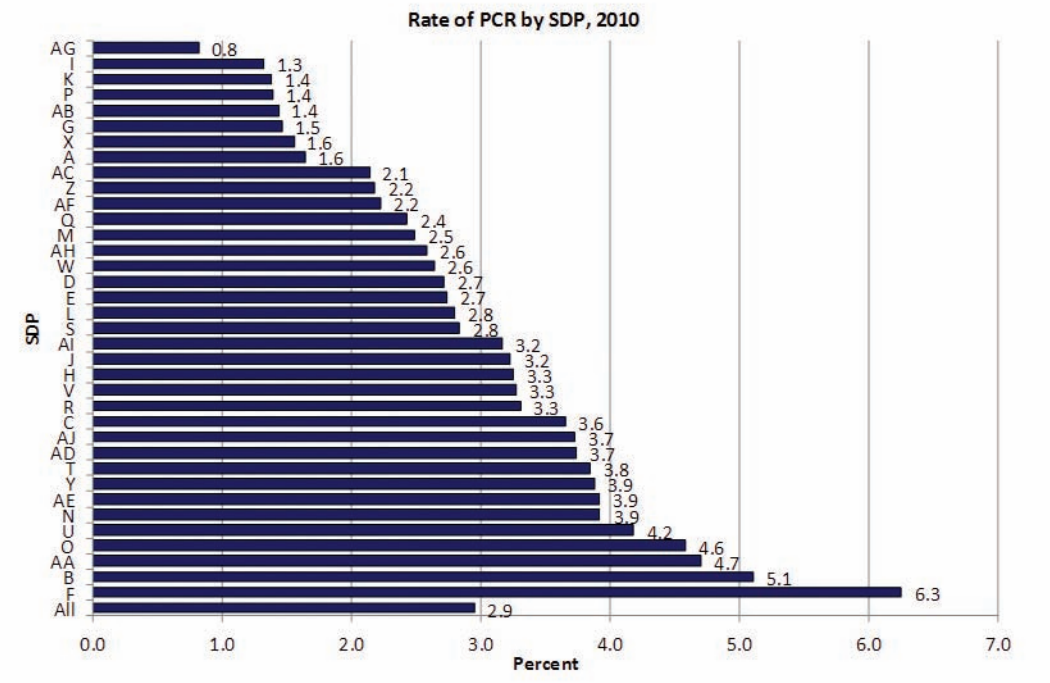
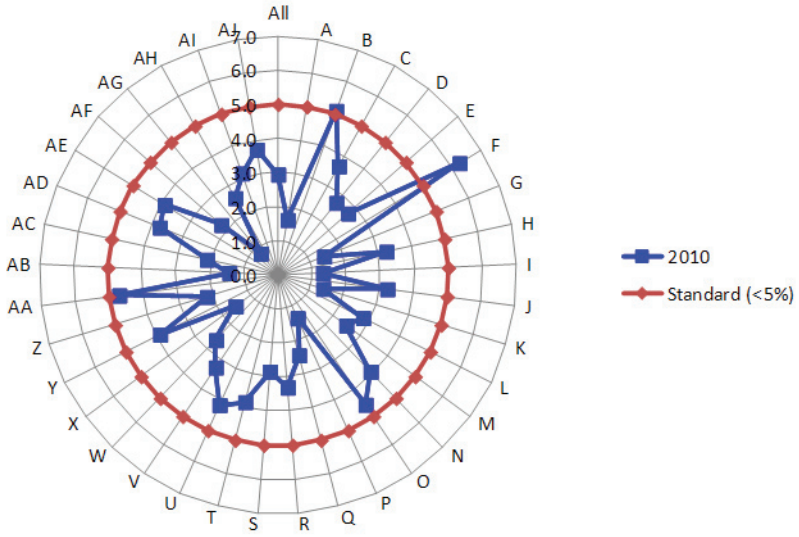


Figure 1.4.6(b): PCR by SDP, CSR 2010-Radar Chart (National KPI set at <5%)



1.4.7 PCR by Type of Cataract Surgery

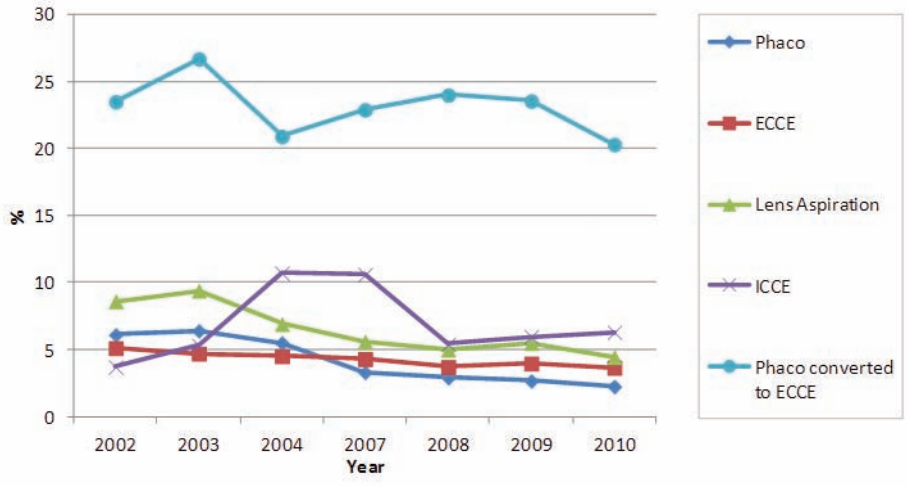
From the year 2002-2004, the percentage of PCR for phaco was higher than ECCE. From 2007 onwards, it demonstrated otherwise. In general, both the PCR percentages for phaco and ECCE were in downward trend over the years.

Table 1.4.7: PCR by Type of Cataract Surgery, CSR 2002-2010

Year	2002			2003			2004		
No. of patients	**12798**			**16815**			**18391**		
Total PCR	773			1036			1013		
	N	**n**	**%**	**N**	**n**	**%**	**N**	**n**	**%**
Phaco	5085	309	6.1	7674	489	6.4	9282	513	5.5
ECCE	6914	356	5.1	8012	374	4.7	7830	356	4.5
Lens Aspiration	372	32	8.6	435	41	9.4	550	38	6.9
ICCE	311	3	3.7	469	5	5.3	454	11	10.7
Phaco converted to ECCE	81	73	23.5	94	125	26.7	103	95	20.9

Year	2007			2008			2009			2010		
No. of patients	**18380**			**21496**			**24438**			**28506**		
Total PCR	764			790			858			840		
	N	**n**	**%**	**N**	**n**	**%**	**N**	**n**	**%**	**N**	**n**	**%**
Phaco	11960	393	3.3	14781	432	2.9	17717	471	2.7	21810	489	2.2
ECCE	5524	239	4.3	5627	210	3.7	5457	216	4.0	5363	195	3.6
Lens Aspiration	323	18	5.6	340	17	5.0	400	22	5.5	451	20	4.4
ICCE	432	15	10.6	524	7	5.4	134	8	6.0	143	9	6.3
Phaco converted to ECCE	141	99	22.9	129	124	24.0	573	135	23.6	586	119	20.3

Figure 1.4.7: PCR by Type of Cataract Surgery, CSR 2002-2010



1.5 CATARACT SURGERY OUTCOME

1.5.1 Post-operative Complications

All eyes had post-operative complication records in 2002 and 2003. In general, the ascertainment was above 80.0%.

Table 1.5.1: Distribution of Cataract Surgery with Post-operative Complication Record, CSR 2002-2010

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

1.5.1.1 Post-operative Infectious Endophthalmitis

The occurrence of post-operative infectious endophthalmitis appeared to be decreasing over the years. It was an improvement with only 0.9 cases in 1000 cataract surgeries performed in MOH hospitals. The mean duration from the time of surgery to diagnosis of infection for eyes operated in 2007 onwards was 3 weeks.

Table 1.5.1.1(a): Post-operative Infectious Endophthalmitis, CSR 2002-2010

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

Figure 1.5.1.1(a): Rate of Post-operative Infectious Endophthalmitis, CSR 2002-2010

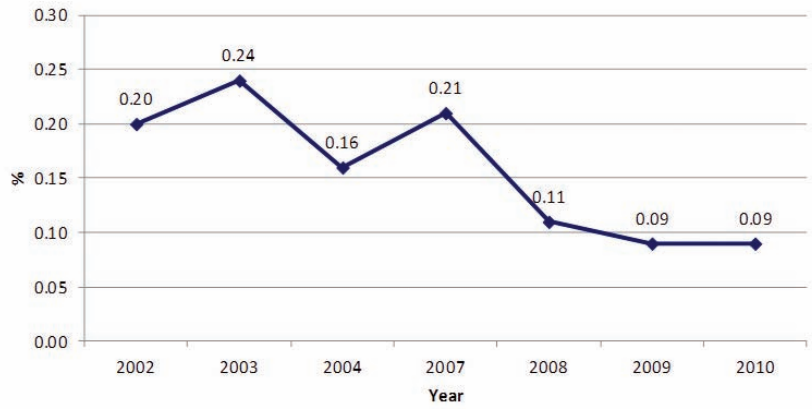


Figure 1.5.1.1(b-i): Post-operative Infectious Endophthalmitis, by SDP CSR 2007

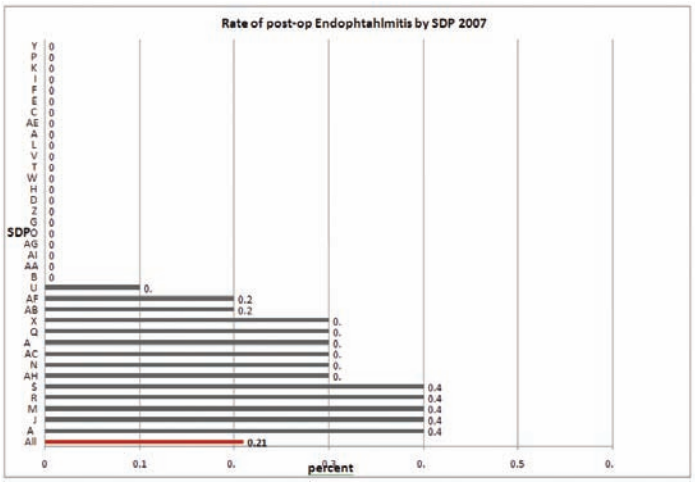


Figure 1.5.1.1(b-ii): Post-operative Infectious Endophthalmitis, by SDP CSR 2008

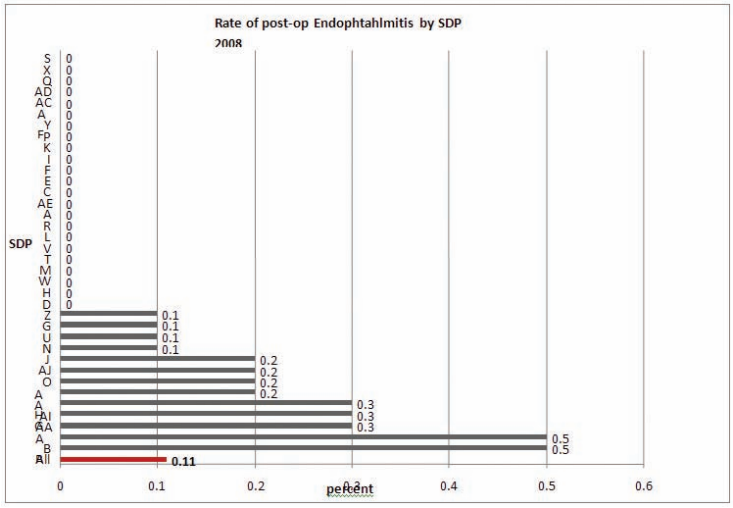


Figure 1.5.1.1(b-iii): Post-operative Infectious Endophthalmitis, by SDP CSR 2009

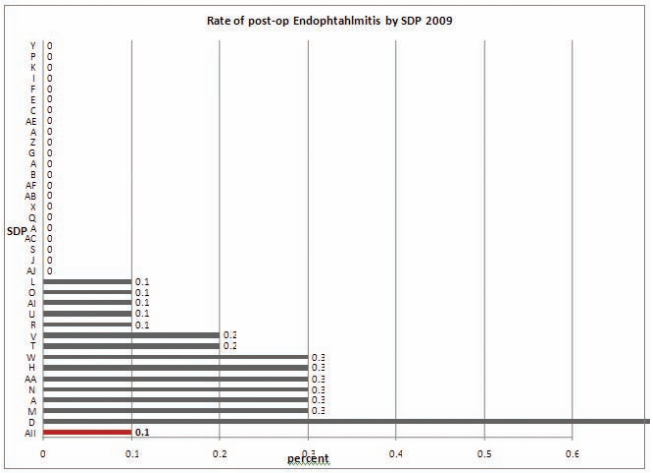


Figure 1.5.1.1(b-iv): Post-operative Infectious Endophthalmitis, by SDP CSR 2010

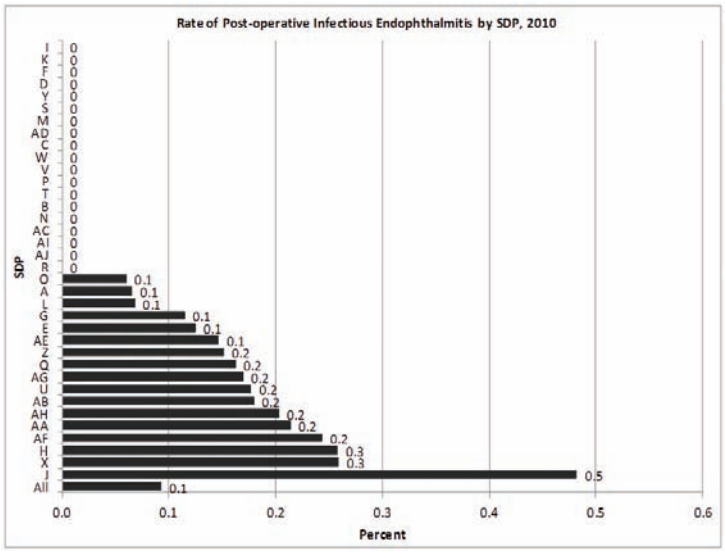


Figure 1.5.1.1(c-i): Post-operative Infectious Endophthalmitis, by SDP CSR 2007

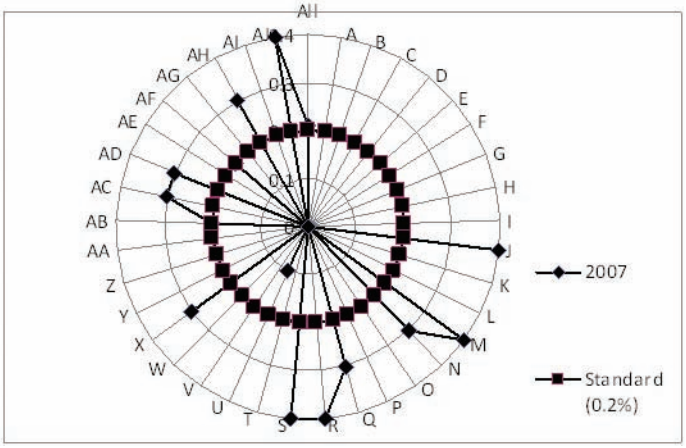


Figure 1.5.1.1(c-ii): Post-operative Infectious Endophthalmitis, by SDP CSR 2008

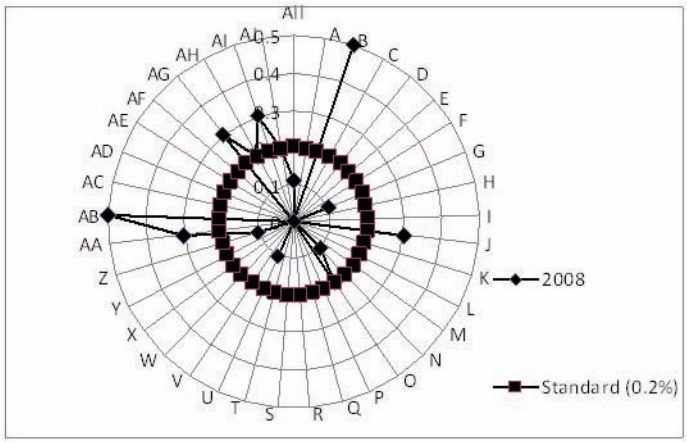


Figure 1.5.1.1(c-iii): Post-operative Infectious Endophthalmitis, by SDP CSR 2009

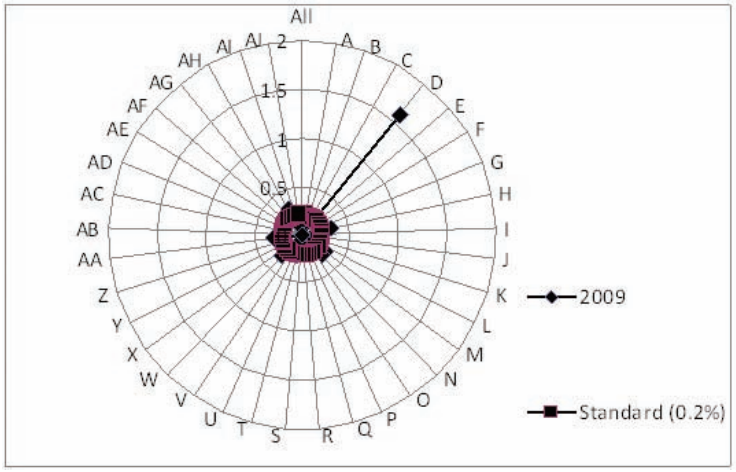


Figure 1.5.1.1(c-iv): Post-operative Infectious Endophthalmitis, by SDP CSR 2010

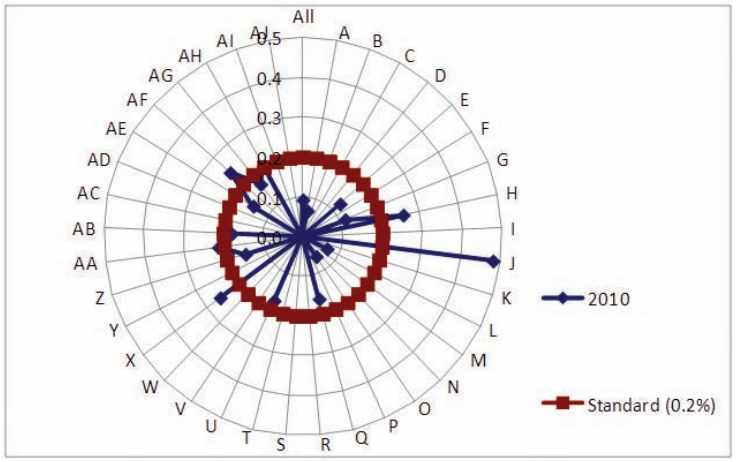


Table 1.5.1.1(b): Time from Surgery to Diagnosis of Post-operative Infectious Endophthalmitis, CSR 2007-2010

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

1.5.1.2 Unplanned Return to Operating Theatre (OT)

Data for unplanned return to OT were available for June to December 2004 and the whole year of 2007 onwards. The average percentage was 0.45% or 4.5 cases per 1000 cataract surgeries.

Iris prolapse, wound dehiscence and high post- operative IOP as the reasons for unplanned return to OT showed a decreasing trend. IOL related problem demonstrated otherwise. In 2010, 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 2004-2010

Year	*2004		2007		2008		2009		2010	
Patients with outcome records (N)	9039		17604		20521		21851		26014	
	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

**Data in 2004 available only from June-December*

Table 1.5.1.2(b): Reasons for Unplanned Return to OT, CSR 2004-2010

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

**Data in 2004 available only for June-December*

Figure 1.5.1.2: Reasons for Unplanned Return to OT, CSR 2004-2010

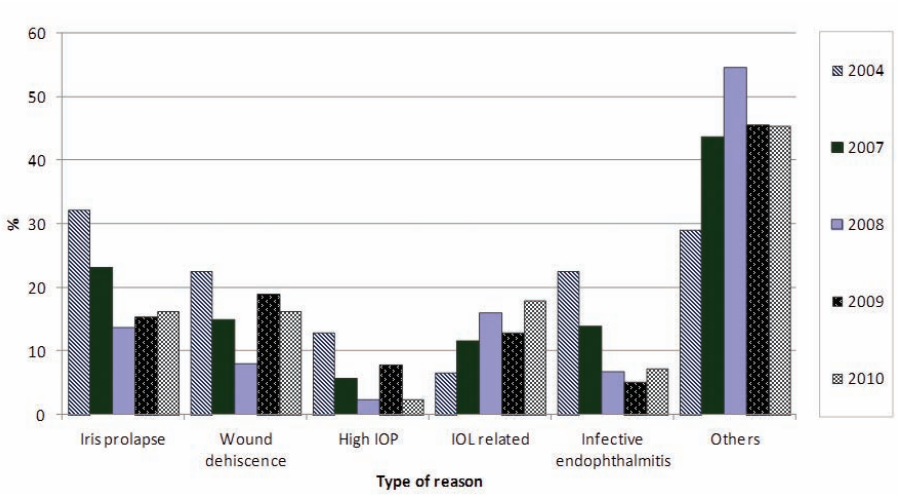


Table 1.5.1.2(c): Time from Surgery to Unplanned Return to OT, CSR 2010

Post-operative period (day)	N	n	Median	Min	Max	Mean
Iris prolapse	20	20	15.5	1	158	26.1
Wound dehiscence	20	20	2.0	0	158	15.5
High IOP	3	3	7.0	1	13	7.0
IOL related	22	21	4.0	0	98	15.5
Infective endophthalmitis	9	8	5.5	1	85	22.7
Others	56	56	7.5	0	385	24.1

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, 2010

Types of surgery	N	n	Median	25th percentile	75th percentile
All surgeries	24509	24471	7	6	10
Phaco	18821	18796	7	6	9
ECCE	4630	4614	8	6	11
Phaco ECCE	522	522	9	6	11
ICCE	106	106	8	6	11
Lens aspiration	346	345	7	6	11

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, 2010

Types of surgery	N	n	Median	25th percentile	75th percentile
All surgeries	22567	22543	7	6	10
Phaco	17431	17412	7	6	9
ECCE	4177	4168	9	7	11
Phaco ECCE	487	487	9	6	11
ICCE	96	96	9	6	11
Lens aspiration	303	302	7.5	6	11

n = No. of available information

1.5.2 Post-operative Visual Acuity

1.5.2.1 Post-operative Visual Acuity (All Eyes)

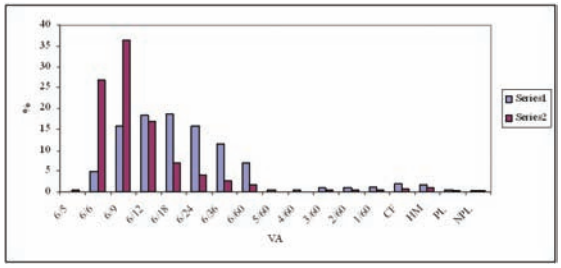
Only approximately 40.0% of eyes had vision unaided VA 6/12 or better i.e. good VA outcome. It appeared to be increasing over the years. However, the percentage increased double folds following refraction. This trend remained unchanged throughout the years.

Table 1.5.2.1: Post-operative Visual Acuity, All Eyes, CSR 2002-2010

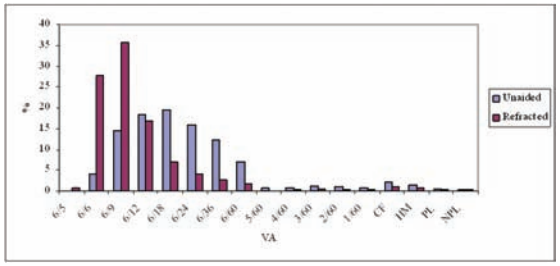
Year	2002				2003				2004				2007				2008				2009				2010			
	Unaided		Refracted		Unaided		Refracted		Unaided		Refracted		Unaided		Refracted		Unaided		Refracted		Unaided		Refracted		Unaided		Refracted	
VA	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
TOTAL	**12512**		**10385**		**15741**		**13645**		**6739**		**5807**		**15786**		**14446**		**19048**		**17215**		**20590**	**100**	**18886**	**100**	**24522**	**100**	**22579**	**100**

Figure 1.5.2.1(a): Percent Distribution of Post-operative Unaided and Refracted Visual Acuity, CSR 2002-2010

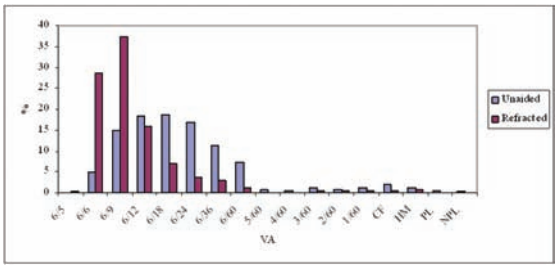
2002



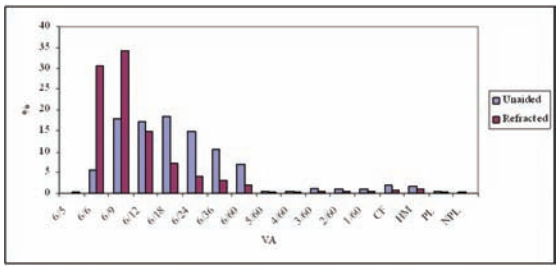
2003



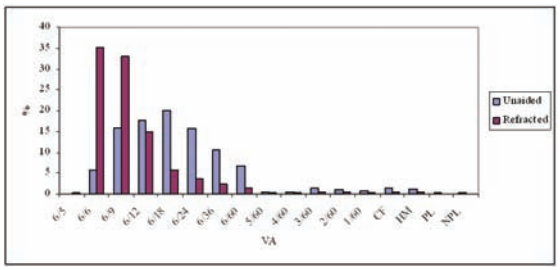
2004



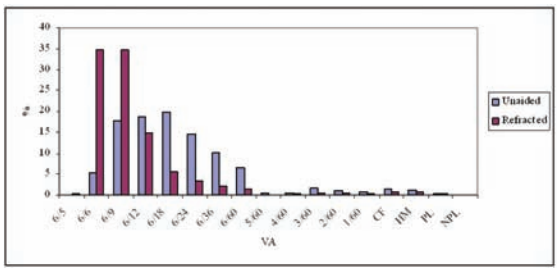
2007



2008



2009



2010

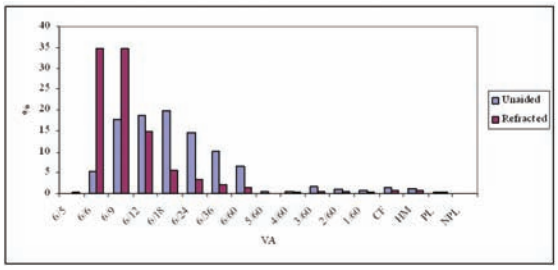
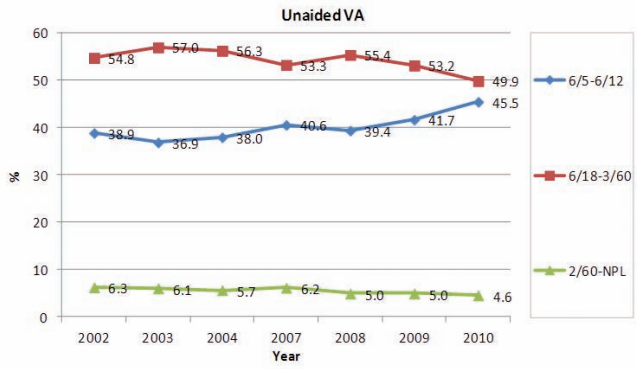


Figure 1.5.2.1(b): Post-operative Unaided and Refracted Visual Acuity by Visual Category for All Eyes, CSR 2002-2010



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			
	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	%
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
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
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
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
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		90.9	7434	52.6		92.0
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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**

Figure 1.5.2.2(a): Post-Operative Visual Acuity for Eyes without Ocular Co-morbidity, CSR 2002-2010

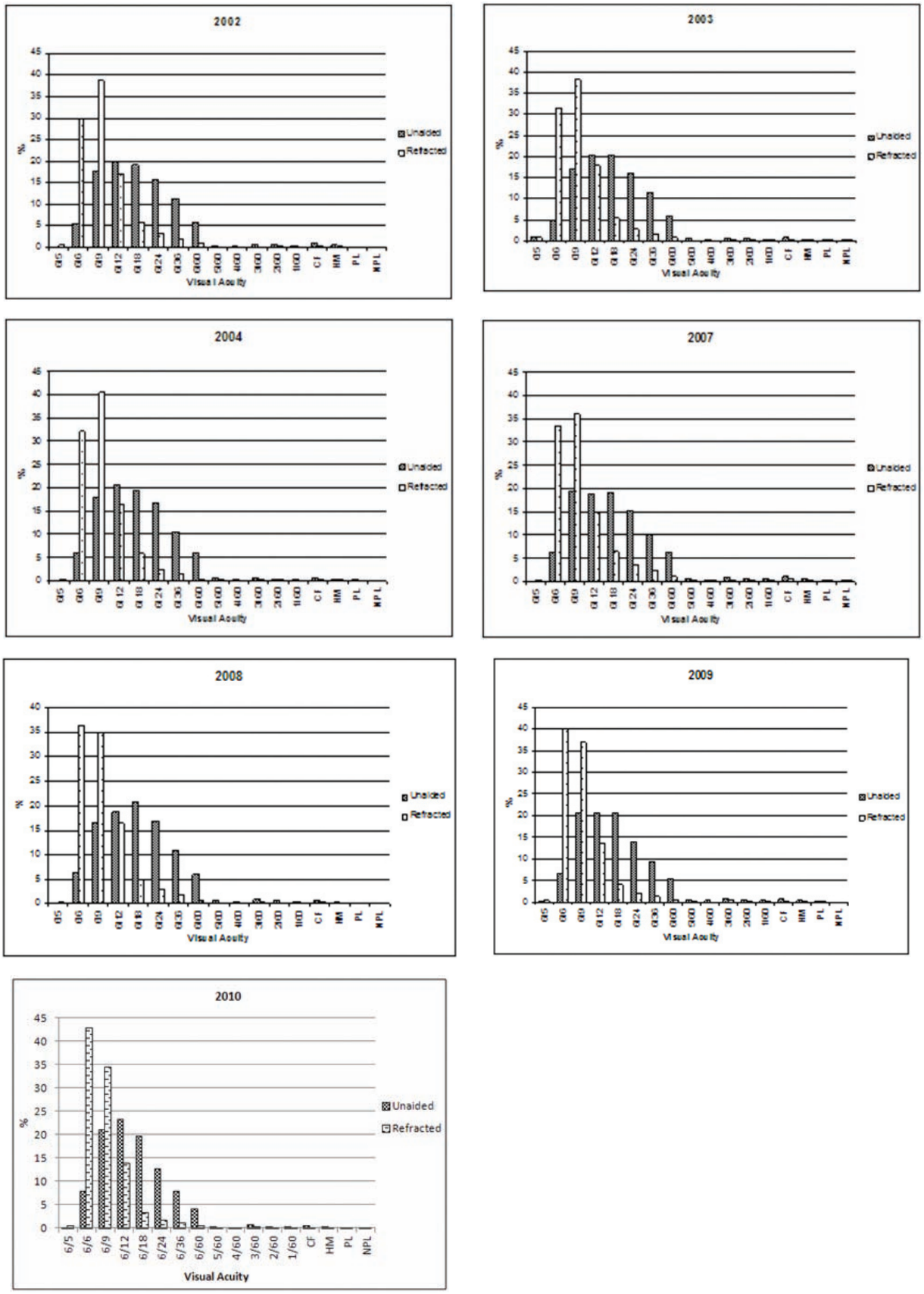
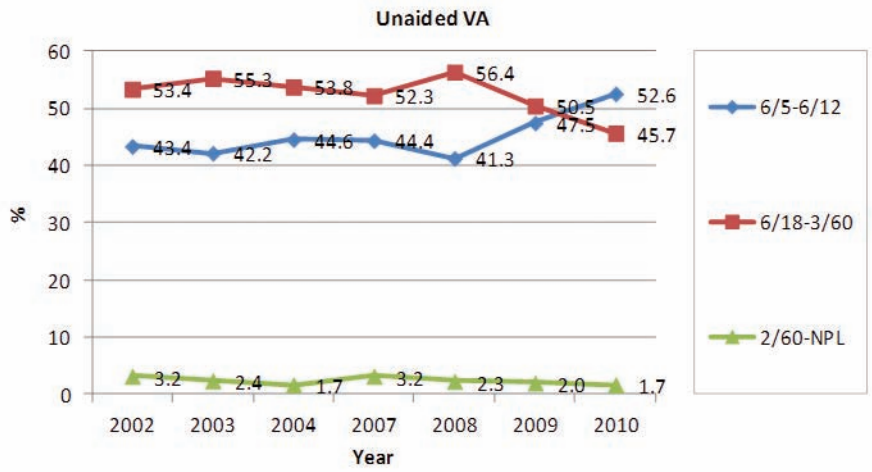


Figure 1.5.2.2(b): Post-operative Visual Acuity by Visual Category for Eyes without Ocular Co-morbidity, CSR 2002-2010



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 93.8% in 2010). 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, CSR2002-2010

Year	2002						2003						2004					
	Unaided			Refracted			Unaided			Refracted			Unaided			Refracted		
	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
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
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
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
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
ICCE	80	12	15.0	66	33	50.0	8	3	38.0	6	4	67.0	-	7	0.0	4	2	50.0
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

Year	2007						2008						2009						2010					
	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	7130	3080	43.0	6632	5551	84.0	8983	3719	41.0	8390	7392	88.0	12618	5990	47.5	11782	10704	90.9	14142	7434	52.6	13171	12115	92.0
Phaco	4868	2332	48.0	4508	3890	86.0	6419	3017	47.0	5958	5440	91.0	9511	5038	53.0	9001	8397	93.3	11520	6589	57.2	10818	10151	93.8
ECCE	2033	675	33.0	1910	1520	80.0	2263	629	28.0	2158	1744	81.0	2607	816	31.3	2329	1967	84.5	2089	672	32.2	1866	1596	85.5
Phaco ECCE	158	36	23.0	143	89	62.0	201	40	20.0	184	140	76.0	270	53	19.6	259	200	77.2	268	67	25.0	253	198	78.3
Lens Aspiration	62	33	53.0	59	46	78.0	74	29	39.0	66	54	82.0	160	57	35.6	128	89	69.5	192	86	44.8	168	126	75.0
ICCE	15	2	13.0	10	4	39.0	24	4	17.0	19	11	58.0	29	7	24.1	25	15	60.0	28	4	14.3	25	13	52.0
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 2002-2010

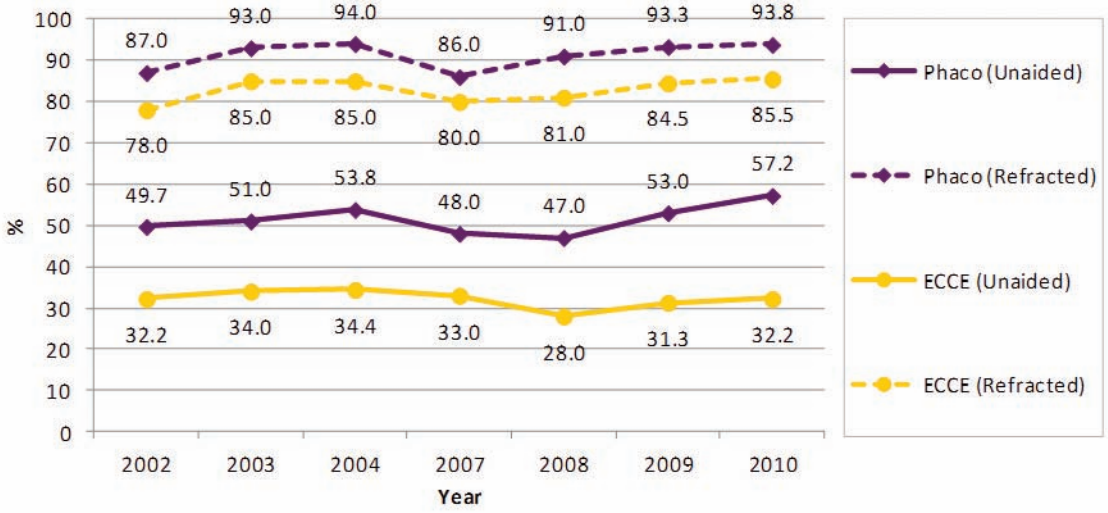


Table 1.5.2.3(b): Post-operative Refracted Visual Acuity 6/12 or Better in Eyes without Ocular Co-morbidities by Complications and Types of Surgery, CSR 2010

	Types of Cataract Surgery																	
	All Surgeries			Lens Aspiration			ECCE			Phaco			Phaco →ECCE			ICCE		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
	13162	12107	92.0	168	126	75.0	1866	1596	85.5	10818	10151	93.8	253	198	78.3	25	13	52.0
With intra-op complications	621	474	76.3	10	5	50.0	149	107	71.8	336	271	80.7	100	76	76.0	13	7	53.8
No intra-op complications	12541	11633	92.8	158	121	76.6	1717	1489	86.7	10482	9880	94.3	153	122	79.7	12	6	50.0

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 2010

	Types of Cataract Surgery																	
	All Surgeries			Lens Aspiration			ECCE			Phaco			Phaco →ECCE			ICCE		
	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
	13162	12107	92.0	168	126	75.0	1866	1596	85.5	10818	10151	93.8	253	198	78.3	25	13	52.0
Specialist	11271	10392	92.2	153	115	75.2	1141	969	84.9	9714	9115	93.8	215	165	76.7	20	9	45.0
Gazetting Specialist	667	617	92.5	11	7	63.6	106	95	89.6	533	500	93.8	16	14	87.5	1	1	100.0
Medical Officer	1221	1096	89.8	4	4	100.0	618	532	86.1	569	534	93.8	22	19	86.4	4	3	75.0

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 2010, the performances of all the surgeons were comparable.

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 2002-2010

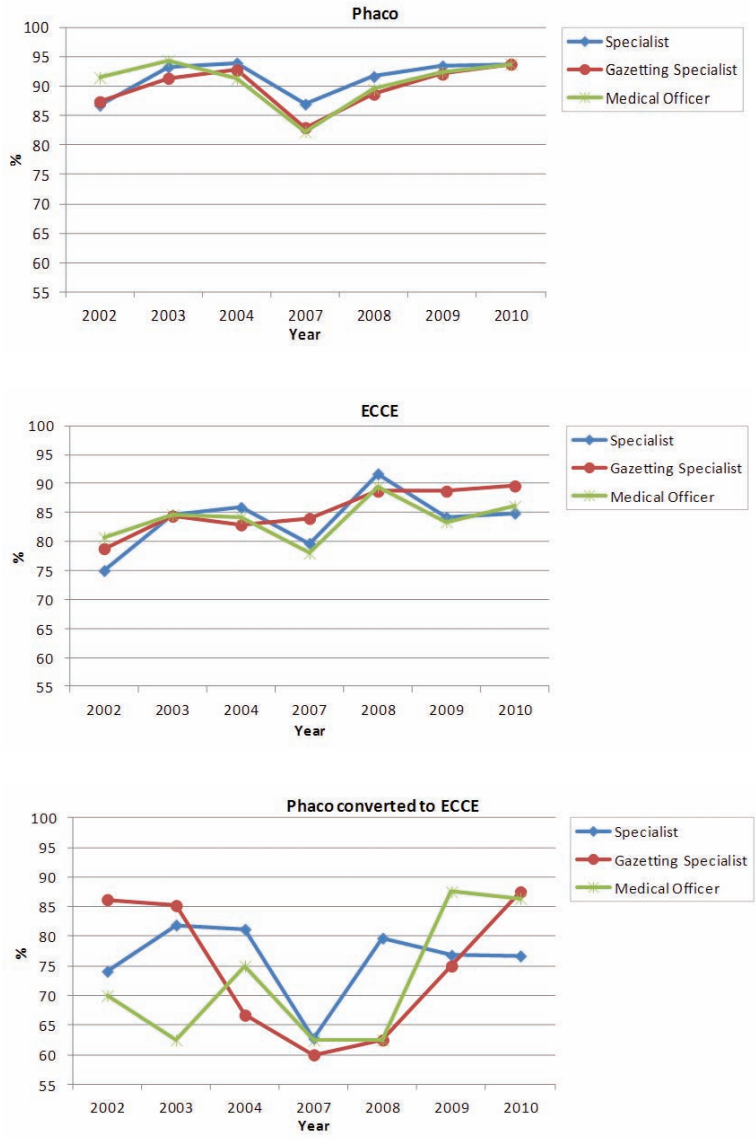


Table 1.5.2.3(d): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP and Types of Surgery, CSR 2010

	All Patients	Type of Cataract Surgery																	
		All Surgeries			Lens Aspiration			ECCE			Phaco			Phaco →ECCE			ICCE		
	N	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
All Centre	13171	13162	12107	92.0	168	126	75.0	1866	1596	85.5	10818	10151	93.8	253	198	78.3	25	13	52.0
A	611	611	553	90.5	5	4	80.0	87	60	69.0	506	481	95.1	11	6	54.5	0	0	0.0
B	355	355	330	93.0	3	3	100.0	19	13	68.4	324	308	95.1	9	6	66.7	0	0	0.0
C	147	147	126	85.7	1	0	0.0	13	8	61.5	125	112	89.6	7	5	71.4	0	0	0.0
D	15	15	14	93.3	0	0	0.0	0	0	0.0	15	14	93.3	0	0	0.0	0	0	0.0
E	295	295	278	94.2	0	0	0.0	44	40	90.9	248	235	94.8	1	1	100.0	1	1	100.0
F	108	108	96	88.9	8	6	75.0	99	89	89.9	1	1	100.0	0	0	0.0	0	0	0.0
G	565	559	522	93.4	1	1	100.0	54	43	79.6	502	476	94.8	2	2	100.0	0	0	0.0
H	248	248	234	94.4	2	2	100.0	17	13	76.5	228	218	95.6	1	1	100.0	0	0	0.0
I	55	55	55	100.0	3	3	100.0	51	51	100.0	0	0	0.0	0	0	0.0	0	0	0.0
J	305	305	286	93.8	15	10	66.7	38	34	89.5	241	234	97.1	9	7	77.8	0	0	0.0
K	84	84	77	91.7	1	1	100.0	5	4	80.0	73	67	91.8	4	4	100.0	1	1	100.0
L	855	855	789	92.3	6	5	83.3	204	173	84.8	625	596	95.4	19	15	78.9	0	0	0.0
M	218	218	193	88.5	2	1	50.0	82	68	82.9	113	107	94.7	20	17	85.0	1	0	0.0
N	444	444	404	91.0	14	7	50.0	122	110	90.2	294	274	93.2	11	11	100.0	2	1	50.0
O	906	906	835	92.2	9	7	77.8	96	82	85.4	771	720	93.4	27	25	92.6	3	1	33.3
P	447	447	430	96.2	2	2	100.0	9	8	88.9	436	420	96.3	0	0	0.0	0	0	0.0
Q	323	323	268	83.0	9	6	66.7	11	8	72.7	287	248	86.4	10	4	40.0	3	0	0.0
R	786	786	725	92.2	1	1	100.0	20	16	80.0	755	701	92.8	7	6	85.7	2	1	50.0
S	124	124	122	98.4	3	3	100.0	11	10	90.9	105	104	99.0	5	5	100.0	0	0	0.0
T	322	322	294	91.3	2	1	50.0	41	35	85.4	267	248	92.9	7	6	85.7	0	0	0.0
U	747	747	679	90.9	5	3	60.0	41	27	65.9	685	640	93.4	12	6	50.0	1	0	0.0
V	230	230	215	93.5	4	3	75.0	28	25	89.3	195	184	94.4	3	3	100.0	0	0	0.0
W	340	340	295	86.8	3	3	100.0	34	25	73.5	293	260	88.7	10	7	70.0	0	0	0.0
X	303	303	286	94.4	0	0	0.0	59	54	91.5	243	231	95.1	0	0	0.0	1	1	100.0
Y	163	163	162	99.4	2	2	100.0	43	43	100.0	115	114	99.1	3	3	100.0	0	0	0.0
Z	762	762	668	87.7	16	9	56.3	12	8	66.7	715	639	89.4	11	7	63.6	2	1	50.0

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 2010 (*cont*)

	All Patients	Type of Cataract Surgery																	
		All Surgeries			Lens Aspiration			ECCE			Phaco			Phaco →ECCE			ICCE		
	N	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%	N	n	%
AA	285	285	257	90.2	2	2	100.0	50	41	82.0	218	203	93.1	14	11	78.6	1	0	0.0
AB	237	237	214	90.3	2	1	50.0	19	14	73.7	210	195	92.9	4	2	50.0	2	2	100.0
AC	301	301	300	99.7	7	7	100.0	45	45	100.0	247	246	99.6	2	2	100.0	0	0	0.0
AD	176	176	150	85.2	3	0	0.0	168	146	86.9	0	0	0.0	4	4	100.0	0	0	0.0
AE	229	229	225	98.3	5	5	100.0	6	5	83.3	216	213	98.6	1	1	100.0	0	0	0.0
AF	229	229	197	86.0	2	1	50.0	27	24	88.9	191	165	86.4	8	7	87.5	1	0	0.0
AG	299	299	283	94.6	10	9	90.0	58	54	93.1	221	212	95.9	8	6	75.0	2	2	100.0
AH	415	412	386	93.7	6	5	83.3	90	81	90.0	306	293	95.8	8	6	75.0	0	0	0.0
AI	517	517	491	95.0	1	1	100.0	48	42	87.5	464	444	95.7	2	2	100.0	1	1	100.0
AJ	725	725	668	92.1	13	12	92.3	115	97	84.3	583	548	94.0	13	10	76.9	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 2010

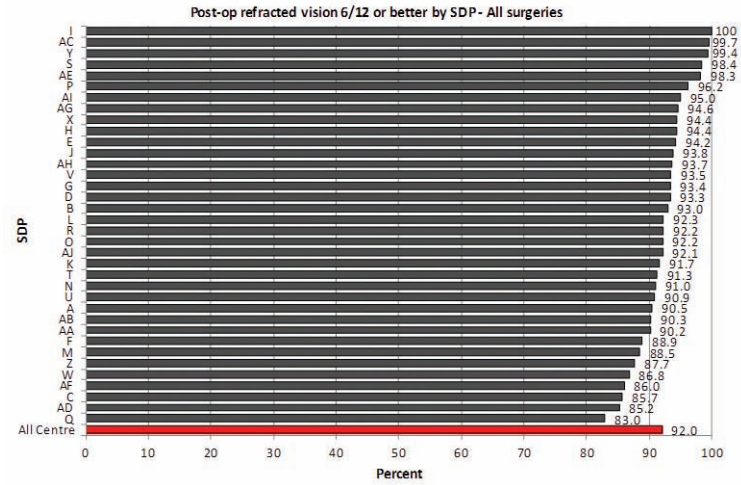


Figure 1.5.2.3(d): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP for Phacoemulsification, CSR 2010

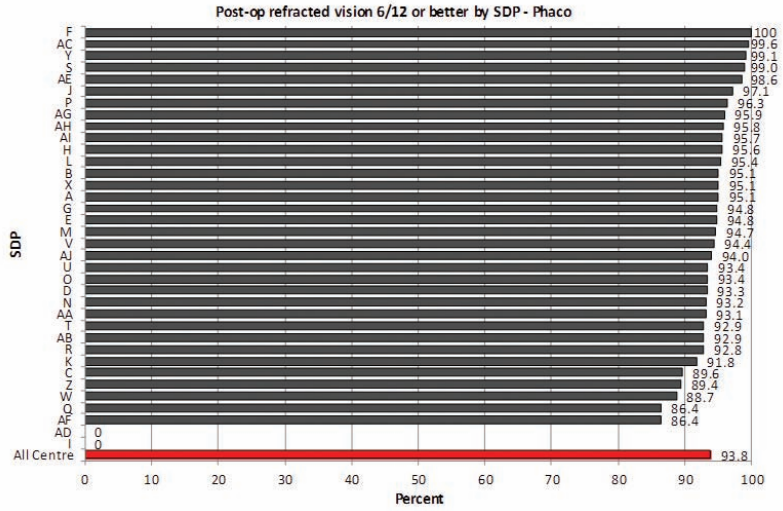
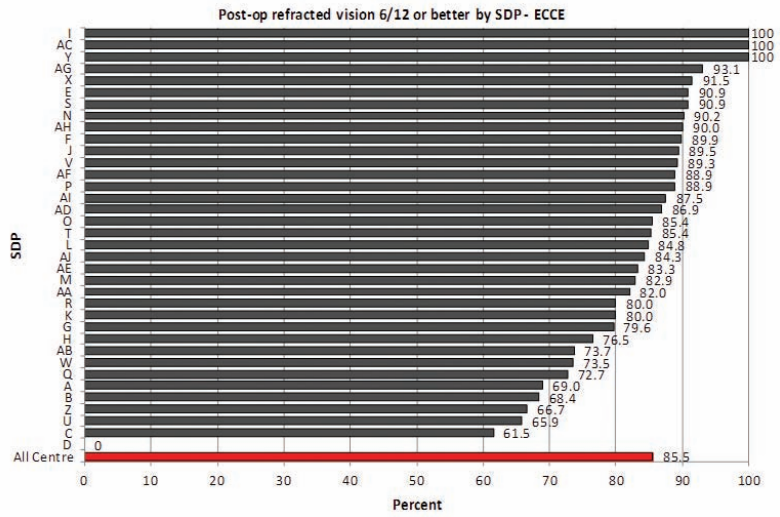


Figure 1.5.2.3(e): Post-operative Refracted Visual Acuity 6/12 or Better for Patients without Ocular Co-morbidities by SDP for ECCE, CSR 2010



1.5.3 Reasons for No Record of Visual Acuity

Of the 28506 eyes operated in 2010, 1359 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 2002-2010

Years	2002		2003		2004		2007		2008		2009		2010	
Reasons	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
All cases	1940	100	1331	100	1872	100	1458	100	1463	100	1557	100	1359	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
Discharged by doctor	396	20.4	212	15.9	306	1.6	32	2.2	13	0.9	44	2.8	38	2.8
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
Others	144	7.4	210	15.8	281	15.0	299	20.5	194	13.3	222	14.3	210	15.5

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. Although infrequent, retinal detachment as the cause for refracted VA worse than 6/12 appeared to be in increasing trend. This was consistent with the increasing number of VR combined surgery performed 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 2002-2010

Years	2002		2003		2004		2007		2008		2009		2010	
Factors	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
N (total no. of post-op refracted vision worse than 6/12)											2973		3397	
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
High astigmatism	489	24.3	392	39.8	321	31.1	478	15.2	460	16.3	395	13.3	378	11.1
Posterior capsular opacity	198	9.9	152	15.4	53	5.0	140	4.5	112	4.0	136	4.6	112	3.3
Cystoid macular oedema	93	4.6	59	6.0	33	3.1	101	3.2	64	2.3	82	2.8	94	2.8
Endophthalmitis	16	0.8	10	1.0	6	0.6	14	0.4	6	0.2	6	0.2	5	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
Decentered IOL	14	0.7	1	0.1	3	0.3	4	0.1	6	0.2	5	0.2	5	0.1
Retinal detachment	27	1.3	8	0.8	7	0.7	67	2.1	50	1.8	56	1.9	44	1.3
Others	302	15.0	202	20.5	134	12.6	620	19.8	603	21.3	794	26.7	857	25.2
Missing/Unavailable	14	0.7	49	5.0	0	0.0	-	-	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 2002-2010

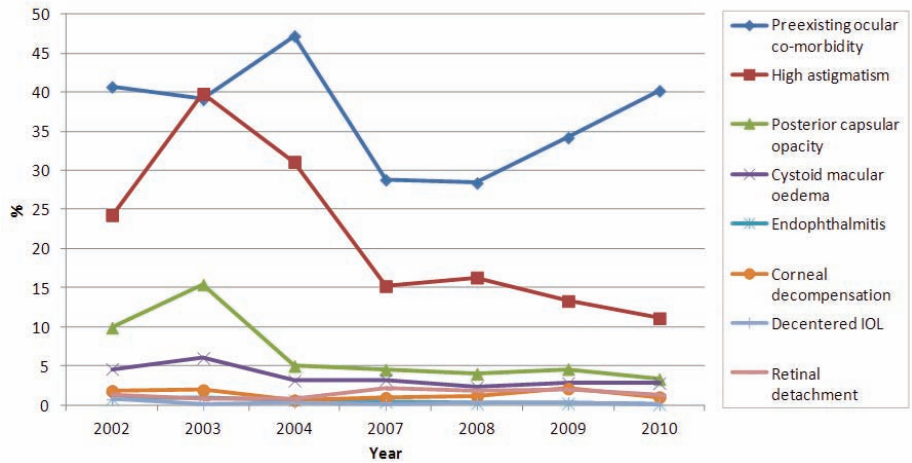


Table 1.5.4(b): Factors Contributing to Post-operative Refracted VA of Worse than 6/12 in Eyes without Preexisting Ocular co-morbidity, CSR 2004-2010

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

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

	Target Refraction								Actual Refraction													
	All Patients								ECCE								Phaco					
Years	2007		2008		2009		2010		2007		2008		2009		2010		2007		2008		2009		2010	
Dioptre (D)	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	1	0.0	0	0.0	2	0.0
-9.5-<(-9)	4	0.0	1	0.0	1	0.0	2	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	7	0.1	0	0.0	1	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	1	0.0	2	0.0	0	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	1	0.0	0	0.0	2	0.0	0	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	3	0.1	1	0.0	0	0.0	3	0.0	0	0.0	0	0.0
-7.5-<(-7)	1	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	11	0.1	0	0.0	3	0.0
-7-<(-6.5)	3	0.0	1	0.0	0	0.0	1	0.0	0	0.0	1	0.0	1	0.0	1	0.0	0	0.0	6	0.0	3	0.0	3	0.0
-6.5-<(-5)	1	0.0	2	0.0	7	0.0	4	0.0	0	0.0	3	0.1	10	0.2	9	0.2	1	0.0	16	0.1	24	0.2	22	0.1
-5-<(-4.5)	3	0.0	4	0.0	7	0.0	3	0.0	1	0.0	1	0.0	12	0.3	15	0.4	1	0.0	15	0.1	14	0.1	13	0.1
-4.5-<(-4)	2	0.0	3	0.0	5	0.0	10	0.0	3	0.1	5	0.1	15	0.4	16	0.4	3	0.0	15	0.1	14	0.1	16	0.1
-4-<(-3.5)	7	0.1	8	0.1	11	0.1	5	0.0	8	0.2	7	0.2	52	1.3	38	1.0	5	0.1	19	0.2	42	0.3	41	0.3
-3.5-<(-3)	6	0.0	7	0.0	11	0.1	15	0.1	19	0.5	15	0.3	74	1.8	68	1.8	2	0.0	29	0.2	81	0.6	78	0.5
-3-<(-2.5)	13	0.1	22	0.1	18	0.1	29	0.1	26	0.6	41	0.9	183	4.6	128	3.3	7	0.1	58	0.5	208	1.6	182	1.2
-2.5-<(-2)	29	0.2	21	0.1	29	0.1	33	0.1	65	1.6	76	1.7	318	7.9	252	6.5	27	0.3	80	0.7	443	3.4	426	2.8

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

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

Figure 1.5.5(a): Percentage Distribution of Actual Refractive Power in ECCE and Phaco, CSR 2007-2010

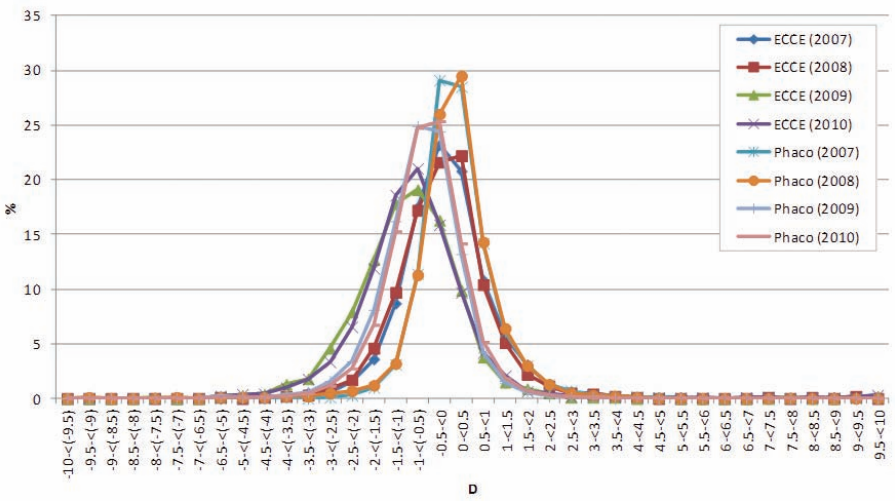


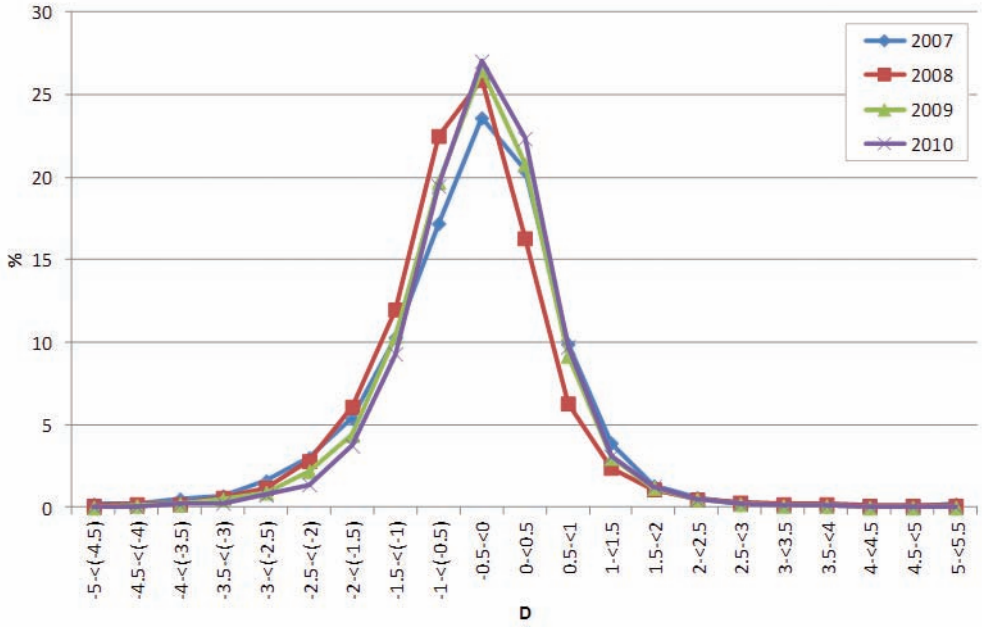
Table 1.5.5(c): Difference in Target and Actual Refractive Power for Patients who had Phacoemulsification Only, CSR 2007-2010

	Target Refraction								Actual Refraction								Difference between Target and Actual Refraction							
Years	2007		2008		2009		2010		2007		2008		2009		2010		2007		2008		2009		2010	
Power (D)	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
N	7975	100	10660	100	10837	100	13653	100	8342	100	12154	100	12845	100	15485	100	5782	100	8803	100	10812	100	13653	100
-5-<(-4.5)	2	0.0	4	0.0	3	0.0	1	0.0	15	0.2	13	0.1	14	0.1	13	0.1	12	0.2	12	0.1	5	0.0	5	0.0
-4.5-<(-4)	1	0.0	3	0.0	2	0.0	6	0.0	30	0.4	19	0.2	14	0.1	16	0.1	14	0.2	19	0.2	8	0.1	7	0.1
-4-<(-3.5)	5	0.1	7	0.1	5	0.0	5	0.0	49	0.6	17	0.1	42	0.3	41	0.3	28	0.5	18	0.2	23	0.2	26	0.2
-3.5-<(-3)	5	0.1	6	0.1	4	0.0	10	0.1	97	1.2	20	0.2	81	0.6	78	0.5	43	0.7	51	0.6	52	0.5	37	0.3
-3-<(-2.5)	10	0.1	20	0.2	6	0.1	15	0.1	200	2.4	55	0.5	208	1.6	182	1.2	93	1.6	103	1.2	94	0.9	104	0.8
-2.5-<(-2)	18	0.2	16	0.2	12	0.1	22	0.2	405	4.9	85	0.7	443	3.4	426	2.8	176	3.0	245	2.8	238	2.2	189	1.4
-2-<(-1.5)	51	0.6	35	0.3	32	0.3	19	0.1	746	8.9	164	1.3	1045	8.1	1043	6.7	311	5.4	541	6.1	473	4.4	510	3.7
-1.5-<(-1)	239	3.0	288	2.7	115	1.1	151	1.1	1382	16.6	423	3.5	2093	16.3	2367	15.3	595	10.3	1052	12.0	1129	10.4	1270	9.3
-1-<(-0.5)	2473	31.0	4065	38.1	3699	34.1	3721	27.3	1771	21.2	1408	11.6	3206	25.0	3831	24.7	994	17.2	1984	22.5	2126	19.7	2659	19.5
-0.5-<0	4512	56.6	5498	51.6	6282	58.0	9087	66.6	1884	22.6	3167	26.1	3143	24.5	3926	25.4	1367	23.6	2278	25.9	2862	26.5	3691	27.0
0-<0.5	583	7.3	563	5.3	494	4.6	443	3.2	1069	12.8	3534	29.1	1697	13.2	2194	14.2	1179	20.4	1434	16.3	2245	20.8	3051	22.3

0.5-<1	45	0.6	107	1.0	115	1.1	123	0.9	399	4.8	1740	14.3	535	4.2	801	5.2	573	9.9	558	6.3	994	9.2	1329	9.7
1-<1.5	6	0.1	23	0.2	6	0.1	8	0.1	142	1.7	786	6.5	179	1.4	285	1.8	225	3.9	214	2.4	329	3.0	422	3.1
1.5-<2	2	0.0	7	0.1	8	0.1	6	0.0	55	0.7	365	3.0	79	0.6	112	0.7	73	1.3	97	1.1	132	1.2	173	1.3
2-<2.5	9	0.1	6	0.1	52	0.5	32	0.2	14	0.2	156	1.3	26	0.2	48	0.3	32	0.6	46	0.5	55	0.5	63	0.5
2.5-<3	1	0.0	4	0.0	2	0.0	1	0.0	15	0.2	55	0.5	14	0.1	27	0.2	14	0.2	26	0.3	18	0.2	31	0.2
3-<3.5	1	0.0	0	0.0	0	0.0	0	0.0	13	0.2	30	0.2	11	0.1	11	0.1	13	0.2	15	0.2	8	0.1	18	0.1
3.5-<4	0	0.0	1	0.0	0	0.0	0	0.0	4	0.0	22	0.2	5	0.0	10	0.1	8	0.1	15	0.2	11	0.1	14	0.1
4-<4.5	2	0.0	0	0.0	0	0.0	0	0.0	3	0.0	10	0.1	5	0.0	9	0.1	3	0.0	12	0.1	4	0.0	8	0.1
4.5-<5	0	0.0	1	0.0	0	0.0	0	0.0	4	0.0	4	0.0	2	0.0	3	0.0	3	0.0	12	0.1	3	0.0	4	0.0
5-<5.5	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0	3	0.0	8	0.1	9	0.2	9	0.1	3	0.0	6	0.0

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

Figure 1.5.5(b): Difference in Target and Actual Refractive Power for Patients who had Phacoemulsification Only, CSR 2007-2010



CHAPTER 2

AGE RELATED MACULAR DEGENERATION REGISTRY

Contributing Editors

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CHAPTER 2: AGE RELATED MACULAR DEGENERATION REGISTRY

1.1 INTRODUCTION

Age Related Macular Degeneration (AMD) is a degenerative disease of the macula resulting in loss of central vision. The prevalence of AMD increases with age, especially after the age of 65. AMD adversely affects quality of life in the elderly, increasing the risk of falls and fractures and limits their ability to drive safely. Furthermore, rising prevalence rates are expected with the growing number and proportion of the ageing population.

Increasing age and cigarette smoking are the two most consistently significant risk factors for AMD. Other risk factors for developing AMD include a family history for AMD, history of stroke or coronary artery disease and heavy alcohol use. Smokers have a two to fourfold increased risk of developing AMD and quicker disease progression as compared to nonsmokers which persists for up to 20 years after smoking cessation. Studies have also identified a dose-responsive relationship between pack years of smoking and AMD. This risk is further increased in smokers who are homozygous for the CFH Y402H polymorphism. Those who give a positive family history tend to present earlier with increased severity at onset.

AMD can be broadly classified as dry (atrophic) and wet (neovascular or exudative). Subretinal drusen deposits, focal or widespread geographic atrophy of the retinal pigment epithelium (RPE), and subretinal pigment epithelial clumping are features of dry AMD. Larger drusens are associated with visual loss. Disease progression is related to the size and number of soft drusen. Around 7.1% of those with dry AMD develop wet AMD in five years. The risk of developing wet AMD in people with bilateral early dry AMD was one to 4.7 percent at one year and 13 to 18 percent at three years. The wet form is more common among patients with advanced AMD. It is characterized by growth of abnormal blood vessels into the subretinal space, usually from the choroidal or retinal circulation. The leakage from these vessels leads to formation of subretinal fluid or causes blood collection.

Thus far, there is no proven treatment for dry AMD. However, it has been suggested that daily oral supplements containing vitamin C, Vitamin E, zinc and copper may be beneficial in both forms of AMD. The AREDS study recommends treatment with the antioxidant vitamins A, C, and beta carotene, plus zinc, for nonsmokers with extensive intermediate size drusen, at least one large drusen, or non-central geographic atrophy in one or both eyes. Some prefer treatment with zinc alone or the AREDS formula without beta-carotene, in smokers, due to the increased risk of lung cancer with beta-carotene.

The past decade has seen an emergence of new expensive therapies for exudative AMD. There has been an increase in therapeutic options with strategies to target neovascularisation without damaging the neural retina or other equally important tissues. This registry was developed in 2008 in view of the emerging new expensive therapies for exudative Age Related macular Degeneration and the need to monitor the treatment.

The objectives of the Registry are:
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

The National Eye Database Age Related Macular Degeneration Registry consists of new cases of age related macular degeneration seen at the tertiary referral medical retina unit (the ophthalmology department of the Selayang Hospital). The period of study was from October 2008 to December 2009. All new patients with Age Related Macular Degeneration who were referred and seen at the medical retina clinic were eligible. The data was recorded in the case report form. Data was entered into a software application with inbuilt analysis and tracking systems.

1.2 CHARACTERISTIC OF PATIENTS AND TREATMENT

There were 169 patient enrolled with 289 affected eyes. The patient characteristics are reported in Table 2.2.

Table 2.2(a): Characteristics of Patients

Characteristics	N (%)
Gender	
Male	100 (59.2)
Female	69 (40.8)
Mean age in years	65.7 (35 - 86)
Ethnic origin	
Malay	56 (33.1)
Chinese	88 (52.1)
Indian	23 (13.6)
Others	2 (1.2)
Laterality	
Unilateral	49 (29.0)
Bilateral	120 (71.0)
Associated factors	
Diabetes mellitus	38 (22.5)
Hypertension	72 (42.6)
Past stroke	4 (2.4)
Ischemic Heart disease	19 (11.2)
Hypercholesterolemia	16 (9.5)
Smoking – Current	13 (7.7)
- Past	25 (14.8)
Mean duration of symptoms	11.5 months (1 weeks to 120 months)

The incidence of age-related macular degeneration (ARMD) the Asian populations is lower than the white population in the United States, but reports suggest that the incidence is increasing. In our population setting, the incidence of AMD is highest amongst the Chinese race (52.1%) followed by the Malay race at 33.1% and Indian race at 13.6%. No known difference exists between gender in Age Related Macular Degeneration. We, however, found that the incidence of age related macula degeneration is higher in men (59.2% vs 40.8%) compared to women. AMD usually manifests after the age of 50 years. In our database, the mean age of presentation was 65.7 years with a range of 35-86 years old.

Age related macular degeneration is a disease that has social and economic implications as it is a potentially treatable disease in the stage of exudative AMD if detected early. However our data at a local tertiary centre shows that majority of cases present late with a mean duration of symptoms of 12 months and the majority of patients (71%) had already developed the disease in both eyes. 26% of the affected eyes had visual acuity of 3/60 or worse. This late presentation could be due to lack of awareness of symptoms as the other eye is still seeing well.

Approximately 11.2% of patients had past history of ischemic heart disease and stroke which shows that majority of patients do not have contraindications to anti VEGF therapy. 22.5% of patients was either an active smoker or had stopped smoking.

Table 2.2(b): Quality of Life

Activity	N (%)
Currently not driving	64 (37.9)
Difficulty reading ordinary print in newspaper	109 (64.5)

Majority of patients reported a difficulty in reading ordinary print in the newspaper in keeping with the disease affecting the macula. Approximately 38% of patients were no longer able to drive as a result of the disease.

Figure 2.2(a): Presenting Visual Acuity

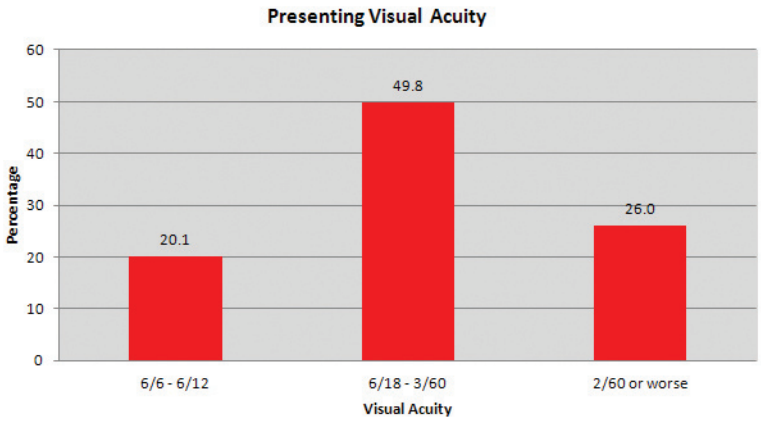


Figure 2.2(b): Staging of AMD

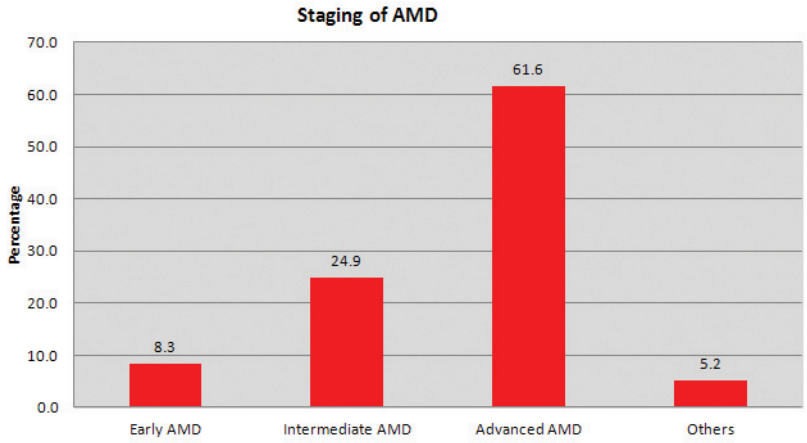


Figure 2.2(c): Distribution of Advanced AMD

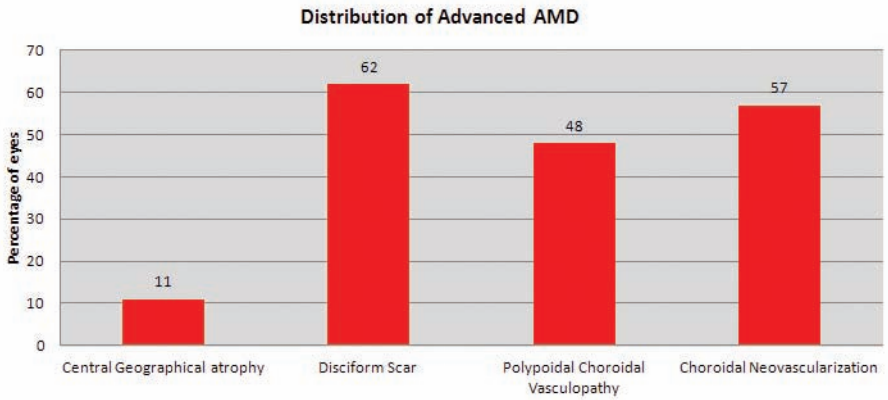


Table 2.2(c): Type of Treatment Offered

Treatment	N (%)
None	170 (58.8)
Photodynamic therapy	24 (20.2)
Anti VEGF	43 (36.1)
Photodynamic therapy and anti VEGF	5 (4.2)
Argon laser	4 (3.4)
Others	44 (37.0)

AMD is a potentially blinding disorder and majority of patients in this registry presented late. Despite advances in pharmacological treatment with Anti VEGF therapy there are still cases that are futile to treat. These include cases with central geographic atrophy, fibrosis at the fovea and RPE rip through the centre of the fovea. Increased awareness needs to be disseminated to the public regarding the symptoms so that cases may be detected and treated earlier before it deemed untreatable.

Majority of eyes (61.6%) had advanced AMD of which approximately 1/3 was attributed to a disciform scar. Only 50.0% of cases were treatable of which 48.0% were polypoidal choroidal vasculopathy and 57.0% were choroidal neovascularisation. Anti VEGF therapy was the main form of therapy in 36.1% of cases followed by photodynamic therapy (20.2%). Only a small number of patients (4.2%) received combination therapy with PDT and anti VEGF in view of the financial constraints.

CHAPTER 3

RETINOBLASTOMA REGISTRY

Contributing Editors

Dr Jamalia Rahmat

CHAPTER 3: RETINOBLASTOMA REGISTRY

Retinoblastoma is the most common intraocular childhood malignancy in children, with a reported incidence ranging from 1 in 15,000 to 1 in 18,000 live births.

The retinoblastoma (RB) registry tracks all the patients diagnosed with Retinoblastoma since 2004 that were seen in 3 major RB treatment centers in the country; namely Hospital Kuala Lumpur (covering Peninsular Malaysia), Hospital Queen Elizabeth (Sabah) and Hospital Umum Kuching (Sarawak).

3.1 INTRODUCTION

There are total of 101 patients registered, of which 17 patients were diagnosed in 2010.

Table 3.1: Stock and Flow

	2004	2005	2006	2007	2008	2009	2010	Total
Hospital Kuala Lumpur	8	10	12	19	11	13	10	83
Hospital Queen Elizabeth, Kota Kinabalu	0	0	0	0	0	0	6	6
Hospital Umum Kuching, Sarawak	1	0	0	2	2	6	1	12
Total	**9**	**10**	**12**	**21**	**13**	**19**	**17**	**101**

3.2 PATIENT DEMOGRAPHY

The mean age at presentation was 2.2 years. The youngest age was 3 weeks and the oldest was 10.2 years. About a third (30.7%) of these patients was in the age group of 13 to 24 months and 25.7% were less than 12 months at presentation.

Table 3.2(a): Distribution of Patients by Age

Age, years	n=101
Mean (SD)	2.2 (1.7)
Median (IQR)	1.8 (1.8)
Min, max	0.1, 10.2

Age group	No.	%
<12 months	26	25.7
13-24 months	31	30.7
25-36 months	20	19.8
37-48 months	14	13.9
49-60 months	4	4.0
>60 months	6	5.9
Total	**101**	**100.0**

There were slightly more boys (60.4%) than girls affected, and the majority were of Malay ethnicity (52.5%), followed by Chinese (18.8%) and Indians (9.9%).

Table 3.2(b): Distribution of Patients by Gender

Gender	No.	%
Male	61	60.4
Female	40	39.6

Table 3.2(c): Distribution of Patients by Ethnics

Ethnicity	No.	%
Malay	53	52.5
Chinese	19	18.8
Indian	10	9.9
Orang Asli	1	1.0
Melanau	1	1.0
Kadazan/ Murut/Bajau	3	3.0
Bidayuh	0	0.0
Iban	2	2.0
Other	10	9.9
Not available/ Missing	2	2.0

3.3 OCULAR HISTORY AND PRESENTATION

The most common presentation was leukocoria followed by strabismus.

Table 3.3(a): Clinical Presentation

Presentation	No.	%
Leukocoria	94	93.1
Strabismus	16	15.8
Proptosis	11	10.9
Others	12	11.9

Number or percentage may be more than total or 100% as patients might have more than one clinical presentation

The mean duration of disease from onset of symptoms to presentation was 4.8 months with the majority (77.9%) within 1 to 6 months.

Table 3.3(b): Duration of Disease at the Time of Presentation

	Months (n=95)
Mean (SD)	4.8 (6.3)
Median (IQR)	2.0 (5.0)
Min, max	0, 36

	No.	%
Less than 1 month	2	2.1
1 to 6 months	74	77.9
7 to 12 months	13	13.7
More than 12 months	6	6.3

Of the 101 patients, 67(66.6%) had unilateral disease whereas 30 patients (33.4%) had both eyes affected. A total of 135 eyes were affected. Only 1 patient had positive family history of retinoblastoma.

Table 3.3(c): Eyes Affected

	No. of patients	% of eyes
Right eye affected only	28	20.7
Left eye affected only	39	28.9
Both eyes affected	34	50.4
Total eyes	**135**	**100.0**

Family history	No.	%
Yes	1	1.0
No	97	96.0
Missing	3	3.0

3.4 INVESTIGATION AND CLASSIFICATION

The presence of calcified mass was detected in 83.0% of CT scan imaging. In patients who had MRI done, 10.4% showed presence of mass but only 8.1% had calcification. There was extraocular extension detected through imaging in 22 eyes, 12.6% and 3.7% through CT scan and MRI respectively. Majority of them were extension into the optic pathway.

Table: Presence of mass, by CT scan

	No.	%
Yes	112	83.0
No	14	10.4
No CT scan/ NA/ missing	9	6.7

Table: Presence of mass, by MRI scan

	No.	%
Yes	14	10.4
No	6	4.4
No MRI scan/ NA/ missing	115	85.2

Table: Presence of calcification, by CT scan

	No.	%
Yes	112	83.0
No	14	10.4
No CT scan/ NA/ missing	9	6.7

Table: Presence of calcification, by MRI scan

	No.	%
Yes	11	8.1
No	9	6.7
No MRI scan/ NA/ missing	115	85.2

Table: Presence of extraocular extension, by CT scan

	No.	%
Yes	17	12.6
No	109	80.7
No CT scan/ NA/ missing	9	6.7

Table: Presence of extraocular extension, by MRI scan

	No.	%
Yes	5	3.7
No	15	11.1
No MRI scan/ NA/ missing	115	85.2

Table: Type of extraocular extension, by CT scan

	No.	% (n=17)
Optic pathway	15	88.2
Orbit and adnexa	7	41.2
Intracranial	6	35.3

Table: Type of extraocular extension, by MRI scan

	No.	% (n=5)
Optic pathway	4	80.0
Orbit and adnexa	1	20.0
Intracranial	0	0.0

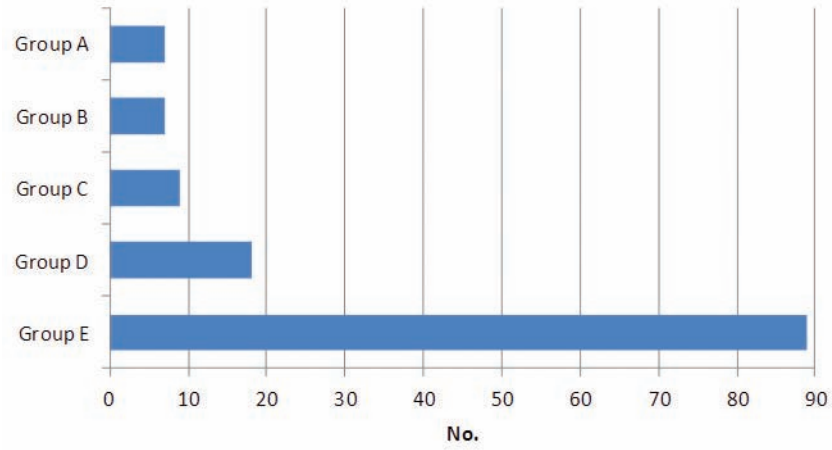
Number or percentage may be more than total or 100% as patients might have more than one type of extraocular extension

About two-thirds (65.9%) of the patients presented with Group E Retinoblastoma (based on International Intraocular Retinoblastoma Classification- IIRC)

Table 3.4: Classification of Retinoblastoma

	Right eye		Left eye		Total	
	No.	%	No.	%	No.	%
Group A	4	6.5	3	4.1	7	5.2
Group B	4	6.5	3	4.1	7	5.2
Group C	7	11.3	2	2.7	9	6.7
Group D	11	17.7	7	9.6	18	13.3
Group E	32	51.6	57	78.1	89	65.9
Not available / Missing	4	6.5	1	1.4	5	3.7
Total eyes	**62**	**100.0**	**73**	**100.0**	**135**	**100.0**

Figure 3.4(b): Disease Staging (IIRC)



3.5 MANAGEMENT AND OUTCOME

63.4% of patients had systemic chemotherapy with a mean of 7 cycles (maximum 15 chemotherapy cycles). 5 patients had subtenon injection of chemotherapy together with the systemic chemotherapy. Focal therapy was given together with chemoreduction. 57 out of 67 eyes (85.1%) with unilateral RB were enucleated with 46.3% of them showed histopathological extension outside the eyeball. Of the bilateral RB, 45.6% were enucleated. 5 (7.4%) patients had external beam radiotherapy.

Table 3.5(a): Chemotherapy by patient

	Unilateral		Bilateral		All	
	No.	%	No.	%	No.	%
Had chemotherapy	37	55.2	27	79.4	64	63.4
Did not have chemotherapy	25	37.3	5	14.7	30	29.7
Total patients registered	**67**	**100.0**	**34**	**100.0**	**101**	**100.0**
	No.	**% (n=37)**	**No.**	**% (n=27)**	**No.**	**% (n=64)**
Systemic chemotherapy	36	97.3	27	100.0	63	98.4
Subtenon injection*	0	0.0	5	18.5	5	7.8
Intraviteal injection*	0	0.0	1	3.7	1	1.6
• Mean cycles given	6.5		8.7		7.4	
• Minimum cycle	2		4		2	
• Maximum cycle	13		15		15	

**All patients in the subgroup had systemic chemotherapy as well.*

Table 3.5(b): Treatment method by no. of eyes

	Unilateral						Bilateral					
	Right (n=28)		Left (n=39)		All (n=67)		Right (n=34)		Left (n=34)		All (n=68)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Enucleation	26	92.9	31	79.5	57	85.1	12	35.3	19	55.9	31	45.6
HPE result:												
Intraocular (no extraocular extension)	11	39.3	10	25.6	21	31.3	5	14.7	0	0.0	5	7.4
With extraocular extension	13	46.4	18	46.2	31	46.3	4	11.8	1	2.9	5	7.4
*Missing	2	7.1	3	7.7	5	7.5	3	8.8	18	52.9	21	30.9
Focal therapy	1	3.6	4	10.3	5	7.5	20	58.8	10	29.4	30	44.1
Laser only	1	3.6	1	2.6	2	3.0	5	14.7	4	11.8	9	13.2
Cryotherapy only	0	0.0	0	0.0	0	0.0	1	2.9	0	0.0	1	1.5
Laser & cryotherapy	0	0.0	3	7.7	3	4.5	14	41.2	6	17.6	20	29.4
Radiotherapy	1**	3.6	1	2.6	2	3.0	5	14.7	0	0.0	5	7.4
External beam radiation	0	0.0	1	2.6	1	1.5	5	14.7	0	0.0	5	7.4

***Missing on subgroup of radiotherapy.*

Table 3.5(c): Outcome and complications, by no. of eyes

	Unilateral						Bilateral					
	Right (n=28)		Left (n=39)		All (n=67)		Right (n=34)		Left (n=34)		All (n=68)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Remission												
Complete	11	39.3	19	48.7	30	44.8	4	11.8	8	23.5	12	17.6
Partial regression	0	0.0	2	5.1	2	3.0	13	38.2	5	14.7	18	26.5
No regression	0	0.0	1	2.6	1	1.5	0	0.0	0	0.0	0	0.0
*NA/Missing	17	60.7	17	43.6	34	50.7	17	50.0	21	61.8	38	55.9
Recurrence	0	0.0	3	7.7	3	4.5	7	20.6	1	2.9	8	11.8
Duration from first time treatment (in months)												
n	0		3		3		6		1		7	
Mean (SD)	-		11.0 (8.7)		11.0 (8.7)		16.5 (7.8)		7		15.1 (8.0)	
Median (IQR)	-		7.0 (16.0)		7.0 (16.0)		19.5 (13.0)		7		17.0 (15.0)	
Min, max	-		5, 21		5, 21		5, 24		7		5, 24	
Complication	2	7.1	4	10.3	6	9.0	5	14.7	1	2.9	6	8.8
Socket /prosthesis related	1	3.6	2	5.1	3	4.5	1	2.9	1	2.9	2	2.9
Disease related	1	3.6	2	5.1	3	4.5	4	11.8	0	0.0	4	5.9

Table 3.5(d): Outcome by patient

	Unilateral (n=67)		Bilateral (n=34)		All (n=101)	
	No.	%	No.	%	No.	%
Lost to follow-up	11	16.4	4	11.8	15	14.9
Status by 1 year:						
Alive	42	62.7	19	55.9	61	60.4
Death	3	4.5	1	2.9	4	4.0
Unknown/Missing	22	32.8	14	41.2	36	35.6

3 eyes of the unilateral RB and 8 eyes in bilateral RB had recurrences. The earliest recurrence was noted at 5 months from diagnosis and the latest was at 24 months.

15 patients defaulted treatment and were lost to follow-up. Death was reported in 4 patients.

Comment

There were 101 patients registered in the RB registry with 135 affected eyes. Data from the RB registry showed that the spectrum of presenting symptoms were similar to those reported elsewhere, in which leukocoria was the most common presentation followed by strabismus.

Late presentation was still a problem. Majority of patients presented with advanced stage Group E which necessitate enucleation. 85.1 % of unilateral RB were enucleated. In bilateral RB, nearly half (45.6%) of the patients had at least 1 eye enucleated. About 12% of eyes showed extraocular extension on imaging and 46% had histopathological evidence of extension.

Chemoreduction is the mainstay of treatment especially in bilateral RB. 7.4% of patients still needed to have external beam radiation due to the advance stage of the disease.

As with other cancers, early detection of retinoblastoma and appropriate treatment can improve outcome.

CHAPTER 4

OPHTHALMOLOGY SERVICE CENSUS

Contributing Editors

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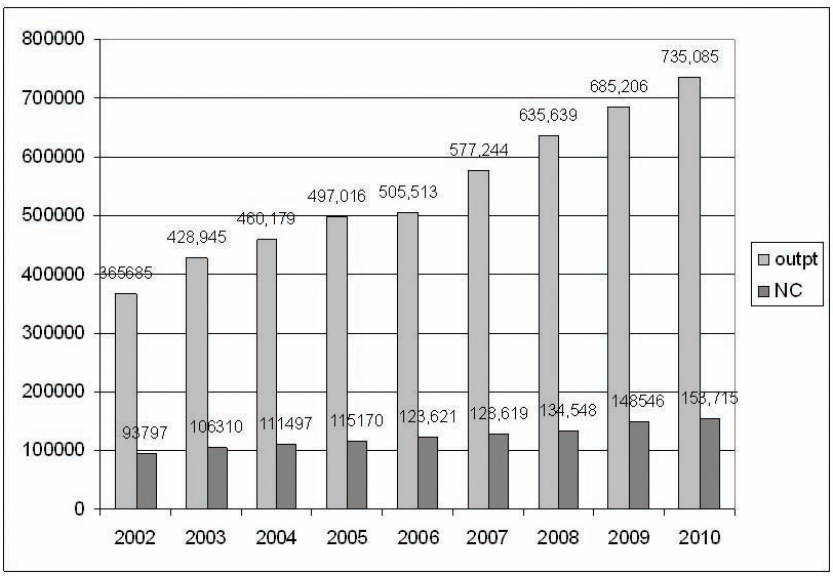
CHAPTER 4: OPHTHALMOLOGY SERVICE CENSUS

The census was returned by hard copy form at the end of each year from 2002 to 2006. For 2007 and 2010, census data were entered monthly by the hospitals. Real time online reports both aggregated and by hospitals are available from 2007 onwards.

Table 4.1: Number of ophthalmology departments which have census return

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

Figure 4.1: Number of out-patients visits at Ophthalmology clinics, 2002-2010



NC = new case

Figure 4.2: Number of in- patients admitted to eye wards, 2002-2010

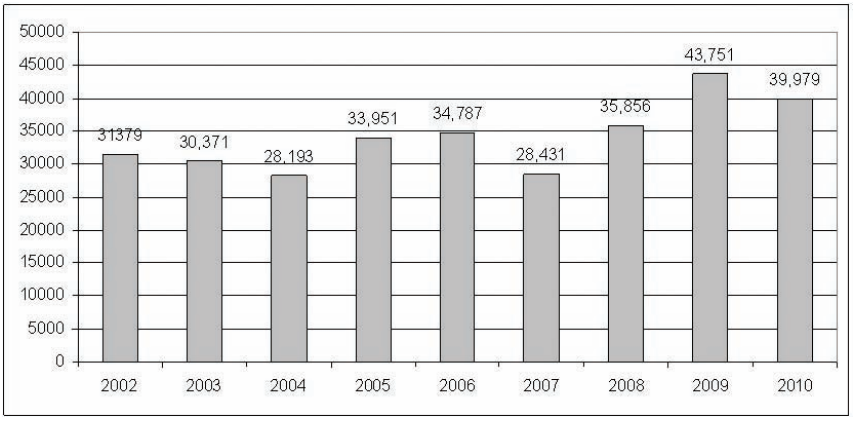
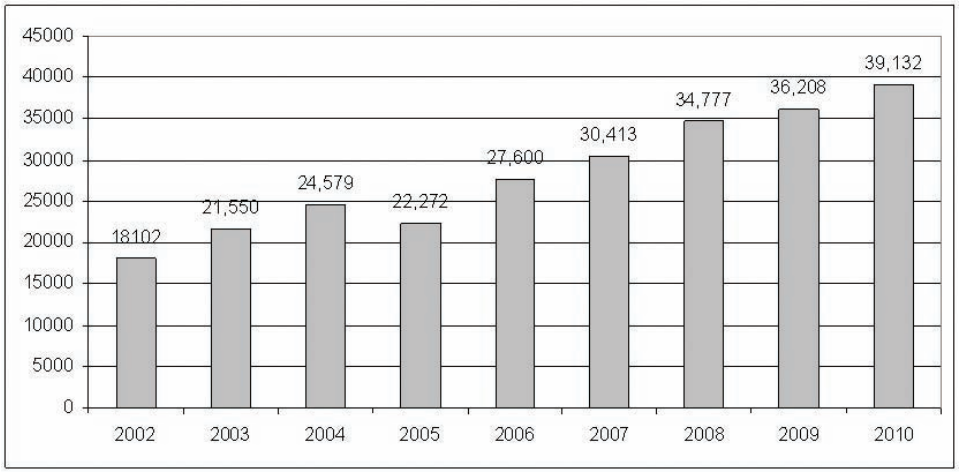


Figure 4.3: Number of ocular operation* performed, 2002-2010



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

Figure 4.4 Number of cataract surgeries, ECCE and phacoemulsification performed, 2002-2010

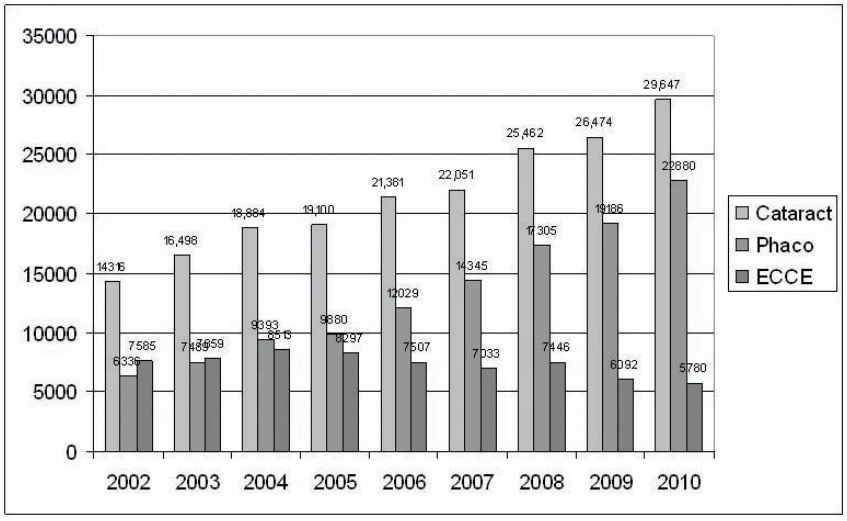


Figure 4.5: Trend of cataract surgeries performed by ECCE and phacoemulsification, 2002 to 2010

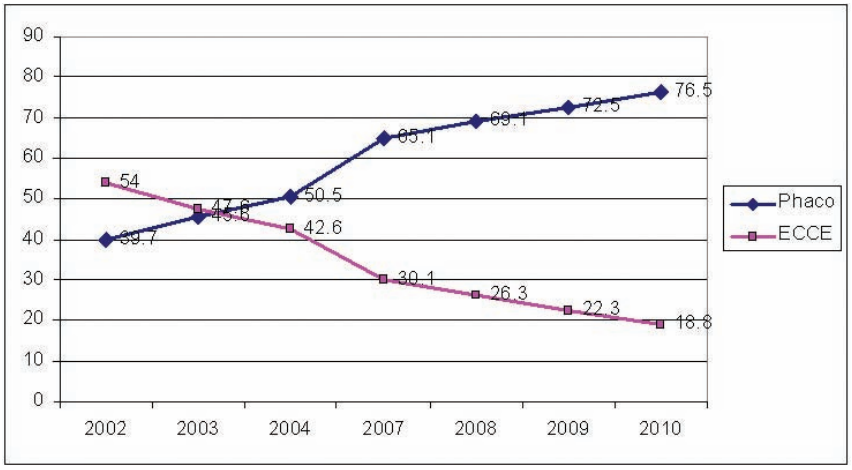


Figure 4.6: Diabetic patients seen at ophthalmology clinics, 2002-2010

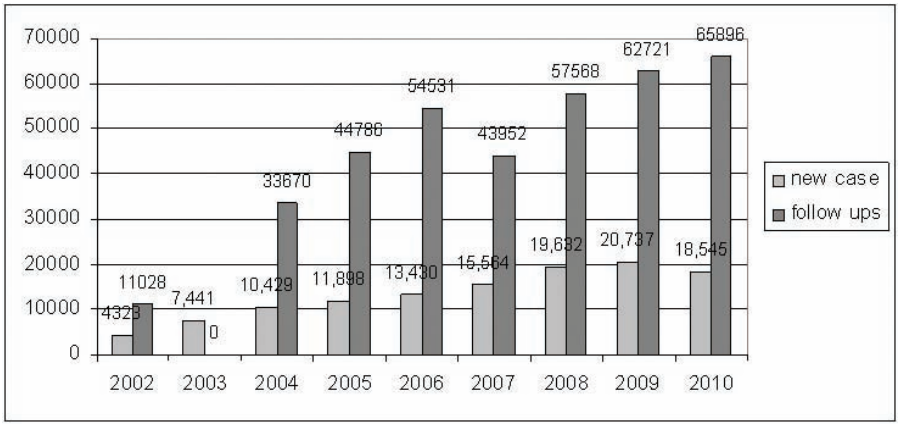


Figure 4.7: Number of vitreo-retinal surgery performed at hospitals with vitreoretinal surgeons, 2002-2010

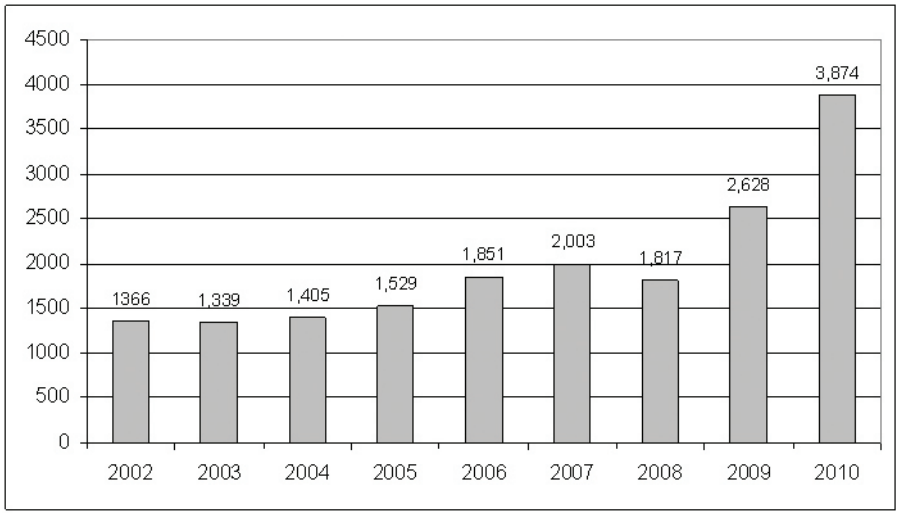


Figure 4.8: Number of refractions performed at ophthalmology clinics, 2002-2010

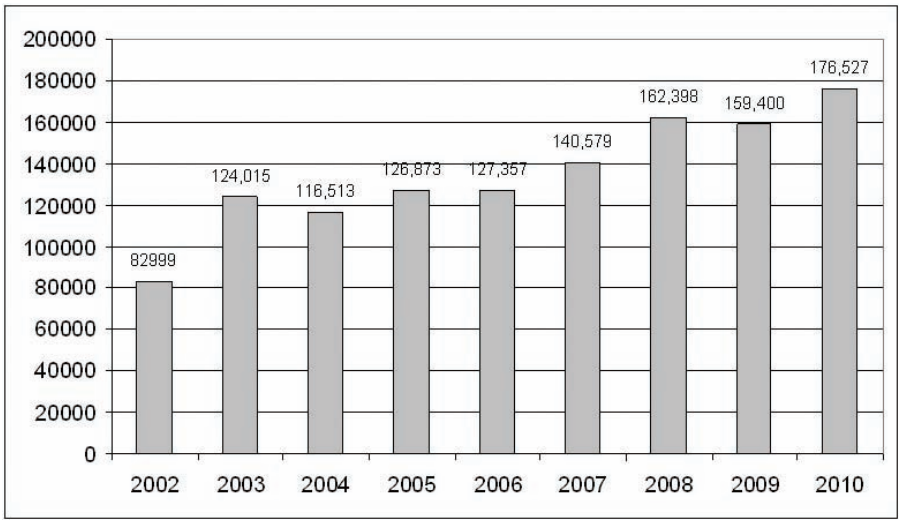


Figure 4.9: Number of patients with low vision assessments, 2002-2010

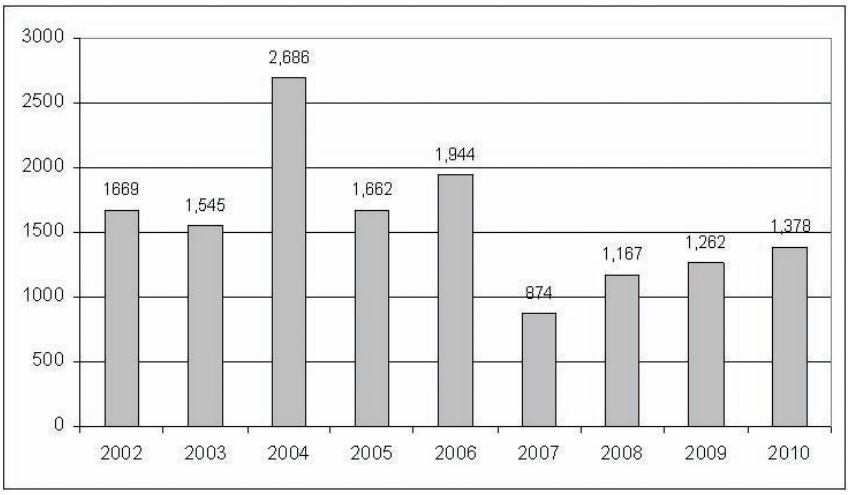


Figure 4.10: Number of premature infants screened for retinopathy of prematurity screening, 2002-2010

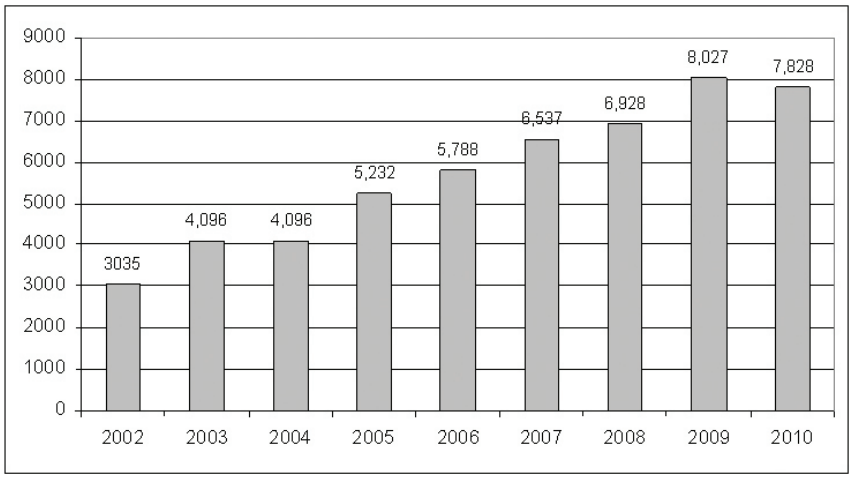
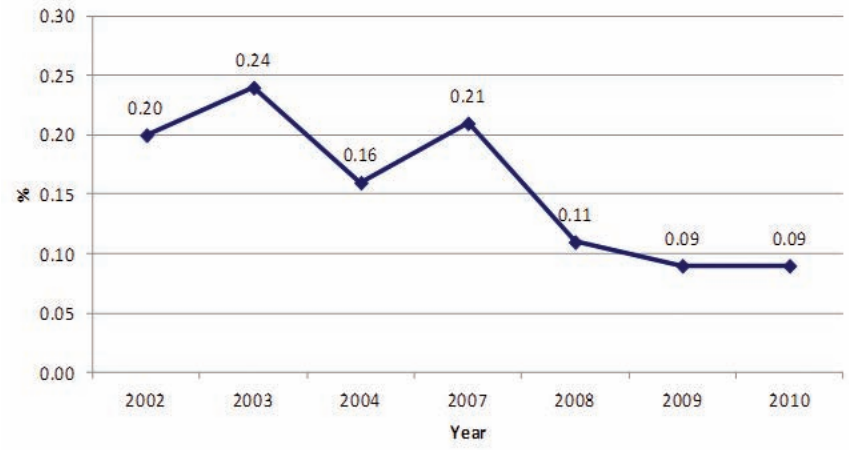


Figure 4.11: Percentage of post-cataract surgery endophthalmitis, 2003-2010



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