



Teleophthalmology In India

Dr. SS Badrinath



Need for Teleophthalmology

- 80% of population resides in rural area
- > 70% of health care resources are in urban area
- 1 Ophthalmologist / 100,000 population¹.
- 70% of them practice in Urban areas¹.



Archives of ophthalmology. 2000 118; 1431 - 2



Teleophthalmology in India

- Teleophthalmology holds a great potential the quality, access and affordability in health care.
- For Patients, it can reduce the need for travel and provide the access to a super-specialist.





Teleophthalmology in India

- Ophthalmologist lends itself to telemedicine as it is a largely image based diagnosis.
- The rapid progress achieved in the field of Telecommunication renders Teleophthalmology easily feasible.





Teleophthalmology Practices in India

- 40 - 50 ophthalmic centers are connected to some tertiary center
- 6 mobile vans with satellite connectivity providing ophthalmic care at doorsteps

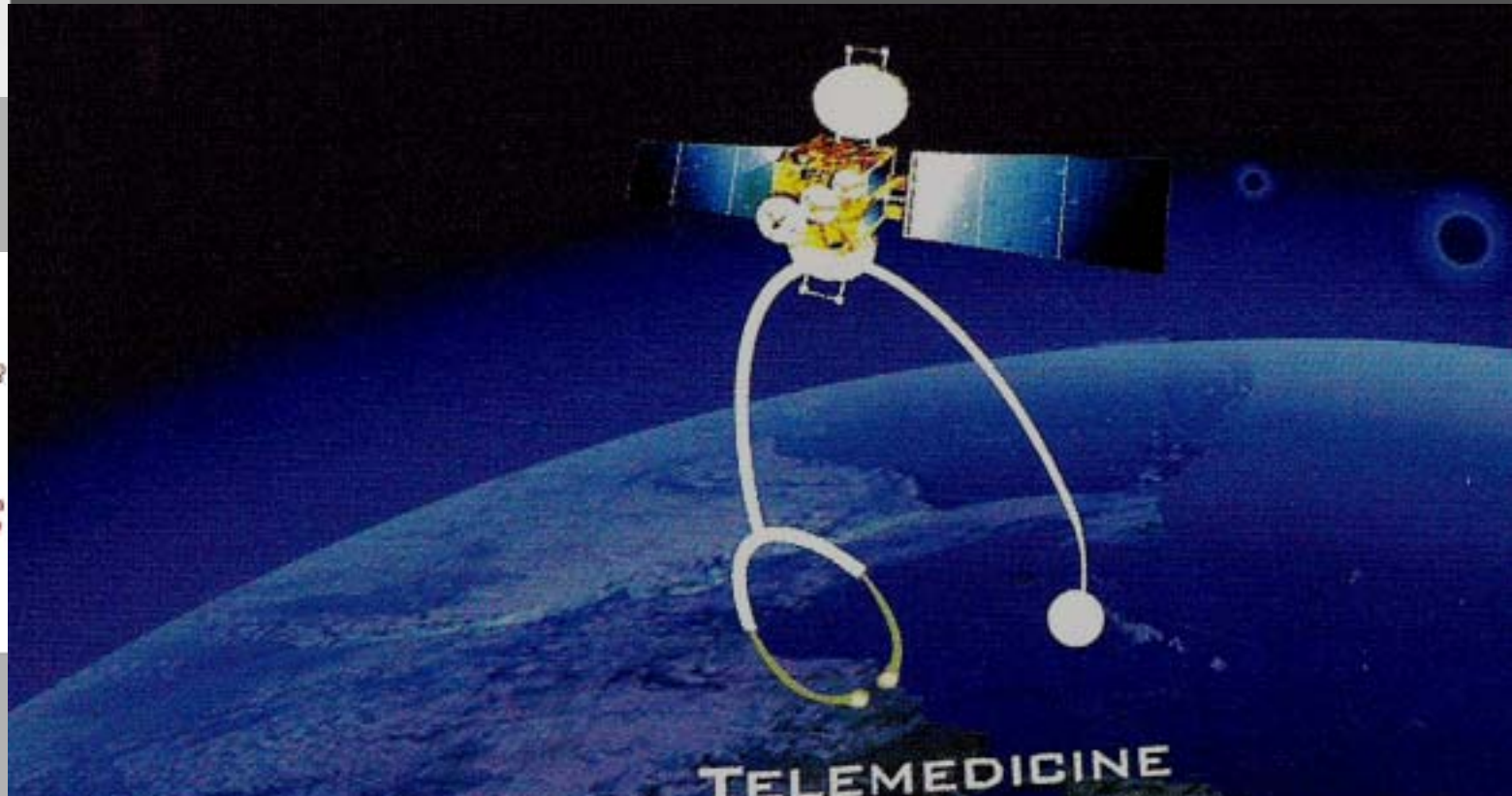


Sankara Nethralaya, Chennai	:	2
Aravind Eye hospital, Madurai	:	1
Agarwal Eye hospital, Chennai	:	1
Chaitinaya Hospital, Cochin	:	1
Prabha Eye Clinic, Bangalore	:	1





Pioneering efforts of ISRO



सत्यमेव जयते

Department of Space

Indian Space Research Organisation

40km

20km



Teleophthalmology in India

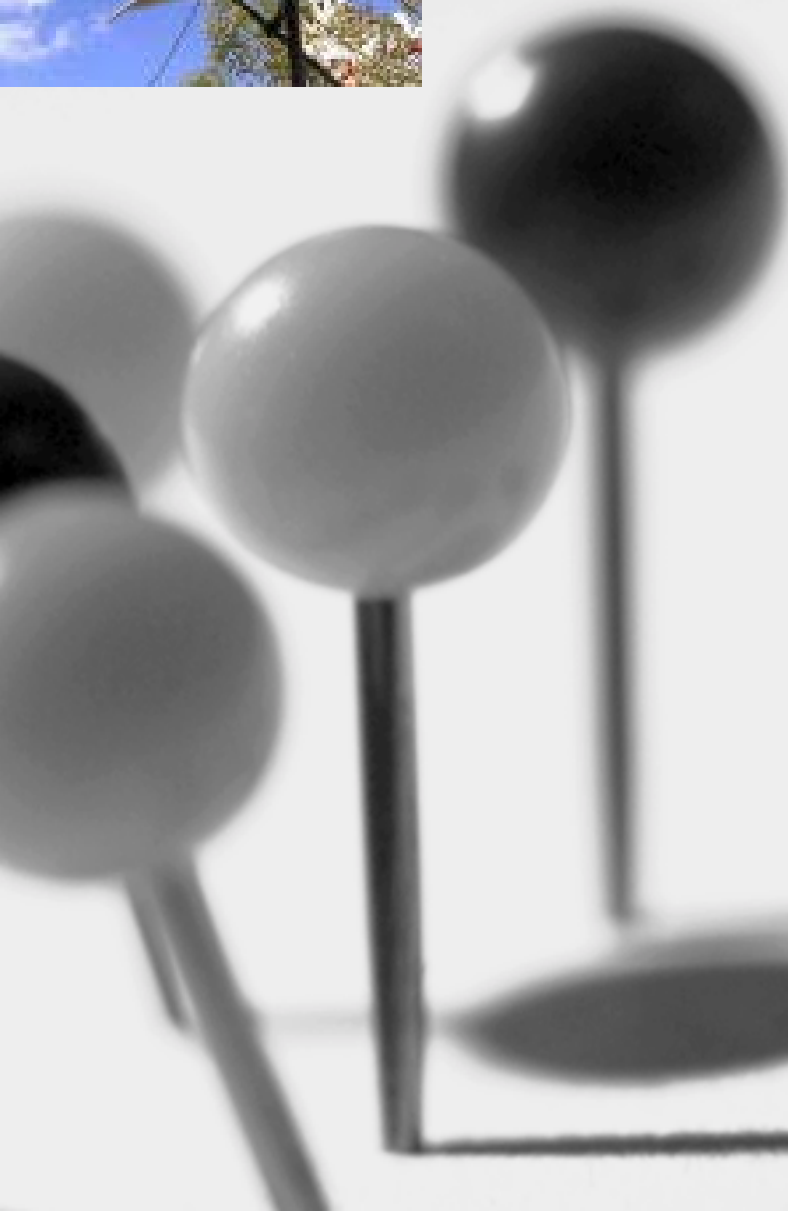
- Scope for Teleophthalmology
 - Patients care
 - Expert opinion
 - Comprehensive eye examination in rural area
 - Eye Screening
 - School Childrens
 - Diabetic Retinopathy
 - Teaching and Training
 - Awareness



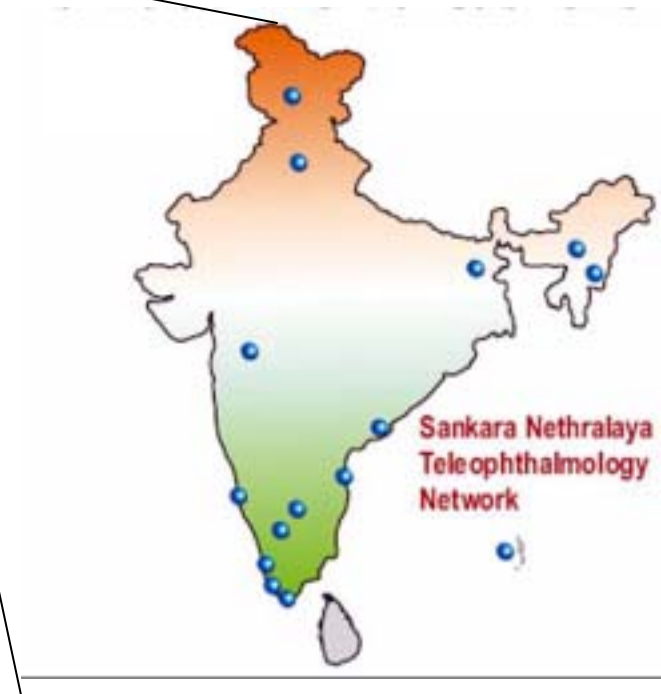
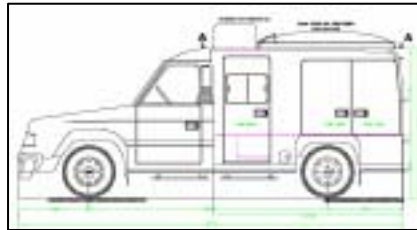
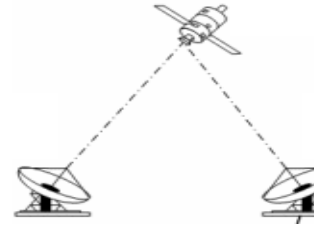
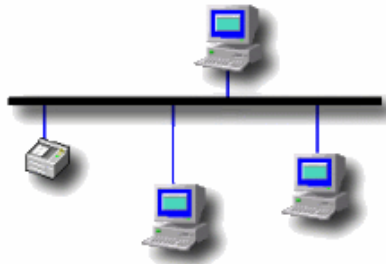


Sankara Nethralaya Teleophthalmology

A Model



Evolution of teleophthalmology at Sankara Nethralaya





SN Mobile Teleophthalmology network

Reaching doorsteps of a Common man



Oct, 2003



▶ No of Camps	-	823
▶ No of patients benefited	-	65,000
▶ No of Teleconsultations	-	15,600

Source : SN TOP, Update June 2006





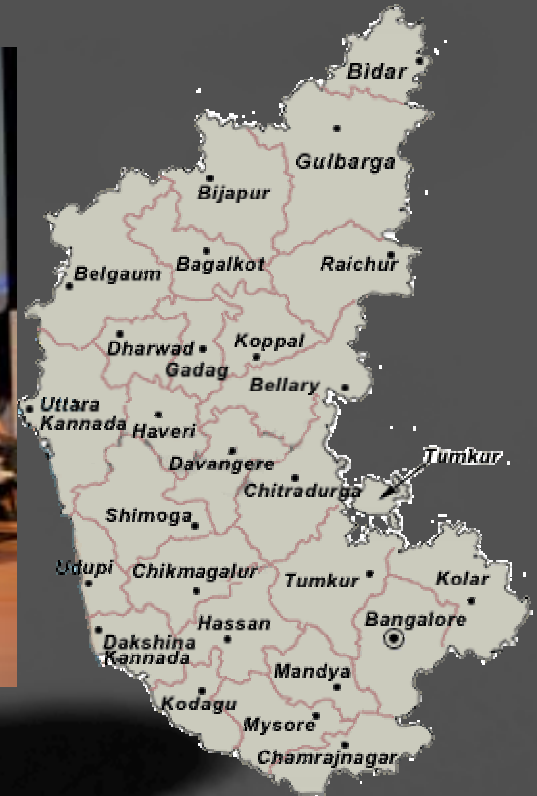
Teleophthalmology – First in India





SN Mobile Teleophthalmology network

Reaching doorsteps of a Common man



Inaugurated : Oct 2005



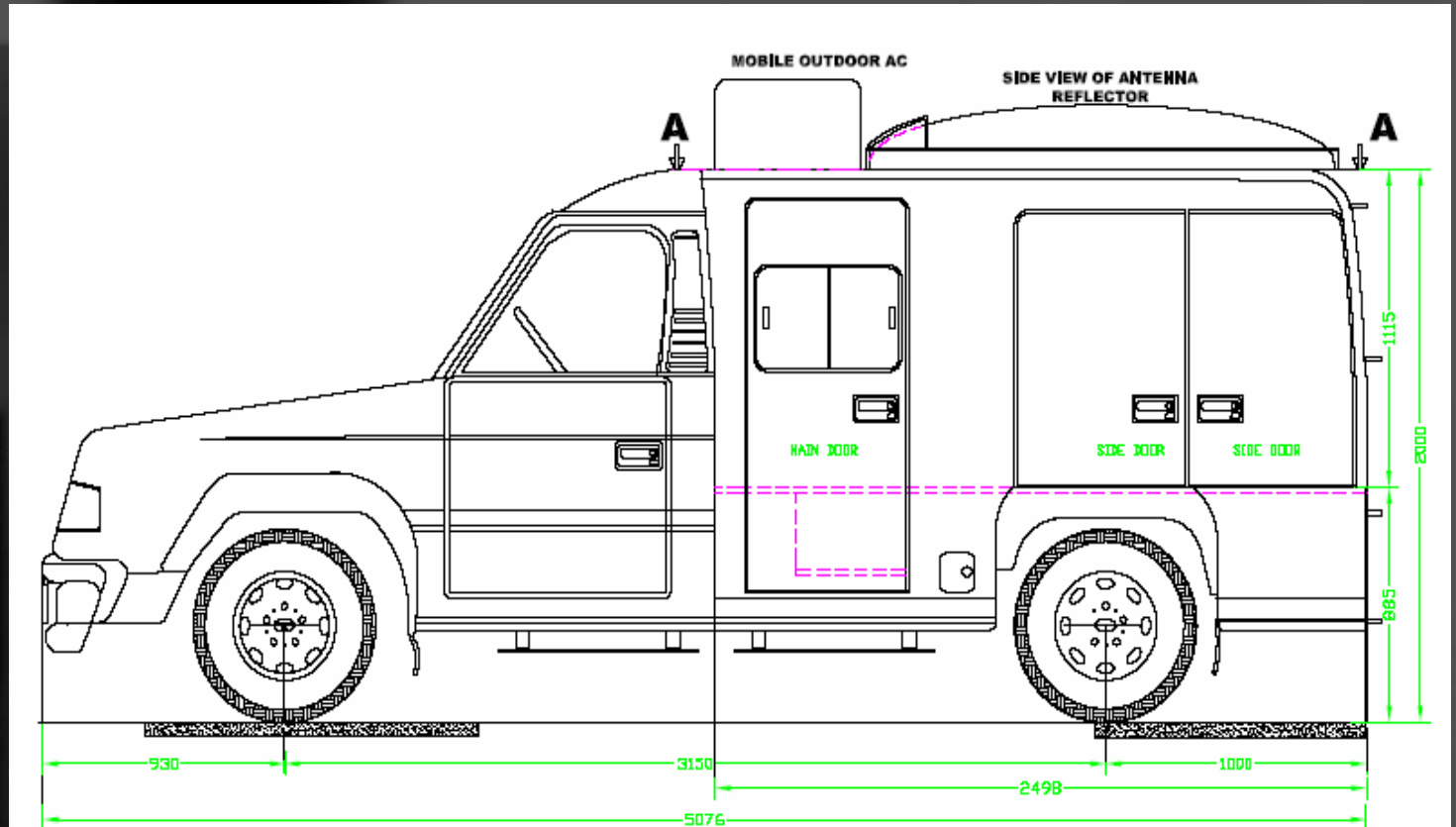


Teleophthalmology – First in India





Teleophthalmology – First in India





Sankara Nethralaya
Mobile
Teleophthalmology
Unit
Tamilnadu



VIDEO WITH AUDIO



Mobile Refraction Unit - Karnataka



Inauguration on July 2006

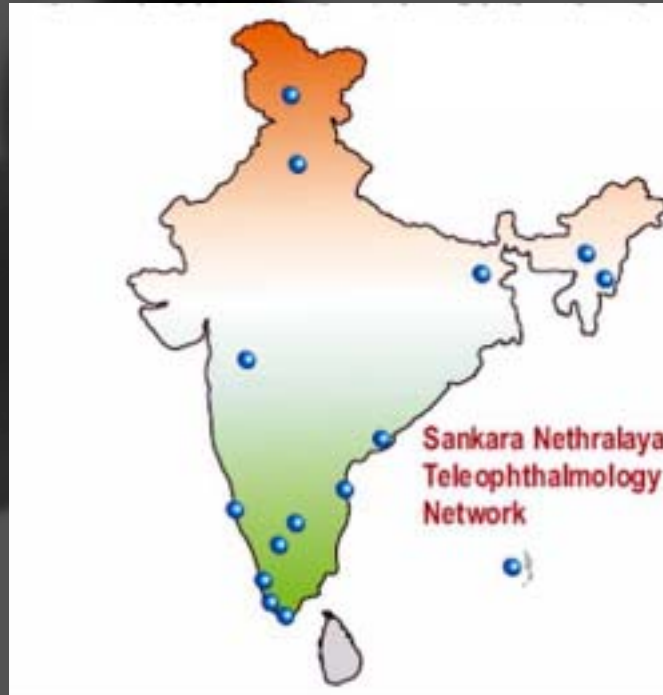


Mobile Refraction unit





Providing second opinions



Name of the Institution	Location
Amirtha Institution of Medical Science	Cochin
G B Pant Hospital	A & N Islands
TMS Eye Hospital	Salem
Army Hospital	J & K
Army Hospital	New Delhi
Oman University	Oman,UAE
Ganapathi Netralaya	Jalna
Sankardeva Nethralaya	Assam
Rotary Narayana Sankara Nethralaya	Kolkotta
Chaithanya Eye Hospital and Research Center	Thirvandapuram
Sankara Nethralaya – Bangalore	Bangalore
All India Institute of Medical Sciences	New Delhi
Bejan Singh Eye Hospital	Nagercoil
Dr. Kumaraswamy Health Center, Kanyakumari	Kanyakumari
Vishaka Eye Hospital	Vizag
Dr. Arup Kumar Bose	West Bengal



Teleophthalmology : Training





Teleophthalmology : A Global reach



Instruction course for Doctors & Technicians from Afghanistan





Teleophthalmology : A Global reach



Dept of Ocular Pathology, University of Oman interacting with Dept. of Ocular Pathology, SN





Creating awareness among rural folks

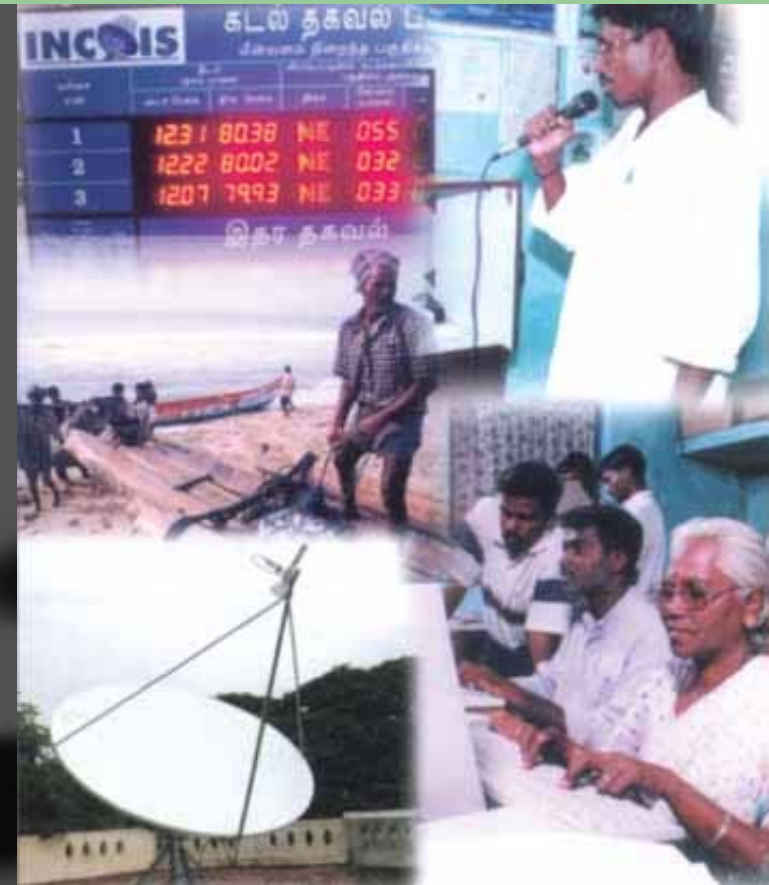


MS Swaminathan Research Foundation

Centre for Research on Sustainable Agricultural & Rural Development



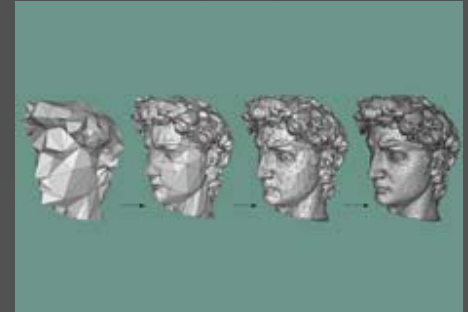
- Village Resources Centers :-
 - Multi-lingual Awareness Programme
- By mobile vans :-
 - Awareness CD's





Teleophthalmology : Research

- **What should be the optimal level of compression of images?**



A degrading effect of increasing compression levels on

JPEG quality index ($r = -0.9221$)(95% CI = -0.9861 to -0.6208), Smoothness index ($r = -0.9299$)(95% CI = -0.9875 to -0.6531), Overall picture quality ($r = -0.9266$)(95% CI = -0.9869 to -0.6394) Percent loss ($r = 0.9113$) (95% CI = 0.5772 to 0.9840). The vessel branching index had good quality until 1:40 compression.

The optimum level of compression using the JPEG algorithm appears to be 1:40. There is no degrading effect of transmission via satellite on either the compressed or the uncompressed image quality.





Teleophthalmology : Research

► Telehealth Program for Diabetic Retinopathy in Rural South India: A Pilot Study



The grading-agreement of DR between digital photograph and indirect ophthalmoscope was good for any retinopathy versus no retinopathy (kappa value=0.79, 95%CI:0.68-0.88). Similarly, grading-agreement between sight-threatening DR and no sight-threatening DR, as determined by ICC, was 0.76 (95% CI, 0.63-0.85).

Telehealth programme is an effective tool of early detection of sight threatening complications of diabetic retinopathy.





Teleophthalmology : Research

- **Measuring Patients' Satisfaction in Telehealth Program for Diabetic Retinopathy in Rural South India**



129 of 132 patients were quite satisfied with the Telehealth program: telescreening for diabetic retinopathy. One hundred and seven (81.1%) patients were of the opinion that the retinal specialist at the base hospital gives enough information or advice.





Teleophthalmology : Research

Is Teleophthalmology cost effective ?



eHEALTH INTERNATIONAL

Open Access

A primary resource for reliable information on the application and use of information technology in all aspects of health and health care nationally, regionally and internationally.

Mobile Teleophthalmology : A cost effective screening tool for diabetic retinopathy in rural south India

Sudhir Reddi Rachapalle, D.O, DNB, MPH,¹ Kevin D Frick, Ph.D.,² Rajiv Raman, MS, DNB,¹ Padmaja Kumari Rani, MS, FNB,¹ Tarun Sharma, M.D.,¹ Murali Vasudevan, BSc.¹

Tele-screening is nearly ½ the cost as compared to base hospital screening



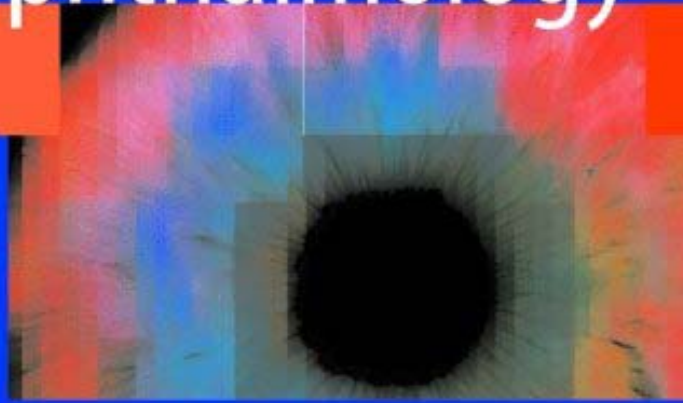


Sharing Knowledge & Experience



Tele-ophthalmology

Kanagasingam Yogesan
Sajeesh Kumar
Leonard Goldschmidt
Jorge Cuadros
Editors



Contributed a Chapter in
the text book on
"Teleophthalmology"

published by Springer-
Verlag Berlin and
Heidelberg GmbH & Co. K

Released on Feb 2006

 Springer





Future



FUTURE OF TELEMEDICINE IN INDIA IS BRIGHT



*AND WE CAN MAKE
IT BRIGHTER*





Telemedicine association of India



- A committee is formed
- Task : To improve the telemedicine practices in India

To Form telehealth guidelines

To solve the technical issues related to telemedicine in India





".....we must be second to none in the application of advanced technologies to the real problems of man and society."

Dr. Vikram Sarabhai



SANKARA
NETHRALAYA



THANK YOU





Teleophthalmology : Research

- **Measuring Patients' Satisfaction in Telehealth Program for Diabetic Retinopathy in Rural South India**

129 (77.7%) were quite satisfied with the Telehealth program: telescreening for diabetic retinopathy. One hundred and seven (81.1%) patients were of the opinion that the retinal specialist at the base hospital gets enough information for advice.

Reasons for Patients' satisfaction

Cost effective 27/132(20.4%)

Time saving 13/132(9.8%)

Direct viewing of own fundus images 55/132(41.6%)

Expert advice 34/132(25.7%)

