



ARAVIND  
EYE  
CARE  
SYSTEM

*activity report*  
2015-16

*Vision:*  
*Eliminate Needless Blindness*

1976-2016 **40** YEARS

*a journey dedicated to compassionate  
service for sight*





*Arunachalam Perumal*  
*Aug 7, 1915- July 20, 2004*

*Hailing from Ammapatti, a small village near Uthamapalayam in Tamil Nadu, Perumal joined Shanthiniketan when he was just eighteen years old. He lived and worked with great artists like Silpacharya Nandalal Bose for over four decades in Kalabhavan of Shanthiniketan. Fondly called as 'Perumalda' by his students (da' means elder brother in Bengali), he was an avid bird-watcher and his love for nature stands out in his paintings, sculptures and murals. He became well known as the artist who took art to the people. He went to the villages around Shanthiniketan and decorated the walls of the humble Santhal homes with nature themes such as birds and animals as in the background of this page.*

*After Kalabhavan, he moved to Madurai and spent the last three decades of his life here. An ardent admirer of Aravind Eye Hospital and a longtime patient of Dr.G.Natchiar, he had donated all his sketches and paintings to Aravind.*

*This being the birth centenary year of Perumalda, an exhibition was conducted in November to share this rare treasure of art with the public, which was a great success.*

*Several of his unique art work are used in the cover and throughout this report.*





*A builder of the Immortal's secret house  
An aspirant to supernal Timelessness  
Above mind's twilight and life's starlit night  
There gleamed the dawn of a spiritual day  
- from Sri Aurobindo's 'Savitri'*



# Contents

<i>Highlights</i>	14
<i>Patient Care</i>	18
<i>Community Outreach</i>	30
<i>Education and Training</i>	38
<i>Consultancy and Capacity Building</i>	58
<i>Research</i>	70
<i>Manufacturing Ophthalmic Supplies</i>	80
<i>Central Functions</i>	85
<i>Recognitions and Achievements</i>	95
<i>Partners in Service</i>	101
<i>Trustees and Staff</i>	105

## PHOTO CREDITS

*Iruthayaraj P, Aravind-Pondicherry*

*Mohan, Aravind-Tirunelveli*

*Ramesh V, Aravind-Madurai*

*Rajkumar M, Aravind-Madurai*

*Saravanan S, Aravind-Pondicherry*

*Senthil Kumar P, Aravind-Coimbatore*

*Seran I, Aravind-Salem*

*Vivekanandan Dr., Aravind-Madurai*







Dr. G. Venkataswamy fondly referred as 'Dr. V'  
Founder Chairman of Aravind Eye Care System  
October 1, 1918 - July 7, 2006

*All work in the outside world reflects  
the action of life inside.*

*- Dr. V's journal entry April 10th, 1988*

*Aravind  
7-11-06*









## *Dr. APJ Abdul Kalam*

*15 Oct, 1931 - 27 July, 2015*

*In July of 2015, Aravind Eye Care System mourned the passing of former President of India, Dr. APJ Abdul Kalam.*

*Dr. Kalam's association with Aravind spanned a quarter of a century, and began when he first visited as a patient in 1990. He was thrilled with the quality of care and the ethos of service that he encountered, and it sowed the seeds of a lifelong friendship.*

*Over the years, he was exceedingly generous with his time and support. Dr. Kalam was the chief guest at Aravind's 25th anniversary celebrations in 2001, and as the President of India, he graced the inauguration of Aravind Pondicherry in 2003. Subsequently he laid the foundation stone for Aravind Medical Research Foundation and came back to inaugurate it when the building was completed in 2008. In the same year he also inaugurated the Aravind Virtual Academy. In 2011, he was the chief guest at the Tamil Nadu Ophthalmic Conference organised by Aravind at Tirunelveli.*

*In addition to these more high-profile visits, he made several other stops at Aravind when his schedule permitted. He was a mentor and friend to the leadership, and keenly interested in the organisation's latest research developments and its use of satellite technology. He had a special gift for interacting with young staff members, and prompting them with his trademark question, "What is your dream?"*

*His inspired example and steadfast good-will have touched Aravind's journey in ways that it will always remain profoundly grateful for.*

# ARAVIND EYE CARE SYSTEM

*Vision: Eliminate Needless Blindness*

## EYE CARE SERVICES

*Mission: Provide compassionate and quality eye care affordable to all*

### ARAVIND EYE HOSPITALS

- 5 | Tertiary Eye Care Centres (Speciality Care, Research & Training)  
Madurai 1976, Tirunelveli 1988, Coimbatore 1997  
Pondicherry 2003, Salem 2011
- 6 | Secondary Eye Care Centres (Cataract Services, Speciality Diagnosis)  
Theni 1985, Tirupur 2010, Dindigul 2010, Tuticorin 2012  
Udumalpet 2012, Coimbatore City Centre 2014

### ARAVIND COMMUNITY EYE CLINICS

- 6 | Out-Patient Eye Care Centres  
(Comprehensive Eye Examination, Treatment of minor ailments)  
Melur 2004, Tirumangalam 2005, Cumbum 2008  
Madurai City Centre 2009, Sankarankovil 2010, Pondicherry City Centre 2011

### ARAVIND VISION (PRIMARY EYE CARE) CENTRES

- 57 | Primary Eye Care Centres (Comprehensive Eye Examination)

### FREE EYE SCREENING CAMPS

*(Community Outreach Programmes)*

*2,590 camps were conducted through which 570,761 patients were screened and 86,325 surgeries performed in the year ending March 2016.*



1976-2016 **40** YEARS

*a journey dedicated to compassionate  
service for sight*

## EDUCATION AND TRAINING

*Mission: Develop ophthalmic human resources through teaching and training*

*Around 8,300 candidates trained from 100 countries*

*1,313 papers published*

## RESEARCH

*Mission: Provide evidence through research and evolve methods to translate existing  
evidence and knowledge into effective action*

*- Basic and translational research - Clinical research - Operations research*

*- Product development in eye care*

*119 research papers published; 17 scholars received Ph.D*

## CONSULTANCY AND CAPACITY BUILDING

*Mission: Enhance eye care through capacity building, advocacy, research and publications*

*- Sharing best practices at Aravind - Advocacy in eye care - Publications*

*320 hospitals from 27 countries received consultancy services in eye care management*

## OPHTHALMIC SUPPLIES

*Mission: Make quality ophthalmic products affordable and accessible to the vision  
impaired worldwide*

*- Intraocular lens - Pharmaceuticals - Suture needles*

*- Equipment - Surgical blades - Special products*

*Products exported to more than 146 countries worldwide*





*1976 - 2016:  
the journey thus far*

*2016 marks the fortieth year of Aravind's journey, from a humble beginning to one of the largest providers of eye care in the world.*

*During the four decades, significant inroads have been made to address a multitude of challenges*

- providing eye care services that are affordable and accessible to all*
- creating a human resource pipeline to serve the needs of Aravind and the rest of the world;*
- continually adding to the body of knowledge on the nuances of causes of eye diseases and on effective ways of delivering care;*
- addressing the supply chain issues by making world-class eye care supplies and equipment readily available at affordable prices;*
- proactively sharing best practices with eye care providers to enhance the performance of the entire eye care sector.*

*all of these happening at significant scale bounded by a non-negotiable ethical framework.*





*Due to the resource scarce circumstances of the early years, which in hindsight can be said to be fortunate, Aravind as an organisation learnt to live within its means and frugality got etched into the DNA of the organisation. These have helped Aravind serve a large number of patients, continually improve the quality towards becoming the benchmark for world standards and become highly efficient. Aravind recognises that these factors will need to be cherished and strengthened.*

*When people constantly question as to why isn't Aravind scaling rapidly expanding to other areas, like some of the other eye care providers, the question that crosses everyone's mind at Aravind is,*

*'How does one scale compassion or the quest for perfection?'*

*While the capacity to build people with the right perspective continues to be the limiting factor, Aravind is also increasingly facing challenges from more practical necessities like procuring land, getting approvals and the like. Challenges that are forcing it to choose between serving the humanity and following the organisation's values and beliefs.*



*This is also a moment for Aravind to look back to distil the factors that have made all this possible. And to determine what amongst these needs to remain and be strengthened, as well as what needs to change and morph to stay relevant in the ever-changing external eco-system.*



*Given the enormity of the problem of needless blindness, Dr. V coached the team to think big and globally, beyond the confines of Aravind and yet remain deeply grounded in doing what needs to be done locally. Not just the patient, but anyone who can benefit from an eye care service became the driver of the service design resulting in a “community centric” service delivery system. Dr. V’s quest to become the perfect vehicle to channel the divine forces pushed the organisation in its daily work towards perfection, making Aravind an eternally learning organisation with a strong ethical fabric.*

# Vision Centres and Scaling

*Suddenly the goal of reaching out to one billion does not seem so audacious.*

*Since the first Aravind Vision Centre was established in 2004, the power of these simple units in effectively reaching out has astonished everyone. For the first time Aravind realised that it has found a scalable way to provide eye care to everyone and thus move towards its goal of “eliminating needless blindness”. Apart from expanding its own network of Vision Centres, Aravind is currently working with Governments and other eye care providers in India and around the developing world to create easy access to good eye care for several million people. They are all in different stages of establishing several Vision Centres as a pilot. Now Aravind has to work towards being adequately prepared to support these initiatives. Suddenly the goal of reaching out to one billion does not seem so audacious.*





# Highlights 2015-16

*When you want something,  
all the universe conspires in helping you to achieve it  
- Paul Coelho*

*At Aravind, this has been seen in play countless times and one such instance of significant importance happened in the last year.*

*Over the years, quite organically, Aravind has built good will and trust amongst patients coming from bordering districts of the neighbouring state, Andhra Pradesh. Though these districts border Tamil Nadu, the patients still have to travel about 600 kms to reach Madurai. Several years ago, what used to be a small number of patients, has now steadily increased to over a 150 patients every day with about 50 of them getting operated. Recognising the hardships these elderly patients must be facing in navigating the great distances, Aravind was very keen to establish a hospital closer to their homes, in one of the bordering districts of Andhra Pradesh. The search started several years ago, but there were several practical difficulties in finding and buying a suitable piece of land. When some of the senior government officials came to know of the situation, they made several suggestions and put in concerted efforts. This resulted in the Tirumala Tirupati Devasthanam allocating seven acres of land at a nominal lease. The allocation had to be approved by the Government and the process which normally takes three to six months, in this instance happened within a week's time. At Aravind, this again is a demonstration of divine force at play towards its aspiration to serve the humanity.*

## **Tirumala Tirupati Devasthanams Allocates 7 Acres Land For Eye Hospital**

by Shirley Johanna on October 28, 2015 at 5:47 PM [Hospital News](#) -     

The Tirumala Tirupati Devasthanams (TTD) board of trustees announced that their administration would allocate seven acres of land owned by it in Tirupathi for setting up a Rs 100 crore eye hospital by renowned Arvind Eye Care Hospital based in Madurai in Tamil Nadu.

## OCTOBER SUMMIT



*Prof. Allen Foster receives Dr. G. V Endowment Award 2015 - with him are Dr. R.D. Ravindran, Mr. G.Srinivasan, Dr.P.Namperumalsamy, Mrs. Penny Foster and Mr. R.D.Thulasiraj*

### *Dr. G.Venkataswamy Endowment Award*

Aravind Eye Care System honoured Prof. Allen Foster with this year's Dr. G.V Endowment Award at a spectacular ceremony held at Dr. G. Venkataswamy Eye Research Institute on 1st of October. Co-Director of the International Centre for Eye Health as well as the International Centre for Evidence in Disability, London School of Hygiene and Tropical Medicine, Dr. Foster in his oration titled Leadership: Relevance to Eye Health, beautifully took the audience through the life of Dr. V as he explained the essentials of leadership.

### *Roots 2015*

For the first time, in the history of Aravind, a get-together was organised for the alumni of Aravind as part of the October Summit. Called Roots 2015, it brought together over a hundred ophthalmologists who had been part of Aravind since inception as students, medical officers, fellows etc. It turned out to be a great get-together with camaraderie and shared nostalgic memories. The alumni have put in a request to the management to organise such meets regularly in the future.

*Roots 2015 - Aravind alumni with Dr. R. Ramakrishnan, Dr. Thiruvengada krishnan and Dr. S. Aravind*





## COMMUNITY ORIENTED ACTIVITIES

Aravind as a community service organisation has been integrating itself into several aspects of the community. In spite of the ever increasing volume of work, Aravind does not deter from community oriented activities. Be it recognising an unsung hero, singing the praise of the land, or lending a hand in the hour of need, Aravind indulges willingly.

### *Responding to adversity*

The end of monsoon season last year saw unprecedented rains in Chennai and districts around it. Countless people lost everything. This calamity instantly mobilised the entire team across Aravind to respond, true to its spirit of compassion. At Madurai, Aravind teamed with Green Walk, another humanitarian organisation in this work. An entire floor of the research building at Madurai became the disaster relief centre. Once the word got out, relief material by way of household items, clothes and groceries started pouring in. These were

professionally repacked into various relief kits - sleeping kit, grocery kit, sanitary kit, children's kit, etc. Members of Green Walk and staff of Aravind got deeply involved into this work as volunteers, often working late into the night. Several truckloads of relief material went out to the flood affected areas again with volunteers to ensure effective distribution. A team from Aravind-Pondicherry collected relief materials and took them to people stranded in waterlogged areas around Cuddalore. Aravind-Salem and Aravind-Udumalpet collected and sent relief materials through NGOs working in the affected areas. This happened to coincide with what is now becoming an annual event - Angaadi, where giving happens through recycling. Employees donate items from home that they no longer use or need to Angaadi and purchase what they need from what others bring in. The entire sales proceeds are donated to a humanitarian cost and this time over 2 lakh rupees was sent towards flood relief work.



*Members of Green Walk and staff of Aravind sorting and packing the relief materials at Aravind-Madurai*



*Aravind-Salem team with materials they collected for relief work*

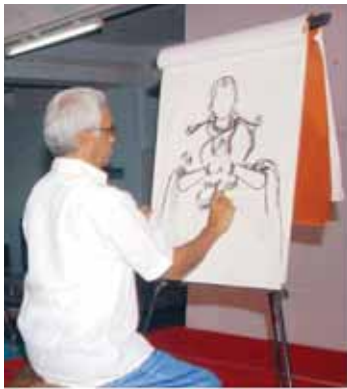
*Aravind-Pondicherry team distributing relief materials*



## *Homage to Perumalda*

Perumalda was born in 1915 in Ammapatti village near Uthamapalayam in the then undivided Madurai district. Destiny took him to Shanthi Niketan to learn and work under great people like Rabindranath Tagore and Nandalal Bose. On retiring from Shanthi Niketan University, he came back and settled down in Madurai over 3 decades ago. Aravind, as a situation and he as an individual were mutually drawn to each other and developed a strong bond. When he passed away in 2004, unknown to Aravind, he bequeathed his entire art collection to Aravind Eye Hospital. Aravind took

over this treasure, restored and widely displayed his art across Aravind facilities. 2015 turned out to be his centenary year and Aravind used the occasion to not only honour him, but also showcase his brilliance as an artist to the people of Madurai through a three-day exhibition of his art. Perumalda's greatness was such that when the word of the celebration plans got around, well-known artists of Tamil Nadu were eager to be a part of it. Soon the centenary celebrations turned out to be an art extravaganza of lectures, practical workshops and display.



*Art demonstration by Artist Trotsky Maruthu*



*Art critic Mr. Indran explaining the unique aspects of Perumalda's style*

*Artist Raffiq Ahmed demonstrating collage art to school children, art teachers and staff of Aravind*





## Patient Care



*Aravind is stepping into its 40th year of serving the community offering quality and affordable eye care. With an aspiration of attaining perfection in delivering eye care service to all, Aravind is keen on providing the highest level of care at every stage of the treatment cycle.*

*There is a constant vigil and retrospection on the quality aspects in eye care delivery - with constant innovations in every sphere - from something as complicated as a surgical step to something as simple as a step in patient flow.*



### *Vision for All*

'Vision for All' project was initiated by Aravind-Theni on July 10. Supported by Topcon and Mehra Eye Tech, the project aims to provide comprehensive eye care services to eliminate needless blindness in Theni District and develop it as the best eye care zone in the state of Tamil Nadu.

Objectives include reduction of prevalence of avoidable vision impairment, major causes being diabetic retinopathy, glaucoma and uncorrected refractive errors. It also aims to work with Government health facilities through a mode of public-private partnership for providing eye care services.

The project activities are being carried out in the service areas of Aravind's primary eye care centres and community eye clinic, diabetes centres, government primary health centres as well as in private schools in Theni District.

Following the inauguration, a special CME was arranged on common eye diseases, which was attended by about 40 physicians and diabetologists in and around Theni.

### *Aravind Eye Hospital, Chennai*

The construction of the biggest Aravind facility is progressing as per schedule in Chennai and is expected to open in February 2017. Manpower planning has been done to staff this large facility.

### *Infrastructure Development*

Across all Aravind Eye Hospitals, various speciality clinics, waiting areas and administrative offices in the existing centres are being expanded to provide maximum comfort to patients. Conscious efforts are taken by various clinical departments to reduce patient waiting time, which is well-received. Newer treatment modalities promising better clinical outcome are constantly being tried out.





We are  
what we repeatedly do.  
**Excellence**, then,  
is not an act,  
but a **habit**.  
- Aristotle

## Performance : April 2015 - March 2016

	Total	Madurai
<b>OUT-PATIENTS</b>		
<b>HOSPITALS</b>		
Paying (New+Review)	2,024,364	617,224
Free (New+Review)	517,945	171,343
<b>OUTREACH</b>		
At Free Eye camps		
Comprehensive camps	334,465	94,515
Diabetic Retinopathy screening camps	42,280	14,576
Refraction camps	51,687	13,576
School children examined by Aravind staff**	64,093	7,408
Paediatric eye screening	42,336	-
Mobile van refraction camps	35,900	-
Total Out-patients examined in outreach**	570,761	130,075
Vision Centres	440,625	181,352
Community Eye Clinics (City Centre)	173,532	100,612
<b>TOTAL OUT-PATIENT VISITS</b>	<b>3,727,227</b>	<b>1,200,606</b>
<b>SURGERIES</b>		
Paying	206,130	73,387
Subsidised (walk-ins to free hospital)	115,765	43,380
Free (through screening camps)	86,325	28,636
<b>TOTAL SURGERIES</b>	<b>408,220</b>	<b>145,403</b>

\*\*Note: Excludes 269,043 children screened by teachers and found to be



Theni	Tirunelveli	Coimbatore	Pondicherry	Tirupur	Dindigul	Salem	Tuticorin	Udumalpet	CBE CC*
86,396	301,085	385,870	285,639	45,669	67,882	120,701	56,125	29,918	27,855
21,217	77,913	120,478	93,014	7,435	-	6,778	8,485	11,282	-
17,437	44,903	86,466	75,155	282	-	11,235	4,344	128	-
3,525	3,213	12,394	7,685	134	-	685	-	-	68
3,777	11,844	11,890	5,778	1,097	-	-	-	3,725	-
1,683	6,799	36,179	8,800	354	-	2,425	-	445	-
835	1,455	2,306	37,740	-	-	-	-	-	-
-	-	29,172	-	-	-	6,728	-	-	-
27,257	68,214	178,407	135,158	1,867	-	21,073	4,344	4,298	68
58,104	95,110	35,507	48,490	10,105	-	-	-	11,957	-
20,301	29,481	-	23,138	-	-	-	-	-	-
213,275	571,803	720,262	585,439	65,076	67,882	148,552	68,954	57,455	27,923
6,418	30,302	44,647	28,970	2,376	4,169	10,755	2,576	1,548	982
3,178	15,254	28,976	18,488	1,554	-	1,585	1,268	2,082	-
2,504	9,160	22,442	19,147	415	-	3,098	632	291	-
12,100	54,716	96,065	66,605	4,345	4,169	15,438	4,476	3,921	982

normal, taking the total outreach screening to 839,804

\*CBE CC- Coimbatore City Centre







## Surgery Details April 2015 - March 2016

	Total	Madurai
Cataract surgeries	262,752	96,185
Trab and combined procedures	5,913	2,031
Retina and vitreous surgery	12,689	4,907
Squint correction	2,453	1,181
Keratoplasty	2,893	882
Pterygium	5,319	2,094
Ocular injuries	1,656	524
Lacrimal surgeries	5,394	2,387
Laser procedures	85,536	27,072
Orbit and oculoplasty surgeries	7,522	2,856
Others	10,657	2,750
Refractive surgery	5,436	2,534
<b>Total Surgeries</b>	<b>408,220</b>	<b>145,403</b>

### Cataract Services

Endophthalmitis is one of the most feared complications after cataract surgery. A study was undertaken at Aravind - Madurai to find the efficacy of Auromox, an Intra Cameral (IC) injection produced by Aurolab in reducing the risk of endophthalmitis. The drug was administered to all charity patients at the conclusion of cataract surgery from August 2014. The electronic health record data of 116,714 patients who underwent cataract surgery in the following 14-month period was reviewed. The endophthalmitis rate which was 0.08% before IC moxi initiation period significantly reduced to 0.02% after starting the drug. The results

#### Wetlab practice sessions



were published in 'Ophthalmology' journal in the February 2016 issue. Endophthalmitis rate before and after initiation of IC moxifloxacin prophylaxis across 10 surgical centres of AECS was also analysed. Results showed an overall 3 fold reduction in endophthalmitis rate after initiating IC moxifloxacin.

Managing complications and complicated cataract cases is a challenge, even for experienced surgeons. In order to better equip young surgeons to manage these complex situations, hands on wetlab practice sessions coupled with lectures were conducted on May 23 and March 26-27 at Aravind - Madurai with support from Alcon. A month-long similar training was held at Aravind - Pondicherry in July and December. Wetlab training included management of posterior capsule tear, anterior vitrectomy basics, lens management and IOL implantation techniques.

### Uvea Services

As the clinics at Aravind - Pondicherry, Salem and Coimbatore encounter lots of presumed viral posterior uveitis cases, a study was initiated to find out the root cause of the disease. As part of the study, serum is being collected and stored at minus 70 degrees for presumed viral posterior uveitis for future analysis.

Another multi-centric study titled FAST- First line Anti metabolites as Steroid sparing Treatment analyses

Theni	Tirunelveli	Coimbatore	Pondicherry	Tirupur	Dindigul	Salem	Tuticorin	Udumalpet	CBE CC
9,366	31,953	58,168	43,069	3,250	3,008	10,231	3,356	3,490	676
118	1,152	1,316	1,025	51	55	112	43	0	10
2	1,359	4,064	1,986	0	1	363	6	0	1
0	302	719	251	0	0	0	0	0	0
3	759	884	327	0	0	35	0	0	3
224	170	1,485	813	64	81	296	43	15	34
4	176	457	402	15	3	75	0	0	0
45	695	1,014	1,181	6	0	66	0	0	0
2,077	14,870	21,953	12,623	895	875	3,736	825	367	243
222	1,183	1,910	935	58	112	137	75	27	7
39	1,396	3,127	2,950	6	34	197	128	22	8
0	701	968	1,043	0	0	190	0	0	0
12,100	54,716	96,065	66,605	4,345	4,169	15,438	4,476	3,921	982

two immunosuppressives namely methotrexate versus mycophenolate to find out which is the better one in non-infectious uveitis cases. The study gains importance in the context that so far no comparative study has been done on immunosuppressives and they are prescribed based on patient's and doctor's preference.

Other international drug trials like Sakura and Spring study too have brought in new understanding on immunosuppressive treatment modalities. Recent European Medicines Agency (EMA) team that came to inspect for Sakura study at the clinic in Madurai delivered an encouraging note that the safety and well-being of subjects were taken care in a proper manner.

*Staff and doctors of the Uvea Services at Madurai with Dr.S.R. Rathinam at the inauguration of the renovated clinic*



The Uvea Services at Aravind - Madurai was renovated with latest infrastructure and was inaugurated on 1st of October. The new clinic is more spacious and helps to maintain a comfortable patient flow within the department. The isolated counselling chamber ensures privacy for patients. The Uvea Services at Tirunelveli too underwent remodelling and the new premises became functional from January 1.

### *Retina Services*

With the number of diabetic population growing rapidly, the number of people losing vision due to diabetic retinopathy is ever increasing. Sensitising the

*At the inauguration of the renovated Uvea Services at Aravind-Tirunelveli*





public about the consequences of the disease is one of the top priorities of the Retina Services across all Aravind Eye Hospitals. Towards this, various awareness creation activities including screening camps, seminars and exhibitions were organised in educational institutions, industries and offices. Retina Services also collaborate with diabetes hospitals to screen patients for diabetic retinopathy.

Under the Retinopathy of Prematurity Eradication - Save Our Sight (ROPE-SOS) project, screening of babies in rural areas via telemedicine was initiated in August 2015 at Aravind - Coimbatore. 1666 babies were screened and 243 babies were diagnosed to have ROP, of which 18 babies were identified to have blinding ROP and treated. Optical Coherence Tomography - Angiography (OCT-A) was introduced for evaluation of macular diseases at Aravind - Coimbatore and Madurai. It is a non-invasive, patient friendly way to further evaluate common macular diseases like diabetic macular edema (Ischemic), Choroidal Neo Vascular Membranes (CNVM) and other conditions. The clinic introduced scleral autograft to close optic disc pit maculopathy associated with macular detachment. This new initiative showed promising results for otherwise poor prognosis/results seen. Lens capsule autograft for failed macular hole surgery cases was started which showed good outcomes in otherwise difficult to manage cases. Aflibercept, a new antiVEGF intravitreal injection was introduced for the treatment of choroidal neovascular membrane occurring in many conditions like Idiopathic Polypoidal Choroidal Vasculopathy (IPCV) and Age related Macular Degeneration (AMD). On the occasion of World Diabetes Day, clinics across the Aravind centres were involved in various activities to create awareness on diabetic retinopathy amongst the public.

*OCT - A for evaluation of macular diseases*



At Aravind - Pondicherry, photodynamic laser treatment was introduced for Polypoidal Choroidal Vasculopathy (PCV) patients who were earlier referred to other Aravind centres. Similarly, the department also started doing ROP surgeries. The clinic was expanded to accommodate more patients in a comfortable manner. It also acquired ERG machine and is waiting for installation.

### *Paediatric Ophthalmology Services*

The department at Madurai has expanded their orthoptic division with a separate wing for binocular vision assessment and vision therapy. This service helps us to diagnose specific problems associated with accommodation, and those with difficulty in changing focus for near and distance. The beneficiaries are older children and young adults and those with small angles of deviation. To treat these patients, the department offers office-based and home-based exercises including computer-based exercises.

To improve the follow up rate of patients with amblyopia, Paediatric ophthalmology services at Aravind - Coimbatore introduced reminder calls to patients and appointment system. Appointment patients will get preference from entry to exit. Similar system was introduced for patients coming for review after squint or cataract surgery. Necessary steps were taken to ensure that patient waiting time is reduced. Lateral rectus palsy, if left untreated can result in prolonged recovery period and troubling double vision. To treat this condition, the clinic started administering Injection Botulinum toxin into the medial rectus muscle of the eye. This will temporarily relieve the patients of double vision and avoid muscle contractures. In some

*Binocular vision assessment*



cases, this procedure can also lead to full recovery and avoid surgery.

Through different projects, the paediatric ophthalmology services across the centres took measures to effectively address the problem of visual impairment in children of various age groups.

### *Cornea Services*

At Aravind - Coimbatore, Gebaeur Microkeratome was introduced to perform automated endothelial keratoplasty which reduces surgery time as well as improves quality. Botulinum toxin injections were started instead of temporary tarsorrhaphy, a procedure where lids are sutured together to keep them closed to aid in corneal healing. Suturing is a painful and cosmetically compromising procedure. Injecting Botulinum toxin will cause lid muscle weakness, and closure of lids for few weeks to months. This procedure is painless and will not cause scarring.

Cornea Services at Madurai is on an ongoing mission to provide evidence based medical care to all sections of the society. It was a productive year, in that the largest number of keratoplasties were performed. Additionally, the department presented 70 papers in national and international conferences. The department also published 15 articles in top class international journals with high impact factor. Seven national and regional awards were bagged by the team which is a testimony to the department's quest for ongoing excellence.

Penetrating Keratoplasty (PKP) skills transfer course was organised at Aravind - Madurai from 8th to 11th March, by department of Cornea in association with SightLife. Six participants from various parts of India and Bangladesh, associated with Government hospitals and NGOs got opportunity to refine their PKP skills under the guidance of Dr. Anthony Aldave, Dr. James Lehmann and Dr. Manoranjan Das. All the fellows and consultants of cornea clinic had the chance to discuss and share their difficulties experienced in management of PKP patients with some of the best in the field during the course.

Landmark studies like MUTT 1 and SCUT studies on infectious keratitis has captured global attention and has become the topic of discussion in many national and international forums. These studies paved the way for newer international collaborations. The department has already finished MUTT 2, smartphone study and has embarked on a new project involving collagen cross linking in collaboration with University of California, San Francisco. Many new research projects

in collaboration with different universities across the world like University of Texas, Liverpool, Illinois, Los Angeles, London school of Hygiene, Singapore National Eye centre are underway.

With support from Francis I. Proctor Foundation for Research in Ophthalmology, University of California, San Francisco, Cornea Services at Aravind - Madurai has undertaken a study to determine whether diagnosis and prophylaxis of corneal abrasions by trained village health workers will reduce the incidence of corneal ulceration in rural south India. It is a cluster-randomised clinical trial assessing the efficacy of an active intervention with topical chloramphenicol and topical Itraconazole ointment after corneal abrasion as a preventive measure against development of an infectious corneal ulcer. As part of the study, the villages were randomised into two groups (intervention and control arm). Persons in the intervention arm receive treatment for corneal abrasions and a community-wide promotional campaign is undertaken by the eye health workers to promote treatment of corneal abrasions within 24 hours of them occurring. Patients who present to the eye health worker with corneal abrasion/eye injuries are taken to the nearest Aravind vision centre where trained ophthalmic personnel under supervision of qualified ophthalmologist at Aravind-Madurai is treated with the above indicated medicines. Patients with corneal abrasions who present to eye care centres in control villages are treated as per the standard treatment protocol, but a promotional campaign is not been undertaken.

As per the study protocol, first year census work is being carried out in the study population to update the birth/death/migration details as well as to know the incidence of corneal ulceration.

#### *PKP skills transfer course*





The fellowship programme has also been raised to an international level where the fellow is now offered to perform complex corneal surgeries like keratoprosthesis and lamellar surgeries apart from routine cornea surgeries. Each fellow is involved in at least one clinical and basic science research project.

The clinic is setting the benchmark in quality of care through new initiatives that raise the standard of patient care and safety.

An innovative and different technique of doing keratoprosthesis where sclera was used as a carrier for K-PRO device rather than cornea, a first of its kind of surgery was performed successfully. The department does internal medical auditing of the outpatients' clinical and in-patients' surgical procedures every week. An initiative has been taken to reduce the bed occupancy rate for post-operative patients thereby promoting day-care surgical procedures.

The cornea module for the electronic medical records has been developed. Although it was a challenge to design the cornea drawing module since it was the first of its kind, with the hard work and dedication of the IT team the cornea department is ready to explore the world of paperless records. In collaboration with Aurolab, a new device "CORNIVIEW" was designed to grade the donor corneas and it was successfully launched at the Annual Conference of Cornea Society of India. The department has now its own Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK) glide, developed with the help of Aurolab.

Cornea Services at Aravind - Pondicherry started harvesting amniotic membranes in collaboration with AG Padmavathy Hospital. It is then processed at Aravind and used for ocular surface reconstruction procedures at eye bank.

*Mr. G. Srinivasan inaugurating the renovated Neuro-Ophthalmology Services at Madurai*



## *Neuro-Ophthalmology Services*

Neuro Services at Aravind - Madurai moved to spacious premises on April 15, providing better amenities and comfort to patients.

## *Low Vision Services and Vision Rehabilitation Centre*

At Madurai, paediatric vision assessment was strengthened with the guidance of Dr. Linda Lawrence, Ophthalmologist, Kansas. She examined 39 children with visual impairment and guided the parents as to how to deal with them. From January 2016, onwards Vision Rehabilitation Centre started following a standardised method to assess vision of children aged 0 - 3 years and those who are with multiple disabilities. 140 children were thus assessed and provided intervention. A separate proforma was developed and used to document the details of children aged 0 - 5 years. This has helped the ophthalmologist and other eye care professionals understand the child's vision status and progression during each visit.

As part of USAID project, Dr. Nagamani Beligere, Developmental Paediatrician from University of Illinois visited vision rehabilitation centre and performed developmental assessment for 123 children with Retinopathy of Prematurity. This assessment helped the parents get a better understanding about their child's present level of functioning and activities. Dr. Nagamani also suggested ways to improve child's performance.

The centre also introduced bioptic telescope for patients to improve their distance vision. The equipment is designed to provide a wider field of view and is easy to use.

*Dr. Linda Lawrence examining a patient with Low Vision*



## Glaucoma Services

Under the guidance of Professor Kamalini Ramdas from London Business School, the Glaucoma Services at Aravind - Pondicherry introduced the concept of Shared Medical Appointments (SMA). Here the doctor meets multiple patients as a group during the final examination stage. Each patient will be examined and prescribed in the classic one on one fashion while others listen to them. This initiative helps patients to understand glaucoma in a better way thereby improving their compliance to treatment and follow up. The clinic moved to renovated and spacious premises on July 10.

Upon request, Glaucoma Clinic, Madurai organised a family screening camp on July 12 at Devakottai during a family celebration of one of its glaucoma patients. A group of doctors and staff did screening of 53 blood relatives. Blood samples were collected to study the genetic basis. Seven relatives were diagnosed with Primary Open Angle Glaucoma (POAG), 5 were glaucoma suspects and 4 were diagnosed with angle closure disease. A detailed pedigree was created to identify the complexity and genetic basis of POAG in the family.

The research project, identifying the barriers to diagnosis and treatment of congenital glaucoma in Southern India is underway at Aravind - Madurai. The project's subject matter is one that the World Glaucoma Association has identified as a priority in its 2013 Consensus Statement. Identification of the best standards of care for rare diseases is especially important to the field of public health and resource planning. Hospital and home based questionnaire survey is being done on identifying the challenges that

the childhood glaucoma patients and their caregivers face.

For better patient comfort at Aravind-Madurai, direct registration exclusively for glaucoma patients has been introduced. In addition to the Heidelberg Retinal Tomograph, an Optical Coherence Tomography machine has been installed exclusively for glaucoma patients. The clinic also acquired an additional Humphrey Visual Field Analyser.

## Orbit, Oculopasty and Ocular Oncology Services

The clinic at Madurai was shifted to spacious premises on August 22. With a better infrastructure now, there are separate areas allotted for research, prosthesis centre and counselling. A fully equipped operation theatre for performing minor surgical procedures and for post-operative care has been set up. Plans for a separate aesthetic clinic are also underway.

Genetic testing was carried out in 30 retinoblastoma patients and appropriate counselling was provided. Next Generation Sequencing system Illumina-Miseq was installed for improving the genetic testing of retinoblastoma patients. This system will also be useful to understand the process of tumor development and progression of retinoblastoma. In addition to the existing tests, newer methods (Promoter methylation, MYCN amplification) were adapted for the analysis of retinoblastoma tumors.

The department at Pondicherry showed a sustainable growth in both out-patient turn out and surgeries especially orbitotomies. The clinic has started offering long term fellowship.

*Patients under the Shared Medical Appointment (SMA) scheme with Dr.Kavitha*



*Prof. Muthukkaruppan, Mr. G. Srinivasan and Dr. Natchiar with Dr.Usha Kim at the inauguration of the renovated Orbit Services*







Street play and Rally at Aravind - Tirunelveli



Awareness programmes for School children at Aravind - Coimbatore



## Observing Eye Donation Fortnight

'Blind Walk' with visually challenged volunteers at Aravind - Madurai





# Aravind Eye Banks

It was a year of achievements for Aravind Eye Banks. Eighteen years into the journey in eye banking, Aravind Eye Banks have so far harvested around 51,100 corneas. This is a remarkable milestone in eye banking in India. The efforts of Rotary Aravind International Eye Bank (RAIEB) in reducing corneal blindness were recognised and honored by two prestigious national forums - SightLife and Eye Bank Association of India.

RAIEB received SightLife quality certification for two years for maintaining international standards in eye banking.

Aravind's eye donation centre at Kumbakonam, opened two years ago as a first of its kind initiative in India was nationally acclaimed for its productivity, both in terms of cornea collection and utilisation. The centre caters to eye donation calls 24 hours, 7 days a week, with the help of technicians and the model is being replicated by a few eye banks in India. The centre also helped to create a good network to improve eye donation in the community. A similar centre was opened in Virudhunagar on August 26. Awareness programmes were organised in offices, educational institutions, industries, to create awareness on eye donation in the community. Propaganda given through various social media helped in better networking and creating a greater impact.

For the Hospital Cornea Retrieval Programme, Aravind Eye banks have good tie up with the Government and Non-governmental organisations. Trained eye donation counsellors have been deputed at the hospitals for providing counselling to the family members of the deceased. Apart from using the tissues at Aravind Eye Hospitals, over 250 corneal tissues were distributed to other eye hospitals as well.

*Inauguration of Eye Donation centre at Virudhunagar*



*Eye donation counsellor receiving consent from next of kin at the mortuary in the Government hospital, Madurai*

Eye bank in collaboration with Cornea Services offers training programmes to cornea surgeons and staff of other eye banks. In addition to this, eye bank also extended its technical support to eye banks for effective eye banking.

## National Eye Donation Fortnight

Aravind Eye Hospitals observed organising various programmes which included awareness lectures, rallies, felicitating donor families and honoring NGOs who supported the cause of eye donation. Pamphlets were also distributed to the public seeking their support towards eye donation.

## Performance 2015 - 2016

	Eyes collected	Eyes utilised
Madurai	2,430	1,381
Coimbatore	1,794	687
Pondicherry	1,139	301
Tirunelveli	489	244
Total	5,852	2,613

*Training in counselling for eye donation to the staff of a private hospital in Dindigul*





## Community Outreach



*The outreach wing of Aravind that started as a simple cataract screening camp has in the past four decades evolved into a comprehensive movement - that involves the communities it serves. Over five hundred institutions, industries and individuals help Aravind as sponsors to reach out to the remotest communities.*

*In the last year, 2,590 camps were conducted through which 570,761 patients were screened and 86,325 underwent surgery.*

## *New Initiatives in Outreach Camps*

Keeping pace with technology advancements, appropriate modifications were made in the camp screening protocol in the last year.

Perkin's Tonometer replaced Shiotz, which ensured high accuracy in measuring intraocular pressure.

To ensure proper compliance to spectacles wearing, Aravind started providing spectacles free of cost for post-op cataract patients during the review camps.

To facilitate smooth admission process, Aravind started documenting the necessary details of the patients to be brought to the base hospital for surgery at the camp site itself.

Aravind has been imparting training to specially identified school teachers to do preliminary eye examination in school children. The children thus diagnosed with vision problems are further screened by the hospital team. Recently, this training is provided to all class teachers to perform preliminary vision tests. This has proved to be more effective, in terms of accuracy in findings and in saving the time taken for screening.

A monitoring system was developed to track the follow up rate of speciality cases referred through camps. To increase the compliance to follow up, Aravind - Pondicherry, introduced a system in which the speciality cases identified in camps were given a unique ID card and on reaching the hospital they were offered exclusive counselling. Aravind - Pondicherry also initiated blood sugar examination at the camp site itself which made sure that only those patients found to be fit for surgery were taken to the base hospital.

The success of Aravind's outreach camps depends to a great extent on the selfless support rendered by the



*Training school teachers to perform preliminary vision tests*

sponsors. Many a time it so happens that they are overburdened with various responsibilities at the camp site. To address this situation, Aravind - Pondicherry came up with an innovative idea of identifying enthusiastic volunteers from the community who would work with the sponsors. PAVES-Programme for Aravind Volunteers Support was conducted for these volunteers on April 17 to orient them into the camp proceedings. Nearly 65 volunteers took part from Cuddalore, Viluppuram and Tiruvannamalai districts. Certificates and identity cards were issued to these volunteers.

Another innovation by Aravind - Pondicherry was the introduction of fundus examination in comprehensive camps which was found useful in identifying patients with diabetic retinopathy and glaucoma. Aravind - Pondicherry started conducting diabetic retinopathy screening camps in primary health centres in Karaikal district after obtaining permission from the government officials. Discussions are underway with the health department officials of Pondicherry to conduct similar camps in primary health centres in Pondicherry.

*Using Perkin's Tonometer at an eye camp*



*Organisers of the DR camp at Karaikal Primary Health Centre*





## Towards Ensuring Universal Coverage in Eye Care

In the last decade, Aravind has moved on to serving the communities through Primary Eye Care Centres (Vision Centres). These are small, permanent facilities set up to extend eye care service to remote and rural communities. They offer innovative internet-based information technology that allows patients in rural areas to be remotely diagnosed by ophthalmologists at the base hospital.

In the last year, six Vision Centres were established at Pennadam (June 5); Ilayangudi (July 27); Puthiamputhur (August 28); Sedapatti (November 27); Rayavaram (January 22) and RS Mangalam (February 22), taking the total to 57 Vision Centres.

For the first time, since the inception of Vision Centres, the number of out patient visits handled at the Vision and Community Centres (624,157) have crossed the numbers seen through screening camps (570,761).

Permanent eye care facilities in rural areas encourage people to seek earlier treatment for vision problems, allowing them to reintegrate back into the workforce instead of becoming increasingly unproductive due to decreasing vision. This new pattern of proactively seeking eye care before it is too late makes the role of vision centres even more crucial in an eye care institution's outreach initiatives.

Aravind's vision centre model is gaining increasing acceptance and has been selected by the Government of Uttar Pradesh to implement in 5 districts namely Agra, GB Nagar, Kanpur, Gorakhpur and Allahabad. Recently, upon invitation from the Uttar Pradesh Government, Mr. Mohammed Gowth, Manager - Vision centres

*Mr. Mohammed Gowth with Chief Minister Shri. Akilesh Yadav in Uttar Pradesh*



made a presentation on this model in the presence of Chief Minister, Shri. Akilesh Yadav and other senior government officials on November 14.

### *Equipping Vision Centres to detect speciality diseases*

Aravind Eye Care System and Bosch joined hands to provide comprehensive eye care through vision centres. The vision centre would be equipped with an eye camera, the MediBilder software and an automated detection platform. The camera operates on a rechargeable battery, thus making it lightweight and portable. The findings from the eye camera can be shared over telemedicine using the MediBilder software. The automated detection algorithm can detect and mark conditions like diabetic retinopathy and glaucoma. Thus, a patient need not physically travel all the way from his/her place to the hospital as the vision centre serves the purpose. This initiative is expected to enhance quality at primary eye care level especially when it looks for diseases beyond cataract and refractive errors.

Training programmes were organised for technicians of vision centres at regular intervals to equip them to detect basic eye problems.

### *Creating Awareness in the Community*

Eye camps in addition to providing eye care, play a great role in enhancing public's awareness of eye diseases and improves the health-seeking behaviour of the

*Training programmes for technicians of vision centres to equip them to detect basic eye problems*





Pennadam



RS Mangalam



Puthiamputhur

*Vision Centres inaugurated  
from April 2015 to March 2016*

Sedapatti

Rayavaram



Ilayangudi





community. Vision centres organised exclusive camps for screening speciality eye diseases, thus creating awareness about the disease amongst the public. Eye care awareness rallies and seminars were organised on various occasions.

Blindness prevention has always been a core activity of Lions Clubs and they have a long-standing association with Aravind Eye Hospitals. Every year, Aravind conducts SightFirst seminars for office bearers of Lions Clubs to familiarise them with the basics of common eye diseases. In the last year seminars were held at Aravind - Madurai and Aravind - Coimbatore on November 11 and Pondicherry on October 11. Lions Cabinet has decided to promote diabetic retinopathy screening as one of its main activities in the field of eye care, the disease being the leading cause of irreversible blindness.

### *Sponsors Day*

The main reason behind the success of Aravind's outreach camps is the generous support extended by the sponsors. Once in two years, Aravind organises sponsors day to acknowledge their services towards outreach programmes and also to get their feedback to improve the effectiveness of the camps. At the sponsors day conducted at Aravind - Theni and Salem, the sponsors shared their long-time association with Aravind, their

#### *Sponsor's Day at Aravind - Theni*



*Patients queuing up to be examined at the Thirukailayapuram camp*

experiences and discussed ideas that would enable them to work more effectively.

### *1000 Camp Surgeries in 2 Days*

Aravind has been conducting comprehensive eye screening camp since 1994 in association with Vetrivel Murugan Temple Committee in Thirukailayapuram near Coimbatore. In April 2015, 1261 persons were screened and 1006 patients were brought for surgery. Thanks to the whole-hearted dedication of the team, Aravind - Coimbatore achieved a rare feat of performing 999 surgeries in just two days.

## Outreach Performance April 2015 - March 2016

	Total	Madurai	Theni	Tirunelveli	Coimbatore	Pondicherry	Tirupur	Dindigul	Salem	Tuticorin	Udumalpet	CBE CC
<b>Comprehensive Eye Camps</b>												
Camps	1,532	388	102	267	373	277	2	-	91	31	1	-
Patients examined	334,465	94,515	17,437	44,903	86,466	75,155	282	-	11,235	4,344	128	-
Glasses prescribed	74,492	18,584	4,584	11,003	16,752	19,899	84	-	2,658	895	33	-
Glasses delivered	62,361	15,398	4,011	9,287	13,478	17,145	65	-	2,237	736	4	-
On the spot deliveries	48,869	11,528	3,055	7,929	11,453	13,539	-	-	772	593	-	-
%	78%	75%	76%	85%	85%	79%	-	-	35%	81%	-	-
<b>Diabetic Retinopathy Screening Camps</b>												
Camps	375	89	72	38	107	61	3	-	4	-	-	1
Out-patients screened	42,280	14,576	3,525	3,213	12,394	7,685	134	-	685	-	-	68
Diabetics Screened	20,068	6,408	2,665	1,497	5,078	3,719	125	-	508	-	-	68
DR Patients Screened	2,632	706	259	376	802	398	23	-	61	-	-	7
<b>Refraction Camps</b>												
Camps	205	53	17	59	35	26	5	-	-	-	10	-
Out-patients examined	51,687	13,576	3,777	11,844	11,890	5,778	1,097	-	-	-	3,725	-
Glasses prescribed	16,578	4,355	1,530	4,134	3,877	1,914	238	-	-	-	530	-
Glasses delivered	13,835	3,750	1,396	3,279	3,195	1,555	180	-	-	-	480	-
On the spot deliveries	7,437	2,326	1,067	2,501	1,072	461	10	-	-	-	-	-
<b>Refraction Camps by Mobile unit</b>												
No. of Camps	149	-	-	-	80	-	-	-	69	-	-	-
Patients screened	35,900	-	-	-	29,172	-	-	-	6,728	-	-	-
Glasses prescribed	3,401	-	-	-	2,000	-	-	-	1,401	-	-	-
Glasses delivered	2,508	-	-	-	1,361	-	-	-	1,147	-	-	-
<b>Eye Screening of School Children- BH</b>												
Schools served	153	49	12	30	24	19	3	-	12	-	4	-
No. of Teachers trained	2,213	754	84	620	70	685	-	-	-	-	-	-
Total Strength of Children	220,362	69,956	12,319	47,389	38,852	27,678	1,249	-	17,096	-	5,823	-
Children screened by ophth.,	35,331	6,883	1,188	5,590	13,548	5,058	194	-	2,425	-	445	-
Children id. with eye defects (RE)	1,970	455	42	423	384	353	21	-	265	-	27	-
<b>Eye Screening of School Children - VC</b>												
Schools served	22	8	4	6	3	-	1	-	-	-	-	-
Teachers trained	326	175	21	130	-	-	-	-	-	-	-	-
Total Strength of Children	16,790	5,598	3,970	6,137	865	-	220	-	-	-	-	-
Children screened by ophth.,	3,241	525	495	1,209	852	-	160	-	-	-	-	-
Children id. with eye defects (RE)	185	42	31	84	22	-	6	-	-	-	-	-
<b>School Children Screening Camps by Projects</b>												
School camps	65	-	-	-	47	18	-	-	-	-	-	-
Teachers trained	789	-	-	-	-	789	-	-	-	-	-	-
Total Strength of Children	95,984	-	-	-	23,966	72,018	-	-	-	-	-	-
Children screened by ophth.,	25,521	-	-	-	21,779	3,742	-	-	-	-	-	-
Children id. with eye defects (RE)	702	-	-	-	438	264	-	-	-	-	-	-
<b>Paediatric Eye Screening Camp</b>												
Camps	104	-	3	4	6	91	-	-	-	-	-	-
Children Examined	42,336	-	835	1,455	2,306	37,740	-	-	-	-	-	-
Refractive Errors	751	-	58	23	99	571	-	-	-	-	-	-
Glasses prescribed	503	-	6	17	55	425	-	-	-	-	-	-
Glasses delivered	460	-	3	17	18	422	-	-	-	-	-	-
Other defects identified	547	-	10	34	46	457	-	-	-	-	-	-
<b>Vision Centres</b>												
Centres	57	24	7	10	4	8	2	-	-	-	2	-
New + Review	440,625	181,352	58,104	95,110	35,507	48,490	10,105	-	-	-	11,957	-
Out-patients / day	27	27	27	32	29	20	16	-	-	-	22	-
<b>Community Eye Clinics</b>												
Centres	4	2	1	1	-	-	-	-	-	-	-	-
New + Review	95,666	45,884	20,301	29,481	-	-	-	-	-	-	-	-
Out-patients / day	77	74	65	95	-	-	-	-	-	-	-	-
<b>City Centre</b>												
Centres	2	1	-	-	-	1	-	-	-	-	-	-
New + Review	77,866	54,728	-	-	-	23,138	-	-	-	-	-	-
Out-patients / day	126	177	-	-	-	75	-	-	-	-	-	-



## Creating Eye Care Awareness in the Community

Eye care awareness rallies and seminars were organised on various occasions to enhance public's awareness of eye diseases and improve the health-seeking behaviour of the community.

### Glaucoma Awareness during World Glaucoma Week



### Glaucoma Awareness Exhibition at Aravind-Tuticorin





*Diabetic Retinopathy Awareness during World Diabetes Day*

*DR screening camp at Primary Health Centre (PHC) Devadhanapatty, Theni*



*DR Awareness exhibition along with DR camp at Aravind-Madurai*



*Awareness on Common Eye Diseases by Vision Centre field workers at Kallupatty*



*DR Awareness exhibition at Aravind-Pondicherry*

*Retinopathy of Prematurity (ROP) Awareness at Children's Hospitals by Aravind-Coimbatore*





## *Education and Training*



*You train everyone, every day - you coach them, guide them, play with them. So you can develop them quickly as top players. So they have to develop a physical stamina, mental capacity and a vision. This our doctors feel and they carry it all their lives  
- Dr. V from Infinite Vision*

With the steady growth in the volume of its work and the ever expanding facilities at Aravind, there is a constant need for trained personnel at all levels. The same scenario provides excellent opportunities for learning making Aravind an ideal centre for education and training.

In the last year ending March 2016, Aravind has trained 506 eye care professionals through its various clinical and management courses.

Every year, Aravind recruits girls who have completed their school education and trains them on-the-job as MLOPs (Mid-Level Ophthalmic Personnel), for the various jobs-nursing, housekeeping, administration, catering etc. MLOPs, the undisputed heroes behind Aravind's success, have been the backbone of the organisation from the beginning. Today, there are over 2,200 MLOPs across all Aravind facilities.



## Candidates Trained 2015-16

Total Candidates : 506

### POSTGRADUATE COURSES

Diploma in Ophthalmology (2 years)	8
Master of Surgery in Ophthalmology (3 years)	12
Diplomate of the National Board (3 years)	10
Post DO DNB (2 years)	13

### LONG TERM - OPHTHALMOLOGY FELLOWSHIP

Ant. Segment / Intraocular Lens Microsurgery (2 years)	11
Orbit & Oculoplasty (18 mths)	5
Paediatric Ophthalmology & Strabismus (18 months)	14
Glaucoma (2 years)	9
Retina Vitreous (2 years)	17
Cornea (18 mths)	18
Comprehensive Ophthalmology (2 years)	2
Fellowship in General Ophthalmology (6 mths)	13

### SHORT TERM - FELLOWSHIP (FOR INTERNATIONAL CANDIDATES)

Cornea (6 mths)	1
Glaucoma (6 mths)	1
Orbit & Oculoplasty (6 mths)	2

### SHORT TERM - CLINICAL COURSES

ECCE - IOL Microsurgery (1 mth)	3
Small Incision Cataract Surgery (1 mth)	26
Phacoemulsification (1 mth)	36
Diagnosis and Management of Glaucoma (1 mth)	22
Lasers in Diabetic Retinopathy Management (2 mths)	33
Vitreotomy (Virtual) (2 weeks)	3
Management of Retinopathy of Prematurity & Paedia. Retinal Disorders (1 mth)	8
Orientation to Paediatric Ocular Anesthesia for Anaesthetists (1 mth)	1
Neuro-Ophthalmology (3 months)	3

### SHORT TERM - PARAMEDICAL COURSES

Optical Dispensing (3 mths)	7
OT Techniques (2 mths)	6
Refraction Techniques (2 mths)	13
Orthoptist (6 mths)	4
Ocularist (3 weeks)	8
Fundus Fluorescein Angiography and Ultrasonography (2 mths)	4
Vision Technicians	3

### MANAGEMENT COURSES

Management Priorities in Eye Care Delivery (1 week)	23
Management Training and Systems Development for Hospital Administrators / Managers (4 weeks)	15
Project Management training for Eye Care (4 weeks)	9
Eyexcel - Expanding Global Eye Care Workforce through Excellence in Training (4 Days)	35
Research Methodology (5 Days)	41
Medical Records Management	5
Management Training for Eye Care Programme Managers	16
Community Outreach and Social Marketing of Eye Care Services (4 weeks)	10
Instrument Maintenance - for Technicians (6 weeks)	36



## CMEs and Training Programmes held at Aravind

### *Vaigeye 2015 - 63rd Annual Conference of Tamil Nadu Ophthalmic Association (TNOA)*

Madurai, July 24-26

Aravind Eye Hospital, Madurai in collaboration with Madurai Ophthalmologists Association organised the 63rd Annual Conference of Tamil Nadu Ophthalmic Association at Velammal Medical College, Madurai. The conference was inaugurated by Mr. Subroto Bagchi, Chairman, Mindtree, Bangalore. Guests of honour included Sri Muthuramalingam, Chairman - Velammal Medical College and Velammal Group of Educational Institutions and Dr. Revathi Kailairajan, Dean, Madurai

*Mr. Subroto Bagchi, Ms. Susmita Bagchi, Dr. G. Natchiar and Dr. Sharmila lighting the lamp at the inauguration of TNOA*



Medical College and Govt. Rajaji Hospital. The support from the management of Velammal Medical college contributed tremendously to the success of the conference. Around 1,100 delegates attended the conference which included several scientific sessions including many live surgeries.

### *Postgraduate Update in Ophthalmology*

Aravind - Coimbatore, September 4 - 6

The All India Ophthalmic Society (AIOS) education committee organised a three day South Zone Update at Aravind - Coimbatore. The programme covered all sub-specialities of ophthalmology. Academic sessions featured examination techniques, case presentations and discussions. Faculty consisted of eminent teachers from leading teaching institutions of South India.

*Dr. Ravindra Bhattu, Dr. Navin Jaya Kumar and Dr. Mahesh Kumar at the Postgraduate Update in Ophthalmology*



*Dr. Revathi Kailairajan delivering the felicitation address at TNOA Conference, Madurai*





Session in progress at the USI conference



Dr. Manohar Babu felicitating Dr. Narsing A Rao at the USI conference

### *AIOS Leadership Development Programme*

Aravind - Pondicherry, September 12-13

The world is changing at a bewildering pace, technology is moving ahead, new economies are emerging and at the same time organisations are restructuring with a view to consolidate their core competencies. In other words, organisations today demand leaders to sharpen their inherent skills and be prepared to face every competition with utmost confidence. Such was the motive behind conducting the Leadership Development Programme jointly by All India Ophthalmic Society (AIOS) and Aravind Eye Care System (AECS) at Aravind Eye Hospital, Pondicherry. The programme was attended by 17 ophthalmologists, mostly healthpreneurs, from all over the country. The programme was led by Dr. S. Natarajan (CMD, Aditya Jyot Eye Hospital),

Dr. Partha Biswas (Chairman-Academic and Research Committee, AIOS), Mr. R.D.Thulasiraj (Executive Director, LAICO) Dr. R.D.Ravindaran (Chairman, AECS), Dr. S.Aravind (Director, Projects, AECS) and Dr. R.Venkatesh (Chief Medical Officer, Aravind-Pondicherry).

### *15th Annual Conference of Uveitis Society of India*

Aravind - Pondicherry, October 23-25

Hosted by Aravind - Pondicherry, a total of 189 delegates including 39 faculty attended the meeting. The inaugural Dr. G.Venkataswamy Endowment Award was presented to Dr. Narsing A Rao in appreciation of his outstanding contributions to the field of ophthalmology. Dr. B.Manohar Babu, Chief Medical Officer, Aravind-Salem was elected as the President of the Uveitis Society of India.

*Outbound learning session for the participants of AIOS Leadership development programme at Aravind-Pondicherry*







Mr. Zoran Pejic, Ms. Daisy Godts, Dr. Rupa and Dr.P.Vijayalakshmi at the inauguration of the Orthoptics CME



Dr. Shashikant Shetty felicitating Dr. Matt J Dunn at the Orthoptics CME

### Cornea Reconnect

Aravind - Coimbatore, October 31 - November 1

The CME dealt with the diseases of ocular surface and cornea and refractive surgery. A total of 275 delegates attended the meeting including Aravind postgraduates and fellows. Apart from Aravind team, the faculty included Dr. Prema Padmanabhan, Sankara Netralaya, Chennai; Dr. D. Ramamurthy, The Eye Foundation, Coimbatore; Dr. Sachin Mathew George, Khoo Teck Puat Hospital, Singapore; Dr. Virender Sangwan, L V Prasad Eye Institute, Hyderabad; Dr. Samar Basak, Disha Eye Hospital, Kolkata; Dr. J.K. Reddy and Dr. K.S. Siddharthan from Sankara Eye Hospital, Chennai; Dr. Radhika Tandon, Dr. Namrata Sharma and Dr. Vanathi Ganesh from All India Institute of Medical Sciences, Delhi.

### Orthoptics Decoded: A Symposium on Basics and Advances in Strabismus and Nystagmus - Evaluation and Management

Aravind - Madurai, October 31 - November 1

The science of Orthoptics and recent advances in the realm of binocular vision and strabismus presents a formidable challenge to ophthalmologists and orthoptists. A sound knowledge of systematic orthoptic work-up and non - surgical intervention is required to fill the lacunae in the practice of strabismology. Paediatric Ophthalmology and Adult Strabismus clinic at Aravind - Madurai organised the symposium that aimed at exploring advancing research, providing up-to-date content in the field of orthoptics, giving the delegates an opportunity to share ideas and experiences as well as assimilating new scientific skills. It also

### Participants to Cornea Reconnect CME at Aravind-Coimbatore





At the inauguration of SPOSI organised by Aravind-Coimbatore

emphasised on advancements in the diagnosis and management of Nystagmus.

Faculty included Daisy Godts, Chief Orthoptist, Antwerp University Hospital, Belgium; Zoran Pejic, Orthoptist and Vision Deficiency Specialist, Orthovision Pvt Ltd, Singapore; Matt J Dunn, Deputy Director and Optometrist, Research Unit for Nystagmus, Cardiff University, UK; Leen Staelens, Optometrist, Eye Clinic, Deurne, Belgium; Rizwana, Optometrist, Sankara Nethralaya, Chennai; Arnab Banerjee, Orthoptist, Sankara Nethralaya, Kolkata; and Premkumar Singh, HOD, Optometry, Dr.Shroff's Charity Eye Hospital, Delhi. Over 240 delegates participated in the symposium.

### *22nd Annual Conference of Strabismus and Paediatric Ophthalmology Society of India (SPOSI)*

Aravind - Coimbatore, December 12-13

Aravind - Coimbatore hosted the annual conference at Hotel Le-Meridien, Coimbatore under the chairmanship of Dr. P.Vijayalakshmi and Dr.Kalpna Narendran as Organising secretary. Around 200 delegates from all over India and abroad attended the conference.

Dr.Marilyn Miller, Professor of Ophthalmology, Illinois Eye & Ear Infirmary, University of Illinois at Chicago, U.S.A inaugurated the conference. It provided a healthy platform for young ophthalmologists to share their experiences through video sessions, free papers, interesting case presentations and e-posters.

## *Residents Social Responsibility Programme*

The postgraduate doctors at Aravind with their extremely busy academic and clinical schedule hardly have time to get to know more about the softer aspects of life. Residents Social Responsibility programme, an initiative started



six years ago exposes and sensitises them to the plight of the less privileged in the community. It provides opportunities for them to help them in whatever ways they could to make a difference in those unfortunate people's lives, beyond medical care. The activities included feeding the abandoned and the mentally ill on the streets, visiting children in orphanages and senior citizens in old age homes, spending time with them who have been left uncared for by their dear ones and so on. In the last year, sales of products made by visually challenged people was organised at Aravind - Madurai. The products made by women at Trichy-based Rehabilitation Centre for the Blind included incense sticks, candles, bed linen, kitchen towels, door mats, cloth napkins, tea coasters, baskets etc. The enthusiastic team of postgraduate students helped the centre collect a handsome amount of Rs. 1,50,000 from the sales.



## Internal Capacity Building

*Dr. Devendra Maheswari, Glaucoma Services  
Aravind - Tirunelveli*

Dr. Devendra Maheswari visited Kellogg Eye Centre, University of Michigan, Ann Arbor, where he spent time with Dr. Paul Lichter in his clinic and operating room. He observed Dr. Paul still practising old glaucoma surgeries called thermal sclerostomy with excellent results. He also spent time with Dr. Paul Lee, the current chair and head of Glaucoma Services to learn evidence based glaucoma practice and essential tips for long term successful trabeculectomy. He attended the 38th Annual Mid-West Glaucoma Symposium - IOP.

At Wilmer Eye Institute, Johns Hopkins university, Baltimore, Dr. Devendra met Dr. Pradeep Ramulu who is in charge of resident teaching and discussed the prospects of future research collaboration with Aravind. He also met with Dr. David S Friedman, head of Dana center of Preventive Ophthalmology.

At Bascom Palmer Eye Institute, Miami, Florida, Dr. Devendra observed Dr. Richard Paris, Head of Glaucoma Services and Dr. Steven J Gedde. He observed GDD surgeries and management of its complications.

Finally, he attended the Annual meeting of American Academy at Las Vegas, Nevada and attended glaucoma and retina subspecialty days. He also participated in skill transfer courses on Schlemm Canal Surgery with Drs. Iqbal K Ahmed, Alan S Crandall MD, and Robert Stegmann MD as main instructors.

*Dr. Neethu Mohan and Dr. Devendra Maheswari with  
Dr. Christine Melton and her husband Dr. Richard Hirschman in  
New York. Dr. Christine was the first resident from the US to come  
to Aravind almost three decades ago. For the past several years,  
their house has become a home away from home to all Aravind  
doctors who go to New York for observership*



*Dr. Neethu Mohan, Glaucoma Services,  
Aravind - Madurai*

At Wilmer Eye Hospital, Baltimore, Dr. Neethu observed the clinics and surgeries with stalwarts in the field of glaucoma - Dr. Pradeep Ramulu, Dr. Harry Quigley and Dr. David Friedman. She observed the technique of laser suture lysis of the tube ligation suture of Baerveldt implant, which seemed to give controlled and predictable outcomes.

Dr. Neethu observed at the operating room and clinic with Dr. Alan Robin. At the University of Maryland, she established contacts with doctors interested in doing a collaborative study with Aravind. At Bascom Palmer Eye Institute, Miami, she observed with Dr. Steve Gedde, pioneer of the Trab versus Tube study. She watched a number of tube surgeries and tube revisions. It was interesting for her to observe the meticulous documentation of field studies and ONH imaging in their patients. She was also fortunate to observe Dr. R. Parrish in his clinic.

Dr. Neethu observed Dr. Joseph Panarelli in the clinic and OR at Mount Sinai Hospital, New York. She got an opportunity to observe tube surgeries in paediatric glaucoma, 360 degree trabeculectomy with i science micro catheter and innovative techniques of venting the Baerveldt. She also observed Dr. Janet Serle in the clinic and was surprised to see Goldmann perimetry still being done especially in those who are unable to do HFA. She could see many interesting cases of anterior segment imaging in secondary glaucoma.

Dr. Neethu had the opportunity to make a presentation on Aravind and small incision cataract surgery at Mount Sinai Hospital and the New York Eye and Ear Infirmary. At AAO conference, she

*Dr. Neethu Mohan and Dr. Devendra Maheshwari with Dr. Steve  
Gedde at the Bascom Palmer Eye Institute*



attended the sub-speciality day and a few instruction courses including those on glaucoma following Boston keratoprosthesis and RNFL imaging.

*Dr. Dayakar Yadella, Orbit and Oculoplasty Services Aravind - Pondicherry*

At Kellogg's Eye Centre, Ann Arbor, Michigan, USA, Dr. Dayakar observed the excellent orbit and oculoplasty team with state of art technology like Stryker CORE with Neuro drill/burr, saw with SONOPET technology and 3D-Imaging similar to C-ARM technology in orthopaedics. It was a thrilling experience to observe orbital decompression without injuring the brain. He had the opportunity to spend time with Dr. Raymond Douglas, the world renowned expert in thyroid eye diseases and section editor in Smith and Nesi Orbit and Oculoplasty book, in his clinics and surgeries. He interacted with Dr. Alon Kahana, senior consultant in Orbit and Oculoplasty, section editor in Smith and Nesi-Orbit and Oculoplasty book. He suggested the idea of making an opening inside the lacrimal intubation tube and leaving it in the lacrimal sac as it acts as an excellent passage in common canalicular block patients which can be manufactured in Aurolab. He attended the weekly grand rounds, clinical meetings and also the international ophthalmology night. He also met Dr. Paul Littman, Director, Proctor foundation who is closely associated with Aravind.

At Moran Eye Centre, Salt Lake City, Utah, USA, Dr. Dayakar got the opportunity to observe Dr. Patel in his clinics. He learnt a lot from him, especially patient communication skills. He learned the intricacies of oculoplastic surgery from him. At the AAO meeting in Las Vegas, he attended the retina sub-speciality day,

*Dr. Dayakar Yadella, Dr. Alon Kahana at Kellogg's Eye Centre*



orbit symposium and instruction courses. He interacted with excellent international faculty like Peter Dolman and Tim Sullivan.

Dr. Dayakar observed Dr. David Chang's high volume, high-end cataract surgery. Dr. David uses split drape to cover the eye instead of placing the drape and cutting it open, it covers very well, no eye lashes exposed and a very good view. He does CCC under saline which saves a lot of visco and uses capsule polisher before placing IOL, which helps a lot in preventing PCO formation.

*Dr. Kowsalya, Neuro-Ophthalmology Services, Aravind - Madurai*

Dr. Kowsalya started her observation in the department of Neuro-ophthalmology at Mass Eye and Ear Infirmary. She got an opportunity to observe examination and management of patients with all neuro ophthalmological disorders, especially Giant cell Arteritis. She interacted with stalwarts like Dr. Dean Cestari, Dr. Joseph Rizzo and Dr. John Gittinger. She got an opportunity to see Temporal Artery Biopsy for GCA and also strabismus surgeries with Dr. Dean Cestari. She also got to be in the radiology reading room to read MRI images of head and neck with Dr. Hugh Curtin. At the Visual Rehabilitation Centre, Dr. Kowsalya observed patients with Dr. Gallantis. She presented a case report on Fulminant Idiopathic Intracranial Hypertension in the Neuro-Ophthalmology Conference and attended a guest lecture by Dr. Lui Grant on Paediatric Pseudotumour Cerebri. She also attended a CME on Visual Function at Schepens Eye Research Institute, Boston. She got to observe cataract surgeries as well and a scleral fixated IOL on a patient with Pseudophacodonesis. Dr. Kowsalya visited Boston Eye and Laser Centre to observe Dr. Bradford Shingleton

*Dr. Joseph Rizzo and Dr. Kowsalya at the Mass Eye and Ear Infirmary*





- his extensive preoperative work up, meticulous cataract surgeries and Yag capsulotomy. At the AAO conference in Las Vegas, she attended the meetings of Retina and Refractive Surgery subspecialty as well as Neuro-ophthalmology sessions.

*Dr. Karthik Srinivasan, Retina and Vitreous Services, Aravind - Tirunelveli*

Dr. Karthik Srinivasan visited the Massachusetts Eye and Ear Infirmary at Boston, USA from September 15 - October 30. He got an opportunity to interact with stalwarts in the field of Retina sub-speciality including Dr. Dean Elliot, Dr. Evangelos S. Gragoudas, Dr. Deeba Husain, Dr. John I. Loewenstein, Dr. Joan W. Miller, Dr. Shizuo Mukai, Dr. Demetrios Vavvas and Dr. Lucy H.Y. Young. He observed Dr. Dean Elliott in his surgeries and also attended his clinics. He also took part in the grand rounds, lectures and case discussions.

From November 2-9 he was at Vanderbilt Eye Institute, Nashville, Tennessee where he did an observership under Dr. Anita Agarwal. He also got an opportunity to see cases that he had only seen in text books.

At Las Vegas, Dr. Karthik attended the subspecialty day on Retina at the Annual Meet of the American Academy of Ophthalmology from November 12-16.

At Dusseldorf, Germany, he attended the MEDICA expo from November 17-19 which attracted 130,000 specialist visitors from around 120 nations. He also visited Aurelios Augenzentrum, Recklinghausen, Germany where he met and observed Dr. Gabor Scharioth from November 22-25.

*Dr. Karthik Srinivasan with Dr. Dean Elliot at Mass Eye and Ear Infirmary, Boston*



## Conferences Attended Elsewhere

*30th Asia Pacific Academy of Ophthalmology Congress*  
Guangzhou, China, April 1-4

**DR. R. VENKATESH**

- Economics of successful high volume cataract surgery system: the Aravind model
- Manual small incision ECCE
- Pre-operative planning with wetlab & OSCAR grading
- The new Aravind tube shunt
- MSICS in difficult situations like white cataract, brown subluxated lenses and small pupils
- Manual small incision cataract surgery and deficient posterior capsules; Iris fixation and scleral fixation strategies for IOLs

**DR. S. KAVITHA**

- Family history in angle closure glaucoma
- SICS basics

*Annual Conference of American Society of Cataract and Refractive Surgery*

San Diego, USA, April 15-25

**DR. KALPANA NARENDRAN**

- Verion image guided system

**DR. R. VENKATESH**

Panelist at ASCRS video symposium on

- Challenging cataract cases

**DR. SANDRA GANESH**

- Chief instructor in Instruction course Biometry in Pediatric Cataract and co-instructor in Maximising Uncorrected Visual Outcomes post Cataract surgery

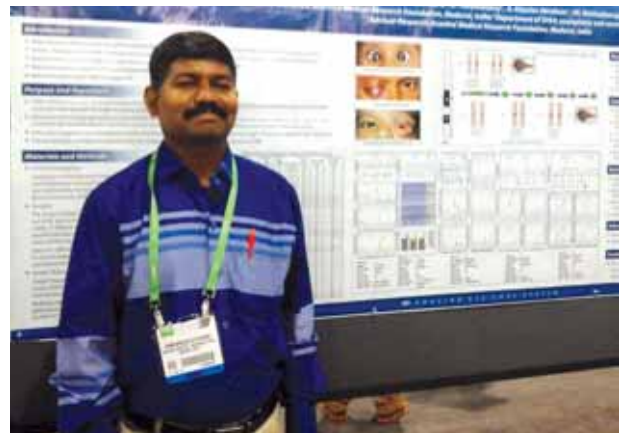
*World Cornea Congress*

San Diego, USA, April 15-18

**DR. N. VENKATESH PRAJNA**

- MUTT- Trials and tribulations

*Dr. A. Vanniarajan at the American Association for cancer Research meeting, Pennsylvania*



American Association for Cancer Research Meeting  
Pennsylvania, USA, April 18-22

DR. A. VANNIARAJAN

- Advanced paternal age as a possible risk factor for retinoblastoma (poster)

Annual Conference of US Association for Research in Vision and Ophthalmology (ARVO)

Denver, Colorado, USA, May 3 - 7

DR. P. SUNDARESAN

- Establishment of retinal transcriptome gene expression signature for diabetic retinopathy using human cadaver eye

DR. M. VIDYARANI

- Pseudomonas aeruginosa induced autophagy in human corneal epithelial cells

DR. D. BHARANIDHARAN

- Human corneal microRNA expression profile in fungal keratitis

DR. A. VANNIARAJAN

- A new sequential screening strategy for rapid diagnosis of retinoblastoma

MS. K. JHANSI RANI

- miR-203 inhibits Np63a dependent clonogenicity in corneal epithelial stem cells (CESCs)

MS. ROOPAM DUVESH

- Cytokines and chemokines profile in aqueous humor of PACG eyes

DR. SABYASACHI SENGUPTA

- Screening for vision threatening diabetic retinopathy using a portable hand held non-mydratric fundus camera

Dr. P. Sundaresan participated in the Asian Eye Genetics Consortium and Global Eye Genetics Research group meeting.

Canada India Healthcare Summit 2015

Ontario, Toronto, Canada, May 19 - 20

DR. P. NAMPERUMALSAMY

- Aravind model - inspiring innovations expanding horizons

Aravind Medical Research Foundation (AMRF) team at the US-ARVO conference, Denver, Colorado



He also participated in the panel discussion on Innovations in health care delivery.

Annual Conference of the World Association of Eye Hospitals (WAEH)

Singapore, May 22

DR. KIM

- EMR design considerations - Aravind's approach

DR. USHA KIM

- How to improve patient safety?
- Strengthening tertiary care services through primary eye care

DR. MEENAKSHI

- Ophthalmic care for community and role of ophthalmic technicians - Aravind's experience in PEC

MR. GANESH BABU

- EMR rollout : patient and staff dynamics

Singapore National Eye Centre: Ophthalmic Plastic and Reconstructive Surgery (OPRS) Symposium

Singapore, May 23

DR. USHA KIM

- Optic nerve sheath fenestration: different surgical approaches

4th Foresight 2015

Suntec City, Singapore, May 24

DR. HARIPRIYA ARAVIND

- Challenging case management with advanced technology - My experience on centurion for challenging cases

11th Annual Conference of VISION 2020

Moradabad, Uttar Pradesh, June 6 - 7

R.D. THULASIRAJ

- Role of leadership in generating demand  
As Chairperson for the sessions:
- Measuring and monitoring quality indicators for continual improvement
- Quality Tools

Mr. Ganesh Babu, Dr. Usha Kim and Dr. Meenakshi at the Annual Conference of WAEH, Singapore





- RCA (Root Cause Analysis) and CAPA (Corrective Action Preventive Action)
- Lean sigma methodology for continuous quality improvement
- Devil is in the details clinical audit
- Vision centres and technology - the key to universal coverage

DR. R.D. RAVINDRAN

- Leadership perspective - ensuring quality of service delivery
  - Outreach Initiative to promote community eye donation
- As Chairperson for the sessions:
- Infection control principles and practices
  - Investigating an endophthalmitis
  - Cluster endophthalmitis and its repercussions
  - Measuring cataract outcome

As moderator for the sessions:

- Efficiency v/s best practices: Dilemma of creating a perfect balance

As panelist:

- Accreditation: Issues, challenges and solutions

DHIVYA RAVILLA

- Measuring and monitoring patient satisfaction

R. MEENAKSHI SUNDARAM

- Aravind model of vision center

USHALINI RASAI AH

- Quality Journey - sharing the Aravind experience

World Glaucoma Congress

Hong Kong, June 9

DR. MOHIDEEN ABDUL KADER

- Comparison of outcomes of Mitomycin-C augmented trabeculectomy with releasable suture versus fixed scleral flap suture

22nd Annual meeting of Indian Eye Research Group - ARVO - India Chapter

Hyderabad, July 25-26

THIRUMALAI RAJ

- Identification of novel indels and splice variants in retinoblastoma patients

Dr. Mohideen Abdul Kader at the World Glaucoma Congress, Hong Kong



K. JHANSI RANI

- Role of miR-203 in suppressing stemness in human corneal epithelial stem cells (CESCs) through Np63a inhibition

B. HEMADEVII

- Differentially expressed micro RNAs in human cornea with fungal keratitis

V. NITHYA

- Comparative genome analysis of ocular methicilin resistant Staphylococcus aureus isolates

ROOPESH R. PAI

- Quantitative proteomics of serum biomarkers for proliferative diabetic retinopathy

SANDHYA KRISHNAN

- Glycoproteome analysis of tear from aspergillus flavus keratitis patients

28th Annual Meeting of Asia Pacific Association of Cataract and Refractive Surgeons

Kuala Lumpur, Malaysia, July 27-30

DR. ANITHA

- Fungal keratitis caused by Exserohilum

DR. HARSHAL RATHI

- Isolated conjunctival lichen planus: A diagnostic dilemma

DR. NISHANTH RAJAN

- Initial experience with the verion guided femto cataract surgery

9th Asia Pacific Vitreo-Retina Society Congress

Sydney, Australia, July 29 - August 2

DR. NARESH BABU

- 2cc 100% Sulfur Hexafluoride as tamponading agent following primary vitrectomy for retinal detachment surgery
- Dislocated posterior chamber intraocular lens with decompensated cornea - Management with simultaneous Descemets Stripping Automated Endothelial Keratoplasty and no glue, sutureless scleral fixation of intraocular lens

AMRF team at the annual meeting of Indian Eye Reserach Group, Hyderabad



DR. ANAND RAJENDRAN

- Combined transpupillary thermotherapy and pharmacotherapy for bullous chronic central serous Chorioretinopathy with anterior segment neovascularisation

DR. MEHER TEJ RAVULA

- Reversible night blindness -A case series

#### Intraocular Inflammation Society Congress

San Francisco, USA, September 25-27

DR. S.R. RATHINAM

- Clinical features of Leptospirosis, Chickunguniya
- Challenges in the diagnosis of ocular TB
- Molecular diagnosis of West Nile Virus ocular infection: recent advances

DR. VEDHANAYAKI

- Autoimmune retinopathy

DR. BHAGYA SUDHEER

- Clinical profile of hypopyon uveitis

#### 5th International Congress on Patient Safety

Bangalore, October 16 -17

DR. HARIPRIYA ARAVIND

- Why measure?

#### 15th Annual Meeting of the Uveitis Society of India

Pondicherry, October 23- 25

DR. B. MANOHAR BABU

- How do I plan cataract surgery in uveitis

DR. ANURADHA

- Paediatric uveitis: Indian scenario

DR. KAVITHA SRINIVASAN

- Glaucoma in uveitis

DR. V. NARENDRAN

- Managing retinal complications of local therapy

DR. V.R. SARAVANAN

- B scan & ultrasound biomicroscopy in uveitis

Dr. R. Kim chaired the session on vitreoretinal diseases.

Dr. Manjunath, Dr. Rama, Dr. Navakant, Dr. Sarita, Dr. Pallavi participated in the conference.

#### International Congress on Ocular inflammation and infection

Barcelona, Spain, September 3-4

DR. PANKAJA DHOBLE

- Crane pecking endophthalmitis - An unusual mode

#### 3rd Congress of World Society of Paediatric Ophthalmology and Strabismus

Barcelona, Spain, September 4-6

DR. P. VIJAYALAKSHMI

- Study of risk factors, visual and developmental outcome in cases of radiologically proven periventricular leukomalacia (free paper)

- The role of stakeholders in developing services

DR. SHASHIKANT SHETTY

- Study of Ocular & general morbidity in babies treated for retinopathy of prematurity (e-poster)

- Large face turn with nystagmus developing diplopia due to esotropia post augmented Kestenbaum Anderson surgery

DR. PRIYANKA SINGH

- Double augmented vertical rectus transposition for treatment of large angle strabismus in Abducens nerve palsy (e-poster)

DR. TULIKA KAR

- Risk factors, time of onset and management outcomes of glaucoma in aphakic children operated for congenital/ developmental cataract

#### European Society of Cataract and Refractive Surgeons

Barcelona, Spain, September 5 -9

DR. MARIE FREDRICK

- A comparative study on retroiridal iris claw lens Vs. sutureless scleral fixated intra ocular lens in the absence of capsular support

Dr. S.R. Rathinam, Dr. Vedanayaki and Dr. Bhagya Sudheer at the Intraocular Inflammation Society Congress, San Francisco, USA



Dr. P. Vijayalakshmi at WSPOS conference, Barcelona







Dr. Naresh Babu at Euretina conference, Nice

*European Vitreo Retinal Society (EVRS) 2015*

Venice, Italy, September 9-17

DR. PRABHU BHASKARAN

- Angle closure glaucoma secondary to polypoidal choroidal vasculopathy - a devastating complication (poster)

*Euretina-2015*

Nice, France, September 15- 22

DR. KIM

- Diabetic vitrectomies: Current practices

DR. NARESH BABU

- 2cc 100% sulfur hexafluoride as tamponading agent following primary vitrectomy for retinal detachment surgery

*14th Human Proteome Organization World Congress (HUPO 2015)*

Vancouver, British Columbia, Canada, September 27- 30

DR. JEYA MAHESWARI

- Proteomics of ocular diseases

Dr. Jeya Maheswari at HUPO 2015



Dr. Venkatesh at the International Forum on Quality and Safety in Healthcare, Hong Kong

*International Forum on Quality and Safety in Healthcare*

Hong Kong, September 28-30

DR. R. VENKATESH

- Establishing a successful organisational approach to quality

*Glaucoma Connect - Annual Conference of Glaucoma Society of India*

Mumbai, October 2-4

DR. R. RAMAKRISHNAN

- Optimising antiglaucoma surgery
- Surgical considerations for angle closure disease

He was also the judge for free paper session

DR. MOHIDEEN

- Detection of progression in a case of POAG would indicate change of treatment

DR. GANESH V RAMAN

- Which therapy to initiate based on the target IOP

DR. SARIKA

- Effect of postural changes on intraocular pressure in primary open angle glaucoma and primary angle closure glaucoma patients using Perkin's tonometer

Dr. Ganesh V Raman at the Glaucoma Society of India conference



DR. R. VENKATESH

- Intraoperative challenging situations in valve implantations
- Novel glaucoma screening in an outreach camp in developing world (video)

Instruction courses:

- Co-existing glaucoma and cataract : Managing difficult situation in combined surgery
- Lasers in glaucoma-CLASS (CO<sub>2</sub> laser assisted Sclerectomy)

DR. S. KAVITHA

- Family history is a strong risk factor for prevalent angle closure in a south Indian population
- Novel glaucoma family screening program using motivational cards and family screening software

*Silver Jubilee Celebrations of Eye Bank Association of India and National CME on Eye Banking*

New Delhi, October 9-11

DR. M.SRINIVASAN

- Transplanting corneas from donors who died due to consuming poison

MR. SARAVANAN

- Eye Donation Nodal Centre Project (EDNC)

*Annual Conference of Ocular Trauma Society of India*

Guwahati, October 30 - November 1

DR. NARESH

- Intraocular foreign body- Management
- Siderosis

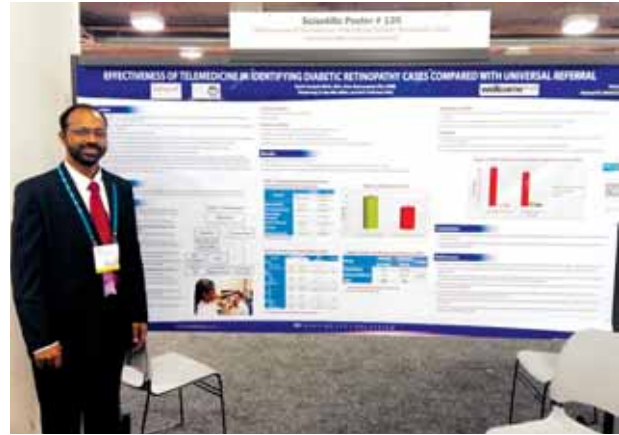
DR. RENU P RAJAN

- Ocular Siderosis : presentation, management and outcomes
- Posterior segment manifestations of blunt trauma

DR. KARTHIK

- Clinical presentation and outcome of 23-20G vitrectomy for retained posterior segment IOFB

Dr. M. Srinivasan at the Silver Jubilee Celebrations of Eye Bank Association of India



Mr. Sanil Joseph at the Annual Meet of AAO

*Annual Meet of American Academy of Ophthalmology*

Las Vegas, USA, November 14-17

DR. KALPANA NARENDRAN

- Retinopathy of Prematurity - Innovation to reach NICUs in rural India

DR. NARENDARN

- Scleral auto Graft for Management of Chronic Maculopathy Associated with Optic Nerve Head Pit

MR. SANIL JOSEPH

- Effectiveness of telemedicine in identifying diabetic retinopathy cases compared with universal referral

DR. V.R. VIVEKANANDAN

- Instructor in SICS instruction course and wetlab training

Dr. V.R. Vivekanand and Dr. Vishnu Deepthi attended the AAO conference and did an observation at Wilmer Eye Hospital, Baltimore under Dr. David Friedman, at Moran Eye Centre, Salt Lake City, under Dr. Alan Crandall, Dr. Geoff Tabin, Dr. Jeff Pattey and also observed surgeries of Dr. Bob Cionni and Dr. David Chang in their hospitals.

Dr. V.R. Vivekanandan at the SICS instruction course at AAO







Dr. K. Ilango at the WHO -ICC, Rome

14th Federation of Asian and Oceanian Biochemists and Molecular Biologists Congress & 84th Annual meeting of Society of Biological Chemists (SBC) India  
Hyderabad, November 27-30

DR. P.SUNDARESAN

- Ocular diseases gene discovery

Annual Conference of Vitreoretinal Society of India  
Kumarakom, Kerala, December 3-5

DR. R. KIM

Scientific Committee Chair Person

DR. NARESH BABU

- IOFB management

DR. ANAND RAJENDRAN

- Retinal vascular diseases - Vexing Vasculature (Panel discussion)
- Refractory DME: Management mantras

DR. GEORGE MANAYATH

- Refractory DME: Management mantras (Case 1)

DR. JATINDER SINGH

- Refractory DME: Management mantras (Case 3)

DR. MEHER TEJ RAVULA

- Submacular surgery for removal of fibrovascular tissue in exudative AMD

DR. CHIRAG D ODEDARA

- Safety and efficacy of concomitant prophylactic posterior sclerostomy before cataract surgery in eyes with nanophthalmos

DR. HAEMOGLOBIN

- To evaluate the clinical presentations and outcome of 23-20g vitrectomy for retained posterior segment intraocular foreign bodies

DR. V. R. SARAVANAN

- Dyes, stains and macular surgeries

DR. PARAG SHAH

- Retinoblastoma - Current management

Dr. Manjunath, Dr. Venugopal Reddy, Dr. Sarita, Dr. Syed, Dr. Viswanath, Dr. Navakant and Dr. Sarita attended the conference.

Annual Conference of Oculoplasty Association of India  
Bhubaneswar, Orissa, December 4-6

DR. VIJI RENGARAJAN

- Controversies in oculoplasty - lymphangiomas - Surgery vs Sclerosing agents
- Palpebral remodelling in management of neurofibromatosis type I - Awarded as best Video
- Orbital vicarious menstruation (e-poster)

DR. HARIKRISHNAN M

- The cystic eye (free paper)

DR. NAMRATA ADULKAR

- Invasive sino orbital fungal infection in immuno competent patients - retrospective study (free paper)

8th International Conference of International Society of Manual Small Incision Cataract Surgeons and 8th Annual Conference of Pune Ophthalmological Society  
Comprehensive Cataract Conference  
Pune, December 4-6

DR. R. D. RAVINDRAN

- Keynote Address: Improving outcomes in Manual small incision cataract surgery through monitoring
- Visual outcomes and complications in Manual small incision cataract surgery in a large volume set up
- Experience of Intracameral antibiotics in prevention of postoperative endophthalmitis

WHO-International Consensus Conference on Visual Rehabilitation Standards (WHO-ICC)

Rome, December 9-12

Dr. K. Ilango was officially nominated by WHO to attend the conference as a technical expert for the South-East Asia Region.

Keracon - Annual Conference of Cornea Society of India  
Kolkata, December 11-13

DR. M. SRINIVASAN

- Invited speaker: Overview of Clinical Trials in Infective Keratitis

Dr. Revathi offering hands-on training at Keracon 2015



DR. N. VENKATESH PRAJNA

- Mycotic ulcer treatment trial
- Medical management of fungal corneal infections

DR. K. TIRUVENGADA KRISHNAN

- Post refractive surgery keratitis

DR. REVATHI. R

- Steroids for Corneal Ulcer Trial
- Cataract surgery in ocular surface problem

DR. ANITHA

- Scleral infections

DR. ARUN KUMAR PANIGRAHI

- D.M.D Repair outcomes

### 22nd Annual Conference of Strabismus and Paediatric Ophthalmology Society of India (SPOSI)

Aravind - Coimbatore, December 12-13

DR. P. VIJAYALAKSHMI

- Cerebral visual impairment

DR. VRUSHALI

- Surgical outcome of nystagmus surgery (e-poster)
- Outcome of large V pattern surgery (e-poster)

DR. TULIKA KAR

- Role of Superior oblique anterior transposition (Scott's procedure) in management of congenital fibrosis of extra ocular muscles

DR. POOJA KEWLANI

- Double augmented vertical rectus transposition for treatment of large angle strabismus in sixth nerve palsy (free paper)

DR. K. VEENA

- Paediatric cataract management

DR. R. MEENAKSHI

- Chaired the session on Esotropia

DR. DIVYA KISHAN

- Ocular associations and prognosis in paediatric cortical visual impairment with Corpus Callosum Agenesis in a tertiary care centre

DR. NEELAM PAWAR

- Paediatric sixth nerve palsy

DR. FATHIMA

- Clinical profile of congenital esotropia

DR. SANDRA GANESH

- Muscle Transposition Surgeries

Dr. Rupa, Dr. Jamuna, Dr. Sathya, Dr. Pooja, Dr. Ribadu, Dr. Palak Macwana attended the conference

### 2016 World Ophthalmology Congress of the International Council of Ophthalmology

Hosted by the Mexican Society of Ophthalmology, Guadalajara, Mexico, January 5-9

DR. R.KIM

- Private Service Delivery Models of Diabetes and DR care in India, and How to Make Them Sustainable
- Intravitreal Injection Technique: Controversy Simplified

DR. USHA KIM

- Analysis of Clinicopathologic Correlation in Ocular Surface Squamous Neoplasms (as chair)
- A novel approach for optic nerve sheath decompression and its outcome: our experiences

DR. AMIT. A.KHEKEDAR

- Smart phone based applications for early stage detection of retinoblastoma-review of methodology (free paper)

DR. NAMRATA GAIKWAD

- Correlation of clinical outcome with genetics of RBI gene in Indian retinoblastoma patients

DR. LALITHA PRAJNA

- Molecular diagnosis of bacterial and fungal corneal ulcers (Symposium)
- Infectious keratitis, risk factors and epidemiology (Instruction course)

### Tuck Global Leadership 2030 Consortium

Chennai, January 21

Dr. Aravind Srinivasan gave a talk on Frugal Innovation in the module on Engaging with Emerging Markets at the Global Leadership 2030 Consortium organised

Dr. Anita presenting at Keracon



Dr. Namrata Gaikwad and Dr. Amit A. Khekedar presenting at WOC







Dr. M. Srinivasan and Dr. P. Vijayalakshmi at the Ophthalmological Society of Bangladesh Annual Conference

by Tuck Executive Education at Hotel Leela Palace, Chennai.

*United Kindom Paediatric Glaucoma Society*  
Moorfields, London, January 25

Dr. Manju was invited to present on the topic -Microspherophakia. It was an in depth discussion on the subeject and was presided by Prof. Sir Pheng Tee Khaw. She also observed Dr. Maria Papadopoulos for a week to get exposure on Childhood Glaucoma.

*71st Annual Conference of the Association of Physicians of India (APICON)*  
Hyderabad, January 29

Dr. P. Namperumalsamy was panelist in the session on *High quality cost effective health care: Indian model.*

*43rd Annual Conference of Ophthalmological Society of Bangladesh*

Dhaka, Bangladesh, March 14-19

DR. M. SRINIVASAN

- Conjunctivo chalasis
- Mooren's ulcer
- Microsporidial Ocular infections

DR. P. VIJAYALAKSHMI

- Childhood blindness - Beyond Statistics
- An act of prescribing spectacles to children
- Heavy eye Syndrome
- Management of Paralytic squint
- Prevention of Blindness due to ROP

*31st Asia Pacific Academy of Ophthalmology Congress 2016*

Taiwan, March 24-27, 2016

DR. ANAND RAJENDRAN

- A Comparative analysis of the Efficacy of Additional Internal Limiting Membrane Removal in Epiretinal Membrane Peeling

## Articles Published in Peer-reviewed Journals

Uddaraju M, Mascarenhas J, Das MR, Radhakrishnan N, Keenan JD, Prajna L, et al.  
*Corneal cross-linking as an adjuvant therapy in the management of recalcitrant deep stromal fungal keratitis: a randomised trial.*  
Am J Ophthalmol. 2015 Jul;160(1):131-134.

Ganesh-Babu BS, Hariharan L, Thulasiraj RD, Ravindran RD, Kempen JH.  
*Demand for Tertiary Eye Care Services in Developing Countries.*  
Am J Ophthalmol. 2015 Oct;160(4):619-627.e1.

Rose-Nussbaumer J, Lietman TM, Shiboski CH, Shiboski SC, Bunya VY, Akpek EK, et al.  
*Inter-grader Agreement of the Ocular Staining Score in the Sjögren's International Clinical Collaborative Alliance (SICCA) registry.*  
Am J Ophthalmol. 2015 Dec;160(6):1150-1153.e3

Do AT, Pillai MR, Balakrishnan V, Chang RT, Robin AL, Singh K, et al.  
*Effectiveness of glaucoma counseling on rates of follow-up and glaucoma knowledge in a South Indian population.*  
Am J Ophthalmol. 2015 Dec 15. [Epub]

Namrata G, Vanniarajan A, Akram H, Jeyaram I, Thirumalairaj K, Santhi R, et al.  
*Knudson's hypothesis revisited in Indian retinoblastoma patients.*  
Asia-Pac J Clin Oncol. 2015 Dec;11(4):299-307.

Ramkrishnan R, Mitra A, Kader MA.  
*Surgical and Visual Outcomes of Childhood Glaucoma at a Tertiary Eye Care Center in South India.*  
Asia Pac J Ophthalmol (Phila). 2015 Sep-Oct;4(5):250-8.

Ramakrishnan S, Baskaran P, Talwar B, Venkatesh R.  
*Prospective, Randomized Study Comparing the Effect of 0.1% Nepafenac and 0.4% Ketorolac Tromethamine on Macular Thickness in Cataract Surgery Patients With Low Risk for Cystoid Macular Edema.*  
Asia Pac J Ophthalmol (Phila). 2015 Aug; 4(4): 216-20.

Ganesh Babu TR, Shenbaga Devi S, Venkatesh R.  
*Optic nerve head segmentation using fundus images and optical coherence tomography images for glaucoma detection.*  
Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub. 2015 Oct 23. [Epub]

Devarajan B, Prakash L, Kannan TR, Abraham AA, Usha Kim, Muthukkaruppan V, et al.  
*Targeted next generation sequencing of RBL gene for the molecular diagnosis of Retinoblastoma.*  
BMC Cancer. 2015;15(1):320.

- Sengupta S, Nguyen AM, van Landingham SW, Solomon SD, Do DV, Ferrucci L, et al.  
*Evaluation of real-world mobility in age-related macular degeneration.*  
BMC Ophthalmol. 2015 Jan;15:1-11.
- Rose-Nussbaumer J, Prajna NV, Tiruvengada Krishnan, Jeena M, Revathi R, Srinivasan M, et al.  
*Risk factors for low vision related functioning in the Mycotic Ulcer Treatment Trial: a randomised trial comparing natamycin with voriconazole.*  
Br J Ophthalmol. 2015 Nov. [Epub]
- Aruljyothi L, Radhakrishnan N, Prajna VN, Lalitha P.  
*Clinical and microbiological study of paediatric infectious keratitis in South India: a 3-year study (2011-2013).*  
Br J Ophthalmol. 2016 Feb 25. [Epub]
- Singh J, Singh R.  
*Submacular Parasite Masquerading as Posterior Pole Granuloma.*  
Case Rep Ophthalmol Med. 2015;2015:910383.
- Harshey KB, Karthik S, Ramakrishnan R, Kim R.  
*Unilateral Crystalline Vitreoretinopathy: a rare entity associated with intraocular inflammation.*  
Case Rep Ophthalmol Med. 2015;2015:460564.
- Upadhyay MP, Srinivasan M, Whitcher JP.  
*Diagnosing and managing microbial keratitis.*  
Community Eye Health. 2015;28(89):3-6.
- Mathews S, Chidambaram JD, Lanjewar S, Mascarenhas J, Prajna NV, Muthukkaruppan V, et al.  
*In vivo confocal microscopic analysis of normal human anterior limbal stroma.*  
Cornea. 2015 Apr;34(4):464-70.
- Priya CG, Saumi M, Arunkumar PK, Mascarenhas J, Prajna NV, Muthukkaruppan V.  
*In vivo Confocal Microscopic Analysis of Limbal Stroma in Patients with Limbal Stem Cell Deficiency.*  
Cornea. 2015 Nov;34(11):1478-86.
- Rathi H, Venugopal A, Rameshkumar G, Ramakrishnan R, Meenakshi R.  
*Fungal Keratitis caused by Exserohilum, an Emerging Pathogen.*  
Cornea. 2016 Feb 9. [Epub]
- Dubey SK, Hejtmancik JF, Krishnadas SR, Sharmila R, Haripriya A, Sundaresan P.  
*Evaluation of Genetic Polymorphisms in Clusterin and Tumor Necrosis Factor-Alpha Genes in South Indian Individuals with Pseudoexfoliation Syndrome.*  
Curr Eye Res. 2015;40(12):1218-24.
- Venkatesh R, van Landingham, Suzanne W, Khodifad AM, Haripriya A, Thiel CL, Ramulu P, Robin AL.  
*Carbon footprint and cost-effectiveness of cataract surgery.*  
Curr Opin Ophthalmol. 2015 Nov. [Epub]
- Muthu Selvam R, Nithya R, Narmatha Devi P, Bhuvana Shree RS, Valar Nila M, Demonte NL, et al.  
*Data set for the mass spectrometry based exoproteome analysis of Aspergillus flavus isolates.*  
Data Brief. 2015 Mar;2:42-7.
- Burdon KP, Fogarty RD, Shen W, Abhary S, Kaidonis G, Appukuttan B, et al.  
*Genome-wide association study for sight-threatening diabetic retinopathy reveals association with genetic variation near the GRB2 gene.*  
Diabetologia. 2015 Oct;58(10):2288-97.
- Arya LK, Rathinam SR, Lalitha P, Usha Kim, Ghatani S, Tandon V.  
*Trematode Fluke Procerovum varium as Cause of Ocular Inflammation in Children, South India.*  
Emerg Infect Dis. 2016 Feb;22(2):192-200.
- Shah PK, Narendran V, Kalpana N.  
*Safety and efficacy of simultaneous bilateral 25-gauge lens-sparing vitrectomy for vascularly active stage 4 retinopathy of prematurity.*  
Eye (Lond). 2015 Aug;29(8):1046-50.
- Kavitha S, Patel SR, Mohini P, Venkatesh R, Sengupta S.  
*Vitiligo iridis and glaucoma: a rare sequelae of small pox.*  
Eye (Lond). 2015 Oct;29(10):1392-4.
- Li Z, Allingham RR, Nakano M, Jia L, Chen Y, Ikeda Y, et al.  
*A common variant near TGFBR3 is associated with primary open angle glaucoma.*  
Hum Mol Genet. 2015 Jul 1;24(13):3880-92.
- Sengupta S, Dhanapal P, Nath M, Haripriya A, Venkatesh R.  
*Goat's eye integrated with a human cataractous lens: A training model for phacoemulsification.*  
Indian J Ophthalmol. 2015 Mar;63(3):275-7
- Radhakrishnan M, Venkatesh R, Valaguru V, Frick KD.  
*Economic and social factors that influence households not willing to undergo cataract surgery.*  
Indian J Ophthalmol. 2015 Jul;63(7):594-9.
- Senthilkumari S, Neethu M, Santhi R, Krishnadas R, Muthukkaruppan VR.  
*Identification of glaucomatous optic nerve head changes in Indian donor eyes without clinical history.*  
Indian J Ophthalmol. 2015 Jul;63(7):600-5.



- Bhandari S, Sengupta S, Yadalla D, Rajagopalan J, Velis GB, Talele D, Kushwaha S.  
*Factors affecting treatment outcome in congenital nasolacrimal duct obstruction: A retrospective analysis from South India.*  
Indian J Ophthalmol. 2015 Nov;63(11):759-762.
- Neelam P, Meenakshi R, Ramakrishnan R, Devendra M, Trivedi B.  
*Unilateral acquired Brown's syndrome in systemic scleroderma: An unusual cause for diplopia.*  
Indian J Ophthalmol. 2015 Nov; 63(11): 861-863.
- Sindal MD, Mourya D.  
*A rare case of traumatic posterior phacocoele with retinal detachment.*  
Indian J Ophthalmol. 2016 Jan;64(1):89-90.
- Manayath GJ, Arora S, Parikh H, Shah PK, Tiwari S, Narendran V.  
*Is myopia a protective factor against central serous chorioretinopathy?*  
Int J Ophthalmol. 2016 Feb 18;9(2):266-70.
- Shirish Dongare, Sharmila Rajendran, S Senthilkumari, Suresh K Gupta, Rajani Mathur, Rohit Saxena, Sushma Srivastava.  
*Genistein Alleviates High Glucose Induced Toxicity and Angiogenesis in Cultured Human RPE Cells.*  
Int J Pharm Pharm Sci. 2015;Aug;7(8):294-298.
- Boomiraj H, Mohankumar V, Lalitha P, Devarajan B.  
*Human Corneal MicroRNA Expression Profile in Fungal Keratitis.*  
Invest Ophthalmol Vis Sci. 2015 Dec 1;56(13):7939-7946.
- Karthikeyan AS, Vijayalakshmi P.  
*A new surgical "noose" technique for excision of pediatric ocular adnexal and anterior orbital cysts.*  
J AAPOS. 2015 Aug;19(4):372-5.
- Trivedi BP, Meenakshi R, Neelam P, Ramakrishnan R, Shelke V.  
*Iron deficiency anemia presenting with macular star.*  
J AAPOS. 2015 Oct;19(5):486-7.
- Prajna NV, Prajna L, O'Brien KS, Sun CQ, Acharya N, Lietman TM, et al.  
*Association of Pretreatment with Antifungal Medication and Fungal Resistance in the Mycotic Ulcer Treatment Trial I.*  
JAMA Ophthalmol. 2015 Oct;133(10):1210-1.
- Mahmud I, Kelley T, Stowell C, Haripriya A, Boman A, Kossler I, et al.  
*A Proposed Minimum Standard Set of Outcome Measures for Cataract Surgery.*  
JAMA Ophthalmol. 2015 Nov;133(11):1247-52.
- Zegans ME, DiGiandomenico A, Ray K, Naimie A, Keller AE, Stover CK, et al.  
*Association of Biofilm Formation, Psl Exopolysaccharide Expression, and Clinical Outcomes in Pseudomonas aeruginosa Keratitis: Analysis of Isolates in the Steroids for Corneal Ulcers Trial.*  
JAMA Ophthalmol. 2016 Feb 4.
- Sindal MD, Nakhwa CP, Sengupta S.  
*Comparison of sutured versus sutureless scleral-fixed intraocular lenses.*  
J Cataract Refract Surg 2016; 42:27-34.
- Palanisamy M, Venkatapathy N, Rajendran V, Shobana CS.  
*Keratomycosis caused by Graphium eumorphum (Graphium State of Scedosporium apiospermum).*  
J Clin Diagn Res. 2015 Apr;9(4):DD03-4.
- Ramakrishnan R, Mitra A, Abdul Kader M, Das S.  
*To Study the Efficacy of Laser Peripheral Iridoplasty in the Treatment of Eyes with Primary Angle Closure and Plateau Iris Syndrome, Unresponsive to Laser Peripheral Iridotomy, Using Anterior-Segment OCT as a Tool.*  
J Glaucoma. 2015 Sep 14. [Epub]
- Chakrabarty L, Joshi GD, Chakravarty A, Raman GV, Krishnadas SR, Sivaswamy J.  
*Automated Detection of Glaucoma from Topographic Features of the Optic Nerve Head in Color Fundus Photographs.*  
J Glaucoma. 2015 Nov. [Epub]
- Munavalli JR, Rao SV, Aravind S, Srinivas A, Merode FV.  
*The Optimization in Workflow Management: Ophthalmology.*  
J Health Management. 2016 Mar;18(1):21-30.
- Thirumalairaj K, Abraham A, Devarajan B, Gaikwad N, Kim U, Muthukkaruppan V, et al.  
*A stepwise strategy for rapid and cost-effective RBI screening in Indian retinoblastoma patients.*  
J Hum Genet. 2015 Sep;60(9):547-52.
- Shah VM, Prabhu V.  
*A Rare Case of Glomus Jugulare Tumor Presenting as Papilledema.*  
J Neuroophthalmol. 2015 Jul 28. [Epub]
- Naresh BK, Adenuga OO, Rajan RP, Kim R.  
*Management of Ocular Siderosis: Visual Outcome and Electroretinographic Changes.*  
J Ophthalmol. Volume 2016 (2016).
- Jayanthi S, Krishnadas SR, Chakravarty A, Joshi GD, Ujjwal, Syed TA.  
*A Comprehensive Retinal Image Dataset for the Assessment of Glaucoma from the Optic Nerve Head Analysis.*  
JSM Biomed Imaging Data Pap. 2015;2(1):1004.

- Congdon N, Suburaman GB, Ravilla T, Varga B, Resnikoff S, McLeod J, et al.  
*Transforming research results into useful tools for global health: BOOST.*  
Lancet Glob Health. 2016 Feb;4(2):e96.
- Preethi P, Muraleedharan VR, Kamalnabhan TJ, Thulasiraj RD.  
*Healthcare human resource for ensuring patient focused care.*  
Management Health. 2015;19(3):20-25.
- Hassan AS, Al-Hatmi AM, Shobana CS, Van Diepeningen AD, Kredics L, Vágvölgyi C, et al.  
*Antifungal Susceptibility and Phylogeny of Opportunistic Members of the Genus Fusarium Causing Human Keratomycosis in South India.*  
Med Mycol. 2015 Dec 24. [Epub]
- Das T, Raman R, Kim R, Rani PK.  
*Telemedicine in diabetic retinopathy: current status and future directions.*  
Middle East Afr J Ophthalmol. 2015 Jun;22(2):174-8.
- Nakhwa CP, Sindal MD.  
*Idiopathic Macular telangiectasia type 1 with ruptured retinal arterial macroaneurysm post intravitreal bevacizumab.*  
Middle East Afr J Ophthalmol. 2015 Jul-Sep;22(3):396-8.
- Kredics L, Narendran V, Shobana CS, Vágvölgyi C, Manikandan P, et al.  
*Filamentous fungal infections of the cornea: a global overview of epidemiology and drug sensitivity.*  
Mycoses. 2015 Apr;58(4):243-60.
- Krizsán K, Tóth E, Nagy LG, Galgóczy L, Manikandan P, Chandrasekaran M, et al.  
*Molecular identification and antifungal susceptibility of Curvularia australiensis, C. hawaiiensis and C. spicifera isolated from human eye infections.*  
Mycoses. 2015 Oct;58(10):603-9.
- Sindal MD, Nakhwa CP.  
*Metastatic Serratia endophthalmitis associated with extravasation injury in a preterm neonate.*  
Oman J Ophthalmol. 2015;8:114-6.
- Newman-Casey PA, Sathya R, Haripriya A, Vinoth P, Manju Pillai, Vijayakumar B, et al.  
*The effect of counseling on cataract patient knowledge, decisional conflict, and satisfaction.*  
Ophthalmic Epidemiol. 2015 Dec;22(6):387-93.
- Shah PK, Sripriya S, Narendran V, Pandian AJ.  
*Prenatal genetic diagnosis of retinoblastoma and report of RB1 gene mutation from India.*  
Ophthalmic Genet. 2016 Feb 25:1-4. [Epub]
- Haripriya A, Chang DF, Namburur S, Smita A, Ravindran RD.  
*Efficacy of Intracameral Moxifloxacin Endophthalmitis Prophylaxis at Aravind Eye Hospital.*  
Ophthalmology. 2015 Oct. [Epub]
- Bains S, Vidhya N, Kim U, Shanti R, Devanand J.  
*Subcutaneous Dissemination from an Orbital Diffuse Large B Cell Lymphoma.*  
Orbit. 2015 Dec;34(6):338-9.
- Homa M, Fekete IP, Böszörményi A, Singh YR, Selvam KP, Shobana CS, et al.  
*Antifungal Effect of Essential Oils against Fusarium Keratitis Isolates.*  
Planta Med. 2015 Jul 30. [Epub]
- Usha Kim R, Wadwekar B, Prajna L.  
*Primary canaliculitis: The incidence, clinical features, outcome and long-term epiphora after snip-punctoplasty and curettage.*  
Saudi J Ophthalmol. 2015 Oct-Dec;29(4):274-277.
- Di Y, Huang L, Sundaresan P, Li S, Kim R, Ballav Saikia B, et al.  
*Whole-exome Sequencing Analysis Identifies Mutations in the EYS Gene in Retinitis Pigmentosa in the Indian Population.*  
Sci Rep. 2016 Jan 20;6:19432.
- Beligere N, Perumalswamy V, Tandon M, Mittal A, Floora J, Vijayakumar B, et al.  
*Retinopathy of prematurity and neurodevelopmental disabilities in premature infants.*  
Semin Fetal Neonatal Med. 2015 Oct;20(5):346-53.
- Shah PK, Prabhu V, Karandikar SS, Ranjan R, Narendran V, Kalpana N.  
*Retinopathy of prematurity: Past, present and future.*  
World J Clin Pediatr. 2016 Feb 8;5(1):35-46.
- Sharma RS, Parag K Shah, Narendran V.  
*Poor uptake of fluorodeoxyglucose in positron emission tomography-computed tomography scan for intraocular choroidal melanoma in Asian Indian Eyes.*  
World J Nucl Med. 2016;Jan;15(1):53-55.
- Shrime MG, Sleemi A, Thulasiraj RD.  
*Charitable Platforms in Global Surgery: a systematic review of their effectiveness, cost-effectiveness, sustainability, and role training.*  
World J Surg. 2015 Jan;39(1):10-20.



# Consultancy and Capacity Building



*For over two decades, LAICO has been working in a comprehensive manner on individuals involved in eye care, eye hospitals, agencies supporting eye care and policy makers in the Government. A lot of progress had been made over the years, creating significant impact. LAICO's activities continue to include consultancy and capacity building, management training in eye care, research, offering IT based products and services as well as being of service to INGOs and Governments.*

*On February 21, 2016 an ideating workshop was held at LAICO, facilitated by Mr. D.Nagarajan to develop clarity on what needs to change and what needs to be strengthened while going forward. The goal was to reflect and re-design LAICO's strategic approach to mentoring and training activities and develop an action plan to operationalise it.*

As an open-source organisation and proactively sharing best practices in eye care, LAICO has been carrying out consulting activities globally, facilitating many of its partners to grow and do well both in terms of volumes and quality as well as assist some of them in expanding their work to include training and research; and a few of them have grown to become mentors themselves. Such consulting work in the past was funded by INGOs, often to work with their partner eye hospitals in a project mode. In recent years, LAICO has started raising funds and has started working directly to build capacity in hospitals identified from underserved areas after ensuring the hospital's capacity to implement change.

This capacity building work is done through a structured mentoring process. Upon identifying potential hospitals, LAICO requests baseline information about the hospital and its performance. Subsequently, a team from Aravind consisting of an

ophthalmologist and a management expert visits the hospital to get first-hand information about its operational model, governance and service area. The team makes some early suggestions as appropriate ideas for improvement and invites the hospital's leadership team to come for a vision building and strategic planning workshop at LAICO. Ongoing mentoring and technical support is provided through training, onsite visits as well as emails and phone calls.

In the year ending March 2016, nine new hospitals were added to LAICO's consultancy network thus taking the total number to 320.

Needs assessment visits were carried out to nineteen hospitals in India, Sri Lanka and Bangladesh. Five Vision Building workshops were conducted for thirteen eye care institutions. Onsite support visits were made to two hospitals in Nepal, one each in Bangladesh and Cambodia and three in India. Follow up visits were

### *Eye hospitals that joined LAICO's network in the year ending March 2016*

Lions Golden Jubilee Eye Hospital	Colombo	Western Province	Sri Lanka
Pinnamaneni Satyanarayana Lions Eye Hospital	Adilabad	Telangana	India
Lions District 324 E3 Charitable Trust Eye Hospital	Paika, Kottayam	Kerala	India
Lions District 324c1 Eye Care & Research Centre	Jaggampeta	Andhra Pradesh	India
Sarada Netralaya, Ramakrishna Mission Ashrama	Patna	Bihar	India
SGVS Hospital and Research Centre	Khunti	Jharkhand	India
Mahadeo Singhi Eye Hospital	Pilani	Rajasthan	India
Aipu Eye Care Hospital	Hubei Province		China
Magrabi - ICO Cameroon Eye Institute	Milei		Cameroon

*LAICO team with the participants of Hilton Cataract Initiative onsite workshop at Addis Ababa, Ethiopia*







*Vision Building Workshop for the teams from Telengana, Rajasthan and Colombo: With Dr. Datta at Aravind-Theni*

carried out to eye hospitals in the African continent as part of Hilton Cataract Initiative and also in Sri Lanka, Mexico, Bangladesh, India.

LAICO also extended onsite support and Aravind team spent time in various hospitals to train the staff in clinical and non-clinical areas.

Mr. Mohammed Ghouse, Manager - Inpatient services, Aravind - Tuticorin was at Innovation Eye Centre, Kisii, Kenya from June 13 - July 16 to help improve the hospital patient flow and counselling process, streamline pricing strategy and day-to-day operations.

Ms. Deepa Krishnan, Mr. Oliver Selvam, Programmer - IT services and senior nurses from Aravind - Madurai Ms. Pitchai Meena and Ms. Gomathi were at Fitsum Birhan Eye Hospital, Mekelle, Ethiopia from July 22 - August 8 to help develop various operational systems and practices in the hospital. The team gave inputs on the proper maintenance of medical records, developing awareness materials and maintenance of ophthalmic

*Ms. Deepa Krishnan, Ms. Gomathi, Ms. Pitchai Meena and Mr. Oliver Selvam with the Fitsum Birhan Eye Hospital team*



*Dr. Preethika Gandhi with trainees at AIPU Eye Hospital, China*

instruments. Mr. Oliver trained the staff on the use of Integrated Hospital Management System software.

Dr. Vedang Shah, Medical Consultant, Aravind-Theni, Mr. Vengadesan, Manager - Inpatient Services, Aravind-Pondicherry and senior nurses - Ms. Lakshmi from Aravind - Madurai and Ms. Gowri from Aravind-Theni and Mr. Praveen, Programmer - IT were at Eye Foundation, Ijebu Ode, Nigeria during November 26 - December 19 to help the hospital improve the efficiency and quality of cataract surgeries and achieve operational excellence (Picture on page 58). The team gave inputs to introduce preferred practices in clinical areas. The importance of improving data quality and management was also stressed during the visit.

Aravind team consisting of Dr. Preethika Gandhi, Medical Officer - Cataract services, Aravind - Madurai and senior nurses, Ms. Ramalakshmi from Aravind-Tirunelveli and Ms. Jeyalakshmi from Aravind-Madurai and Mr. Ranjith Kumar, Manager - General from

*Dr. Shivakumar Chandrasekhar at Ispahani Islamia Eye Institute, Dhaka, Bangladesh*



Aravind - Coimbatore spent three weeks at AIPU Eye Hospital, Xiantao, China from January 16-February 7. Three ophthalmologists were trained in SICS technique. The team analysed and streamlined the activities of operating room, outpatient department and outreach system. Cataract Quality Assessment software was installed and the doctors were trained to use the same.

Dr. Shivakumar Chandrasekhar, Chief - Cataract and IOL services, Aravind - Tirunelveli, was at Ispahani Islamia Eye Institute and Hospital, Dhaka, Bangladesh during October 17-24 to facilitate the starting of a long term IOL fellowship with the aid of Orbis International.

### *Enhancing Paediatric Eye Care Services in the Developing / Under-Developed World*

Aravind - Pondicherry has been working with USAID on a multi-country project to improve cataract surgical services for girls. The project also involves hospitals in Nepal, Cambodia, Uganda and Malawi. As part of the project, Ms. Priya Adhisheshan, Manager - Paediatric Ophthalmology Services, Aravind - Pondicherry visited two hospitals in Nepal - Bharatpur Eye Hospital, Chitwan and Lumbini Eye Hospital, Bhairawa as well as Angkor Hospital for Children, Siem Reap, Cambodia in November. The purpose of the visit was to collect data and participate in the workshop to lay down strategies to be adopted during the course of the project. Another visit was made to Lumbini Eye Hospital from March 23-30 to conduct interviews and field work as part of developing a case study for the same project. As part of another USAID supported project on "Preferred practice guidelines and manuals for programs addressing vision loss in children in developing countries", Ms. Priya attended a meeting at Cape town, South Africa from January 11-15.



*Ms. Priya Adhisheshan and Dr. Ken Basset with the project team at Lumbini Eye Hospital, Bhairawa, Nepal*

Ms. Priya visited Salfa Eye Hospital, Antananarivo (Tana), Madagascar from January 16-20 to share inputs on the school children screening programme and also to give inputs to the hospital for developing its paediatric eye care services.

### *October Summit 2015*

#### *Leveraging Vision Centres for Universal Eye Health and Strengthening Tertiary Care*

This two day consultation held at Madurai on October 1-2 brought together eye care providers and experts to deliberate on strategies and approaches in order to leverage vision centres to achieve universal eye health in large scale across the communities. Dr. Pararajasegaram, former WHO Consultant; Dr. Allen Foster, Co-Director International Centre for Eye Health; Mr. Arun Arora, Dr. Shroff's Charity Eye Hospital, New Delhi; Dr. G.N Rao of LV Prasad Eye Institute, Hyderabad,

*Participants at the Workshop on Leveraging Vision Centres for Universal Eye Health Meet*







*Prof. Jagdeep Chokker at the Workshop on Managing Network of Eye Care Facilities*

Mr. Sudhir Kumar Thakur, Eastern Regional Eye Care Programme, Nepal; Ms. Sameera Ahmed, Sightsavers and Mr. Subramanyam, Sadguru Netra Chikitsalaya - Chitrakoot were the experts who shared their views apart from the Aravind team. Around 60 participants from eye care institutions and INGOs participated.

### *Managing Network of Eye Care Facilities*

A key strategy adopted by several organisations to achieve their goal and create better access is to expand their services geographically by adding more facilities. Such geographic expansion, though extends the services to a wider community and redefines their service areas, throws up several challenges. The consultation held on October 3-4 mainly aimed to gain better clarity on structures, systems and policies that should be in place to effectively manage network of eye care facilities and enable organisations to consolidate and grow further. Prof. Jagdeep Chokker, Founder and Trustee Association for Democratic Reforms, New Delhi, Mr. Arun Arora of Dr. Shroff's Charity Eye Hospital, Delhi; Dr. G.N. Rao of LV Prasad Eye Institute, Hyderabad and Dr. Ramani of Sankara Hospitals, Coimbatore and the Aravind team shared the challenges faced and how they addressed them. More than forty participants attended.

### *Insights into Employee Engagement*

LAICO, October 10-11  
The internal workshop focused on employee engagement and empowerment, communication and connection through sharing of real stories from Aravind. Prof. Biju Varkkey and Dr. Rajesh Chandwani from IIM - Ahmedabad, Mr. Masood, Head, Aerostructures Programme Management, Tata Enterprises were the guest faculty. Mr. Larry Hulbert facilitated the entire

workshop. More than fifty participants from across the Aravind centres participated.

### *Training*

LAICO regularly runs eye care management training programmes for eye care professionals across the world. Through ten such structured courses, around 200 people were trained in the last year. Apart from this, customised training programmes were offered in the

#### *MANAGEMENT COURSES*

<i>Management Priorities in Eye Care Delivery (1 week)</i>	23
<i>Management Training and Systems Development for Hospital Administrators / Managers (4 weeks)</i>	15
<i>Project Management training for Eye Care (4 weeks)</i>	9
<i>Eyexcel - Expanding Global Eye Care Workforce through Excellence in Training (4 Days)</i>	35
<i>Research Methodology (5 Days)</i>	41
<i>Medical Records Management</i>	5
<i>Management Training for Eye Care Programme Managers</i>	16
<i>Community Outreach and Social Marketing of Eye Care Services (4 weeks)</i>	10
<i>Instrument Maintenance - for Technicians (6 weeks)</i>	36

### *An Exhibition on Aravind Model for the Eyexcel participants*





Mr. Meenakshi Sundaram and Ms. Ushalini with the trainees in Lao People's Democratic Republic

areas of counselling, optical shop management, library management, etc. upon request from partner hospitals.

### *Training Programme for Province-wise Directors and Ophthalmologists*

Lao PDR, November 24-26

Mr. R.Meenakshi Sundaram, Senior Manager - Community Outreach and Ms. Ushalini Rasiah, Manager - Quality Assurance from Aravind - Madurai were invited as faculty for a training programme organised by Fred Hollows Foundation for Province-wise Directors and Ophthalmologists in Lao People's Democratic Republic. Trainees from seven provinces attended the programme. Aravind team handled sessions on Organisational Sustainability, Service Marketing, Demand Generation and Quality Assurance. The team also visited National Ophthalmic Centre.

### *AUROSIKSHA - Online Learning Resource for Eye Care Personnel*

Launched in 2010, Aurosiksha now has close to 2000 users around the globe. Efforts are underway to develop this into a tutor-support platform. The Aurosiksha platform was used by the Government of Tripura to conduct online tests for its vision centre technicians. Online tests are conducted for Aurolab's marketing executives at the end of every month.

### *Projects*

#### *Queen Elizabeth Diamond Jubilee Trust Supported DR project*

Diabetic Retinopathy (DR) project funded by the Queen Elizabeth Diamond Jubilee Trust (QEDJT) through



Africa	Asia	Europe	North America	Australia	South America	Total
227	1488	60	102	16	13	1906

Public Health Foundation of India (PHFI) aims to build models in seven districts in India to build capacity within the Government health system from primary to tertiary levels for effective management of DR. This is being done by including retina screening services to all the registered diabetics at the Non-Communicable Diseases (NCD) clinics set up at Community Health Centres (CHC) with adequate linkages to the district hospital or medical college hospital for delivering laser or surgical services as indicated. Tirunelveli is one of the selected districts. Aravind -Tirunelveli will work with the District Government health system to build this capacity through training, provision of equipment, building a database for monitoring and setting up systems of remote grading of retinal images for DR.

The project duration is three years and this model will be developed in a few selected CHCs, Primary Health Centres (PHCs), the District Hospital and the Tirunelveli Medical College Hospital. The project team has just started the preparatory work for the project and efforts are on to obtain permission from the Department of Health and Family Welfare, Tamil Nadu to carry out the project.

#### *Low Vision Screening, Treatment and Service Provision for Children in Coimbatore, supported by USAID*

The project implemented by Aravind - Coimbatore aims to establish a rehabilitation centre for children with low vision which will also provide early intervention and appropriate referral to support services. Children with low vision are identified through community screening and provided low vision aids. During this screening





*ROPE-SOS Project at Aravind -Coimbatore*

process, if children are identified with other treatable causes of childhood blindness including refractive errors, amblyopia, cataract and strabismus, appropriate and subsidised treatment will be offered.

As part of the project, 219,248 children were screened and 543 were identified with low vision during the last year. Low vision aids were given to 270 children; 466 glasses were dispensed. A total of twenty children underwent cataract surgery and squint correction. In addition, thirty six screening camps were conducted in special schools, orphanages and primary health centres. Through this a total of 66 children were identified for vision therapy.

### *Retinopathy of Prematurity (ROP) Eradication - Save Our Sight (ROPE-SOS) Project*

With a view to address blindness due to Retinopathy of Prematurity (ROP) through early diagnosis and timely

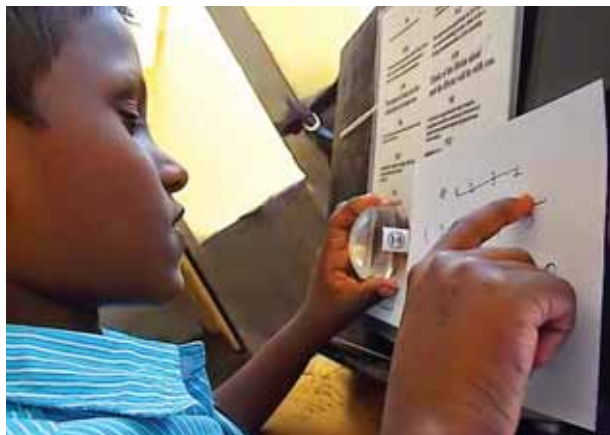
treatment, Aravind - Coimbatore initiated the project with support from USAID and a generous grant from Mr. Subroto Bagchi and Mrs. Susmita Bagchi. Using a retinal camera, a trained technician screens babies for ROP at the Special Neonatal Care Units (SNCUs) in the under served and rural areas. Babies with this blinding disease are identified real-time by transmitting retinal images to a remote ROP expert (via broadband internet) and those who require treatment are referred immediately to the base hospital. If the child is too sick to travel, within 3 days of diagnosis, an ROP expert visiting the SNCU will provide onsite laser treatment using a portable diode laser.

As part of the project, 1666 babies were screened during the year; 243 of them were diagnosed to have ROP of which 18 babies identified with sight threatening ROP were treated. The project covered both private and Government hospitals in places such as Erode, Salem, Karur, Tiruppur, Pollachi and Gobichettipalayam in Tamil Nadu and Malappuram, Palakkad, Pattambi and Thrissur in Kerala. CMEs were conducted at regular intervals for staff of Neo-natal intensive care units, paramedics and neonatologists.

### *Vision for All*

The project was launched at Aravind - Theni on July 10 and aims to reduce the prevalence of avoidable visual impairment and preventable blindness like Diabetic Retinopathy (DR), glaucoma, uncorrected refractive error and cataract. As part of the project, glaucoma screening camp and awareness exhibition were conducted during World Glaucoma Week. 412 people attended the camp; of these 152 persons were family members of high risk glaucoma patients who had their eyes checked for preventive measures. A total of

*Low Vision Screening camp at a school for the visually challenged by Aravind-Coimbatore*



42 Diabetic Retinopathy (DR) screening camps were conducted at PHCs, ESI Hospital, diabetes centres, Aravind vision centres/community centres to screen the known diabetics for DR. Around 2,300 diabetes patients were examined; 232 patients were diagnosed with DR and referred to base hospital for further investigations.

16 camps were conducted for school children to screen for refractive errors, squint, cataract and Vitamin A deficiency. Of the 16,289 students screened by teachers, 1,683 students were found to have eye problems. Ophthalmologist examined these students and provided 1,021 spectacles to students with refractive error. 203 students who were found having other eye problems were referred to the base hospital for further treatment.

In order to reduce uncorrected refractive error among adult population, 13 refraction camps were conducted in organised sectors like mills/industries. 3,000 people were examined; 1,163 spectacles were distributed.

#### *XOVA Project*

XOVA (Excellence in Ophthalmology Vision Award) project at Aravind - Pondicherry aimed at transitioning the traditional School Teachers (ST) screening model with All Class Teachers (ACT) model thereby screening 400,000 school children from 6 adjoining districts of Pondicherry. The project concluded in December

*XOVA Project: School teachers receiving training to identify common paediatric eye diseases and their symptoms among school children at Aravind - Pondicherry*



*Launch of 'Vision for All' at Aravind-Theni*

2015 benefiting 374, 942 children from 426 schools. Additionally, a total of 8,896 school teachers got trained in identifying common paediatric eye diseases and their symptoms.

#### *USAID Vision Screening Project in Children in the Age Group 0-6 Years*

Through the USAID-Childhood Blindness Programme project, Aravind - Pondicherry aims to build sustainable capacity and public health measures to effectively address the problem of visual impairment and blindness among children under 6 years of age. During April 2015





*USAID ROP Project: Dr. P. Vijayalakshmi interacting with doctors on ROP awareness at Theni Government Medical College*

- March 2016, around 35,000 children were screened for ocular defects from three adjoining districts of Pondicherry. A total of 500 children received free spectacles and 6 children underwent free surgery for defects like cataract, squint, retinal detachment and lid abscess.

### *USAID ROP Project*

The project started in December 2014 at Aravind - Madurai aims to develop a comprehensive Retinopathy of Prematurity (ROP) model that can be replicated in other setups as well as to increase early detection of ROP through awareness creation among different stakeholders.

*USAID Vision Screening Project Aravind-Pondicherry -to build sustainable capacity and public health measures to effectively address the problem of visual impairment and blindness among children*



Until March 2016, 1848 new babies were examined under the project and 437 treated children have been followed up. During the year, 85 laser procedures were done, 37 Avastin injections have been administered and 5 surgical procedures performed. The project team established referral linkage with Government Medical College and Hospital, Theni and Sivaganga and Government Hospital, Dindigul, in addition to the Government Rajaji Hospital, Madurai. Awareness creation programmes were also carried out.

Dr. Nagamani Beligere, Developmental Paediatrician, University of Illinois Medical Centre and Mrs. Marla Joy Garstka, Director - Children's Programmes, Chicago Lighthouse International North visited Madurai from January 17-28. They followed up 48 children and assessed the functional development of children who are afflicted by ROP.

Dr. Linda Lawrence, Paediatric Ophthalmologist from Kansas, visited twice during the year and assessed the present capacity and teaching skills and also guided the independent work of the vision rehabilitationist at Aravind - Madurai.

Towards building awareness on ROP among the ophthalmic community, Dr.P.Vijayalakshmi, Chief of Paediatric Services, conducted an instruction course

during the 63rd annual conference of Tamil Nadu Ophthalmic Association held at Madurai in July 2015.

### *Universal Eye care and Comprehensive Eye Care for a Million people: Using Technology and Vision Centres as the Foundation - Building a Scalable Model in Tamil Nadu, India.*

Supported by Sightsavers, the objective of this project was to explore the feasibility of providing ongoing comprehensive eye care through the Vision Centres including those needing chronic management. For such conditions like glaucoma or Diabetic Retinopathy (DR), case detection in the community is also a significant challenge and this project addressed this aspect as well. It was implemented in 15 Vision Centres covering a population of 1 million around Aravind - Madurai. Some of the early steps were in the realm of technology, developing a system for all patients to receive a unique ID number, regardless of where they register across the Aravind Eye Hospital network, which numbers 73 locations as of end March, 2016. This was to enable easy and seamless tracking of follow-up and compliance. To assist this further the concept of "Registry" was introduced to register and track all those who need to comply with an advice for surgery or a follow-up regimen. In terms of service delivery interventions, over 200 events covering awareness creation, DR and Glaucoma follow up and screening, school eye examination and refractive error screening camps were conducted. In all over 21,000 targeted persons were examined and received the required treatment. Though this project officially ended in December 2015, the activities continue and are getting integrated into Aravind's regular work.

*Universal Eye care and Comprehensive Eye Care Project: Refractive error screening camp at work place Aravind-Madurai*



### *Health Services Research*

One of LAICO's goals is to enhance eye care service delivery globally by strengthening health services research. Towards this, members of LAICO faculty are involved in various research projects leading to publications. In the weekly journal club organised for LAICO staff and managers of the hospitals, 38 articles were presented and discussed in the past year most of which were research articles. The 10th edition of annual research methodology workshop was attended by 41 participants from India and abroad. Following are some of the major research projects currently being co-ordinated from LAICO:

- Comprehensive Eye Care Work Assessment (CEWA) study in Theni district of Tamil Nadu
- Corneal Ulcer Prevention (CUP) through health education - A prospective public health intervention on promotion of eye health
- Validation of a low-cost, portable autorefractor developed by PlenOptika-Aurolab
- Development and implementation of the short form- IND - VFQ in a Tamil speaking South Indian population
- Validation of fundus image grading results by an automated detection algorithm (CAD) with that by a human grader

### *Other Events*

#### *LAICO in Seva - Canada Board*

Ms. K.M.Sashipriya, Senior Faculty, LAICO was elected member to the board of Seva - Canada. In this capacity, she attended the annual general board meeting at Vancouver and met the sponsors. She was also one

*Comprehensive Eye Care Work Assessment study: Aravind-Theni*







*Ms.Sashi with some of the Seva Canada Board members and staff*

among the three women felicitated by Seva - Canada for their leadership role in giving the power of sight in Nepal, Tanzania and India. She shared stories from the field and her own experiences working as a woman in leadership positions in eye care. In the United States, Ms. Sashipriya participated in the board meeting of Seva Foundation. She visited a few organisations involved in consultancy services to get to know about their way of working so as to apply the best practices in Aravind's consultancy programmes.

*Exposure Visit*

Mr. Sanil Joseph, Senior Faculty, LAICO was in the United States in November visiting prestigious universities and health care facilities. He held discussions with the faculty of Public Health and Epidemiology at the University of California, Berkeley and University of North Carolina, Chapel Hill with a

*At the Seva-Canada AGM - Felicitating women in leadership roles in eye care - Ms. Sashipriya with Fortunata Shija from KCCO and Parami from Seva-Nepal*



*Mr. Sanil Joseph and Ms. Leslie Louie with senior professors at the School of Optometry, University of Berkeley, California, USA*

focus on enhancing health services and epidemiological research at LAICO. He gave a presentation on Aravind, at the Berkeley School of Optometry and at the Gilling's School of Global Public Health for the faculty and students of various departments. He also visited the Cleveland Clinic's Eye Centre to explore their quality assurance programme. Several potential collaborative projects have come up as an outcome of these visits and interactions. At Google campus, Mountain view, he had a meeting with Dr. Lily Peng, the project lead to update on the Aravind - Google project towards developing an automated image grading software.

Dr. R.Venkatesh and Mr. R.D.Thulasiraj shared their inputs as panelists at the conference on Driving Innovation in Healthcare Delivery at the Deloitte Institute of Innovation and Entrepreneurship organised by London Business School, London on October 20. At the UBS Global Philanthropy Forum held

*Mr. R.D.Thulasiraj at the stakeholders meeting of the Africa Eye Foundation-Cameroon Eye Hospital Project*





*Dr. R. D. Ravindran and Dr. Bruce Spivey signing the MoU to provide required consultation to Pacific Vision Foundation*

at St. Moritz, Switzerland from December 4-6, Mr. Thulasiraj gave a talk on ‘What next? Ensuring innovative solutions reach scale’ The Forum discussed ways to embrace risk to foster innovation and address the world’s most intractable social and environmental problems.

At the Digital India Healthcare Summit organised by HIMSS Asia Pacific India at Gurgaon on August 5, Mr. R.D.Thulasiraj spoke on how Aravind has been able to benefit patients across geographies via telemedicine. He was also one of the panelists at the discussion on enabling policies to advance the cause of IT adoption in healthcare.

At the invitation from Fred Hollows Foundation, Ms. Dhivya Ramasamy gave a talk on Community Eye Health: A global Perspective citing experiences from Aravind Eye Care System at the Prevention of Blindness Programme: Second Annual Summit organised by the

*Ms. Priya Adishesan at the IAPB Regional Learning Forum at Phnom Penh*



*Mr. R. D. Thulasiraj at the headquarters of Conrad N. Hilton Foundation*

Department of Health, Philippines at Manila on August 13-14.

Ms. Priya Adishesan participated in the IAPB Regional Learning Forum on Eye Health for Women and Girls held at Phnom Penh, Cambodia on November 17. She spoke on “Reaching women and girls in the community: Sharing Aravind’s experience”.

Mr. R.D.Thulasiraj shared case studies from Aravind and stressed the importance of quality of leadership for the success of any healthcare organisation at the Round table on healthcare organised under the aegis of Tata Social Enterprise Challenge 2015 -16, by IIM Calcutta Innovation Park in association with the Tata group at Chennai on January 28.

At ‘Wavelength - On Your Marks’ held at Berkshire, London, UK, March 14-18, Dr. S. Aravind spoke on nurturing the emotional infrastructure and the aspect of joy in doing something beautiful.

*Dr. S. Aravind at ‘Wavelength - On Your Marks’*





# Research



*Research programmes at Aravind Medical Research Foundation continue to explore the fundamental mechanisms of eye diseases that are of importance to the country. Therapeutic interventions are also being attempted wherever possible. Keeping pace with modern developments in science is imperative since AMRF is involved in teaching as well as research. Therefore, inducting new experts is a continuing effort here. A new faculty with expertise in microbial systems and cancer biology was recruited.*

Research programmes at AMRF continue to focus on the fundamental mechanisms of relevant and specific eye diseases which cause a lot of burden to India and other similar developing countries. In tandem, many clinical trials, especially in relevant, but orphan diseases go hand in hand. A strong Ph.D programme with close collaborations with clinicians and basic researchers continues to provide an active academic environment to the entire institute. Creating new departments with investigators in different expertise has also been carried out in addition to strengthening the existing departments. With generous support from well-wishers, developments were made on the infrastructure front and new equipment were added to the existing facilities.

### *Proteomics of Ocular Diseases*

Understanding the mechanisms underlying eye diseases including fungal keratitis, diabetic retinopathy (DR) and glaucoma is the major focus of this department. Identification of protein biomarkers is also explored using proteomics. Well-equipped proteomics facility with two state-of-the-art mass spectrometers helps in both the identification and quantitation of the proteins relevant to these diseases. Key events triggered in the patients during fungal infection are innate immunity controlled by complement cascade and neutrophil mediated antifungal response. These are found in the tear film of patients. Many proteins that are markers for the severity of the host response in these patients

have also been identified. Study on diabetic retinopathy identified candidate predictive and prognostic biomarkers that can help in identifying the subgroup among diabetes who are at a higher risk of developing retinal complications. Validation of these proteins using a larger sample size across the different stages of the disease is currently underway. In addition to the proteome wide changes, the department is also analysing changes in the microRNA levels in different stages of DR. Over the last year, it has established collaboration with Institute Pasteur to compare the pathogenesis of *A.fumigatus*, a pulmonary pathogen and *A.flavus*, a corneal pathogen.

### *Molecular Genetics*

Presently, the department is working on molecular genetics of common eye diseases like cataract, diabetic retinopathy, glaucoma, corneal and retinal dystrophies. Studies are on to identify putative genetic markers for diagnosis and genetic counselling in retinoblastoma. The department has given priority to study genetics of Primary Angle Closure Glaucoma (PACG). It is genetically heterogeneous disorder with complex genetic basis affecting many individuals within a family. Studies at the department have previously reported the significant association of SNP rs1015213 in PCMTD1-ST18 gene with PAC/PACG group ( $p=0.002$ ) in South Indian population (Duvesh et al, 2013). Recently, a genome wide association study (GWAS) was conducted across 23 countries (Asia, Australia, Europe,

*Team involved in the proteomic studies of ocular diseases*





North- and South America) including 10,404 PACG cases and 29,343 controls to identify the susceptibility loci for PACG. This study showed significant evidence of disease association at five new genetic loci. These loci are at EPDR1 rs3816415, CHAT rs1258267, GLIS3 rs736893, FERMT2 rs7494379, and rs3739821 mapping in between DPM2 and FAMI02A on chromosome 9. The department also contributed to this study in collaboration with Singapore Eye Research Institute (SERI) and analysed 190 PACG cases and 200 controls for these SNPs using Taqman allelic discrimination assay. A highly significant association of SNP rs1015213 in PCMTD1-ST18 ( $p=9.17E-05$ ) was observed and a significant association of a new locus rs16856870 in FNDC3B gene ( $p=0.0046$ ) was also found. FNDC3B is Fibronectin Type III Domain Containing 3B protein, which in earlier studies, has been associated with IOP and Central Corneal Thickness (CCT) in Primary Open Angle Glaucoma (POAG) subjects. In addition, Whole-exome Sequencing Analysis was performed and mutations were identified especially in the FAMI61A and EYS Genes in Retinitis pigmentosa in Indian population. Studies are also underway to understand the role of SIX6 gene in the pathogenesis of POAG. The department also focused on screening of CHST6 gene for Macular Corneal Dystrophy (MCD) and identified novel and reported genetic variants in south Indian population.

### *Genetics of Retinoblastoma*

Retinoblastoma is the intraocular tumor of children, primarily caused by the changes in the Rb1 gene. These changes can be either a single base change or deletion of whole gene ultimately affecting the function of the retinoblastoma protein which controls the cell division. The alterations in the gene can be either inherited from parents or occur during the development of eyes in children. When it is inherited, it is usually detected in all the cells including the blood cells and there is high chance that the next child of parents or their grandchildren may also be affected. If the change is detected only in the tumor, it is less likely that it will be inherited.

The department has developed a cost effective method of genetic testing of Rb1 gene. A new high throughput sequencing instrument - Illumina Miseq has been installed in to quicken the process and to analyse the other genetic factors involved in retinoblastoma. In addition, the department is also studying the



*Genetic analysis of retinoblastoma using Illumina Miseq*

significance of the mutations through the analysis of Rb1 gene expression.

30 patients were analysed during the last year and mutations were detected in 21 of them. Increased risk of retinoblastoma in next child in two families was predicted through the analysis of the patient and their family samples. In twelve patients, the changes were detected in their blood samples but not in their parents inferring that these changes occurred during their development, which may be passed on to the next generation. The analysis of tumor could tell about the mutations in seven patients, which will not be inherited to their sibling or next generation.

### *Stem Cell Biology*

The main focus of research is to understand the basic biology of limbal epithelial stem cells, responsible for the maintenance of corneal epithelial homeostasis. The department has earlier established a specific method (high p63 expression in cells with high nucleocytoplasmic ratio) to identify and quantify these stem cells using confocal microscopy. Further, a two-step protocol to enrich the limbal epithelial stem cells to 80% (basal cell isolation followed by selection of cells with high nucleocytoplasmic ratio by laser capture micro dissection) was developed.

In order to identify stem cell specific markers and to understand the molecular signaling pathways associated with the maintenance of stemness, next generation sequencing of the enriched stem cells was carried out. More than 320 differentially expressed genes were identified in the enriched stem cell population (fold change >100) compared to central corneal cells (differentiated cells). Further analysis of these highly



*Victor X light luminescence counter to quantify the bioluminescence*

expressed genes and their signaling pathways are being carried out to confirm their role in the maintenance of stemness. In parallel, studies are now being carried out to profile the miRNAs, the molecular regulators of gene expression. These studies will aid in developing better methods for the limbal stem cell expansion and maintenance, particularly for treating patients with Limbal Stem Cell Deficiency (LSCD).

Under translational research, a non-invasive method for assessing the limbal epithelial as well as the stromal microarchitecture in healthy individuals was established earlier using In Vivo Confocal Microscopy (IVCM). In continuation, the nature of the limbal stromal niche in ten LSCD patients was carried out this year to assess the severity of damage due to the injury. IVCM analysis revealed that in addition to loss of limbal epithelial architecture, the stromal niche structures were also lost and were fibrotic in nature. Further studies are being carried out to characterise the

*Team involved in the use of drugs to treat and diagnose eye disease*



sequential changes in the limbal architecture in different stages of LSCD.

### *Ocular Pharmacology*

The main research focus of the ocular pharmacology department is to understand the pathogenic mechanisms and to identify a better therapeutic strategy for age-related eye diseases such as Age Related Macular Degeneration (ARMD) and glaucoma.

The age-related macular degeneration project aims to investigate the importance of dietary macular carotenoids (lutein, zeaxanthin and metabolite meso-zeaxanthin) and its protective role in preserving vision with age and also in macular degeneration. Dietary carotenoids and metabolite mesozeaxanthin constitute the Macular Pigment (MP) in the retina and can be estimated in vivo using Macular Pigment Screener (MPS) II. Estimating such Macular Pigment Optical Density (MPOD) in healthy individuals and patients with AMD will help in identifying individuals at reduced, medium and elevated risk of developing age-related macular degeneration based on high, medium and low central MPOD levels respectively and their genetic predictors in Indian population. The present findings from the healthy volunteers indicate that, MPOD is positively associated with plasma carotenoids and inversely associated with total cholesterol and triglycerides, adding further evidence that additional intake of LZ may be beneficial in delaying the risk of AMD in our population. The recruitment of AMD patients is in progress to investigate the association of MPOD, plasma carotenoids and AMD disease condition.

In glaucoma project, the department aims to focus on the role of Rho A-ROCK signalling in the pathogenesis and to identify the potential clinical candidates for the management of the disease using ex vivo human organ perfusion system (HOCAS). The effect of SB77 (Rho Kinase inhibitor) on human aqueous outflow facility at three dose levels has been studied (100nM, 10 & 50µM) using HOCAS. SB77 was effective in enhancing the outflow facility in HOCAS and thus may be a potential clinical candidate for the management of glaucoma therapy. In addition, we are investigating the effect of cyclic mechanical stress on the Rho A-ROCK signalling in altering the contractility of intact trabecular meshwork in mediating aqueous outflow resistance and also the role of Rho Kinase inhibitors in reducing such resistance generated by cyclic IOP.





A core computational facility for high-throughput omics data analysis

### Bioinformatics

Bioinformatics facility has reliable infrastructure and framework comprised of LINUX and Windows based servers and desktop workstations, which could be used by other researcher as well. It is to customise data analysis tailored to the needs of individual research projects across all the research groups. Recently, automated pipeline developed for RBI gene Next-Generation Sequencing (NGS) data for diagnosis of Retinoblastoma (RB) patients was expanded and written with UNIX scripting language for 18 cancer gene panel and 47 cancer genes with hotspots. The pipeline with heuristic approach was applied to detect pathogenic variants from in-house MiSeq illumina sequencing data in RB patients. In this study, five patients, identified to have no mutations with conventional methods were identified to carry pathogenic variants by NGS. In addition, a comprehensive benchmarking study on human exome data using 15 automated pipelines with various algorithms suggested that single nucleotide variants (SNVs) and other types should be analysed separately for genetic eye disorders.

A bioinformatics approach was applied to identify differentially expressed miRNAs and their targets from fungal infected corneas compared to normal cadaver through small-RNA deep-sequencing method. A total of 75 differentially expressed miRNAs were detected and subset of highly dysregulated miRNAs (miR-511-5p, miR-142-3p, miR-155-5p, and miR-451a) were predicted as wound inflammatory genes that may regulate wound healing. Further, our experiments with miR-451a suggested a possible potential target viz Macrophage

migration Inhibitory Factor (MIF) as a candidate for further clinical use.

### Ocular Microbiology

The department focuses on the cellular and molecular basis of ocular infectious diseases, with a special emphasis on ocular inflammation. The experimental approaches to study host pathogen interactions involve in vitro cell culture models, ex vivo analysis of ocular tissue. Studies at the department show autophagy as an important host defense mechanism to limit bacterial load. Induction or inhibition of the autophagic process resulted in variable intracellular bacterial load which may have a therapeutic value in *P.aeruginosa* keratitis. The results are being validated in vivo with a mice model.

Drug tolerance mechanisms may prevent complete eradication of bacteria from the ocular tissues despite an effective antibiotic treatment. Work on the intracellular bacterial survival and drug tolerance mechanisms may help select appropriate therapy for keratitis patients.

To better understand the virulence and antibiotic resistance mechanisms, whole genome sequencing of ocular *Pseudomonas aeruginosa* and methicillin-resistant *Staphylococcus aureus* (MRSA) isolates was done on a Next Generation Sequencing platform.

### Ongoing Basic Research

- Pathogenic *Aspergillus* interaction with Innate Immune cells
- Limbal miRNAs and their potential targets associated with the maintenance of stemness
- Analysis of bacterial persistence mechanisms in recalcitrant ocular *Pseudomonas aeruginosa* infections

#### Ocular microbiology team



- Studying the Role of Rho A - Rock Signalling in conventional outflow pathway using Human Organ Culture Anterior Segment (HOCAS)
- Genetics and transcript analysis of RBI gene in South Indian Retinoblastoma patients
- Centre for Excellence In human mycotic keratitis
- Epidemiology, pathogenomics and system biology of *A.flavus* infections in India an integrative approach
- Proteomics and peptidomics of human infectious diseases and biomarker discovery
- Mitoscriptome analysis to understand the pathogenesis of diabetic retinopathy using tissue microarray
- Etiology and immunopathogenesis of subconjunctival and anterior chamber granulomatous uveitis in children of South India
- Establishing the genetic testing centre for childhood ocular cancer (retinoblastoma) in Aravind Medical Research Foundation
- Predictive biomarkers for diabetic retinopathy among diabetics and stage specific biomarkers for NPDR and PDR
- Indian Macular Carotenoids Research (INDMACARE) - A Feasibility study
- Genetic screening in a large family with Primary Open Angle Glaucoma
- Functional analysis of circulating microRNAs and their regulatory role in Diabetic Retinopathy

## Major Workshops / Events

### World Immunology Day

World Immunology Day is celebrated since 2007, with a purpose to establish a community of immunologists dedicated to improve the health of people around the world. Under the initiative of Indian Immunology Society, New Delhi, World Immunology day was celebrated in AMRF. A seminar on “Immunology Today” was organised and a total of 76 participants attended the meeting. Speakers included Dr. S. Vijaya, IISc, Bangalore, Dr.P. Rajaguru, Anna University, Trichy, Prof. VR. Muthukkaruppan, Advisor - Research, AMRF; Prof. K. Dharmalingam, Director - Research, AMRF; and Dr. S. R. Rathinam, Professor and Head, Uvea Clinic, Aravind-Madurai.

### 5th Annual conference of the Society for Mitochondrial Research and Medicine (SMRM)

Aravind Medical Research Foundation hosted the conference as part of the annual October Summit. Dignitaries who shared their views included Dr. P.Namperumalsamy, Chairman Emeritus - AECS, Dr. VR. Muthukkaruppan, Advisor-Research, Dr. K. Dharmalingam, Director - Research, and Prof.K.Satyamoorthy, President - SMRM. The conference proceedings and annual report of AMRF were released by Mr. G. Srinivasan, Director-Finance, AECS. The meeting served as a common podium for

*Participants of the seminar on Immunology Today*







*Prof. Muthukkaruppan and Mr. G. Srinivasan at the release of the conference proceedings of SMRM 2015 and annual report of AMRF*

basic scientists, clinicians and young researchers to discuss recent advances in mitochondrial biology, diagnosis and treatment of mitochondrial diseases. About 170 participants including 9 National and 9 International invited faculties attended the meeting.

*Workshop on Mycology and Ocular Microbiology*  
November 30 - December 4

The five day workshop aimed to give a basic working knowledge about handling and processing of ocular specimens and interpretation of cultures through informative lectures and hands-on training in basic mycology and molecular biological techniques. A total of 19 participants attended the workshop, including

MD Microbiology postgraduate students and people working in the field on clinical microbiology. Apart from the Aravind team, the faculty included Dr.M.R.Shiva Prakash, PGIMER, Chandigarh, Dr. Anupma Jyoti Kindo, Sri Ramachandra University, Chennai and Dr. Jayanthi Savio, St. John's Medical College, Bangalore.

*Workshop on Experimental Approaches to Proteomics*

March 2-5

The main objective of the workshop was to provide the participants a comprehensive hands-on training on the bottom-up proteomics approaches. There were twenty-two participants, both research scholars and faculty who were from different universities and institutes. The four-day workshop was designed to cover four modules on the basics as well as experiments done routinely in the mass spectrometry based proteomics studies. The participants were given hands-on training in the experiments such as protein quantitation, different methods of sample preparation and clean-up of samples for mass spectrometry analysis. Participants were also provided training on analysis of MS data, both identification as well as quantitation of proteins using Proteome Discoverer and Pinpoint softwares. The workshop also included invited lectures by Prof.Balamurugan from Alagappa University, Karaikudi, Dr. Krishna Tej from Narayana Nethralaya, Bengaluru and Dr. Mahesh Kulkarni from National Chemical Laboratory, Pune.

*Participants of the Mycology and Ocular Microbiology*





Ms. Jhansi Rani receiving the Prof. VR. Muthukkaruppan Endowment Award



Mr. Lalan Kumar Arya, defending his Ph.D thesis

### *Prof. VR. Muthukkaruppan Endowment Award*

Prof.VR.Muthukkaruppan Endowment Award was given to Ms. Jhansi Rani Kasinathan, Senior Research Fellow, Stem cell Department for her outstanding research work on miR-203 inhibits  $\Delta Np63$  dependent clonogenicity in Corneal Epithelial Stem Cells (CESCs). The award carries certificate and cash prize of Rs.25,000/.

### *Ph.D Thesis Defended*

Four research scholars - Mr. Sushil Kumar Dubey, Mr. Lalan Kumar Arya, Mr. Anshuman Verma and Ms. Prasanthi Namburi have successfully defended their Ph.D thesis.

### *Newly Added Research Facilities*

This year two equipments were purchased with funding support from Aravind Eye Foundation, USA.

### *Illumina Miseq*

Illumina Miseq, is a high end next generation sequencing facility used for genetic testing of retinoblastoma and other ocular genetic disorders. Identification and characterisation of causative microorganisms involved in infectious ocular diseases and elucidating the resistance mechanism in multidrug resistant bacteria are quite possible with this bench top sequencer.

### *Macular Pigment Screener (MPS) II*

MPS II (Electron Technology, UK) is a unique equipment used to assess the macular health of an individual in terms of Macular Pigment Optical Density (MPOD). This equipment will help to study the role of carotenoids in preserving vision with age and in the progression of age-related macular degeneration.

Mr. Anshuman Verma, Ms. Prasanthi and Mr. Sushil Kumar Dubey defending their Ph.D thesis





## Ongoing Clinical Research

### Retina

- A randomised, controlled study evaluating the efficacy and safety of Ranibizumab compared with laser therapy for the treatment of infants born prematurely with retinopathy of prematurity (Rainbow study)
- A 12-month, phase III, randomised, double-masked, multicentre, active-controlled study to evaluate the efficacy and safety of the individualised regimens of 0.5 mg ranibizumab vs verteporfin PDT in patients with visual impairment due to choroidal neovascularization secondary to pathologic myopia (Brilliance)
- A prospective, comparative, assessor blind, randomised, multicentric phase 3 study to compare the safety and efficacy of ranibizumab of intas biopharmaceuticals ltd. in comparison with lucentis of novartis in patients of wet ARMD (Age Related Macular Degeneration).
- A prospective, randomised parallel group, double blind, multicentric study to compare the efficacy, safety, immunogenicity of Luupin's Ranibizumab with Lucentis in patients with neovascular age-related macular degeneration
- Retinopathy of Prematurity -Difference between the presentation of Government NICUs and private hospital NICUs
- A study to assess the effectiveness of a Computer Assisted Diagnosis (CAD) programme in identifying the presence of Diabetic Retinopathy (DR) and Diabetic Macular Edema (DME) in persons with diabetes.
- Indian Macular Carotenoids Research (IND MACARE) - A feasibility study
- Collection of normative data for full field electroretinography
- Comparative study of inverted ILM flap technique over standard technique in large macular holes
- Efficacy of Yellow (pattern) laser versus PASCAL Green for panretinal photocoagulation in high risk proliferative diabetic retinopathy

### IOL and Cataract

- The natural history of intraocular lens in eyes with exfoliation syndrome

- Identifying risk factors for complications of cataract surgery
- Evaluation of the visual performance and rotational stability of i-Sert 351 (Hoya preloaded Toric) lenses.
- Effect of morphological characteristics of posterior polar cataract on the surgical and visual outcome following phacoemulsification.
- Comparison of Centurion vision system with balanced tip and the Infiniti vision system with the Mini Flared Kelman (MFK) tip during cataract extraction surgery of hard lenses
- Efficacy of intracameral Moxifloxacin endophthalmitis prophylaxis at Aravind Eye Hospital
- Effect of the nature of ocular trauma on axial length - A comparative study
- Effect of preoperative oral glycerol on intraoperative complications during phacoemulsification for intumescent cataracts
- VERION versus slit lamp manual marking in Toric IOL implantation
- A prospective, non-randomised, single arm, open label study to evaluate the efficacy of multifocal intra ocular lenses in patients having cataract in both eyes
- Cataract surgery in Indian patients with or without LenSx laser
- Comparison of Lignocaine 4% drops vs Lignocaine 2% jelly for anesthesia in Femto laser cataract surgery
- Refractive Stability of Femto Arcuates at 6 months

### Cornea

- Parasitic Ulcer Treatment Trial (PUTT)
- Mycotic Ulcer Treatment Trial (MUTT)
- Evaluation of the efficacy of 2% cyclosporine in preventing graft rejection
- To compare intrastromal vs. topical voriconazole in fungal keratitis refractory to topical natamycin therapy
- Management of recurrent pterygia using Polytetrafluoroethylene (gore-tex)

### Glaucoma

- Compare the sensitivity and specificity of Dell tablet fields with the standard white on white perimetry done on Humphrey's Field Analyser (HFA)
- A prospective, randomised comparative study of efficacy and safety of sub-conjunctival injectable MMC VS MMC soaked sponges in trabeculectomy patients.

- A randomised, multicentre, prospective, parallel group, double blind, three arm comparative study to compare the efficacy and safety of brinzolamide 1% ophthalmic suspension of Cipla Ltd., India against azopt® manufactured by Alcon Pharma Ltd., in subjects with Chronic Open Angle Glaucoma or ocular hypertension
- A clinical trial to study the efficacy, safety and tolerability of Ripasudil Hydrochloride Hydrate Eye Drops 0.4% w/v Vs Timolol Maleate Eye Drops 0.5% w/v in subjects suffering from ocular hypertension / glaucoma.
- International pilot survey of childhood glaucoma (IPSOCCG).
- Central macular thickness and its relation to axial length and intraocular pressure after phacotrabeculectomy
- A prospective randomised comparative study to determine the safety and efficacy of 2 fixed 10-0 polyglactin suture and one fixed nylon suture v/s 2 fixed 10-0 nylon suture with one releasable nylon suture for triangular sclera flap in phacotrabeculectomy
- A cross sectional study on the factors associated with optic disc hemorrhage in patients with primary glaucoma in a tertiary care centre in south India.
- A comparison of Glaucoma surgeries' waste and cost in India and the United States
- Identifying the social challenges of paediatric patients and their caregivers in rural and urban environments.

## Uvea

- First line antimetabolites as steroid- sparing treatment
- A Phase III, multinational, multicentre, randomised, double-masked, study assessing the safety and efficacy of intravitreal injections of DE-109 (three doses) for the treatment of active, non-Infectious Uveitis of the posterior segment of the eye
- A Phase IIIb, multinational, multicentre, open-label extension study assessing the long-term safety of PRN intravitreal injections of DE-109 in subjects with non-infectious uveitis of the posterior segment of the eye who have participated in the SAKURA development program.

## Orbit, Oculoplasty and Ocular Oncology

- Identification of mitochondrial biomarkers in retinoblastoma
- Establishing the genetic testing centre for childhood ocular cancer (retinoblastoma) in Aravind Medical Research Foundation
- Genetic and transcript analysis of RBI in south Indian RB patients - ICMR
- A simple smartphone-based method for early detection of retinoblastoma - a pilot study
- A prospective, non-randomised, single arm, open label study to evaluate the safety and efficacy of Aurotube in conjunctivo dacryocystorhinostomy
- A prospective, non-randomised, single arm, open label study to evaluate the safety and efficacy of lacrimal silicone intubation for the management of epiphora

## Operations Research

- Comprehensive Eye Care Work Assessment (CEWA) study in Theni district of Tamil Nadu
- Corneal Ulcer Prevention (CUP) through health education - A prospective public health intervention on promotion of eye health
- Validation of a low-cost, portable autorefractor developed by PlenOptika-Aurolab
- Development and implementation of the short form- IND -VFQ in a Tamil speaking South Indian population
- Validation of fundus image grading results by an automated detection algorithm (CAD) with that by a human grader

## Clinical Trials

### Aurolab

- A prospective, non-randomised, single arm, open label study to evaluate the performance of Multifocal Intra Ocular Lenses (MFIOL) with patients having cataract in both eyes.
- A prospective clinical investigation of Conjunctivo Dacryocystorhinostomy (CDCR) With Aurotube.



# *Manufacturing Ophthalmic Supplies*



*2016 is a landmark year for Aurolab as it steps into 25th year of service. What began as just an intraocular lens manufacturing unit, over the years went on to manufacture all essential ophthalmic supplies and equipment, thus contributing to Aravind's mission of making quality eye care affordable to all. Aurolab later diversified to a state-of-the-art facility with five full-fledged divisions exporting products to over 146 countries.*

*With an altruistic perspective and stringent quality standards Aurolab elegantly meets the challenge of manufacturing world class ophthalmic products and yet making them affordable and available to all.*

In the last year, Aurolab has also widened its reach with the registration of its products in 22 more countries.

### New Products

#### *Aurocoat - Sodium Hyaluronate 2% w/v with Chondroitin Sulphate 2% w/v*

Aurocoat is a high end viscoelastic with both cohesive and dispersive properties. This unique combination helps in maintaining the depth of the anterior chamber throughout the surgery and provides better endothelial protection. It is easy to remove and hence saves time and avoids post surgical complications. This product enhances the surgical outcomes, especially in complicated cases.

Within 6 months of its launch, Aurocoat has received good acceptance from ophthalmic surgeons and more than 7000 units have been sold across India. Many top surgeons have been appreciative of the product, price and quality. With the introduction of this product, the range of viscoelastics offered by Aurolab is complete with Hydroxy Propyl Methyl Cellulose (HPMC), Sodium Hylauronate and now Sodium hyaluronate + Chondroitin Sulphate to meet the varied needs of an ophthalmic surgeon.



### Product Extensions

#### *Hawk I slit lamp*

Introduced a year ago, Aurolab's Hawk I slit lamp has received good acceptance in the market. Two products - an Applanation Tonometer (made in Spain) and an Integrated CCD camera system with image storing facility - were introduced to enhance the use of Aurolab's Hawk I slit lamp. A new variant of Hawk I slit lamp with LED module, was also launched.

Aurolab has identified a reliable partner for supply of chair units. With the inclusion of this product to its







Slit lamp and digital vision chart, Aurolab can be a one point supplier for Ophthalmic outpatient department supplies.

### *IOLs*

For the first time, Aurolab made negative powers from (-5D to -1D) available in foldable IOLs on the popular Auroflex platform. The range of Aurovue EV IOLs has also been increased to cover 5D to 9D and 31D to 35D.

### *Surgical Blades*

MVR 19G and 20G straight and angled blades have been added in Aurosleek range as there is an increased usage of the above models for side port entry incision.

### *Suture Needles*

Suture needles specially designed for Keratoplasty with half circle design (6802N) were introduced, and are well appreciated by top corneal surgeons in the country.

### *Marketing Activities*

#### *Training*

With the increasing customer base for equipment, sales staff were trained to service basic products such as

digital vision chart and slit lamps. With this initiative, Aurolab's ability to meet customer demands has been strengthened significantly.

Understanding the need for creating awareness about latest trends in cataract surgery, Aurolab has initiated a two-day training programme for ophthalmic community including aspiring surgeons, refractionists, optometrists and counsellors. The programme titled "ACT"- Advanced Cataract Training focuses on the promising

"ACT" - Advanced Cataract Training



protocols followed in Aravind Eye Hospitals for Toric IOL implantation.

Four batches underwent training and implemented protocols in their respective hospitals, achieving excellent postoperative results.

### *Aurolab Continuing Medical Education*

Aurolab organised its first international CME in three cities of Philippines - Manila, Greater Manila and Cebu from November 17-20. Dr. Shivakumar, Chief - Cataract Services, Aravind Eye Hospital, Tirunelveli was the lead speaker of these CMEs. He shared the podium with Dr. Carlos Naval, Former President of Philippines Academy of Ophthalmology and Medical Director of the Galileo Surgicenter, Manila.

Aurolab conducted a CME at The Eye Foundation, Bangalore with Dr. Ramamoorthy, President, AIOS; Dr. M.S. Ravindra, Chairman and Medical Director, Karthik Netralaya - Bengaluru; Dr. Shreesh Kumar, Medical Superintendent, The Eye Foundation - Coimbatore; and Dr. Arulmozhivarman Medical Director, Uma Eye Clinic, Chennai as speakers.

Auroflex Toric wetlab was organised at the Kerala State Ophthalmological Society and at the CME in Chakrabarty Eye Care in Trivandrum.

### *Midyear Sales Review*

Midyear sales review meets were conducted for Aurolab's Area Development Managers at Delhi and Pune from October 9-10 and 12-13 respectively to review the region wise sales and to plan effectively for the second half of the year.

*Dr. Shivakumar at Aurolab's first international CME in Philippines*



### *Regulatory Activities*

Preloaded Hydrophobic IOL, Glaucoma Shunt (AADI) and Aurosleek are in line to receive CE certification. Manufacturing license for IOL has been renewed for the next 5 years. Pharma and Suture needle division received WHO GMP renewal certificate from Central Drugs Standard Control Organisation (CDSCO), Government of India.

Products' registration certificate for Uganda has been renewed, which is valid for the next 3 years. GMP audit has been successfully done by the National Agency for Food and Drug Administration and Control (NAFDAC), Nigeria. This year 22 products were registered in seven countries.

Patent filing is in progress for IOL delivery system and safety guard for surgical blades.

### *HR Activities*

A total of 93 production trainees completed the training and were absorbed as staff at Aurolab.

Yoga classes were organised for different cadres of staff to keep their body and mind fit.

Aurotsav 2015 was celebrated in November with great fervor. Various events were conducted and the winning team was awarded with trophy.

Continuing technical education training programme was arranged for production staff to update them on new products, sterilisation procedures, importance of GMP and quality analysis system. Aurolab joined Aravind's efforts to raise resources to help Chennai flood victims by organising game show and snacks stall at Angaadi charity fest. Education funds were allotted

*Navarathri celebrations at Aurolab*







*Dr. P. Balakrishnan, Managing Director of Aurolab was felicitated for his twenty five years of service on Aurolab day*

for children of staff members. A total of sixty children benefitted.

Festivals like Gokulashtami, Navarathri, Diwali and Pongal etc. were celebrated in the traditional way with much enthusiasm.

Aurolab stepped into its 25th year of service and at the annual day celebrations held on January 23, Dr.Venkatesh, Chief Medical Officer, Aravind-Pondicherry was the chief guest.

On the occasion of International Women's Day, a workshop was organised for the production staff to train them in several arts and craft works using waste materials, wires and clay pots. The items thus made were kept on display.

A bird watching session was arranged in Aurolab farm with Mr. Raveendran and Dr. Badrinath both avid bird watchers. The team was surprised as they spotted 45 rare species of birds in the farm.

*Aurolab staff locating birds at Aurolab farm with Dr. Badrinath*



*Traditions revived during Pongal celebrations*

Various motivational lectures and health care awareness talks were organised to promote a healthy lifestyle amongst the staff.

### *Prominent Trade shows*

Aurolab participated in the following major conferences during the last year, where it promoted its products.

- Congress of American Society of Cataract and Refractive Surgeons - ASCRS
- Annual Conference of European Society of Cataract and Refractive Surgeons - ESCRS
- Annual Conference of the American Academy of Ophthalmology - AAO
- World Ophthalmic Congress - WOC
- Annual Conference of All India Ophthalmic Society - AIOS

Apart from these, Aurolab also participated in 12 international conferences and various regional and state level ophthalmic forums.

*Mr.Alexander, Mr.Vishnu Prasad and Mr.Venkateswaran at WOC held at Guadalajara, Mexico*



# Central Functions

## Human Resources Development

As much as the organisation places importance on ensuring patient satisfaction, equal attention is given to make sure that the interests of the employees are maintained and taken care of. This became evident at the recent employee survey conducted by Great Place to Work Institute, India where more than 70% of the participants responded that they are satisfied being a part of Aravind.

For many who have been a part of the organisation in the early years, it was nothing short of a homecoming when Aravind organised an alumni meet, the first of its kind in its four decade history. "Roots", held during October 17-18, provided an excellent opportunity for alumni ophthalmologists to come together and share their good old memories. Close to 100 alumni attended the programme which was filled with fun and leisure.

As the organisation expands, it becomes imperative to develop in people the mindset to drive and enable growth, to bring in a collective ownership and to understand potential challenges that need to be addressed along the way. In January 2016, a planning meeting was held at Aravind - Madurai to bring everyone on board for the major expansion plans that Aravind is undertaking. Managers, nursing superintendents and staff of Personnel and HR

departments from all the centres of Aravind came together for this day long discussion.

The annual HR Retreat held from January 19-20 analysed the department's performance. HR mission for the year was finalised and an action plan was developed.

## Employee Engagement Initiative

The year passed by can be considered as a period of advocacy for employee engagement programme with the major theme emerging out as 'communication'. Projects done by students from University of Michigan, series of meetings and workshop on Insights into employee engagement helped to develop understanding and overall buy in of seniors from across the system. While initiatives like Wanderers and quiz competitions with social gatherings broke the silos between people, ground level initiatives like revamping of meetings helped in removing the operational bottlenecks. A Facebook page named 'Humans of Aravind' dedicated to the people of the Aravind was launched. Fetzer project has helped in writing down how Aravind is able to practise compassion at a large scale and the values it stands for. A documentary, final output of the project will be shared with the world soon. With a strong base established, key initiatives like mentorship, leadership and professional development programme will see the light in the coming year.

*Roots 2016 participants with Dr. Venkatesh and Dr. Mohideen and senior MLOPs on a trek at Keelakuyilkudi*







Aurolab

## Glimpses of Auroutsav 2015

- the biennial arts-sports-literary competitions  
It is a beautiful time, when each and every Aravind employee competes from equal grounds.

A judge (the judges for all events are external) for one of the events observed that he felt as though he was visiting Gandhiji's Phoenix farm in South Africa where the dignity of human beings is celebrated.



Aravind-Coimbatore



Aravind-Pondicherry







Aravind-Tirunelveli



Aravind-Theni



Aravind-Salem



Aravind-Madurai







*University of Michigan students presenting the project they worked on to the Aravind senior management team*



*Photo Exhibition by 'Wanderers'*

### *Employee Development Programmes*

With a view to equip the employees meet the growing demands of work, training programmes are arranged on a regular basis. Various sessions of continuing medical education programmes were held for Mid Level Ophthalmic Personnel. Sessions on fire safety training, how the employees can keep themselves safe from hospital infections as well as basic life support measures in an emergency, are being held regularly.

Training programmes were conducted for staff of optical sales, technicians and refractionists by Essilor India Private to create awareness on various types of lenses, and their benefits. HR department also organised sessions for staff of Optical department to discuss ways to improve customer satisfaction.

A Continuing Professional Education (CPE) programme was organised for the staff of audiovisual and DTP departments across the centres from November 20-21 at Aravind - Madurai. A total of 15 participants attended the training that focused on product/portrait photography as well as the use of Illustrator software.

To standardise the accounting process across all hospitals and to ensure error free, accurate and timely reports to management, a CPE was arranged for the accounting staff of Aravind Eye Care System on March 12. The participants were also provided exposure and training on the new initiatives planned for the fiscal year 2016-17. Thirty five participants from all Aravind facilities took part in the CPE.

*HR personnel at the Annual Retreat at LAICO*





*Aravind Communications team with Mr. Mike Myers at the CPE Programme*



*Dr. Ramakrishnan distributing prizes at the Programme for Aravind Staff Support (PASS)*

### *Employee Welfare Activities*

Aravind - Tirunelveli introduced 'Programme for Aravind Staff Support' (PASS) wherein the vision centre technicians along with their family members were invited for a day long get-together. The programme was held on December 20 and the main aim was to ensure that the staff of vision centres receives the necessary support from their family members to enable them to do their work efficiently. The family members were briefed on the important role played by the mid level ophthalmic personnel in the system. The management described in detail how the family members' support would make a positive change in these technicians' work. Several fun games and a quiz programme were also arranged.

Entertainment programmes and festival celebrations were arranged on several occasions which provided the staff the much-needed relief from an otherwise mundane work schedule. Anniversaries of hospitals were celebrated elaborately. Excursions were arranged for different cadres of staff members.

Auroutsav, the biennial arts-sports-literary competitions was celebrated with much enthusiasm and team spirit across the centres.

Child care centres functioning in all the main centres of Aravind have been a great blessing to the working mothers at Aravind. The Child care centre was inaugurated on April 1 at Aravind - Tirunelveli.

Funds were offered to employees to support their children's education needs. Felicitation programmes were arranged for children of staff members who successfully completed tenth and plus two.

*Participants of the Accounts CPE programme*







*Dr. Meenakshi inaugurating the child care centre at Aravind-Tirunelveli*

Tutorials on spoken English / Hindi / Tamil as well as computer skills are being held regularly for different cadres of staff members. Motivational sessions, spiritual talks and healthcare awareness lectures were also arranged for the benefit of staff members.

### *Into the Heart of the Community*

Aravind has always been a strong community oriented organisation and the various initiatives taken up in the recent past were beyond the realm of eye care.

Aravind along with Green Walk actively mobilised resources to support the victims of the devastating Chennai floods that happened in late November. The great charity fest 'Angaadi' was organised from December 19-20 and the proceeds were sent to support relief work.

On October 14, 'Madura -A Musical Discovery of Madurai' was launched with the release of the first song in the series, "Enga Madura". The project aims to

*'Angaadi' at Aravind - Madurai*



*Distributing relief materials in the flood affected areas around Cuddalore*

explore the rich tradition and heritage of this ancient city and is supported by senior members of Aravind as well as eminent personalities in Madurai.

Mr. Karumuttu Kannan, Managing Director, Thiagaraja Mills released the CD. The lyrics and music is by Prof. R. Prabahar and sung by Mr. Sanil Joseph senior faculty LAICO. There was an overwhelming response to the function as people from different walks of life gathered at LAICO.

To mark the birth centenary of the veteran artist Perumalda, Aravind - Madurai organised an exhibition of his art works along with other forms of art immersion from November 27-29. The exhibition attracted thousands of students and admirers, from the city.

### *Jagriti Yatra 2015*

Aravind - Madurai, December 27

For the eighth year in a row, around 480 Yatris visited Aravind in the last week of December.

*Prof. R. Prabahar and Mr. Sanil Joseph at the launch of 'Enga Madura'*



## Information Technology and Systems

Since inception, Aravind has been a forerunner in using IT as a tool for effective eye care service delivery. In the last four decades, the team has developed several information management systems for the smooth functioning of the various departments of Aravind Eye Care System. Today, several of the partner hospitals in the LAICO network are also benefitting from these unique systems developed exclusively for eye care institutions.

Electronic Medical Record (EMR) is on the top priority of IT implementation and a dedicated team has been working on it for the past four years. It was first implemented in the City Centre at Madurai three years ago with refraction modules. Even as the development is ongoing, implementation of it in smaller units of the Aravind system has begun. Mr. Richard Gartee, volunteer from USA was at Aravind to help develop resources and curriculum for training staff in the use of EMR. Mr. Suman Venkataswamy, another volunteer gave inputs on testing tool (Telerik) and worked on areas such as Google Analytics and Patient communication service.

During 2015-2016, EMR was implemented in both the Out-patient and In-patient services at Aravind-Theni and at Aravind-Madurai Free Section. It was also implemented in Aravind-Madurai Paying Out-patient Unit III and in the Community Centre at Cumbum taking the total number of centres with full fledged EMR to nine.

By June 2017, all the existing Aravind centres will start using EMR and the upcoming centres will have the facility from day one.

*Electronic Medical Record implementation at the out-patient area*



## Product Enhancements

### *Integrated Hospital Management System (IHMS)*

Several enhancements, changes and upgrades were done to this programme. Some of the new features added are:

- Corporate accounts management: to manage credit transactions and tracking individual invoices.
- Facility for online admission at campsite using a laptop has been implemented in Aravind - Coimbatore, Tirunelveli and Pondicherry
- Combined collection report from both outpatient and inpatient services is added and same could be uploaded into Tally.

### *Stores Management System*

New features to upload purchase details directly into tally were included and barcode label scanner was installed for sub stores.

### *Optical Shop Software*

Central inventory and order management of optical services for vision centres was introduced. This enables the vision centres to manage optical services without keeping stock and also to process the orders as soon as they are registered.

### *Integrated Human Resource Information System*

Attendance reports for doctors and others were added in the existing system to monitor the punch-in/on-duty/leave status.

### *Siksha Gauge*

A new version of Resident MIS was introduced with additional features to evaluate residents' performance across centres, and training programmes conducted. Aurovikas, the training management software was

*Mr. Karthikeyan, IT programmer is training and implementing IHMS software at CEH, UHEAL, Nairobi*





upgraded incorporating online application form for Long term Fellowship.

### *BOOST-Cataract Outcome Monitoring*

An exciting new “app” called BOOST (Better Operative Outcomes Software Tool) is being developed as a collaborative effort between Aravind and other eye care organisations. Conceived by Dr. Nathan Congdon, this simple application could make it possible for ophthalmologists in areas where patients may not return after a month for follow-up after cataract surgery to predict the final outcome based on the first day post-op visual acuity. The app uses new information proving that making early measurements of vision, in the first day or so after surgery, can provide very reliable information on the quality of surgery. Aravind’s IT department helped develop windows based application for piloting and getting feedback. Based on the feedback, the team will finalise the requirements and specifications for developing BOOST mobile application.

### *Upgraded Technology*

At the central office in LAICO, Madurai, the main server was upgraded to incorporate the entire email accounts of Aravind domain.

A central SMS gateway service was implemented that could be utilised by any Aravind centre for patient communication purposes.

Various upgrades were done in several Aravind centres for improving capacity, performance and security.

- Database and application servers were connected to a switch that manages inputs of 2 uninterrupted



*Upgraded technology in mail server*

- power supply units to ensure that the system runs continuously even in case of power or UPS failure.
- To manage the ever growing size of images generated from diagnostic equipment, the storage capacity was upgraded at Aravind -Coimbatore and Tirunelveli.
- To ensure continuous operation of systems in the patient care area, mirror server was setup in SQL. This ensures uninterrupted work even if the main server fails for any reason.
- To address increased traffic in the wireless network and to improve the performance and security, Cisco Air cap access point with wireless controller was installed.
- Camp hospital at Aravind-Madurai located 300m away from the base hospital was earlier connected to the main centre using WiFi technology for sharing central database and applications. This facility was upgraded to WiFi ac technology to ensure higher bandwidth as well as better performance when EMR system is fully implemented.

### *Information Technology division*



## Support to Other Eye Hospitals

Since 2004, Aravind has been offering IT solutions to enable other eye hospitals in using data for managing and improving eye care services in their region. Today, 92 hospitals in India and other countries around the world use the various IT systems developed at Aravind. During 2015 - 2016, the following software implementations were done.

### Training Programmes

In addition to the onsite support provided during software implementation, the IT team also offers training to staff from user hospitals on request. In the last year, personnel from Khulna BNSB Eye Hospital and Grameen GC Eye Hospitals, Bogra received such training.

## Aravind Tele-ophthalmology Network

At Aravind, tele-ophthalmology network was developed primarily to benefit the rural masses with better eye care in vision centres. On an average, a thousand tele consultations are being handled each day at Aravind across the fifty eight various vision centres. Over the years, Aravind has also started collaborating with various diabetes centres in the screening of diabetics through tele-consultation with the help of Aravind Diabetic Retinopathy Evaluation Software (ADRES). In the year ending March 2016, 1837 cases were evaluated using ADRES.

The tele-ophthalmology network also plays a major role in different educational interactions which include grand rounds, journal clubs, clinical meetings, post

*Collaborating with diabetes centres in the screening of diabetics for diabetic retinopathy through tele-consultation*



graduate classes and classes for mid level ophthalmic personnel and paramedics. Around 390 video conferencing sessions including a few for international conferences were conducted during the last year.

## Biostatistics

The Biostatistics department plays a vital role in supporting the various clinical and non-clinical research projects at Aravind. It also helps in reporting and publishing in collaboration with the investigators. During April 2015 - 2016, the department supported five clinical trials, and two Randomised Controlled Trials (RCT) and four observational studies. The support included first level consultation, pro-forma development, sample size calculation, randomisation, data analysis and developing graphs. The department staff also conduct classes in biostatistics for postgraduates, fellows and other research scholars.

## Library and Information Centre

Libraries at Aravind centres provide an enabling environment for continuous learning, information sharing and knowledge management. Library committee meets regularly to take stock of the existing resources and also suggest ways to improve the services. Visits were carried out to libraries in Aravind's satellite centres to oversee their functioning and give necessary recommendations. Apart from catering to the needs of Aravind users, the library helps develop the capacity of other resource centres in India and developing nations. A week long practical training session was arranged for the librarians of Siliguri Greater Lions Eye Hospital (April 23-27) and Netra Niramay Niketan, West Bengal

*Ms. Kumaragurupari, Ms. Pamela C Sieving and Ms. Sabera Banu at NIH Library*





(March 7-12). The training focused on strengthening the existing collection (print and electronic resources) in these centres, and indexing system (retrieval and search technique). It gave inputs on various electronic and technological applications in library services. The librarians helped the participants develop an action plan for better performance.

In the year ending March 2016, libraries across the centres welcomed more than 20,000 users and clarified queries of more than 9153 persons at the reference desks and through the 'ask a librarian' services.

### *Exposure Visit*

Ms. Kumaragurupari, Senior Librarian, Aravind-Madurai participated in the Association of Vision Science Librarians (AVSL) meeting on October 6 at New Orleans and gave a presentation on Aravind libraries. She visited the Health Sciences Library, South East Asia Library and the Sheldon Margen Public Health Library at the University of California, Berkeley (UCB). She interacted with Ms. Deborah of the Marian Koshland Bioscience and the Natural Resources Library at UCB, who gave her a demo of Global Infectious Diseases and Epidemiology Online Network (GIDEN).

At the John Hopkins University Medical Centre, she visited the Welch Medical Library and the Friedenwold Romano Library. She learnt about the Refwork and Web of Science Databases. At the National Health Institute, she got an understanding of the IT services in library management and gained a better understanding of bibliometrics and impact analysis.

She went on a tour of National Library of Medicine, Bethesda, Maryland, and learnt more about the preservation of ancient books. She also had a tour of PubMed indexing area and held discussions with PubMed trainers, Peter Siebert and Mr. Sarah Helson.

At the NIH- Global Health Interest Group pre-symposium workshop, she spoke on the Challenges and opportunities of accessing resources.

### *Aravind Communications*

Consisting of the publications and audio visual departments, Aravind Communications Division plays a major role towards fulfilling the publication, communication, health education and publicity material needs of Aravind Eye Care System.

Web pages were created to facilitate online registration and sharing information for the various



*Mrs. Premalatha Panerselvam, Mr. Manohar Devadoss and Mr. Suryanarayanan - at the Launch of the tamil version of 'Infinite Vision' with Mr. G. Srinivasan and Dr. P.Namperumalsamy*

conferences and workshops conducted in the last year. Intranet web pages were created for NABH Training resources and Drug Formulary. A New suggestion portal is launched in Inspiration website with a content management system to administrate the user suggestions.

### *New Publications*

The third edition of the much sought after book, 'Anatomy of the Eye' authored by Dr. S.P.Banumathy was launched in December 2015.

'Infinite Vision', the very popular book that talks about 'How Aravind became the World's Greatest Business Case for Compassion' translated and published by Manjul Publications was launched on July 11. Aravind Communications team played a small role in the editing of this publication. Eminent persons including Mr. Manohar Devadoss, Mr. Suryanarayanan, Madurai Readers Club and Ms. Premalatha Panerselvam, Principal - Mahatma Schools shared their thoughts on the book and inspired the audience. Dr.P.Namperumalsamy and Mr. G. Srinivasan released the book presenting a copy to each of the dignitaries.

Two awareness creation songs for promoting eye donation among the public were also launched on the same day. Lyrics written by Mr. Ramamoorthy of the Accounts Division were put to tune and sung by Mr. Sanil Joseph and visualisation was done by Mr. Muneeswaran of Aravind Communications. The songs are being played in the common waiting areas in the hospitals along with other awareness creation videos and are used for eye donation promotion.

# Recognitions and Achievements

Apart from celebrating the efforts taken, awards motivate people with a drive for improved performance. Last year too, contributions of Aravind staff were recognised by various forums, both national and international. Senior members were specially invited for delivering memorial lectures as well.

## Recognitions

### Geneva Forum for Health Award

Aravind Eye Care System was presented with Geneva Forum for Health Award by the Health Practice of McKinsey and Company held at Geneva on May 19. The award recognised the organisation's innovations in healthcare delivery providing quality low cost eye care to millions across India.

### Honour by the Indian World of Retinologists

The Indian World of Retinologists honoured Dr.P.Namperumalsamy along with Dr. Badrinath of Sankara Netralaya, Chennai and Dr. Pran Nagpal of Retina Foundation, at the event titled Celebrate Retina Celebrate Life held at Mumbai on May 16. Dr.P.Namperumalsamy was felicitated on the occasion of his reaching 75 years of dedicated life in teaching and training new generations of Retinologists in the subcontinent.



*Dr. P.Namperumalsamy receives the Prof.M. Viswanathan Award from Dr.V.Santha, Founder, Adyar Cancer Institute*

### Prof. M. Viswanathan Selfless Service Award

Dr. P. Namperumalsamy was conferred with Prof.M.Viswanathan Selfless Service Award by M.V.Hospital for Diabetes for his outstanding contributions to ophthalmology on August 26 at Chennai.

### APOS Honour

Dakshin Netra - Annual Conference of Andhra Pradesh Ophthalmic Society (APOS) honoured Dr.P.Namperumalsamy for his outstanding contributions to the field of ophthalmology at the annual conference held at Tirupathi on September 11.

*Dr. R.D. Ravindran received the Geneva Forum for Health award on behalf of Aravind*







*Eminent Doctor award to Dr. M.Srinivasan*

### *Dr. K G R Nair Memorial Oration*

Dr. P. Namperumalsamy delivered the Dr. K. G. R. Nair Memorial Oration on Combating blindness from diabetic retinopathy in India at the annual CME of Trivandrum Ophthalmic Club held at Trivandrum on April 26.

### *Healthcare Service Award*

Dr. G. Natchiar was awarded Health Care Service Award by Muthu Pharmacy Charitable Trust, Chennai on June 21. Dr. Justice AR. Lakshmanan presented the award which consisted of citation, medal and a cash prize of Rs.1 lakh.

### *Eminent Doctor Award*

On the occasion of its centenary celebrations, Tamil Nadu Medical Council honoured Dr.M.Srinivasan with 'Eminent Doctor' award at Chennai on December 30.

*GSI Silver Jubilee award to Dr. R. Ramakrishnan*



*Susrutha Award to Dr. R.D.Ravindran at APAO, Taipei*

### *Among the World's Most Compassionate Leaders*

Dr. R.D.Ravindran was named among the world's most compassionate leaders by the UK based SALT Magazine. The selection was based on Aravind resource conservation and economic sustainability, innovation, compassion and on the number of beneficiaries.

### *Swach Bharat Samman*

Dr. R.D.Ravindran received the Swach Bharat Samman by Zee News, India's leading television channel in September.

### *Susrutha Lecture*

Dr. R.D. Ravindran delivered Susrutha Lecture on Improving visual outcomes and minimising surgical complications in a large volume of cataract surgeries at Aravind at the Asia Pacific Academy of Ophthalmology conference held at Taipei, Taiwan on March 25 -27.

### *Glaucoma Society of India (GSI) Awards*

GSI honoured Dr. R.Ramakrishnan with Silver Jubilee award in recognition of his sustained efforts towards enhancing the science and practice of Glaucoma in India. Dr.Tin Aung, Singapore National Eye Centre presented the award at the annual conference of GSI held at Mumbai on October 3.

### *Dr. Sudha Sutaria Vitreo Retinal Oration*

Dr. R. Kim delivered the Dr. Sudha Sutaria Vitreo Retinal Oration on *Diabetic retinopathy care in India* at the installation ceremony of new body of Vidharbha Ophthalmic Society held at Nagpur on March 19.



PSG Scroll of Honour to Dr. Usha Kim

### PSG Scroll of Honour

On the occasion of Founder's Day celebrations held on January 25, PSG Institute of Medical Sciences and Research, Coimbatore presented a Scroll of Honour to Dr. Usha Kim, a distinguished alumnus of the institute as a way of recognising her contributions to the field of ophthalmology and more specifically to the Orbit, Oculoplasty and Ocular Oncology Services.

### Tamil Nadu Ophthalmic Association Awards

At the 63rd Annual Conference of Tamil Nadu Ophthalmic Association (TNOA) held at Madurai, Dr.M. Srinivasan was awarded the Lifetime Achievement Award of TNOA in appreciation of his contributions to the field of ophthalmology on July 25. And the Dr. M.N. Endowment Award was presented to Dr. Haripriya Aravind.

TNOA Lifetime Achievement award to Dr. M. Srinivasan



Dr. S. Aravind and Mr. Saravanan receive the award for Excellence in Eye Banking

### Best Eye Bank in the Country Award

Rotary Aravind International Eye Bank received the award for the best eye bank in the country by the Eye Bank Association of India. Dr.M.Srinivasan received the award at New Delhi on October 10.

### Award for Excellence

Rotary Aravind International Eye Bank, Aravind - Madurai won award for excellence in eye banking at the annual conference of Sight Life held in Delhi on January 30. The eye bank was also honoured by SightLife for having crossed 1000 transplants a year.

### Vocational Excellence Award

Dr. R. Meenakshi received the Vocational Excellence Award from the Rotary club of Tirunelveli West on September 15.

Dr. M.N. Endowment award to Dr. Haripriya Aravind







Dr. Meenakshi receives the Vocational Excellence award

## Hearing and speech loss is no impediment for him

A recipient of National Award for the Empowerment of Persons with Disabilities

K. ANANDAMALI

**MADRAS:** Precision and perfection. These are the two words that go to describe 66-year-old S. Poornachandran, Senior Technician-cum-Instructor at Aravind Eye Hospital here.

He has trained hundreds of people, including 23 ophthalmologists and eight administrators of big eye hospitals and repaired 25, 808 medical instruments over a quarter century. His trainees speak Tamil, Malayalam, Kannada, Telugu, Hindi, English, French, Spanish and Swahili.

But Mr. Poornachandran does not speak any language as he was not born with the ability to speak and hear.

With an eighth standard qualification while getting general and technical education in a special school for the hearing impaired and a certificate from an Industrial Training Institute in Hyderabad, he has been working as a fitter or welder in small units across the country from 1979 to 1982, when his father, Sundaram, brought



DR. MEENAKSHI S. POORNACHANDRAN, Senior Technician-cum-Instructor, Aravind Eye Hospital, Madurai. — PHOTO: S. ANAND

looks at his disability as a challenge, has travelled all over the world, especially African countries, to train people in maintenance of bio-medical instruments. He employs a unique methodology by encouraging participants to observe what he does. He is able to 'feel' the noise emanating from a machine by touch. "The touch transmits the status of the machine to my brain, which comes up with a solution," explains Mr. Poornachandran through sign language. His activities extend beyond "Room 240." He is a consultant for exhibitions organised for and by hearing impaired persons all over the country.

Last week, he was in Coimbatore to organise an exhibition at the 4th Deaf Expo 2015.

On December 3, he received the National Award for the Empowerment of Persons with Disabilities for outstanding performance as role model among persons with disabilities in the category of hearing impairment. He was given the Best En-

### Role Model Award

Mr. Poornachandran received the Role Model Award as part of National Award for the Empowerment of Persons with Disabilities, 2015 by the Ministry of Social Justice and Empowerment, Government of India at New Delhi on December 3. The award is given to persons with disability who can be an exemplar for others by way of his/her achievements in their chosen field.

### Lions Award for Senior Nurses

Senior nurses at Aravind, Tirunelveli Ms. Chidambaram, Ms. Arumugam, Ms. Prema, Ms. Jenny and Ms. Sankara Gomathy were felicitated for their humanitarian service by Lions Club of Palayamkottai Stars on April 9. Tamil Nadu Ophthalmic Association

### IAPB Recognition

Mr. Raj Kumar, Aravind - Madurai was declared a runner-up, Professional category in IAPB's Eye Care for All Photo competition. Aurolab's IOL picture fetched him this recognition.



Role Model Award to Mr. Poornachandran from the Ministry of Social Justice and Empowerment, Government of India

Humanitarian Service awards to Ms. Chidambaram, Ms. Jenny, Ms. Arumugam, Ms. Prema and Ms. Sankara Gomathy



## Achievements

### Best Poster Prize at the Annual Congress of the Royal College of Ophthalmologists

Poster based on a study co-investigated by Dr. Jaya Chidambaram, Dr. N.Venkatesh Prajna titled *Diagnostic accuracy of In vivo confocal microscopy in detecting fungus and acanthamoeba in microbial keratitis* won the best poster prize at the Annual Congress of the Royal College of Ophthalmologists held at Liverpool, England from May 19-21.

### Glaucoma Society of India (GSI) Award

Dr. R.Venkatesh's video presentation on 'Novel glaucoma screening in an outreach camp in developing world' won the second best video award.

### TNOA Awards

Dr. R. Josephine Shyamala received Best Paper Award for her paper on 'A Retrospective Study on Epidemiology and surgical management of canalicular lacerations in paediatric population'.

Dr. P.S. Vivek won third place in Just a Minute session for his presentation on 'Calibration of tonometers'.

Dr. Anubhuti Vyas and Dr. Sabyasachi won first prize in the Prof. E.T. Selvam Memorial Quiz Competition.

### TANSA Award

Dr. P. Sundaresan was selected for the Tamil Nadu Scientist Award - TANSA (2013) under the discipline -

Biological Sciences by the Tamil Nadu State Council for Science and Technology.

### Prize at Erudio Allergan 2015 Quiz

Senior residents of Aravind - Tirunelveli, Dr. Sabyasachi Chakrabarty (2nd Prize) and Dr. Anubhuti Vyas (3rd Prize) emerged winners of the Erudio Allergan 2015 Quiz Competition held at Chandigarh on January 9.

### Raghavachar Medal for Best Paper

Dr. Hemalatha Gudiseva received the Raghavachar Medal for Best Paper at Andhra Pradesh State Ophthalmic Conference held at Tirupathi from September 11-13.

### Best Video Award at Oculoplasty Association of India Annual Conference

Dr. Viji Rengarajan received the award for her video presentation on *Palpebral remodelling in management of neurofibromatosis type I* at the annual conference held at Bhubaneswar from December 4-6.

### Award at Cornea Society of India Conference

Dr. Sayali Pradhan was awarded second prize for the paper, *Epidemiology and management of microsporidial keratitis* at Keracon - the Annual Conference of Cornea Society of India held in Kolkata on December 11.

### Young Achievers Award

Dr. Sabyasachi Sengupta of Aravind-Pondicherry received Young Achievers Award at the 40th Annual

Dr. Sabyasachi Chakrabarty and Dr. Anubhuti Vyas, winners of the Erudio Allergan 2015 Quiz Competition



Dr. Sabyasachi Sengupta receives the Young Achievers award at Vidharbha Ophthalmic Society Conference







*Dr. Barath Janakiram receives the Dr. G. V Endowment award for securing highest mark in the DO examination*

Conference of Vidharbha Ophthalmic Society held at Chandrapur on November 21.

### *Prize at the Dinamalar Kolam Competition*

For the third consecutive year, Ms. K.R.Deepa, Housekeeping Supervisor won prize worth 4 gram gold coin at the Kolam competition organised by Dinamalar in Pondicherry on December 20.

### *Farm Fest Awards for the 6th consecutive year*

At the 30th Flower, Vegetable and Fruit show organised by the Government of Puducherry from January 24-26, Aravind-Pondicherry won First Prize for Ornamental and Kitchen Garden and Second Prize for Herbal Garden for the sixth consecutive year.

*The proud gardeners team of Aravind - Pondicherry that won the Farm Fest awards for the sixth time with the senior staff and special friends - Mike Myers, Dr. Krishnamoorthy and Dr. Chitra Krishnamoorthy*



*Dr. B. Raghuraman receives the Dr. G. V Endowment award for securing highest mark in the MS examination*

Aravind staff also won the first prize for Vegetable and Fruit Carving and the second prize for Rangoli.

### *Proficiency Awards*

At the annual day celebrations of Aravind - Madurai, Dr. B.Raghuraman and Dr. Barath Janakiram were honoured with Dr. G. Venkataswamy Endowment Award for securing highest marks in the MS and DO examinations respectively.

### *Honorable Mention at ASCRS*

Ophthalmic photographs taken by Mr. John Arumai Selvan and Mr. Rajkumar were displayed at the Ophthalmic Photographers' Society Exhibit as part of the ASCR Symposium held at San Diego, California from April 17-21.

# Partners in Service

Though Aravind's core patient care services are financed internally, the organisation is indeed fortunate to have support from well-wishers, friends and like-minded organisations in taking forward its mission. Their constant support and generosity, in addition to providing the much-needed moral support has played a key role in the growth of Aravind. The organisation looks forward to a continuing partnership with them.

## *For service delivery, training and more*

- Acumen, USA
- Alcon Laboratories Inc, USA
- Aravind Eye Foundation, USA
- Bloomberg School of Public Health, Johns Hopkins University, US
- Canadian International Development Agency CIDA
- Carl Zeiss Meditec, Germany
- CBM International, Germany
- Centre for Innovation in Public Systems, Hyderabad
- Combat Blindness Foundation, USA
- Conrad N. Hilton Foundation, USA
- Essilor, India
- Fred Hollows Foundation, Australia
- Harvard University - T H Chan School of Public Health
- Indian Institute of Management, Bangalore, India
- Indian Overseas Bank, Chennai, Madurai
- International Agency for Prevention of Blindness, UK
- International Council for Ophthalmology, UK
- Lavelle Fund for the Blind, USA
- Lions Clubs International Foundation, USA
- London School of Hygiene & Tropical Medicine, UK
- Narotam Sekhsaria Foundation, Mumbai
- ORBIS International, USA
- Rotary International, USA
- Schwab Foundation and Social Entrepreneurship, Switzerland
- Seva Foundation, USA
- Seva Canada Society, Vancouver, Canada
- SightLife, USA
- SightSavers, UK
- State Bank of India, Madurai
- Standard Chartered Bank, UK
- SoHum Foundation, US
- Subroto Bagchi grant, Bangalore
- The Queen Elizabeth Diamond Jubilee Trust, UK
- TOMS, USA
- Topcon, Japan
- University of British Columbia, Vancouver, Canada
- University of California, Berkeley, USA
- University of Michigan, USA
- University of Pennsylvania, USA
- USAID, USA
- VISION 2020 - The Right to Sight, India
- Wescott Williams Ltd., UK
- World Association of Eye Hospitals
- World Diabetes Foundation, Denmark
- World Health Organization (WHO), Switzerland
- XOVA: Excellence in Ophthalmology Vision Award, USA

## *For research*

- Alagappa University, Karaikudi
- All India Institute of Medical Sciences, New Delhi, India
- Aravind Eye Foundation, USA
- Council of Scientific and Industrial Research, New Delhi, India
- Delhi Institute of Pharmaceutical Sciences and Research (DIPSAR), New Delhi
- Department of Biotechnology, New Delhi, India
- Department of Science and Technology, New Delhi, India
- Francis I. Proctor Foundation for Research in Ophthalmology, UCSF, USA
- Geisel School of Medicine, Dartmouth, USA
- Hitchcock Medical Centre, Lebanon New Hampshire
- Indian Council of Medical Research, New Delhi, India
- Indian Institute of Technology, Chennai
- Kalasalingam University, Krishnan Koil, Virudhunagar District
- London School of Hygiene and Tropical Medicine, UK
- Madurai Kamaraj University, Madurai, India
- National Eye Institute, USA
- North Eastern Hill University, Shillong, India
- Sastra University, Thanjavur
- Singapore National Eye Centre, Singapore
- Sichuan Academy of Medical Sciences & Sichuan Provincial Peoples Hospital, Sichuan, China
- Sri Ramachandra University, Chennai
- Science and Engineering Research Board, New Delhi, India
- Subroto Bagchi grant, Bangalore
- Tamil Nadu Dr. M.G.R. Medical University, Chennai, India
- University of Liverpool, Liverpool, UK
- University of Pennsylvania, Philadelphia, USA
- University of Tasmania, Australia
- University of Wisconsin, Madison, USA
- Vision Research Foundation, Sankara Nethralaya, Chennai
- Wellcome Trust, UK
- World Health Organization, Switzerland
- Unite des Aspergillus, Institut Pasteur, Paris



## Aravind Eye Foundation

The Aravind Eye Foundation was founded in 2000 to support the Aravind Eye Care System in its mission to eliminate needless blindness and to promote sustainable, high quality, patient-centric eye care across the world. It does so by facilitating knowledge exchange and active partnerships with higher education, social enterprise, healthcare, government, other non-profits and individuals. The Aravind Eye Foundation also funds those programmes of the Aravind Eye Care System, which are not self-sustaining by Aravind's core operations:

### Ring of Hope

Now in its twelfth year, the Ring of Hope fund provides treatment for children suffering from retinoblastoma and other types of eye cancer. A full course of treatment, which includes surgery, chemotherapy, radiation, custom-made prostheses and family counselling, costs roughly \$1000 - well beyond the means of most Indian families. The fund also pays for patients to travel to follow-up visits.

Last year, Ring of Hope fund paid for treatment of 33 new patients and 567 review patient visits. Nearly 5,000 patient visits have been funded since the inception of the Ring of Hope, and more than 400 children have received the gifts of sight and life.



School children at Vallalar Matric Hr. Sec. School

### Spectacles for Scholars

Aravind's Spectacles for Scholars program provides free vision screening and eye glasses to school children in Tamil Nadu and Pondicherry, India. Free eye glasses have a major impact on a child's development. Wearing eye glasses has been shown to improve math's scores as much as reducing class size and can produce the same effect as six months' more education. The impact is greatest among the poor, where education is the way to a better life.

Ms. Donna Campbell with Prof. Muthukkaruppan, Dr. Usha Kim and the Genetic Testing Lab team



This year, Aravind Eye Foundation funded school screening projects in Madurai, Coimbatore, Salem, Pondicherry, Tirunelveli and Theni; 250,000 school children were screened and nearly 11,000 eye glasses were dispensed. Aravind plans to screen 1 million school children annually by 2020.

## Research

This past year, Aravind Eye Foundation purchased \$160,000 worth of equipment for Aravind's Genetics Testing Lab for Retinoblastoma, the final stage in the development of this world-class facility for genetic testing. Aravind's unique rapid-sequencing methods greatly reduce the cost of testing, from \$1400 to \$200 per test, making it more affordable for hospitals in the developing world.

The Foundation is grateful for the generous support of the Allene Reuss Memorial Trust, the SoHum Foundation and the many friends who contributed to the Genetics Testing Lab for Retinoblastoma. With their faith in this work, Aravind has become an internationally-recognised centre of excellence for retinoblastoma research and treatment.

Age Related Macular Degeneration (ARMD) is one of the leading causes of blindness among older people around the world. Aravind Medical Research Foundation is studying how to identify patients at risk for the disease and the efficacy of nutritional

supplements. Aravind Eye Foundation purchased a portable screening device for the study to assess the health of macula. This research is funded by the Indian Council of Medical Research, New Delhi.

## Rural Vision Centres

With grants from the JJ Keller Foundation and an anonymous donor, Aravind Eye Foundation has sponsored the set-up and first year operating costs for vision centres in the villages of Sivagiri, Thiruvannainallur and R.S. Mangalam, bringing the total to 59 centres. By 2020, Aravind plans to open such 150 centres and provide access to eye care 10 million people.

To date, Aravind Eye Foundation has funded 13 centres in India, each connected to an Aravind Hospital by Aravind's award-winning telemedicine system. During April 2015 to March 2016, 12 of these centres saw 73,665 patients; 3,849 of these patients were referred for cataract surgery and 8,805 patients ordered glasses.

*It is ourselves we are helping; it is ourselves we are healing - Dr. G. Venkataswamy*

*Thank you to all of our donors, volunteers, and advisors for giving so generously of yourselves.*

*Members of the board of directors and advisory board of Aravind Eye Foundation*





## Govel Trust Mahema Devadoss Endowment

*Nandini aged 14 and Ramesh aged 12 are bubbly siblings who fared very well in academics until they were diagnosed with Retinitis Pigmentosa almost three years ago. Even though their condition did not have any cure as such, Vision rehabilitation centre at Aravind gave them hope to lead a near-normal life with the help of low vision aids. However, the portable electronic video magnifier which would help them tremendously in their studies priced at Rs. 20,000 was way beyond their reach. Thanks to Govel Trust Mahema Devadoss Fund instituted by Mr. Manohar Devadoss - Aravind was able to provide them one at just half of its original price. Using this, the children are able to do very well in their studies.*



Mr. Manohar and Mahema Devadoss

An artist-cum-writer, Manohar Devadoss grew up in the Madurai of the 1940s. Mahema, his wife was an exceptionally talented lady and together they made an extraordinary couple. In the midst of their joy, they made a promise to always strive to practice what Mahema called, 'The Art of Giving'. Then there was the road accident that changed everything. Mahema was left paralysed below the shoulders - for life. Around the same time Manohar was diagnosed with Retinitis Pigmentosa, a degenerative retinal disorder for which there is no known cure.

The couple never lost heart, never complained, and accepted life cheerfully the way it came.

For more than three decades, Manohar remained Mahema's most faithful nurse and attendant. Even as his vision rapidly failed, Manohar Devadoss began work on "Green Well Years" an illustrated book that is a tribute to his boyhood in Madurai. Because of his condition, Manohar has no color perception, and the little he does see is as if seen through a pinhole. With special eye drops to dilate his pupils, with strong lights and special magnifiers, with a photographic memory and uncompromising attention to detail, he made these beautiful drawings that are flawless, sharp-edged, heartbreaking reproductions of snapshots from his life.

Together, each year they worked on a special set of greeting cards. Manohar did the drawing and Mahema prepared a short write-up explaining the particular

significance of the place, building, statue or scene that he has drawn. They sold these cards and donated the proceeds to charity, a significant part of which went to Aravind's work for several years.

Manohar lost his beloved wife in 2008. He instituted Govel Trust Mahema Devadoss Endowment in her memory to support people with low vision. Since inception in 2009, the fund continues to make tremendous difference in the lives of several persons with vision impairment.

It is not so common to come across individuals who are an inspiration to everyone who knows them. Mahema and Manohar were an exceptional couple who by their warm and charismatic personality attracted many into their lives who gradually became their extended family and joined the Art of Giving.

Today, the couple's friends scattered all over the world are a part of this chain and their contributions to the endowment help bring smiles in the lives of many with low vision. These include celebrities like Tamil actor Ajith Kumar, a friend of Mano who has contributed substantial amount every year in the last three years, and other individuals who consider it a great privilege being a part of this noble cause.

Last year, over 350 persons with low vision have received a new lease on life with the aids they have received, either at half the price or fully free, thanks to the endowment.

## *Govel Trust*

### *Board of Trustees*

#### *President*

ER. G. SRINIVASAN

#### *Trust Secretary*

DR. N. VENKATESH PRAJNA

#### *Members*

DR. G. NALLAKRISHNAN

DR. P. NAMPERUMALSAMY

MRS. LALITHA SRINIVASAN

DR. G. NATCHIAR

DR. R. KIM

DR. S. ARAVIND

PRESIDENT, ROTARY CLUB,

MADURAI

MAIN BRANCH - (EX-OFFICIO)

## *ARAVIND EYE CARE SYSTEM*

### *Chairman &*

#### *Director - Quality*

DR. R.D. RAVINDRAN, MS., DO

### *Chairman Emeritus &*

#### *Director - Research*

DR. P. NAMPERUMALSAMY, MS, FAMS

### *Directors Emeritus*

DR. G. NATCHIAR, MS, DO

DR. M. SRINIVASAN, MS, DO

## *CENTRAL FUNCTIONS*

### *FINANCE*

#### *Director*

ER. G. SRINIVASAN, BE, MS

#### *Manager*

N. SHANMUGASUNDARAM, B.COM

### *OPERATIONS*

#### *Director*

R.D. THULASIRAJ, MBA

### *HUMAN RESOURCES*

#### *Director*

DR. S.R. KRISHNADAS, DO, DNB

#### *Managers*

R. DEEPA, MHM

C. GNANASEKARAN, MBA

### *ACADEMICS*

#### *Director - Residency Training*

DR. N. VENKATESH PRAJNA, DO, DNB,  
FRCOphth

#### *Director - Mid Level Ophthalmic*

#### *Personnel*

DR. USHA KIM, DO, DNB

### *PROJECTS*

#### *Director*

DR. S. ARAVIND, MS, MBA

### *INFORMATION TECHNOLOGY*

#### *Director*

DR. R. KIM, DO, DNB

#### *Senior Manager*

B.S. GANESH BABU, M.COM, MS

#### *Senior Network Administrator*

S.J. RAJAN, MCA

#### *Manager - Web Applications*

S. SANTHA SUBBULAKSHMI, MCA, MBA, MLIS

#### *Manager*

R. MALA, MCA

### *ARAVIND COMMUNICATIONS*

CHITRA THULASIRAJ, B.SC

### *PURCHASE & MAINTENANCE*

S. JAYACHANDRAN, MHM

### *OUTREACH*

#### *Senior Manager*

R. MEENAKSHI SUNDARAM, MHM

### *BIostatistics*

B. VIJAYAKUMAR, M.Sc

### *LIBRARY & INFORMATION CENTRE*

R. KUMARAGURUPARI, MA, M.LI.Sc, M.Phil



# Aravind Eye Hospitals & Postgraduate Institute of Ophthalmology

Run by Govel Trust

## ARAVIND - MADURAI

### Chief Medical Officer / Professor

DR. R. KIM, DO, DNB

### Administrator / Professor

DR. S. ARAVIND, MS, MBA

## RETINA-VITREOUS SERVICES

### Chief / Professor

DR. R. KIM, DO, DNB

### Professors

DR. ANAND RAJENDRAN, DO, DNB, FRCS (G)

DR. K. NARESH BABU, MS

### Assistant Professors

DR. MANISH TANDON, DNB

DR. JATINDER SINGH, MS

DR. PUJA BHUWANIA, DNB

### Tutors

DR. RENU P RAJAN, MD

DR. KARTHIK KUMAR, MS

DR. K. HEMALATHA, MS

DR. M.Y. VISHAL, MS

DR. G.V. PAVAN KUMAR, MS

DR. BHANU PRATAP SINGH PANGTEY, MS

## INTRAOCULAR LENS & CATARACT SERVICES

### Chief / Professor

DR. G. HARIPRIYA ARAVIND, MS

### Professors

DR. S. ARAVIND, MS, MBA

DR. K. ILANGO, DO, DNB

### Assistant Professors

DR. NIRAJ KUMAR AGARWAL, MS

DR. MADHU SHEKHAR, MS

DR. TANPREET PAL SINGH, MS

DR. V.R. VIVEKANANDAN, MS

DR. PREETHIKA GANDHI, MS

DR. ARUNA PAI, MS

DR. ASHOK VARDHAN, DO, DNB

### Tutors

DR. VISHNU DEEPTHI, MS

DR. B. RAGHURAMAN, MS

DR. G.N. SUBATHRA, MS

DR. P.C. RANJAN, DNB

DR. ABIRAMASUNDARI, MS

DR. AMISH SHAH, MS

## Medical Consultants

DR. V.P. RAVICHANDRAN, DO

DR. PAMONA SAMSON, DO

DR. K.N. JAYASRI, DO

DR. G. VEDHANAYAKI, DO

DR. DEEBA ISHRATH, DO

DR. GOMATHI RAMYA, DO

DR. BARATH JANAKIRAM, DO

DR. LIZ MARY SANTHOSH, DO

DR. S.M.SINDOORY, DO

DR. LEENU JERIS, DO

## CORNEA & REFRACTIVE SURGERY SERVICES

### Chief / Professor

DR. N. VENKATESH PRAJNA, DO, DNB,  
FRCOphth

### Director Emeritus / Professor

DR. M. SRINIVASAN, MS, DO

### Professor

DR. MANORANJAN DAS, DNB

### Assistant Professor

DR. M. PURUSHOTHAMA RAJKUMAR, MS

### Tutors

DR. ARUNKUMAR PANIGRAHI, MS

DR. NAVEEN R, MS

DR. ASHISH KUMAR, DNB

DR. V. LUMBINI DEVI, MS

## Medical Consultants

DR. MOHAMED FAIZAL, DO

DR. ASHWIN B, DO

## PAEDIATRIC OPHTHALMOLOGY & ADULT STRABISMUS SERVICES

### Chief / Professor

DR. SHASHIKANT SHETTY, MS

### Professor

DR. P. VIJAYALAKSHMI, MS

### Assistant Professors

DR. SATHYA T RAVILLA, MS

DR. A.S. JAMUNA, DO, DNB

### Tutors

DR. NAVDEEP KAUR, DNB

### Medical Consultant

DR. A. RUPA, DO

## GLAUCOMA SERVICES

### Chief / Professor

DR. GEORGE VARGHESE PUTHURAN, MS

### Director-HRD / Professor

DR. S.R. KRISHNADAS, DO., DNB

### Professors

DR. MANJU R PILLAI, DO, DNB

DR. R. SHARMILA, DNB

### Associate Professors

DR. H. KASTHURI BAI, DO, DNB

DR. P.S. VIVEK, DO, DNB

### Assistant Professors

DR. NEETHU MOHAN, MS

DR. INDIRA DURAI, DNB

### Medical Consultant

DR. S. VIDYA, DO

## UVEA SERVICES

### Chief / Professor

DR. S.R. RATHINAM, DO, DNB, Ph.D

### Professor

DR. T. RADHIKA, DNB

## ORBIT, OCULOPLASTY AND OCULAR ONCOLOGY SERVICES

### Chief / Professor

DR. USHA KIM, DO, DNB

### Tutor

DR. NAMRATA GAIKWAD, MS

DR. JYOTI S SANGHI, MS

## NEURO-OPHTHALMOLOGY SERVICES

### Chief / Professor

DR. MAHESH KUMAR, DO, DNB

### Professor

DR. A. KOWSALYA, DO, DNB

## VISION REHABILITATION CENTRE

### Professor

DR. ILANGO, DO, DNB

## MICROBIOLOGIST/ PROFESSOR

DR. S. LALITHA PRAJNA, MD, DNB

## ANAESTHETISTS

DR. A. RAVICHANDAR, MD, DA

DR. A. HARI NARAYANA PRABHU, MD, DA

### PHYSICIANS

DR. BANUSHREE, MD

DR. NAVEEN, MS

### FREE HOSPITAL

Medical Consultant

DR. V.P. RAVICHANDRAN, DO

Assistant Administrator

R. RAMESH BABU, M.A

### NURSING

Nursing Superintendents

B. DHAGIRNISA BEGUM

R. JEEVA

Staff - Tutor

ALEES MARY, R.N.R.M

Staff - Theatre

ALIKUTTY VARGESE, R.N.R.M

### ADMINISTRATION

Transport & Public Relations Officer

S.G. RAMANATHAN, M.A

Manager - Office

K.S. KANDASAMY, B.A

Accounts Officer

R. RETHINASABAPATHY, B.A

Manager - Accounts

R. VELUMANI, B.COM, (BA)

Manager - Stores

J. SHOBHA, MCA

Manager - Personnel

A. VENKATACHALAM, B.Sc

Manager - Inpatients

S. SUNYTHA, MSW, MBA, DLL

Manager - Quality Assurance

USHALINI, MBA

Manager - Retina Vitreous Services

A. SHOBANA, B.Sc, PGDHM

Manager - Glaucoma Services

DAMIEN JACOB, MBA

---

### ARAVIND - THENI

Chief Medical Officer / Professor

DR. DIPANKAR DATTA, DO, DNB, MNAMS,  
(OPH)

Medical Consultants

DR. ASHIS GHOSH, MS

DR. KANCHAN SAWANT, MS

DR. VEDANG SHAH, MS

DR. MANISHA SHAH, DO

DR. V. RAGHURAM, MS

DR. MANORANJAN M, DO

### ADMINISTRATION

MANAGER - VISION CENTRE

R. BALASIVA, BA, MSW

Manager - Patient care

K. KALAIVENDAN, MBA (HA)

### NURSING

Nursing Superintendent

R. SEENIAMMAL

R. GOWRI

---

### ARAVIND - TIRUNELVELI

Chief Medical Officer / Professor

DR. R. RAMAKRISHNAN, MS, DO

Deputy Chief Medical Officer

DR. R. MEENAKSHI, DO, DNB

### RETINA - VITREOUS SERVICES

Chief / Assistant Professor

DR. VENUGOPAL REDDY, Y.C.

Assistant Professors

DR. KARTHIK SRINIVASAN, MS

DR. SYED MOHIDEEN ABDUL KHADAR,  
MS

DR. H. S. VISHWANATH, DO, DNB

### INTRAOCULAR LENS & CATARACT SERVICES

Chief / Professor

DR. SHIVAKUMAR CHANDRASHEKAR, MS

Assistant Professors

DR. A. FATHIMA, MS

DR. M. SHERIN HAROON, MS

Tutors

DR. ABHIJITH, MS

DR. AARTHY, MS, DO

### CORNEA & REFRACTIVE SURGERY SERVICES

Chief / Assistant Professor

DR. V. ANITHA, DNB

Tutor

DR. RATHI HARSHAL, DNB

Medical Consultant

DR. SHAMMY KRISHNAN, DO

### PAEDIATRIC OPHTHALMOLOGY & ADULT STRABISMUS SERVICES

Chief / Professor

DR. R. MEENAKSHI, DO, DNB

Assistant Professors

DR. A. FATHIMA, MS

DR. NEELAM PAWAR, MS

### GLAUCOMA SERVICES

Chief / Professor

DR. MOHIDEEN ABDUL KADER, DNB

Chief Consultant / Professor

DR. R. RAMAKRISHNAN, MS, DO

Assistant Professor

DR. DEVENDRA MAHESHWARI, MS

Tutors

DR. K. RAVICHANDRA, MS

DR. AMY MOHAN, DO, DNB

DR. K. ABHISHEK, DO, DNB

### ORBIT, OCULOPLASTY AND OCULAR ONCOLOGY SERVICES

Chief / Professor

DR. V. MANEKSHA, MS

Medical Consultant

DR. UPASANA KATHURIA, DO, MS

### NEURO-OPHTHALMOLOGY SERVICES

Chief / Professor

DR. S. PADMAVATHY, MS

Consultant Anesthetist

DR. S. NAVANEETHA KRISHNAN, MBBS, D.A

### GENERAL OPHTHALMOLOGY SERVICES

Assistant Professors

DR. M. DIVYA, MS

DR. ABISHEK REDDY, MS

### LOW VISION CLINIC

Assistant Professor

DR. NEELAM PAWAR, MS



### FREE HOSPITAL

Professor

DR. SAKTHIVEL, MS

Manager

S. BALAKRISHNAN

### NURSING

Nursing Superintendents

M.N. CHIDHAMBARAM

V. ARUMUGAM

### ADMINISTRATION

Manager - Office & Outreach

P. NAVANEETHA KRISHNAN

Public Relations Officer

M. MAHADEVAN

Manager - Human Resource

LAKSHMI. R, MBA

Manager - Inpatient Services

M. VIKKY KUMAR, MBA

Manager - Glaucoma Clinic

RANITHA GUNASELVI, BPT, MBA

Manager - IT & Systems

P. THIRUVENGADAM, MA, PGDCA

Librarian

E. PERUMALSAMY, M.LL.SC

Microbiologist

G. RAMESH KUMAR, M.SC

---

### ARAVIND - COIMBATORE

Chief Medical Officer / Professor

DR. V. NARENDRAN, DO, DNB

### RETINA – VITREOUS SERVICES

Chief / Professor

DR. V. NARENDRAN, DO, DNB

Professors

DR. RODNEY JOHN MORRIS, MS

DR. V.R. SARAVANAN, DO, DNB

DR. PARAG K SHAH, DNB

Reader

DR. GEORGE MANAYATH, MS, FRCS

Assistant Professor

DR. UPENDRA BABU, MS

Tutors

DR. KARAN ANNAPUR KUMARASAMY, MS

DR. PALMEERA D SOUZA, DO, DNB

DR. UDAYASREE G, MS

DR. VAIBHAV SHAH, DNB

DR. GAYATRI MURUGAN, MS

DR. ADARSH NAIK, MS

DR. RAMYA, MD

DR. MERLYN PEREIRA, MS

### INTRAOCCULAR LENS & CATARACT SERVICES

Chief / Professor

DR. KALPANA NARENDRAN, DO, DNB

Professor

DR. KAVITHA YUVARAJAN, DO, DNB

Associate Professor

DR. S. GUHAPRIYA, DNB

Assistant Professors

DR. VISHNU POUNRAJ, MS

DR. MUMDHAI, DNB

DR. ANITA MOHANAN, MS

DR. P. VIVEKANAND, DO, DNB

Tutors

DR. ARJUN, DNB

DR. SHALINI P, MS

DR. KRISHNA BABU, MS

DR. NISANTH RAJAN, MS

DR. CHANDRASEKAR, MS

DR. MANJU VINYTHERA, DNB

DR. A.J. NIRMAL, MS

Medical Officers

DR. SHOBA CHINNAN, DO

DR. DHANALAKSHMI, DO

### CORNEA & REFRACTIVE SURGERY SERVICES

Chief / Professor

DR. R. REVATHI, MS

Associate Professor

DR. ANITA RAGHAVAN, DO, FRCS (G)

Assistant Professors

DR. P. MANGALA, DNB

DR. PRABHU, MS

Tutors

DR. PRAVIN SAMBANDHAM, MS

DR. SOLY SOMAPALAN, MS

DR. SUSHMA POOJARY, MS

DR. SANKIT SHAH, MS

DR. RAGHVENDRA BORGAONKAR, DNB

DR. YACHANA PRAKASH, DNB

DR. SAKTHI RAJESWARI, DNB

DR. DEVI ROSETTE, MS

### PAEDIATRIC OPHTHALMOLOGY & STRABISMUS SERVICES

Chief / Professor

DR. KALPANA NARENDRAN, DO, DNB

Associate Professor

DR. C. SANDRA, DO, DNB

Tutors

DR. SASIKALA ELIZABETH, DNB

DR. DHAGE AASHISH RAMESH, DNB

DR. AMRUDHA SINDHU, DNB

### GLAUCOMA SERVICES

Chief / Associate Professor

DR. GANESH V RAMAN, MS

Assistant Professor

DR. ROHAN DANIEL, DO, DNB

Tutors

DR. PREMANAND, MS

DR. MRUNALI MOHAN, MS

DR. KARTIK PANIKKAR, DNB

### UVEA SERVICES

Chief / Assistant Professor

DR. V.K. ANURADHA, MD, FRCS

### ORBIT, OCULOPLASTY AND OCULAR ONCOLOGY SERVICES

Chief / Medical Officer

DR. VIJI RANGARAJAN, DO

Tutor

DR. HARIKRISHNAN. M, MS

DR. NAMRATA ADULKAR, DNB

### NEURO - OPHTHALMOLOGY SERVICES

Chief / Medical Officer

DR. VIRNA SHAH, DO

### NURSING

Nursing Superintendent

S. SULOCHANA

Assistant Nursing Superintendent

R. RADHIKA

#### ADMINISTRATION

##### Manager - General

M. RANJITHKUMAR, B.Sc, PGDHM

##### Manager - Administration

S. SANGEETHA, MHA

##### Manager - HR

R. UMAPRIYA, MA, PTSTA

##### Manager - Accounts

S. KRISHNASAMI B.SC

##### Manager - Maintenance

K.M. SENNIAPPAN, B.Sc, B.TECH

##### Manager - Outreach

M. MURUGARAJU, MA

##### Manager - Personnel

R. JEBADURAI, BA, PGDPM

##### Manager - Transport

D. KARTHIKEYAN, DIP, COP

##### Civil Engineer

S. GANAPATHY, DCE

##### Electrical Engineer

A.M. APPUSAMY, DEE

##### Manager - IT Systems

S. THIRUNAVUKKARASU, B.Sc

##### Manager - Opticals

M. MURUGESAN, B.COM

##### Manager - Quality Assurance

MR. GAUTHAM KUMAR, M.SC

(HOSP.ADMN)

##### Manager - Inpatient

MRS. PRIYA AJITHAN M.SC (HOSP.ADMN)

---

#### ARAVIND - PONDICHERRY

##### Chief Medical Officer / Professor

DR. R. VENKATESH, DO, DNB

#### RETINA-VITREOUS SERVICES

##### Chief / Assistant Professor

DR. PANKAJA DHOBLE, MS

##### Tutor

DR. MANAVI D. SINDAL, MS

##### Medical Officers

DR. PRABU BASKARAN, MS, DNB

DR. MADANAGOPALAN, V.G. MS.,

#### INTRAOCULAR LENS & CATARACT SERVICES

##### Medical Officers

DR. MANAS NATH, DO

DR. PRASANTH GIREESH, MS

#### CORNEA & REFRACTIVE SURGERY SERVICES

##### Chief / Associate Professor

DR. TIRUVENGADA KRISHNAN, DO, DNB

##### Tutors

DR. SHIVANANDA, MS

DR. SEEMA RAMAKRISHNAN, DO, DNB

##### Medical Officer

DR. RAJESH V, MS

#### PAEDIATRIC OPHTHALMOLOGY - CONTACT LENS SERVICES

##### Chief / Associate Professor

DR. K. VEENA, DO, DNB

##### Assistant Professor

DR. MARIE FREDRICK MOUTTAPPA, DO, DNB

##### Medical Officer

DR. ANJALI KHADIA, MS

#### GLAUCOMA SERVICES

##### Chief / Professor

DR. R. VENKATESH, DO, DNB

##### Assistant Professor

DR. S. KAVITHA, MS

##### Tutor

DR. SWATI UPADHYAYA, DO, DNB

##### Medical Officer

DR. DEBASISH DASH, MS

#### ORBIT, OCULOPLASTY & OCULAR ONCOLOGY SERVICES

##### Assistant Professors

DR. JAYAGAYATHRI, DO, DNB

DR. DAYAKAR YADALLA, MS, FRCS

#### NEURO - OPHTHALMOLOGY SERVICES

##### Medical Officer

DR. K. NIRMALADEVY, DO

#### UVEA SERVICES

##### Assistant Professor

DR. S. BALA MURUGAN, MS

#### GENERAL OPHTHALMOLOGY SERVICES

##### Assistant Professor

DR. S. JOSEPHINE CHRISTY, MS

##### Tutors

DR. PRIYA S, MS

DR. JAYASHREE B, DO, DNB

DR. ANNAMALAI O, DO, DNB

DR. GIRISH BHARAT VELIS, DNB

DR. SANKALP SINGH SHARMA, DO, DNB

DR. PUJA PRATIVA, MS

DR. SREENATH K. DO

##### Medical Consultant

DR. BALAMURUGANANDARAJ, DO

##### Microbiologist

I. JOSEPH GUBERT, M.Sc., M.Phil

#### NURSING

##### Nursing Superintendents

R.V. SELVARANI

A. SUBBULAKSHMI

#### ADMINISTRATION

##### Manager - Administration

P. POOBALAN, B.Com

V. SANTHANAM, B.Com

##### Manager - General

P. KANAGARAJ, BE

##### Manager - Human Resource

A. SUMATHI, MBA

##### Manager - Accounts

J. SOLAIMUTHU, P.U.C

##### Manager - Camp

A. XAVIER, B.Sc

##### Manager - Free Hospital and Vision Centre

K. KAVERI, B.A

##### Manager - Maintenance

P. THANAPAL, DCE

##### Manager - Patient Care & Quality Assurance

N. VENGADESAN, MBA

##### Manager - Paediatric Ophthalmology Services-City Centre

A. PRIYA, MBA

##### Manager - It & Systems

M. ASHOK, MCA



---

## ARAVIND - TIRUPUR

Medical Consultant  
DR. VAIDEE VIKRAM, MS

## ARAVIND - DINDIGUL

Medical Consultants  
DR. DEEPAK KUMAR, MS  
DR. M. NAVEEN, DO  
Manager  
R. BALASUBRAMANI, M.SC

---

## ARAVIND - SALEM

### RETINA - VITREOUS SERVICES

Medical Consultant  
DR. M. MANJUNATH, MBBS, MS, FVRS  
DR. GIRISH V BALIGA, MS

### UVEA & CATARACT SERVICES

Chief Medical Officer/ Professor  
DR. B. MANOHAR BABU, MS

### CORNEA & REFRACTIVE SURGERY

Medical Consultants  
DR. J. ANUJA, MS,  
DR. RAHUL ANIL NEHATE, MS

### GLAUCOMA SERVICES

Medical Consultants  
DR. SUNDAR T, MS  
DR. K. MANJULA, DNB

### GENERAL

DR. P.J. ARUNA, MS  
DR. NANDA KISHORE P, DO  
DR. VIJAYALAKSHMI G, DO  
DR. V.CHANDRASEKAR, DO

### NURSING SUPERINTENDENT

INDIRANI

### ADMINISTRATION

Manager – Patient Care  
MR. SERAN.I, MBA (HM); FEHM  
Manager Accounts & Finance  
MR. SELVARAJ  
IT & Systems  
MR. IRSHAD HUSSAIN, DECE

---

## ARAVIND - TUTICORIN

Medical Consultant  
DR. G. ANITHA, DO, DNB  
Manager - Patient Care &  
Administration  
N. MOHAMMED GHOUSE, MBA  
Manager - Office  
A. NAMMALVAR, B.SC

---

## ARAVIND - UDUMALPET

Assistant Professor  
DR. R. SANKARANANDHAN, MS  
Tutor  
DR. R. JANANI, MS  
Manager - Office  
V. MOUNA GURUSAMY

---

## Lions Aravind Institute of Community Ophthalmology

Run by Govel Trust  
Grant Administrator  
LN. N.A.K. GOPALAKRISHNARAJA, MJF

Executive Director  
R.D. THULASIRAJ, MBA  
Senior Faculty  
B. S. GANESH BABU, M.COM, MS  
R. MEENAKSHI SUNDARAM, MHM  
K. M. SASHIPRIYA, MHM  
V. VIJAYAKUMAR, MSW, M.Phil  
R. SURESH KUMAR, MA, PGDHM  
SANIL JOSEPH, MHM

Faculty  
DHIVYA RAMASAMY, MBA  
MOHAMMAD GOWTH, MA, PGDHM

Faculty Associate  
A. SYED ALI, MA  
D. YESUNESAN, MSW  
B. UDAYAKUMAR, MSW  
Administrator  
G. KRISHNA VENI, M.SC

---

## Aravind Eye Banks

### ROTARY ARAVIND INTERNATIONAL EYE BANK, MADURAI

Medical Director  
DR. M. SRINIVASAN, MS  
Technical Director  
DR. LALITHA PRAJNA, MD, DNB  
Medical Director Designee  
DR. MANO RANJAN DAS, DNB  
Eye Bank Manager  
D. SARAVANAN, MSW, M.Phil, MBA(HR)  
PGDC

### ROTARY ARAVIND EYE BANK, TIRUNELVELI

Medical Director  
DR. R. RAMAKRISHNAN, MS, DO  
Medical Director Designee  
DR. V. ANITHA, DNB, FAICO

### ARAVIND - IOB EYE BANK, COIMBATORE

Medical Director  
DR. V. NARENDRAN, DO, DNB  
Medical Director Designee  
DR. ANITHA RAGHAVAN, DO, FRCS (G)

### ARAVIND EYE BANK ASSOCIATION OF PONDICHERRY

Medical Director  
DR. K. TIRUVENGADA KRISHNAN, DO,  
DNB

Medical Director Designee  
DR. N. SHIVANANDA, MS

# Dr. G. Venkataswamy Eye Research Institute

Run by Aravind Medical Research  
Foundation

## President

DR. P. NAMPERUMALSAMY, MS, FAMS

## Vice President

DR. G. NATCHIAR, MS, DO

## Secretary & Treasurer

DR. R. KIM, DO, DNB

## Director-Research

DR. K. DHARMALINGAM, M.Sc., Ph.D

## Advisor - Research

DR. VR. MUTHUKKARUPPAN, M.Sc., Ph.D

## MOLECULAR GENETICS

### Senior Scientist

DR. P. SUNDARESAN, M.Sc., Ph.D

### Scientist

DR. A.VANNIARAJAN, M.Sc., Ph.D

### Clinician Scientists

DR. R. KIM, DO, DNB

DR. P. VIJAYALAKSHMI, MS

DR. HARIPRIYA ARAVIND, MS

DR. USHA KIM, DO, DNB

DR. MAHESH KUMAR, DO, DNB

DR. N. VENKATESH PRAJNA, DO., DNB.,  
FRCophth

DR. SHASHIKANT SHETTY, MS

DR. R.VENKATESH DO, DNB

DR. S. KAVITHA, MS

## IMMUNOLOGY & STEM CELL BIOLOGY

### Scientists

DR.VR. MUTHUKKARUPPAN, M.Sc., Ph.D

DR. GOWRIPRIYA CHIDAMBARANATHAN,  
M.Sc., Ph.D

### Clinician Scientists

DR. N. VENKATESH PRAJNA, DO., DNB.,  
FRCophth.

## OCULAR PHARMACOLOGY

### Scientist

DR. S. SENTHILKUMARI, M.Pharm, Ph.D

### Clinician Scientists

DR. ANAND RAJENDRAN, DO, DNB,

FRCS (G)

DR. S.R. KRISHNADAS, DO, DNB

## PROTEOMICS

### Director

DR. K. DHARMALINGAM, M.Sc., Ph.D

### Scientists

DR. J. JEYA MAHESHWARI, M.Sc., Ph.D

### Associate Faculty

DR. O.G. RAM PRASAD, M.Sc., Ph.D

### Clinician Scientists

DR. N. VENKATESH PRAJNA, DO,  
DNB, FRCophth.

DR. SR. KRISHNADAS, DO, DNB

DR. R. KIM, DO, DNB

## MICROBIOLOGY

### SCIENTIST

DR. M. VIDYARANI, M.Sc., Ph.D

### Clinician Scientists

DR. SR. RATHINAM, MNAMS, Ph.D

DR. LALITHA PRAJNA, MD, DNB

## BIOINFORMATICS

### Scientist

DR. D. BHARANIDHARAN, M.Sc., Ph.D

## PATHOLOGY

### Clinician Scientist

DR. R. SANTHI, MD

# Aurolab

Run by Aurolab Trust

## Trust President

R.D. THULASIRAJ, MBA

## Trust Secretary

DR. S. ARAVIND, MS, MBA

## Members

G. SRINIVASAN, BE, MS

DR. P. NAMPERUMALSAMY, MS, FAMS

DR. G. NATCHIAR, MS, DO

DR. R. KIM, DO, DNB

## Managing Director

DR. P. BALAKRISHNAN, BE, Ph.D

## Joint Managing Director

R.D. SRIRAM, BE

## Division Manager - Pharmaceuticals

V. VENKATESA KANNAN, M.Sc., PGDPMIR

## Division Manager - Intraocular Lens

R.D. SRIRAM, BE

## Marketing Manager - Exports

N. VISHNU PRASAD, MHM, MBA

## Marketing Manager - Domestic

S. SIVANAND, B.Sc., MBA

## Manager - Regulatory Affairs

R. KRISHNA KUMAR, B.Pharm, MS

## Manager - Human Resources

SWETHA V, MBA

## Manager - IT & Systems

K.R. SANKAR, M.Sc

## Production Supervisor

L. LINGAMMAL



**ARAVIND EYE HOSPITALS**  
& POSTGRADUATE INSTITUTE OF OPHTHALMOLOGY

**MADURAI** - 1, Anna Nagar, Madurai 625 020, Tamilnadu, India. Phone: (0452) 435 6100

**THENI** - Periyakulam Road, Theni 625 531, Tamilnadu, India. Phone: (04546) 252 658

**TIRUNELVELI** - S.N. High Road, Tirunelveli Jn. 627 001, Tamilnadu, India. Phone: (0462) 435 6100

**COIMBATORE** - Avinashi Road, Coimbatore 641 014, Tamilnadu, India. Phone: (0422) 436 0400

**PONDICHERRY** - Cuddalore Main Road, Thavalakuppam, Pondicherry 605 007, India. Phone: (0413) 261 9100

**DINDIGUL** - 31A, New Agraharam, Palani Road, Dindigul 624 001, India. Phone: (0451) 244 8100

**TIRUPUR** - Dharapuram Main Road, Chettipalayam Post, Tirupur 641 608, India. Phone: (0421) 226 6100

**SALEM** - Sankagiri Main Road, Nethimedu, Salem 636 002, India. Phone: (0427) 335 6100

**TUTICORIN** - Meenakshipuram West, Near Old Bus Stand, Tuticorin 628 002, India. Phone: (0461) 230 0410

**UDUMALPET** - 112, Dhalli Road, Opp. Palaniandavar Mills, Udumalpet 642 126, India. Phone: (04252) 260 400

---

**LIONS ARAVIND INSTITUTE OF COMMUNITY OPHTHALMOLOGY**

72, Kuruvikaran Salai, Gandhinagar, Madurai 625 020, Tamilnadu, India. Phone: (0452) 435 6500

---

**ARAVIND EYE BANKS**

ROTARY - ARAVIND INTERNATIONAL EYE BANK

1, Anna Nagar, Madurai 625 020, Tamilnadu, India. Phone: (0452) 435 6100

ROTARY - ARAVIND EYE BANK

S.N. High Road, Tirunelveli Jn. 627 001, Tamilnadu, India. Phone: (0462) 435 6100

IOB - ARAVIND EYE BANK

Avinashi Road, Coimbatore 641 014, Tamilnadu, India. Phone: (0422) 436 0400

ARAVIND EYE BANK ASSOCIATION OF PONDICHERRY

Cuddalore Main Road, Thavalakuppam, Pondicherry 605 007, India. Phone: (0413) 261 9100

---

**DR. G. VENKATASWAMY EYE RESEARCH INSTITUTE**

ARAVIND MEDICAL RESEARCH FOUNDATION

1, Anna Nagar, Madurai 625 020, Tamilnadu, India. Phone: (0452) 435 6550

---

**AUROLAB**

1, Sivagangai Road, Veerapanjan, Madurai 625 020, Tamilnadu, India. Phone: (0452) 244 6100



World Health Organization  
Collaborating Centre  
For Prevention of Blindness



**ARAVIND EYE CARE SYSTEM**

[www.aravind.org](http://www.aravind.org)