# Content

**1 About the Institute: Sanjay Gandhi Postgraduate Institute of Medical Sciences:**
Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), is situated in Lucknow, the capital of the state of Uttar Pradesh in northern part of India. The foundation stone of SGPGIMS was laid on 14th December, 1980 by the then President of India, Shri Neelam Sanjeeva Reddy. It is a tertiary level referral medical institution with objective to create a center of excellence for providing state-of the-art patient care, high quality medical education, training and conduct research in the relevant disciplines of medicine and other allied sciences. A national peer group recommended the development of the Institute in three phases of six super specialties each. At present this super specialty hospital has 695 beds and 30 academic departments (www.sgpgi.ac.in). The institute has been innovative starting from the beginning of it's concept e.g. introducing new disciplines, new courses and duration of training etc.



Fig.1 Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow

## 2. Information Technology at SGPGIMS

**2.1** SGPGIMS takes pride in early adoption of information technology for hospital automation. It was the first public sector medical institution to introduce computerization of patient care activities in the year 1998. Hospital Information System (HIS) was designed indigenously in collaboration with the Center for Development of Advanced Computing (C-DAC), an autonomous scientific organization under the Department of

Information Technology, Ministry of Communication and IT, Government of India. It was made fully functional in the year 2000 and at present more than 300 HIS nodes are functional. All records, including investigations, reports, bills and other documents of registered patients are maintained and operated by the HIS.

Fig.2 HIS operation at registration counter and OPD Chamber



HIS at SGPGIMS is now in the process of upgradation and will now integrate Picture Archiving and Communication System (PACS) and Telemedicine with 10G network. This is going to be web-based so that patients can access their records anytime and anywhere.

**2.2** Institute had started its Internet and e mail services in 1997-98. Initially the internet link (64 kbps) was installed using radio link provided by Department of Telecom (DOT). In the year 2003-04 Institute changed its ISP from DOT to M/s Sify Limited with upgraded bandwidth of 512 (1:4) kbps leased line. Later on it was upgraded to 1 MBPS (1:4) leased line. Number of internet users was increased manifold and more bandwidth was required for speedy and easy access of internet and email facility. Also it was decided that internet connection would be provided to all the faculty residences. The leased line was upgraded to 2 MBPS (1:4) and the ISP was changed to BSNL. The campus network was provided through ADSL using existing telephone line which was feasible after the upgradation of telephone exchange. To cater the additional requirement of internet access and upcoming web based HIS/PACS application the Institute has decided to upgrade the same to 10 MBPS (1:1) leased line. Institute has been providing email facilities to about 550 email users. It has group mailing facility like sending mails to all faculty members, senior residents, PhD students etc. Recently email server has been upgraded with web mail/squirrel mail facility.

**2.3** Central Library of SGPGIMS is also a part of the institute IT network. It has a dedicated section equipped with 20 computer work stations for internet access available to the users round the clock. The library is operating in a fully automated environment through integrated library automation software Libsys v. 4.0. Entire library collection can be browsed through Online Public Access Catalogue (OPAC) with the help of Boolean search strategy. The Library of SGPGIMS has also embraced electronic journals as a part of serial collection since last few years and today this on-line collection has become the essential component of the Central Library. In the year 2008-2009 the institute has subscribed to five online journal database resources comprises of nearly 1000 journals which are all linked out through PubMed.

### 3. SGPGIMS Telemedicine Programme

Telemedicine activities at SGPGIMS were initiated in the year 1999 in the form of testing the concept of information and communication technology in the field of medicine. Telemedicine, as defined by WHO, is delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technology for exchange of valid information for diagnosis, treatment and prevention of diseases and injuries, research and evaluation, and for continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities.

### 3.1 Telemedicine Infrastructure at SGPGIMS

At SGPGIMS, telemedicine activities started from the office of the Head of the Department of Endocrine Surgery in August 2000 during Kailash Mansarover Yatra Project. Then from September 2001 till July 2006, all telemedicine activities were carried out in a hall located near the operation theater complex and was called Telemedicine Resource Center. The first research grant received in 2001, which helped in creating an infrastructure for telemedicine here.



Fig 3 – Telemedicine Infrastructure (2000 – 2006)

The technical infrastructure at the SGPGIMS Telemedicine Resource Center was built on gradually with sponsored research grants consisted of several independent telemedicine workstations equipped with tele-radiology, tele-pathology, tele-cardiology and videoconferencing units with large display devices. It could carry out medical data transfer and videoconference with six remote locations simultaneously. The communication set-up consisted of six Integrated Services Digital Network (ISDN) telephone lines, one Ku band Demand Assigned Multiple Access (DAMA) satellite, one extended C band Very Small Aperture Terminal (VSAT) based on flexi DAMA satellite supported by Indian Space Research Organization and Fiber optic cable network supported by Gas Authority of India Ltd. Later in the year 2003 with the support of Government of Uttar Pradesh. All telemedicine sessions are real time and interactive in nature except some of the tele-consultation with rural nodes based in Uttaranchal state. The operation theatres of SGPGIMS are equipped with high-resolution video camera to transmit live telecast of surgical procedures. Two auditoria of 700 and 120 seating capacity are networked through optic fiber backbone to the telemedicine center to enable interactive live telecast of proceedings of seminars, workshops and conferences to different locations in India and abroad. With the completion of intra-hospital telemedicine network as an infrastructure component of upcoming School of Telemedicine, all HIS nodes will be made potential telemedicine nodes. Construction of the first two floors of the school has been complete, the other two floors will be completed in December 2008. All the telemedicine activities has been shifted to the new school complex in August 2006. Additional technical infrastructure is getting added to equip various laboratories and other facilities in the complex.

### 3.2 SGPGIMS Telemedicine Programme Partners:

The national medical partners of the SGPGI Telemedicine Network include; all three Medical Colleges of Orissa located at Cuttack, Berhampur and Burla; two district hospitals of Uttarakhand State (Almora & Sirnagar); All India Institute of Medical Sciences (AIIMS), New Delhi; Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh; Amrita Institute of Medical Sciences (AIMS), Kochi; Christian Medical College (CMC), Vellore; Sri Ram Chandra Medical College (SRMC), Chennai; Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak;

Regional Institute of Medical Sciences (RIMS), Imphal; Indira Gandhi Medical College, Shimla, Railway Hospital, Ijjat Nagar, Bareli. The overseas network partners are Ranguil University, Toulouse, France & Holy Family Hospital, Rawalpindi, Pakistan; Oregon Health and Science University (OHSU), USA. Recently SGPGI established link to Jigme Dorji Wangchuck National Referral Hospital (JDWNRH), Thimphu, Bhutan and Indira Gandhi Child Hospital, Kabul, Afghanistan under SAARC Telemedicine Network Project sponsored by Ministry of External Affairs, Govt. of India.

The technical partners are Indian Space Research Organization, Bangalore, Center for Development of Advanced Computing, Pune & Mohali and Online Telemedicine Research Institute, Ahmadabad.



Fig 4: Medical Network Partners of SGPGIMS

### 3.3 SGPGI Telemedicine Programme organization and management:

All the telemedicine activities are now carried out in the newly established School of Telemedicine & Biomedical Informatics since the year 2006. The facility is being run by Project Staff under the supervision of a Nodal Officer who is guided on Policy matters by the "SGPGI Telemedicine Programme Management Committee" as approved by Academic Board and Governing Body of the Institute. Faculty members, Residents of different departments, Specialists of General Hospital, Nursing staff, Laboratory Technologist, and Hospital Administration department take part in daily telemedicine activities in a schedule manner.

**SGPGI Telemedicine Programme Management Committee**

Prof. R.K. Sharma, Director      Chairman

Prof. U.K Misra,   Dean      Member

Prof. Ramnath Misra      Member

Prof. R.K. Gupta      Member

Prof. S.K.Mishra      Member Secretary & Nodal Officer

**Project Staff:**

1. Ms Lily Kapoor      Technical Project Assistant
2. Mr Repu Daman      Technical Project Assistant
3. Mr Indra Pratap Singh      Technical Project Assistant
4. Mr Vijay Pal Singh      Technical Project Assistant
5. Mr Sandeep Singh      Telemedicine Technician
6. Mr Dhirendra Kumar Tripathi      Telemedicine Technician
7. Mr Arvind Kumar      Project Assistant
8. Mr Ashish Verma      Project Assistant
9. Mr Arun Kumar      Project Assistant
10. Ms Somya Krishna      Telemedicine Technician
11. Mr Dina Nath Pandey      Telemedicine Technician
12. Mr Ashok Kumar Kashyap      Project Assistant
13. Mr Manokant Shukla      Project Assistant
14. Mr Sachin Verma      Project Attendant
15. Mr. N.B. Chhetri      Administrative Assistant
16. Mr Amit Mohan      Content Developer
17. Mr Kalika Prashad Pathak      Technical Assistant
18. Mr Himanshu Srivastava      Research Assistant
19. Ms. Neha Singh      Tele-ophthalmology Technician
20. Mr Lalit Mishra      Project Attendant
21. Mr Rajesh Mourya      Telephone Operator
22. Mr. Awadhesh Pandey      Driver

**Faculty of SGPGI Participated in SGPGI Telemedicine Program**

| S. No. | Name | Designation | Department |
|--------|------|-------------|------------|
| 1. | Prof R K Sharma | Director and HoD, Member of Telemedicine Prog Committee | Nephrology |
| 2. | Prof U K Misra | Dean and Head, Member of Telemedicine Program Committee | Neurology |
| 3. | Prof S K Mishra | Prof & Head & Nodal Officer SGPGI Telemedicine Program | Endocrine Surgery |
| 4. | Prof R N Misra | Member of Telemedicine Program Committee | Rheumatology |
| 5. | Prof Nakul Sinha | Head | Cardiology |
| 6. | Prof V K Kapoor | Head | Surgical Gastroenterology |
| 7. | Prof G Choudhury | Head | Gastroenterology |
| 8. | Prof Eesh Bhatia | Professor | Endocrinology |
| 9. | Prof. Rakesh Kapoor | Head | Urology |
| 10. | Prof. C.M. Pandey | Head | Bio Statistics |
| 11. | Prof. Raj Kumar | Professor | Neurosurgery |
| 12. | Dr Amita Aggarwal | Additional Professor | Rheumatology |
| 13. | Dr Manoj Jain | Additional Professor | Pathology |
| 14. | Dr Kumudani Sharma | Additional Professor | Neuro-ophthalmology |
| 15. | Dr Vikas Kanoujia | Assistant Professor | Neuro-ophthalmology |
| 16. | Dr. Anjali Mishra | Assistant Professor | Endocrine Surgery |
| 17. | Dr. Amit Agarwal | Additional Professor | Endocrine Surgery |
| 18. | Dr Gaurav Agarwal | Additional Professor | Endocrine Surgery |

| | | | |
|---|---|---|---|
| 19. | Dr. Ashok Kumar | Additional Professor | Surgical Gastroenterology |
| 20. | Dr PK Pradhan | Associate Professor | Nuclear Medicine |
| 21. | Dr. Rajnesh Singh | Assistant Professor | Surgical Gastroenterology |
| 22. | Dr. Anu Bihari | Assistant Professor | Surgical Gastroenterology |
| 23. | Dr. Richa Lal | Additional Professor | Surgical Gastroenterology |
| 24. | Dr Vikas Agarwal | Associate Professor | Immunology |
| 25. | Dr Able Lawrance | Assistant Professor | Immunology |
| 26. | Prof. T.N. Dhole | Professor & Head | Microbiology |
| 27. | Dr. V.L. Nag | Assistant Professor | Microbiology |
| 28. | Dr. Ujjala Ghosal | Assistant Professor | Microbiology |
| 29. | Dr. R. S.K.Marak | Assistant Professor | Microbiology |
| 30. | Dr. Priti Elhence | Associate Professor | Transfusion Medicine |
| 31. | Dr Archna Gupta | Additional Professor | Radiology |
| 32. | Dr. Mandakini Pradhan | Additional Professor | Genetic |
| 33. | Dr. G. Ghosal | Additional Professor | Gastroenterology |
| 34. | Dr. Anish Srivastava | Additional Professor | Urology |
| 35. | Dr. Anil Mandani | Associate Professor | Urology |
| 36. | Dr. M.S. Ansari | Additional Professor | Urology |
| 37. | Dr. Aditya Kapoor | Associate Professor | Cardiology |
| 38. | Dr. Jayanti Kalita | Additional Professor | Dept of Neurology |
| 39. | Dr. Sanjay Bihari | Additional Professor | Neurosurgery |
| 40. | Dr. A. Jaiswal | Associate Professor | Neurosurgery |
| 41. | Dr. Gyan Chand | Associate Professor | Endocrine Surgery |
| 42. | Dr Subhash Yadav | Associate Professor | Endocrinology |
| 43. | Dr Banani Poddar | Associate Professor | Critical Care Medicine |
| 44. | Dr Afzal Azim | Associate Professor | Critical Care Medicine |
| 45. | Dr Mohan | Assistant Professor | Critical Care Medicine |
| 46. | Dr P Bhattacharya | Senior Specialist | Paediatrics |

| 47. | Anju Rani | Specialist | Gynecology |
|---|---|---|---|
| 48. | Deepa Kapoor | Specialist | Gynecology |
| 49. | Prerna Kapoor | Specialist | General Medicine |
| 50. | Prof Kartar Singh | Former Director and member of Telemedicine Program Committee | Gastroenterology |
| 51. | Prof A K Mahapatra | Former Director and member of Telemedicine Program Committee | Neurosurgery |
| 52. | Prof Ratni Gujral | Former Dean, Head and member of Telemedicine Program Committee | Radiology |
| 53. | Prof A Ayyagari | Former Dean, Head and member of Telemedicine Program Committee | Microbiology |
| 54. | Prof. Sita Niak | Former Dean, Head and member of Telemedicine Program Committee | Immunology |

**Hospital Administrators and Paramedical Professionals of SGPGI Participated in SGPGI Telemedicine Program**

| S. No. | Name | Designation |
|---|---|---|
| 1. | Dr. Hemchandra Pandey | Additional Professor |
| 2. | Ms Lila Mashi | Nursing |
| 3. | Ms Madhuri Smith | Nursing |
| 4. | Ms Meera Prakash | Nursing |
| 5. | Ms Neelam Srivastava | Nursing |
| 6. | Ms Pratibha | Nursing |
| 7. | Ms Sabita Swain | Nursing |
| 8. | Mr Alice Joseph | Nursing |
| 9. | Ms Suman Singh | Nursing |
| 10. | Ms Pushpa Singh | Nursing |
| 11. | Ms Devi Dev | Nursing |
| 12. | Ms Sanguta Bal | Nursing |
| 13. | Ms Ankita | Nursing |
| 14. | Ms Vijay Goel | Nursing |
| 15. | Ms L. Masin | Nursing |
| 16. | Ms S. Sanges | Nursing |
| 17. | Ms Ankita | Nursing |
| 18. | Ms Sangita Bal | Nursing |
| 19. | Ms Devi Dev | Nursing |
| 20. | Mr Satish Babu | Lab technology |
| 21. | Mr Manoj Shukla | Lab technology |
| 21. | Mr Uttam Kumar | Lab technology |
| 22. | Mr Viresh Dubey | Lab technology |
| 23. | Mr J S Shukla | Lab technology |
| 24.. | Ms Nirupama | Dietician |
| 25. | Mr Ramjeet | Physiotherapist |

**a. Students/ Residents from various Departments of SGPGI Participated in SGPGI Telemedicine Program**

| 1. | Endocrinology | 8 Residents |
|----|----|----|
| 2. | Endocrine Surgery | 10 Residents |
| 3. | Critical Care Medicine | 2 Residents |
| 4. | Gastroenterology | 12 Residents |
| 5. | Genetics | 8 Residents |
| 6. | Immunology | 10 Residents |
| 7. | Microbiology | 3 Residents |
| 8. | Nephrology | 8 Residents |
| 9. | Nuclear Medicine | 3 Residents |
| 10. | Pathology | 10 Residents |
| 11. | Surgical Gastroenterology | 8 Residents |
| 12. | Urology | 8 Residents |

### 3.4 Evolution of SGPGIMS Telemedicine Program:

### 3.4.1   Activities during Year 1999
**Tele-CME**
- The first activity was the transmission of proceedings and operation procedures of **1st Endocrine Tele-surgery workshop** (Tele medical education) organized by department of Endocrine Surgery. A five days workshop was held on October 25th -29th 1999 in which live surgery performed at SGPGIMS was transmitted online to hospitals located as far as Kochi and to a city hospital for surgeons to view and interact live with the experts. The hardware used were desktop monitor as display device and webcam and  telecommunication link was using high bandwidth (384 kbps) ISDN (Integrated Services Digital Network). The participant's were satisfied with the high quality of transmission of data, image and voice.



Fig.5- Transmission of proceedings of 1st Endocrine Tele-surgery workshop and Tele-surgical image in 1999

- A month later in December 1999 Department of Gastroenterology conducted a Continuing Medical Education (CME) program was transmitted live using high bandwidth telecommunication link to Amrita Institute of Medical Sciences (AIMS), Kochi located 2500 km away from Lucknow and was attended more than hundred delegated who shown satisfaction with the quality of transmission and the benefit of such technology in imparting distance education.

### 3.4.2 Activities during Year 2000

**Tele-education, Tele-consultation and Field Application of telemedicine technology**

- Tele-Endocrine Pathology Workshop organized jointly by Department of Endocrine Surgery and Pathology in February 2000 in which interactive pathology slide presentation and discussion was held between SGPGIMS, Lucknow and Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, another premier medical institution, for two days.

    So the first few telemedicine activities were the transmission of educational Tele-CMEs program organized by the various departments of the Institute and the concept of telemedicine was conceived which was followed by several proof of concept studies supported by SGPGIMS.

- **Tele-consultation at District hospitals ( Remote connectivity for Tele-consultation):** Balrampur and Civil Hospital, located in Lucknow city, were chosen for this study. The same exercise, as was done at Pithoragarh Hospital, was carried out. The outcome of the study was better here in the sense telecommunication network was functioning all the time. Overall the outcome was satisfactory taking in to account all the parameters studied to judge the efficacy of Telemedicine technology i.e. image & data quality, doctor & patient satisfaction, time gap, cost-affectivity and technological performance. The result could have been excellent if the telecommunication infrastructure would have been reliable. We are still working in this area to take care of the problems faced in this project especially failure of satellite transmission.

- On 14th to 26th September 2000 SGPGIMS started another telemedicine activity by provided tele-consultation at hospital in the hill region. The study tried to look at the feasibility of using telemedicine technology to transmit the images to SGPGIMS and get the reports in shortest possible time. Pithoragarh District Hospital, in the Kumaon region of Uttarakhand, situated 275 km away from Lucknow got linked through Public Switched Telephone Network (PSTN) telecommunication of 64 kbps and "Store & forward" telemedicine technology was used. Video clippings of the patient, ultrasound and X-ray images, typed and hand written notes and audio clippings were transmitted from the said hospitals to SGPGIMS every day. The clinicians and radiologist at the Telemedicine receiving

station temporarily established at SPGPIMS interpreted the data. The quality of the images, both radiological studies and video clippings were excellent and the experts had no problem in the interpretation. The opinion in regard to diagnosis and management were well received by the doctors of Pithoragarh hospital. There were no face to face or real time consultation at that time. The problems encountered were frequent power failure and breakdown of telephone network at Pithoragarh hampering transmission. Similar activities were performed by establishing link with Smt. Sushila Tewari Forest Hospital, Haldwani and Balrampur and Civil Hospital, located in Lucknow city in which the CT scan and other radiology films are sent by courier to be reported here and sent back. the outcome was satisfactory taking in to account all the parameters studied to judge the efficacy of Telemedicine technology i.e. image & data quality, doctor & patient satisfaction, time gap, cost-affectivity and technological performance. But the result could have been excellent if the telecommunication infrastructure would have been reliable so working in this area to take care of the problems faced in these studies were started.

- **Tele-health care for the Kailash Mansarovar Pilgrims** (Telemedicine in extremes of environment) – In August 2000, an experiment was carried out to test the technical feasibility of online transmission of patient health data such as ECG from high altitude. The project is sponsored by Kumaon Mandal Vikas Nigam and SGPGIMS. In 14 -22 August2000, SGPGIMS telemedicine team comprising of one doctor and one telemedicine engineer joined the12th batch of pilgrims who were visiting Kailash Mansarovar located in the Himalayan mountains (5029 meter from sea level at Lepulekh Pass) in the Chinese territory to perform religious rituals. At this height some pilgrims may develop high altitude sickness (loss of appetite, fatigue headache, nausea, dizziness, palpitations, sleeplessness, shortness of breath) and heart problems for which an immediate ECG is required. The team trekked along with the pilgrims up to Nabhidhang, the last camp on the Indian border. On the way they stopped at the camps located at many camps located at various altitudes. From all these camps during the Kailash-MansarovarYatra, ECG was transmitted successfully to SGPGIMS for tele-consultation through INMARSAT satellite.

Fig 6 – Tele-consultation provided from a temporary workplace created at the office a faculty member in the  Department of Endocrine Surgery to the pilgrims of Kailash Mansarovar Yatra. Prof. S.S.Agarwal,  Former Director in picture

### 3.4.3 Activities during Year 2001

**Field Application, Telemedicine awareness initiatives and Tele-education for postgraduate students of medical college,  Research and Development**

- SGPGIMS carried out telemedicine application project during the Maha Kumbh mela held from January 3$^{rd}$ to 26$^{th}$ February, 2001 at the Sangam, Allahabad to find out the benefits of telemedicine technology over and above the traditional health care delivery system. At the Maha Kumbh Mela, large congregation of people (approximately 10 million people) occurs at one time. In such a large congregation a number of infectious ailments and accidents like fracture, burn and drowning etc occur which require immediate help. In normal course temporary hospitals set up at the mela ground were the only healthcare infrastructure provided by the state government which does not have the specialist expertise to handle all kinds of medical problems. Further, public healthcare monitoring such as water quality, infective disease cases were carried out from the state headquarter at Lucknow. So a telemedicine network with 128 kbps ISDN was set up connecting five locations which included mela site field hospital, local medical college at Allahabad and SGPGIMS, public health department and Mela monitoring cell at Lucknow located 300 km away. Regular exchange of health related data and video-conferencing were carried out between these nodes. Continuous monitoring of water samples from different areas spread over several sq km helped to prevent water borne diseases and epidemic outbreaks.
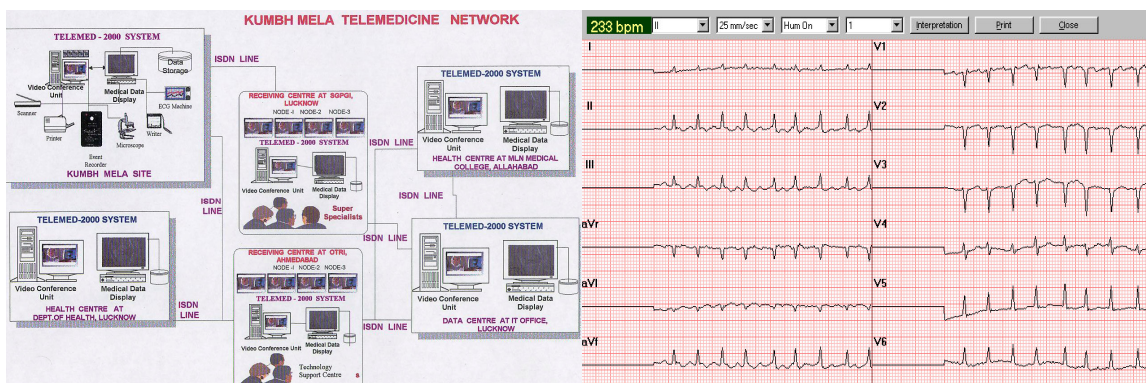
Fig7- Network Diagram and sample of ECG received during Kumbh Mela Project

- **Exhibition on telemedicine during " Health Mela " at Lucknow (Mass awareness on utilities of Telemedicine)**

  In order to develop awareness of public and health care providers on the utility of telemedicine in modern day health care, an exhibition and on line demonstration of application of telemedicine System was conducted during "Health Mela" organised by the Govt. of India in February, 2001 at Lucknow.



Fig 8: SGPGI Telemedicine Stall in Health Mela organized by Ministry of Health & FW, Govt. of India. Dr. C.P. Thakur, Hon'ble Union Minister of Health in picture

- **National Conference on Telemedicine (Awareness of health professionals, public and policy makers)**

  In order to develop awareness and gather information on telemedicine activities undergoing in the country and imparting education in the field of telemedicine, a National Conference was organised at SGPGIMS, Lucknow on 23-27 April 2001. Five international faculty delivered State of the art lectures. Around 150 delegates participated and 25 delegates presented papers. **Telemedicine Society of India was launched during this first National Conference on Telemedicine**

Fig 9 - National Conference on Telemedicine organized by SGPGIMS. Overseas Faculty in picture

- **Tele-continuing education for postgraduate medical student of SCB Medical College, Cuttack, Orissa (Tele medical education)**

 In the month of August, with due permission from Funding Agency, Telemedicine infrastructure was created at S.C.B. Medical College Hospital, Cuttack, Orissa by shifting some of the equipments used in the Kumbh mela project. Since 15th August 2001 tele-continuing medical education for postgraduate students of SCB Medical College, located 1500 km away from Lucknow, has been started through ISDN telecommunication link. Various departments were taking part in this tele-teaching programme; those are departments of Surgery, Surgical Gastroenterology, Urology, Pathology, Radiology, Paediatric Nephrology, Rheumatology, Endocrine Surgery The response from students is prompting us to continue on a long term basis. Such distance education programme for postgraduate medical students offered by a tertiary care medical center was first to happen then.



Fig 10 -  Tele-education sessions with SCB Medical College, Cuttack

- **Mobile Tele-hospital (Rural telemedicine, tele-ambulance)**

   Mobile tele-hospital project was launched in the middle of 2001 in collaboration with Online Telemedicine Research Institute, Ahmedabad. It was aimed at providing telemedicine facility in a mobile setting which can find application in emergency health care (Tele-ambulance) and rural health care (Mobile Tele-hospital). The first proto type was developed in December 2001 and was inaugurated by the Honorable Union Health Minister during Indian Science Congress held at Lucknow on $2^{nd}$ to $7^{th}$ January 2002.



Fig.11- First Prototype Model of Mobile Tele-hospital

### 3.4.4 Activities during Year 2002

**Tele-CMEs, Organizational Activity, Research    and    Development**

- **$2^{nd}$ Endocrine Telesurgery Conference (Tele-medical Education)**

   5th postgraduate course in Endocrine Surgery and 3rd International Workshop on Minimally Invasive Endocrine Surgery was held at SGPGIMS Lucknow on $18^{th}$ to $22^{nd}$ March 2002. The entire five days Proceeding of the conference starting form 8.30 am till 5.30 pm was telecasted live to SCB Medical College Cuttack, Orissa. The Programme included case discussion (seven and half hours) guest lecturers (six hours) endocrine-pathology case studies (four hours) endocrine imaging (four hours) and live Surgery (fifteen hours). 128kbps bandwidth ISDN media   was used for communication, around fifty participants took part in this teleconference at the remote location and had interactive discussion. As expected, the live surgery part was far from satisfactory due to bandwidth limitations, rest of the proceedings was received with utmost clarity of image and sound.

- **Muti-institutional Collaborative Project: Development of Telemedicine Technology and its applications towards optimization of Medical Resources :**
  This Collaborative project involving SGPGIMS, Lucknow; All India Institute of Medical Sciences (AIIMS), New Delhi; Post Graduate Institute of Medical Education and Research (PGIMER), Chandhigarh; Center for Development of Advanced Computing (C-DAC), Pune; Centre for Electronics Design and Technology of India (CEDTI), Mohali sponsored by DIT , Ministry of Communication &  Information Technology, Govt. of India was the first sponsored multi-institutional Research & Development Project to happen in the history of Indian Telemedicine . The objective of this project was to develop indigenous software for Telemedicine and its application. C-DAC and CEDTI developed software to inter phase with accessories like tele-pathlogy, tele-radiology tele-cardiology and video-conferencing and all the three premier medical institutions (SGPGIMS, AIIMS, PGIMER) tested this software in 2002. All the above institutes were linked by broad band communication network (384 Kbps ISDN) and exchange various educational and research activities utilizing this software.
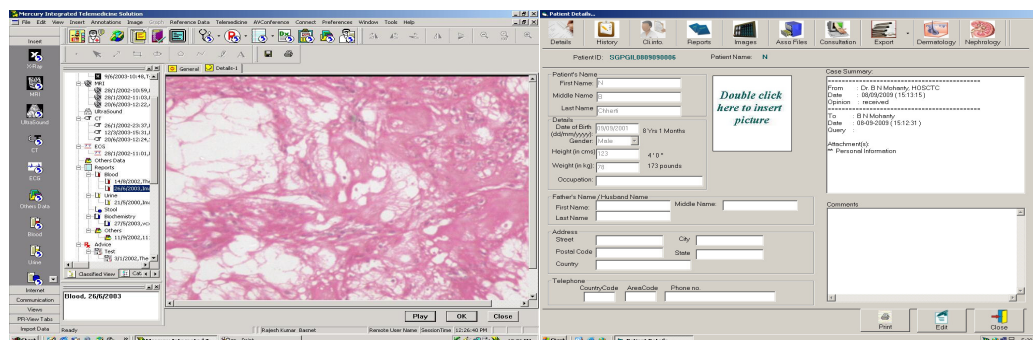


Fig 12 – Mercury and Sanjeevani Telemedicine Software developed under this Collaborative Project

- **First Annual Conference of Telemedicine Society of India**
  A three day conference was held on 22nd -24th November 2002 at SGPGIMS in which many eminent international (11) and national speakers (62) from different professions such as medicine, engineering, legal and IT participated in the conference and discussed various issues related to the science of telemedicine. The conference was attended by about 158 delegates from all over the country.

Direct telecast of two guest lecturers from National Technology University, Singapore and CNES (Centre National d'Etudes spatiales), Toulouse, France and two keynote lectures from European Institute of Telesurgery and European Institute of Telemedicine-University Hospital of Toulouse, France at higher bandwidth (384kbps) was greatly appreciated. The entire three days proceedings of the conference were telecasted live to SCB Medical College, Cuttack in Orissa at higher bandwidth (384kbps) via VSAT (Very Small Aperture Terminal). The first general body meeting of Telemedicine Society of India was held and more than 100 delegates enrolled as member of the society.
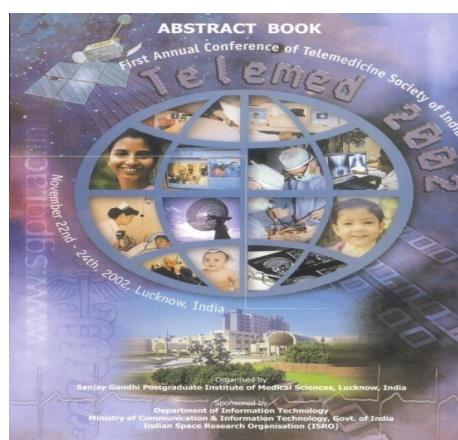


Fig 13 - First Annual Conference of Telemedicine Society of India held in SGPGI, Lucknow

### 3.4.5 Activities during Year 2003

**Tele-education and tele-healthcare**

- **Orissa Telemedicine Network through VSAT (extended C-band)**

This programme, sponsored by Indian Space Research Organisation and Govt. of Orissa, is continuing since March 2003, to support distant medical education programme. Three medical colleges of Orissa i.e. SCB Medical College, Cuttack, MKCG Medical College, Berhampur and VSS Medical College, Burla were connected to SGPGIMS via VSAT at 384 kbps bandwidth. Regular sessions of various departments held daily in schedule manner. These sessions consist of Tele-education, Tele-consultation and Tele-follow up. This distant education programme has immensely benefited the postgraduate students and doctors of these medical colleges in enhancing their knowledge and keeping them abreast with the recent advances and research in various super-specialties and treatment of their patients. The frequent Tele-follow up clinics of Rheumatology, Endocrine

Surgery and Nuclear Medicine are helping the patients from the state of Orissa who had undergone primary treatment at SGPGIMS, to a great extent by saving their time, money and efforts by avoiding a trip to Lucknow for followup.



Fig14- Tele-education and tele-healthcare activities with medical colleges of Orissa

- **National Informatics Center (NIC) Tele-CME Project for North East through VSAT(Ku-band)**

This project was conducted from July 2003 to October 2004 between SGPGIMS, Lucknow and National Informatics Centre (NIC), Delhi. The Tele-education session from this tertiary care institute was telecasted interactively with eight North Eastern states head quarters and broadcasted to 450 Community Information Centers located in the same region. Various departments participated are Endocrine Surgery, Microbiology, CVTS, Gastroenterology, Rheumatology, Gynaecology, Immunology, Neuro-ophthalmology, Anesthesiology. This programme has benefitted the doctors at the peripheral and remote hospitals to become aware of the recent advances in the management of the patients. Initially started as a monthly session, the frequency had to be increased to twice a month because of its popularity and increasing demand.
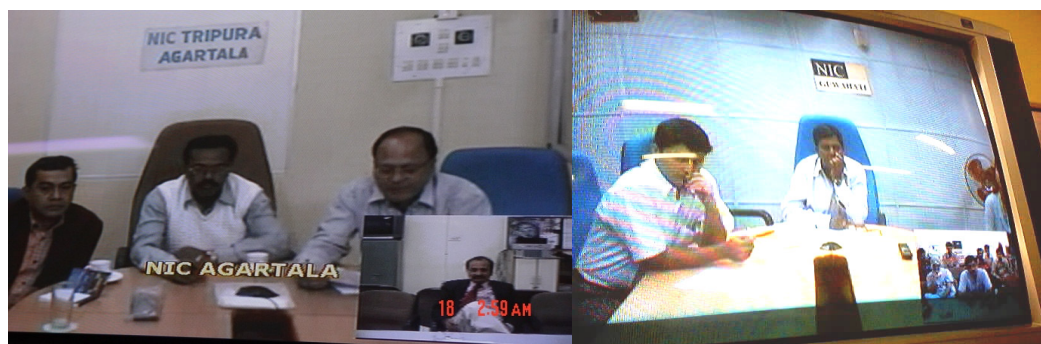


Fig15– Professional Career Development of the doctors at the periphery in Northeast region of India

- **3<sup>rd</sup> Endocrine Telesurgery Conference**

The 6<sup>th</sup> postgraduate course in Endocrine Surgery was held from 13<sup>th</sup>-17<sup>th</sup> October 2003 at SGPGIMS. The conference was attended by 5 international faculty, 39 national faculty and about 40 delegates. The entire proceedings of the conference were telecasted live to SCB Medical College, Cuttack via VSAT at 384 kbps. and some surgical procedure were transmitted to Bangalore and Chennai using higher bandwidth ( 384kbps) with interactive question answer sessions. *During the conference Orissa Telemedicine Network was formally inaugurated.*

- **Establishment of School of Telemedicine & Biomedical Informatics:**

Systemic processing of information in Medicine and in health care, for appropriate and responsible application of information technology, health and IT professionals are needed who are well educated in health informatics. Raising the scope and providing high quality of education in this emerging discipline an infrastructure needed to be created. Keeping this objective in mind SGPGIMS, Lucknow had taken up the initiative to set up this School. This project started in June 2003 with the support of Uttar Pradesh Govt. with a grant of Rs. 28.00 Crore and is getting completed in 2009. The telemedicine training had started since October 2007, but Diploma Courses could be started from 2009.



Fig 16: School of Telemedicine and Biomedical Informatics

### 3.4.6 Activities during Year 2004

**Tele-education, Tele-healthcare, Organizational activities**

- **Knowledge sharing programme with Amrita Institute of Medical Sciences (AIMS), Kochi**

This programme has started utilizing the existing infrastructure in March 2004 with the idea of sharing knowledge between the doctors of these two referral Institutions. The departments of Endocrinology, Endocrine surgery, Surgical Gastroenterology and Gastroenterology are actively participating in this programme. The doctors of both the institutions share their experiences and knowledge and discuss the complicated and interesting cases. The two day conferences of Endocrine surgery and Cardiology were directly telecasted to SGPGIMS from AIMS which immensely benefited the Postgraduate students. Conference lecture of one of the faculty members of SGPGIMS was transmitted from Lucknow to Kochi.



Fig 17- Knowledge sharing educational session with AIMS, Kochi. Prof. Kartar Singh, former Director in Picture

- **Tele-mentoring Trial -** There was one session on tele-mentored surgery carried out by the department of Endocrine Surgery. An experienced surgeon acts as a preceptor for a remote inexperienced surgeon by observing the surgeon via interactive video. As a proof of concept in March 2004 surgeons at SGPGIMS assisted surgeons in AIMS, Kochi to successfully operate a patient of primary hyperparathyroidism who had two unsuccessful operations in the past.

Tele-mentoring

512 Kbps

Video conferencing unit

Local Cable network

512 Kbps

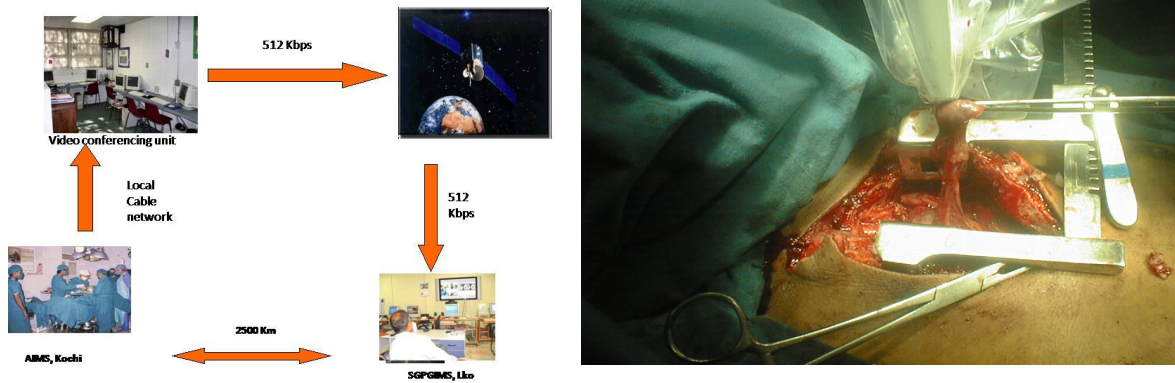2500 Km

AIMS, Kochi

SGPGIMS, Lko

Fig-18 Network diagram showing satellite connectivity & Intra-operative picture showing tumor excision

- **Uttaranchal Telemedicine Network Project**

This project has started in April 2004 with the support of Government of Uttaranchal and Online Telemedicine Research Institute, Ahmedabad to facilitate specialty consultation from SGPGIMS and distant learning for medical colleges of Uttaranchal. Based hospital Almora and Srinagar are linked to SGPGIMS through ISDN for tele-education and tele-consultation. The programme was used to maximum by Radiologists who seek opinion and consultation from the expert at SGPGIMS.



Fig 19 : Tele-education sessions with Base Hospitals at Almora & Srinagar under Uttarnchal Telemedicine Network Project

- **2<sup>nd</sup> Asia Pacific Telecommunity Telemedicine Workshop 2004 (APT-HRD Programme)**

This two day workshop was organised by SGPGIMS on $25^{th}$ –$26^{th}$ February 2004 at New Delhi. It was supported by Asia Pacific Telecommunity (APT), International Telecom Union (ITU), Tokai University Institute of Medical Sciences, Telemedicine Society of India (TSI). The conference was attended by 28 International invited faculty and 49 National delegates from different profession such as medicine, engineering, IT. The theme of the conference was Wireless Communication for Health.



Fig 20 - 2<sup>nd</sup> Asia Pacific Telecommunity Telemedicine Workshop 2004 organized in New Delhi

### 3.4.7 Activities during Year 2005

**International Collaboration for Knowledge sharing, Tele-CMEs, Regular tele-education and tele-healthcare activities**

- **International Collaboration** - In April 2005 an academic link, using 384 kbps ISDN was established with Ranguel University, Toulose, France as a monthly session in which department of Endocrinology, Endocrine Surgery and Radiology take part.



Fig

- **4<sup>th</sup> Endocrine Telesurgery Conference –** The 7<sup>th</sup> Postgraduate Course was organized by department of Endocrine Surgery, SGPGIMS on 6-10<sup>th</sup> November 2005 and attended by 2 international and 97 national faculty and delegates. The entire proceedings of this tele-CMEs were transmitted to SCB Medical College, Cuttack and AIMS, Kochi simultaneously using 3 ISDN lines of 128 kbps and VSAT (384 kbps) telecommunication link. Two video lectures from eminent professors of Endocrine Surgery Department, Ranguel University, Toulouse, France were also received using 3 ISDN lines of 128 kbps each. All the sessions were real time interactive and the quality of audio and video were satisfactory.

- **Diabetic Foot Care Tele-Workshop** – This one day workshop on Diabetic Foot Care was organized by the Department of Endocrine Surgery, SGPGIMS, Lucknow on 14<sup>th</sup> November 2005. About 100 national faculty and delegates participated in this workshop. The proceedings of the entire day were transmitted to SCB Medical College, Cuttack, AIMS, Kochi and Base Hospital Almora and Srinagar simultaneously through ISDN and VSAT telecommunication link.



Fig 22 - Live Transmission of Diabetic Foot care Workshop

- **2nd Postgraduate Clinic 'Clinical Problem Solving' in Immunology** – This one day Continuing Medical Education programme for the postgraduate students was organized by the Department of Immunology, SGPGIMS, Lucknow on 20<sup>th</sup> November 2005. The programme was attended by 20 national faculty and delegates and the students of SCB Medical College,

- **4th Endocrine Telesurgery Conference –** The 7th Postgraduate Course was organized by department of Endocrine Surgery, SGPGIMS on 6-10th November 2005 and attended by 2 international and 97 national faculty and delegates. The entire proceedings of this tele-CMEs were transmitted to SCB Medical College, Cuttack and AIMS, Kochi simultaneously using 3 ISDN lines of 128 kbps and VSAT (384 kbps) telecommunication link. Two video lectures from eminent professors of Endocrine Surgery Department, Ranguel University, Toulouse, France were also received using 3 ISDN lines of 128 kbps each. All the sessions were real time interactive and the quality of audio and video were satisfactory.

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Cuttack also participated in this programme through VSAT tele-communication link. The sessions were real time interactive.

- **Video Broadcasting of AROI conference proceedings from Gujrat Cancer & Research Institute, Ahmedabad –** The Association of Radiation Oncologists of India (AROI) organized a national conference at Gujarat Cancer and Research Institute, Ahmedabad on 1st-4th December 2005. Many leading faculties in the field of Radiation Oncology and 25 faculties from across the world participated in this conference. The proceedings of this 4 day conference were telecast through VSAT and attended by faculties and the residents of Radiotherapy Department. This was however, only one way non-interactive session.

### 3.4.8 Activities during Year-2006

**Tele-CMEs, Regular tele-education and tele-healthcare activities**

- **3rd Annual Conference of Indian Thyroid Society and International symposium on recent advances in management of thyroid disorders** - Department of Nuclear Medicine organized '3rd Annual Conference of Indian Thyroid Society and International symposium on recent advances in management of thyroid disorders' on 4-5th March 2006. about 125 National and International participated actively in this meeting. The entire proceedings of two days conference were transmitted to SCB Medical College, Cuttack, Orissa and Holy Family Hospital, Rawalpindi, Pakistan through VSAT and ISDN communication link. All the sessions were interactive.

- **XIV Surgical Gastroenterology Week (SGE Week)-** The XIVth SGE Week was organized by Department of Surgical gastroenterology from 24-26th March 2006 and the theme of the CME was " Diseases of Pancreas". A total of 77 external delegates and 13 invited faculty from various medical colleges and institutions and corporate and private sector hospitals from all over the country participated in this academic event. In addition; 29 departmental senior residents and 14 internal faculties also participated. The entire proceedings of this 21/2 days SGE week were uninterrupted transmitted to AIMS Kochi through VSAT. The faculty and delegates from AIMS, Kochi

and Lakeshore Hospital and Research Centre, Kochi presented their lectures and participate in all discussions and open house sessions. Four lectures were delivered by the faculty members from Kochi through this telelink.

- **National Informatics Centre's Tele-Referral Services for Doctors in Remote Areas of Orissa -**
  NIC had set up the communication infrastructure under GRAMSAT project of Department of Space which was being implemented by Orissa Remote Sensing Application Centre with support of Orissa Government. Using this GRAMSAT set-up, tele-referral services, in collaboration with SGPGI MS, have been launched in two remote blocks of Orissa, namely, Jeypore and Khariar. . In these programm the doctors are being given an opportunity to discuss the latest trends in diagnosis, management and treatment of prevalent disease and also bring patients to GRAMSAT centers to enable better diagnosis and patient management. These services are proposed to be extended to all the blocks in Orissa and virtual OPDs would be set up to enhance the health care facilities in these remote areas. A one day workshop on tele-referral services was also organized by NIC for the doctors of Orissa to make them aware about the advantages of this upcoming technology. This multi point conference has linked with NIC Delhi, SGPGIMS, Lucknow and 6 remote blocks of Orissa through GRAMSAT satellite link.

- **Telemedicine Network between District Hospital Raibareli and SGPGIMS Lucknow under Corporate Social Responsibility programme (CSR) programme of Gas Authority India Limited (GAIL)**
  This project has started in April 2006 under the CSR programme of GAIL in which SGPGIMS is linked with District Hospital of Raibareli with fiber optic cable network. The main objective of the project is to provide tele-health care (tele-consultation and tele-follow up) and tele-education services for the benefit of the patients and to update medical knowledge of the doctors of the Raibareli.

Fig 23 – Tele-education sessions with District Hospital, Raibareli

- **Healthcom 2006** – This three days international conference (17-19$^{th}$ August 2006) was organized by School of Telemedicine & Biomedical Informatics, SGPGIMS in New Delhi which was technically co-sponsored by IEEE Communications Society. The theme of his 8$^{th}$ International Conference on e-Health Networking, Application and Services is Mobile e-Health for Developing Countries. It had also became a forum for discussions on related topics in world bodies such as ITU, WHO and APEC. The conference has programme of 62 papers from 11 countries representing North America, Europe, Australia and Asia and was attended by about 23 international and national 70 national people from academia, research, government and industry including clinicians, hospital administrators, software developers, healthcare system developers.

- **Global Convention & Expo on Telemedicine & e-Health** – This convention was organized by the School of Telemedicine & Biomedical Informatics, SGPGIMS in New Delhi from 18$^{th}$ -22$^{nd}$ August 2006 with the aim to provide an opportunity for the global community to see the advances that have been made in the field of telemedicine and e-Health. This convention was supported by Ministry of Health and FW, DIT, Ministry of Communication & IT, Indian Space Research Organisation; Govt. of India. About 260 international and national delegates participated in this convention.

Fig-24 - Global Convention & Expo on Telemedicine & e-Health

- **2nd Diabetic Foot Care Workshop**

  The second Diabetic Foot Care workshop was organized by the Department of Endocrine Surgery, SGPGIMS, Lucknow on 24-25th November 2006. About 100 national faculty and delegates participated in this workshop. The entire proceedings of this one and half day workshop were transmitted to SCB Medical College, Cuttack via VSAT telecommunication link.

- **2nd SGPGI Breast Course**

  This one and half day workshop was organised by Department of Endocrine Surgery, SGPGIMS on 25th-26th March 2006 the lecture theatre of School of Telemedicine and Medical Bioinformatics. The objective of this course was to promote dissemination of knowledge about state of art comprehensive breast cancer care detection and diagnosis, breast conserving surgery, scentnel lymph node biopsy breast oncoplasty and reconstructive surgery. The course was attended by 4 international faculty, 23 national faculty and 12 SGPGIMS faculty and 138 delegates. The entire proceedings of two day workshop were transmitted to SCB Medical College, Cuttack. An hour video session was received from Orange, California, USA. 6 to 7 videos of 10 min durations of surgical procedure related to different aspects of breast surgery were also transmitted.

Fig 25 - 2nd SGPGI Breast Course

- **National and International Consultancy:** Telemedicine Resource Center has stated providing consultation to the governments of various states with in the country and abroad for the deployment of telemedicine network in their state and country respectively.

    a.  UP Tele-radiotherapy Network project (2006)
    b.   ITU e-Health expert for Nepal (2006)

### 3.4.8   Activities during Year 2007

**Tele-CMEs, Regular tele-education and tele-healthcare activities, Capacity Building**

**National Resource Center for Telemedicine & Biomedical Informatics -** Dept. of Information Technology, GoI sanctioned this project to develop laboratories facilities at School of Telemedicine and Biomedical Informatics to become a National Resource Center for telemedicine in India. The Center will function as inter-university research and development center besides imparting training to meet Technical manpower in the field of Health IT. (www.nrct.in)

- **UP Tele-radiotherapy Network:** This project was sanctioned by the Department of Science and Technology (DST), with a view to enhance the knowledge skills among the radiation oncologists, medical physicists and radiation technologists of the state. Also the objective laid down was for tele-consultation, assistance in radiation treatment planning and sharing of common treatment protocols within the state. The first phase of this project was launched in 2007 and presently videoconferencing with Chhatrapati Shahuji Maharaj Medical University (CSMM U) has been successfully established.

- **Development and Maintenance of e-Seminar Web Portal on "National Knowledge base on Telemedicine & e Health:** The objective of the project was creation of e Seminar web portal on National knowledge Base on Telemedicine and e Health to gather information on all aspects of telemedicine and e Health around the country. This portal (www.telemedindia.org) aims at providing updated information and knowledge on telemedicine in India and will act as single source of reference.

- **Customized Short Term Training Programme :** In October 2007, the School has started short-term, non-curriculum based training programs in a scheduled manner that included lectures on telemedicine technology, applications, management, hands-on-practice and visits to district hospital telemedicine center for practical exposure to independently handle telemedicine platform. The first batch of trainees were a five members team from Maldives for 15 days sponsored by WHO. A modified version of **Telemedicine Training Manual** was also prepared under this project.



Fig 26 – First Batch of Telemedicine Trainees from Maldives sponsored by WHO with Prof A K Mahapatra, Prof U K Misra and Prof S K Mishra (left to right) and learning of telemedicine technique

- **Preparation for starting curriculum based educational programme:**

  As per institute guidelines for starting any new academic programme, a "Board of Studies" has to be constituted as the first step and then a meeting of this statutory body needs to be convened to recommend all issue relating to the new academic programme which should be placed in the Academic Board for deliberation. Accordingly, a board of studies for the School of Telemedicine and Biomedical

Informatics has been constituted with due approval of the Director, SGPGIMS. First meeting of the Board of Studies for the School of Telemedicine and Biomedical Informatics was held on 17<sup>th</sup> July 2007.Recommendation of the board of studies was placed in the 39th Academic Board meeting of institutes held on 18<sup>th</sup> July 2007 for deliberation and advice. The 39th Academic Board approved the recommendation of the board of studies. One of the recommendations of the Board of studies is to convene a **"National Brain Storming Workshop"** to decide on Course design, Curriculum and syllabus.

- **National and International Consultancy:** Center provided consultation to the governments abroad for the deployment of telemedicine network in their state and country respectively.

  a. WHO e-Health expert for Maldives (2007)

  b. WHO e-Health expert for DPR Korea (November, 2007)

  - **Overseas Collaboration:** The center is in the midst of discussion with overseas academic and research organization for long term collaboration in different academic matters. A delegation of seven students from Claremont Graduate University, Southern California under the guidance of Prof. Samir Chatterjee as the chief of delegation is visiting the center from 5th to 8th August on Summer Study Tour for gaining firsthand experience on healthcare IT practices are visiting the center.

### 3.4.9  Activities during Year 2008

**Tele-CMEs, Regular tele-education and tele-healthcare activities, Capacity Building, Organizational Activity**

- **Constitution of National Advisory Council:**

  As per the recommendation of the Academic Board of the Institute, a National Advisory Committee was constituted to advice on various academic matters and policy issues related to the functioning of this newly created academic wing. The first meeting of the National Advisory Council was held on 12<sup>th</sup> July 2008 under the chairmanship of Prof. SG Dhande, Director, IIT Kanpur at the School of Telemedicine & Biomedical Informatics. The committee recommeneded, the School has the adequate infrastructure to start short & long term courses.

Fig 27– First Meeting of National Advisory Council

- **Constitution of National Committee on development of Course and Curriculum   Framework:**

  The first meeting was held on 8th September 2008under the chairmanship of  Prof A K Majumdar,  Director, IIT Kharagpur at the School of Telemedicine & Biomedical Informatics. The committee recommended   three types of Telemedicine programme viz Short term, Mid term and Long term.


- **Capacity Building - Short Term Training Program :** The Following delegates received short term telemedicine training program in 2008.

| S.No. | Programme Title | Duration | No   of trainee | Sponso red |
|---|---|---|---|---|
| 1 | Delegation of Governments of Madhya Pradesh | 11th      -15th Feb'08 | 30 | Govt.  of M.P. |
| 2 | Delegation of Governments of Uttar Pradesh | 11th – 16th Feb'08 | 15 | Govt.  of U.P. |
| 3 | Delegation of Government of Maharashtra | 17th-22nd Nov'08 | 24 | Govt.  of Maharas htra |
| 4 | Delegation of Government of Jammu & Kashmir | 21-26th Dec,08 | 25 | Govt.  of J & K |

Fig 28: Telemedicine trainees from the states of Madhya Pradesh, Uttar Pradesh, Maharashtra and Jammu & Kashmir

- Creation and Maintenance of medical educational portal www.telemedindia.org, www.nrct.in,www.stbmi.ac.in,www.sgpgi-telemedicine.org.

- **South Asian Association for Regional Cooperation (SAARC Telemedicine Network Project):** This project was initiated by Ministry of External Affairs, Govt. of India with objective of connecting one/two hospitals in each of the SAARC countries with the super specialty hospitals that include All India Institute of medical Science (AIIMS), New Delhi; SGPGIMS, Lucknow; Post Graduate Institute of Medical Research and Education (PGIMER), Chandigarh and CARE Hospital, Hyderabad of India. Jigme Dorji Wangchuck National Referral Hospital, Thimphu, Bhutan has been connected to SGPGIMS, Lucknow under this project which was inaugurated in October 2008.



Fig 29: Inauguration of SAARC Telemedicine Network Project

- **Integrated Disease Surveillance (IDSP) Project:** IDSP launched by Ministry of Health and Family Welfare, Govt. of India in November 2004 is a decentralized, State based Surveillance Program to detect early warning signals of impending outbreaks and help initiate an effective response in a timely manner. The project was implemented at the Center in 2008.

- **Organizational Activity:** The Center had organized two national and international events - Regional Workshop on Uttar Pradesh Medical College Telemedicine Network in September 2008 and United Nations / India Regional Workshop on using Space Technology for Tele-epidemiology to benefit Asia and the Pacific region in October 2008.



Fig-30 : Organization of Regional Workshop on Uttar Pradesh Medical College Telemedicine Network & United Nations / India Regional Workshop on using Space Technology for Tele-epidemiology

- **National and International Consultancy:** In this year the Center provided consultation is summarized below
  - Government of Orissa, Jammu and Kashmir to make State Resource Center - 2008
  - WHO e-Health expert for DPR Korea - November'2007, September – 2008
  - National Institute of Tuberculosis Diseases and Repository, New Delhi - October 2008
  - Satcom Based Low cost Mobile Tele-epidemiology Unit (UNOOSA/ ISRO) – October 2008
  - Capacity Building in the field of telemedicine and e-Health (UNOOSA/ ISRO) – October 2008
  - Orissa Trust of Technical Education and Training with the collaboration of Orissa State Government – December -2008

- **Overseas Collaboration:** The Center is also involved in e-Health for Healthcare Delivery (eHCD) which is an International Collaborative Research project sponsored by WHO under Prof Pradeep Kumar Ray from University of New South Wales, Australia for collection of quantitative, qualitative and user acceptance evaluation data from India, China, Vietnam and Philippines.

### 3.4.10 Activities during Year 2009

**Tele-CMEs, Regular tele-education and tele-         healthcare activities, Capacity Building:**

- **Starting of curriculum based diploma courses:**

The Board of Studies reconstituted and approved by the director of SGPGIMS, was held under the chairmanship of Dean SGPGIMS on 1st May 2009. The course structure and curriculum for the one year Advance Diploma course in five disciplines from July 2009 session was proposed and approved by the committee. The recommendation of the Board of Studies were approved by the 42 Academic Board held on 2nd May 2009. The advertisement for the diploma courses were published on 3rd of July in all the national and regional newspapers (both Hindi and English). The National Level Entrance Test (MCQ type) was conducted on 25th July 2009 . Twenty three candidates were appeared in the test and 14 candidates qualified the exam. Six candidates applied for sponsorship, out of these two candidates were found eligible. Eleven candidates were offered for admission (Telemedicine – 6, HIMS – 2, Nursing Informatics – 1, Public Health Informatics – 1 & Digital Medical Library – 1). Three candidates were kept in the Waiting List in the Telemedicine stream. Reservation was followed as per U.P. Govt. rules. Ten candidates (Telemedicine – 6, HIMS – 2 and Sponsored candidate -2) took admission and the classes started from 1st September 2009. There are eight male and two female candidates. Three qualified candidates from one each from Nursing Informatics Public Health Informatics and Digital Medical Library respectively did not join the course.
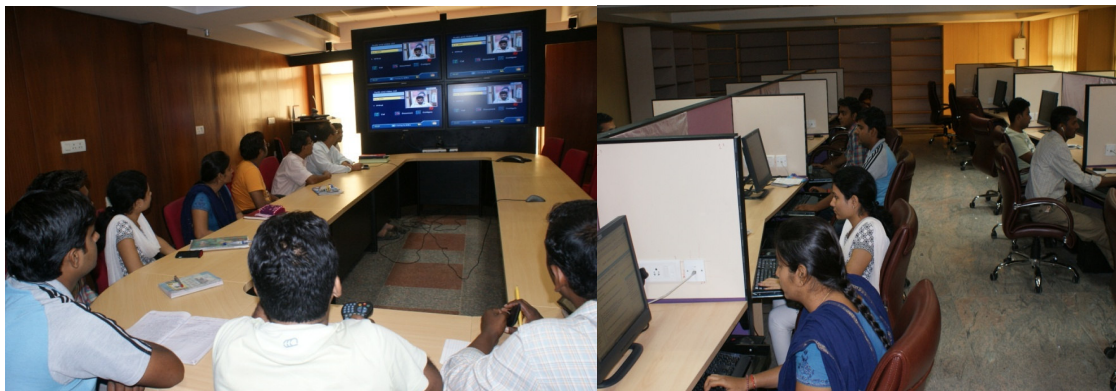
Fig 30 - Students of Curriculum based Diploma Courses

- **Short Term Training Program: :** The Following delegates received short term telemedicine training program in 2008.

| S.No. | Programme Title | Duration | No of trainee | Sponsored |
|---|---|---|---|---|
| 1 | Telemedicine Training for Delegation from AIIMS, New Delhi | 12-17 Jan'09 | 2 | |
| 2 | Summer Training Program | 16 Jun- 15 Jul' 09 | 4 | |
| 3 | Institute Rotary Cancer Hospital (IRCH), AIIMS, New Delhi | 14-15 August 2009 | 1 | |
| 4 | Telemedicine Training for Delegation from DPR Korea | 6September - 16 October 2009 | 2 | WHO |



Fig 31- Telemedicine Trainees from DPR Korea sponsored by WHO

- Portal was created for SAARC Telemedicine Forum, a virtual platform to foster collaboration between telemedicine stake holders( www.saarctf.org). The school took the responsibility to maintain the portal of Telemedicine Society of India (www.tsi.org.in)
- **National and International Consultancy:** In 2009, the School has provided consultation for the design and deployment of Telemedicine Program at national and international level.

National

i. Govt. of U.P to implement UP State wide Telemedicine Grid
ii. Govt. of Orissa for expansion of Orissa Telemedicine Network to connect remaining 23 District Hospitals of the State
iii. OTTET Institute, Bhubaneswar with collaboration of Govt. of Orissa
iv. Govt. of Uttarakhand for the expansion of Uttarankand Telemedicine Network
v. LRS Institute, New Delhi

International – 3

i. WHO Consultant for e-Health in Maldives
ii. WHO e-Health expert for DPR Korea
iii. Ministry of Health, Govt. of Bhutan

- **Overseas Collaboration:**

Visit of Mr Kochi Sampei, General Manager, Avid –Japan and member of Japan Telemedicine Association to the School of Telemedicine and Biomedical Informatics, Lucknow from 3-9 August 2009 to work on his research theme titled "Telemedicine adoption in developing country". The purpose of his visit was to study one of the most advanced telemedicine center and study facilities in India, and doing the basic survey how people, who are in charge for telemedicine consider/ think the benefit of telemedicine from the point of view in each position.

Fig.32 - Visit of Mr Kochi Sampei from Japan

- **Organizational Activity:** The Center provided assistance to Government of Bhutan in organization of workshop on Applications of Tele-health to Service Delivery in Public Health and Environment at Thimphu, Bhutan on 27-30 July 2009. The workshop was jointly organized with Royal Government Bhutan and sponsored by UNOOSA.



Fig.33 - Workshop on Applications of Tele-health to Service Delivery in Public Health and Environment at Thimphu, Bhutan

### 3.5 Present Telemedicine activities

Various activities carried out in this center are – Distance Medical Education, Tele-health Care, Participation and Organization of National and International Telemedicine conferences, Creating Public Awareness, Research & Development related to telemedicine. Encouraged with the activities and realizing the impact of the telemedicine program, the Government of UP took a visionary step in this direction and decided to set up a School of Telemedicine in SGPGIMS campus in 2003 for capacity building in this upcoming field.

### 3.5.1 Tele-education:

In September 2001, SGPGIMS initiated its distance education programme for the post-graduate students of SCB, Medical College, Orissa state. This was the first distance education programme for postgraduate medical students offered by a tertiary care medical centre in India. Various modules of tele-education are practiced to educate and share knowledge using telemedicine aiming at patient care and skill development of remote care physicians. The various distance medical education modules adopted are tele-education, tele-CME, tele-conference, tele-consultation, surgical treatment planning, tele-pathology, tele-radiology, tele-follow up and tele-mentoring, lectures, case discussions etc.

### 3.5.1.1 Tele-education of postgraduate students of medical colleges

From September 2001 to March 2002, SGPGIMS conducted its distance medical education programme for the post-graduate students of SCB, Medical College, Orissa state, eastern part of India, linking through ISDN. This project was funded by the Department of Information Technology (DIT) Ministry of Communication and Information Technology, Government of India. Faculties of various departments took part in it. Encouraged with the outcome of this pilot project based on the feed back from the users, in March 2003, SGPGIMS again revived and extended this programme to two other medical colleges i.e. VSS Medical College, Burla and MKCG Medical College, Berhampur of this state. The project was sponsored by Indian Space Research Organization (ISRO) which also provided communication link for this point to point connectivity with DAMA- V SAT of 384 kbps bandwidth. The Department of Radiotherapy of SGPGIMS which is also a Regional Cancer Center is also linked with Chhatarpati Shahuji Maharaj Medical University, Lucknow sponsored by DST to perform similar activity.

### 3.5.1.2 Tele-education of district hospital doctors:

With an aim to develop and improve the professional career and consultation skill of the rural and remote doctors, SGPGIMS used telemedicine technology in various projects. In these programs, the specialties and topics chosen for these programs were based on the needs and demands of the users at the remote end which they thought would be helpful in their day-to-day clinical work.

Between 2004 -2007 we carried out a telemedicine project with support of Government of Uttaranchal state to facilitate specialty consultation and distant learning for the doctors

and paramedical professionals of two district hospitals of Uttaranchal . Base Hospitals Almora and Srinagar in the remote hilly areas were linked to SGPGIMS through ISDN media. In April 2006 under the Corporate Social Responsibility (CSR) program of Gas Authority of India Limited (GAIL), a telemedicine project was started linking SGPGIMS with District Hospital of Raibareli, located at a distance of 80 km, with fiber optic cable network. The main objective of the project is to provide tele-health care  and tele-education services.

**3.5.1.3 Tele-education for Paramedical Professionals***:* In November 2004, two new modules targeting on paramedical professionals such as nursing skill development and hospital administration were taken up in distance education mode for two district hospitals under Uttaranchal Telemedicine Project. Later on this module is adopted for the paramedical professionals of medical colleges of Orissa and District Hospital, Raibarel and extended to lab technicians, dieticians and physiotherapists.



Fig 34 – Tele-education sessions for paramedical workers

**3.5.1.4  Knowledge Sharing with Peer Institutions**
Sometimes the specialists also need to discuss or share their knowledge with the specialists of other centers of the same level. For this purpose SGPGIMS telemedicine center established contact with other reputed national and international institutions. In this program, the doctors of both the institutions share their experiences and knowledge and discuss the complicated and interesting cases.  This Knowledge Sharing programs were subsequently introduced for Amrita Institute of Medical Sciences, Kochi in March 2004    multipoint connectivity with AIIMS, New Delhi and PGIMER, Chandigarh (October 2005) CMC, Vellore (September 2006), SRMC, Chennai (April 2008),

internationally Ranguil University, Toulouse, France (April 2005) Oregon Health and Science University, Portland, USA (November 2007).

### 3.5.1.5 Tele-CMEs

From time to time various departments of SGPGIMS organizes Continuing Medical Education (CME) programs to update knowledge   The entire proceedings of these CMEs were also transmitted to the networked medical colleges or institutions. On an average 15-20 faculties and medical students participated at the remote locations. The video lectures of eminent persons of international fame received at SGPGIMS from abroad were also transmitted to these network partners during these Tele-CMEs. So far we have conducted 40 Tele-CME programmes

• In Year 2007 SGPGIMS started receiving weekly sessions of Clinico-Pathology Conference (CPC) held at PGIMER, Chandigarh. Similarly Clinical Grand Round (CGR), a weekly program conducted by the various department of SGPGIMS is being transmitted to Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak (2007), Jigme Dorji Wangchuck National Referral Hospital (JDWNRH), Thimphu, Bhutan, Railway Hospital, Izzat Nagar, Bareli and Indira Gandhi Medical College, Shimla  (2009).

**3.5.1.6 SARRC Telemedicine Network Project***: This project was sponsored by Ministry of External Affairs, Govt. of India under which one to the hospital of the countries in the SAARC region would be linked to the premier institutions of India. In the first phase,  Jigme Dorji Wangchuck National Referral Hospital (JDWNRH), Thimphu, Bhutan inaugurated on 16 April'09 and Indira Gandhi Child Hospital, Kabul, Afghanistan inaugurated on 17 August'09 got networked to SGPGIMS and academic activities are started with both them.

*A total No. of 1732 tele-education sessions are held till October 2009.*



Fig 35 - Transmission of CGR from JDWNRH, Thimphu, Bhutan SGPGIMS to and weekly educational activity with IGC Hospital, Kabul, Afghanistan

### 3.6 Tele-healthcare

Over the years the following modules have been standardized and been integrated into routine practice.

### 3.6.1 Tele-consultation

In September 2000 the first experiment was carried out using store and forward technology on Public Switched Telephone Network (PSTN) to exchange electrocardiogram (ECG) between District Hospital, Pithoragarh, Uttaranchal and SGPGIMS, Lucknow, Uttar Pradesh located 275 km apart. The exchange of video clippings of 30 patients, ultrasound and radiographic images, typed and hand written notes and audio clippings provided images of satisfactory quality. Later in the same year similar experiment was carried out with Balrampur and Civil Hospitals located in Lucknow city. In August 2001, SGPGIMS initiated a project by linking one of the medical colleges of Orissa – SCB Medical College, Cuttack situated 1500 km away from Lucknow, through 128 kbps ISDN, to study the impact of telemedicine technology in providing remote super-specialist medical consultation to physicians. To evaluate the success of this program an audit was carried out in March 2002, at the end of seven months from the beginning of the Telemedicine sessions. Based on the successful outcome of this experiment and the interest shown by the Orissa government, the network was extended to the remaining two government medical colleges in the state: the VSS Medical College, Burla and MKCG Medical College, Berhampur. SGPGIMS designed and implemented another statewide telemedicine network project for the state of Uttaranchal in April 2004. In the first phase, doctors of two district hospitals at Almora and Srinagar have been receiving tele-consultation. The Second phase of network is under process with two new nodes. Similar activity performed with District Hospital Raibareli under SGPGI-Raibareli Telemedicine Network Project.

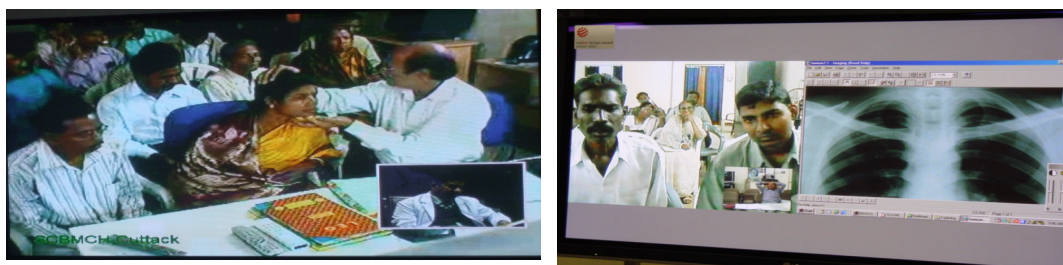*So far we have provided tele-consultation to 1385 patients till October 2009.*



Fig 36 – Tele-consultation sessions with SCB Medical College, Cuttack, Orissa

### 3.6.2 Tele-follow up

Tele-follow-up clinics in the Departments of Rheumatology, Endocrine Surgery & nuclear medicine were established in 2004 for the patients of Orissa. Some of the patients who received primary treatment at SGPGIMS need not come to Lucknow for their follow-up. So far till August 2009, 562 patients of department of Endocrine Surgery, Rheumatology and Nuclear Medicine received tele-follow up through our center.



Fig 37 – Tele-follow up session with patients of Orissa state

### 3.6.3 Pre-referral Screening

Doctors of SCB Medical College, Orissa who refer patients to SGPGIMS, discuss the patients with the consultants of SGPGIMS before referring the patients to SGPGIMS. Department of Endocrine Surgery has started this activity from October 2004, *so far 22 patients have availed this service.*

### 3.6.4  Treatment Planning

Thyroid cancer Patients from Orissa state who have been operated there and need radio-iodine scan and therapy are discussed with Nuclear Physicians at SGPGI to plan post-operative adjuvant therapy. Schedule of appointment is fixed depending on the availability of isotope. Also, such patients from Orissa who have been operated here also schedule their appointment for adjuvant therapy. This programme started in April 2004, till August 2009*, 113 patients* have been benefited from this programme.

### 3.7 Research and Development

- SAARC Telemedicine Network Project: Funded by Ministry of External Affairs, Govt. of India (Rs. 28,58,323 excluding bandwidth) –In addition to JDWNRH,

Thimpu, Bhutan, a new node at Indira Gandhi Children's Hospital, Kabul, Afghanistan was added to the network on 1st September 2009.

- Creation and Maintenance of Web portal www.telemedindia.org, www.nrct.in, www.stbmi.ac.in, www.sgpgi-telemedicine.org, http://biomedinfo.sgpgi.ac.in, www.tsi.org.in,

- A new portal was created for SAARC Telemedicine Forum, a virtual platform to foster collaboration between telemedicine stake holders( www.saarctf.org). The school took the responsibility to maintain the portal of Telemedicine Society of India (www.tsi.org.in)

- Development of low cost portable Telemedicine Unit – Prototype Completed

- Tele- ophthalmology Project ( Rs. 28.00 lacs, Funding Agency: MOH&FW, Govt. of India under NBCP) – Under Implementation

- Satcom Based Low cost Mobile Tele-epidemiology Unit (UNOOSA/ ISRO) – To learn this technology PI had visited Verona, Italy on 6-10 th September 2009 to take part in the workshop on the said theme sponsored by UNOOSA held in the side line of 5th European Conference of Tropical Medicine & International Health. Also, one of the Project Technical Staff participated in the 3rd International Conference on Health GIS held in July 2209 at Hyderabad.

- Capacity Building in the field of telemedicine and e-Health (UNOOSA/ ISRO) – Workshop on Applications of Tele-health to Service Delivery in Public Health and Environment - jointly organized with Royal Government Bhutan supported by UNOOSA from27-30 July2009 at Thimphu, Bhutan

- UP State Wide Telemedicine Grid - Under implementation

- Intra-hospital Telemedicine GRID - Implementation phase

- Design & development of Mobile Telemedicine for rural emergency transportation system

- Design & development of Tele-oncology Unit – Equipments are procured and vehicle awaited

- Design and development of Portable Low Cost mHealth Units ( Back pack & Suitcase) – Prototype completed & in process to trade mark registration

- Telemedicine enabled Specialty Healthcare access for health emergencies during Lord Jagannath Rath Yatra at Puri – A proof of Concept Study Project-Completed

## 3.8 Capacity Building:

Since October 2007 the school has conducted two short-term training programs that included lectures on telemedicine technology, applications, management, hands-on-practice and visits to district hospital telemedicine center for practical training in a scheduled manner. A structured teaching and training program is being developed in Health ICT (diploma, degree, masters, Ph.D. & post-doctoral courses) to train manpower, considering the present and future needs in healthcare delivery organizations and Medical IT research and development organizations. Curriculum based diploma courses has already started.

## 3.9 Organizational Activities:

In order to create awareness among the stake holders and public about the benefits and advantages of telemedicine in the modern healthcare delivery, the Center is involved in organizing workshops and conferences at the national and international level.

## 3.10 National and International Consultation and Policy initiatives:

The Center is providing consultation to Government of India, State Governments, and government of other countries and medical institutions on deployment and implementation of telemedicine program. It also participated in the policy initiative meetings on telemedicine of various national and international agencies.



Fig – 38:    Participation in International Policy Initiative meeting : ITU sponsored meeting

### 3.11    Participation in Policy Initiatives, National and International   assignments

1.  Design, configuration and implementation of Orissa Telemedicine Network Project: 2001 - ongoing

2.  Design, configuration and implementation of Uttaranchal Telemedicine Network Project: 2003-ongoing

3.  National Task Force on Telemedicine, Govt. of India: 2005 - continuing

4.  WHO meeting on Research methodology on evaluation of electronic health delivery system in developing countries, Schenzen, China - 24-28 June 2006

5.  Telemedicine in the Reconstruction of Afghanistan through Telemedicine Technology under India/ USA/ UNOOSA (United Nations Office for Open space Affairs), Expert Meeting - Amritha Institute of Medical Sciences, Kochi, India Vienna - 29-31 August 2006

6.  ITU e-health expert for Nepal - September 2006

7.  Invited Speaker as e-health expert in the 6th APT workshop hosted by Asia Pacific Telecommunity (APT), Bangkok - February 2007

8.  WHO Consultant for e-Health in Maldives  - May 2007

9.  Invited Speaker as e-health expert in the Expert Group Meeting on "Regional trends in health services and their impacts on health system performance in the Asia and Pacific region" organized by UNESCAP at Bangkok on 9-11, September 2007

10. WHO Consultant for e-Health in DPR Korea – November 2007

11. Invitees in " eHealth Summer Series Planning" A Rockefeller Foundation Event, Bellagio Center Bellagio, Italy, 14-17 April 2008

12. Invited Resource person for the contribution on mHealth & Mobile Telemedicine theme in the "Making the eHealth connection" by Rockefeller Foundation at Bellagio, Italy - July-Aug. 2008

13. WHO Consultant for e-Health in DPR Korea - September, 2008

14. Design and Development of Orissa Rural Telemedicine Network on PPP Model by Orissa State Government – 14 December 2008

**4.0 Research Publications:**

1. Mahapatra Ashok Kumar, Mishra Saroj Kanta, Kapoor Lily, Singh Indra Pratap, "Critical Issues in Medical Education and the Implications for Telemedicine Techology". Journal of Telemedicine & eHealth, VOL. 15, No. 6, P 592-596, August 2009

2. Mishra Saroj Kanta, Kapoor Lily, Singh Indra Pratap, "Telemedicine in India: Current Scenario and the Future" Journal of Telemedicine & eHealth, VOL. 15, No. 6, P 568-575, August 2009

3. Anjali Mishra , Lily Kapoor, Saroj Kanta Mishra, "Post-operative care through tele-follow up visits in patients undergoing thyroidectomy and parathyroidectomy in a resource-constrained environment", J Telemed Telecare;15:73-76, 2009

4. Singh Indra Pratap, Kapoor Lily, Chand Repu Daman, Mishra SK, "Comparative Study of Connectivity in Telemedicine". Journal of Telemedicine & eHealth, VOL. 14 No. 8, P 846-850, October 2008

5. Singh Indra Pratap, Chand Repu Daman, Mishra SK, "Comparative Technical evaluation of Various Communication Media used for Tele-medical Videoconference". Proceeding: 10th IEEE International Conference on e-Health Networking, Applications & Services, Healthcom2008, ISBN: 978-1-4244-2281-4 © 2008 IEEE, P3, Biopolis, Singapore, 7th-9th July 2008

6. Mahapatra AK, Kapoor Lily, Kumar Shaleen, Agarwal Sushma, Pradhan PK, Mishra Anjali, Mishra SK. " Telemedicine Technology in Cancer Care – Developing Country Perspective". Proceeding: 10th IEEE International Conference on e-Health Networking, Applications & Services, Healthcom2008, ISBN: 978-1-4244-2281-4 © 2008 IEEE, Biopolis, Singapore, 7th-9th July 2008

7. Kapoor Lily, Chand Repu Daman, Singh Indra Pratap, Mishra SK, " E-Learning Technology in Healthcare – Indian Case Study". Proceeding: 10th IEEE International Conference on e-Health Networking, Applications & Services, Healthcom2008, ISBN: 978-1-4244-2281-4 © 2008 IEEE, Biopolis, Singapore, 7th-9th July 2008

8.  Mahaparta AK, Kapoor Lily, Singh Indra Pratap, Chand Repu Daman, Mishra SK. "Capacity Building in e-Health in a Developing Country - Indian Initiatives". Journal of eHealth Technology and Application; Vol. 6 (1):61-62, July 2008

9.  Mishra SK. "e-Health India Country Report". Journal of eHealth Technology and Application; Vol.6 (1):55-60, July 2008

10. Mishra SK, Gupta Deepak, Kaur Jagdish, "Telemedicine in India : Initiatives and Vision": Proceeding: 9th International Conference on e-Health Networking, Application & Services, Healthcom2007, ISBN: 1-4244-0942-X © 2007 IEEE, P81-83, Taipei, Taiwan, 19th-22nd June 2007

11. Mahapatra AK,  Mishra S K, "National Resource Center for Telemedicine and Biomedical Informatics": Proceeding: 9th International Conference on e-Health Networking, Application & Services, Healthcom2007, ISBN: 1-4244-0942-X © 2007 IEEE, Taipei, Taiwan, 19th-22nd June 2007

12. Kapoor Lily, Basnet Rajesh, Chand Repu Daman, Singh Sandeep, Mishra SK, "An Audit of Problems in Implementation of Telemedicine Programme", Proceeding: 9th International Conference on e-Health Networking, Application & Services, Healthcom2007, ISBN: 1-4244-0942-X © 2007 IEEE, P87-89, Taipei, Taiwan,  19th-22nd June 2007

13. Archna Gupta, "Teleradiology - Building bridges of knowledge" : Proceeding:9th International Conference on e-Health Networking, Application & Services, Healthcom2007, ISBN: 1-4244-0942-X © 2007 IEEE, P260, Taipei, Taiwan, 19th-22nd June 2007

14. Pradeep PV, Mishra Anjali, Kapoor Lily, Daman Repu, Mishra SK, "Application of Tele-health technology in Endocrine Surgery: Indian Experience",  Proceeding : International Association of Science and Technology for Development (IASTED), ISBN:987-0-88986-667-6, P13-16, Montreal, Quebec, Canada, 31st May-1st June, 2007

15. Mahapatra AK, Mishra SK, "Bridging the Knowledge and Skill Gap in Healthcare: SGPGIMS, Lucknow, India Initiatives" Journal of eHealth Technology and Application; 5(2):67-69, June 2007

17. Kapoor Lily, Basnet Rajesh, Chand Repu Daman, Singh Sandeep, Pradhan Varad, Joshi Pankaj, Semwal Maneesh, Durgapal, Negi KS, Shah Ragesh, Mishra SK, "Analysis of Telemedicine Project deployed in Sub-Himalayan Region in the Indian state of Uttaranchal". Journal of eHealth Technology and Application; 5(2):169-73, June 2007

18. Pradeep PV, Mishra A, Mohanty BN, Mohapatra KC, Agarwal G, Mishra SK, "Reinforcement of Endocrine Surgery Training: Impact of Telemedicine Technology in a Developing Country Context", World J Surg , DOI 10.1007/s00268-007-9108-1, 2007

19. Kapoor L, Basnet R, Pradeep PV, Mishra A, Mishra SK. Integrating Telemedicine in Surgical Applications, CSI Communications; 30(11): 17-20, February 2007

20. Kapoor L, Mishra SK, Singh K, "Telemedicine: experience at SGPGIMS, Lucknow. J Postgrad Med.;51 (4):312-5, December 2005

21. Misra UK, Kalita J, Mishra SK, Yadav RK. Telemedicine in neurology: underutilized potential. Neurol India;53(1):27-31, March 2005

22. Mishra SK, Ayyagari A, Bhandari M, Bedi BS, Shah R. Telemedicine Application in Maha Kumbhmela (Indian Festival) with Large Congregation. Telemed J E Health; 10: S107-08, 2004

23. Singh K, Mishra SK, Misra R, Gujral RB, Gupta RK, Misra UK, Ayyagari A, Basnet R, Mohanty BN. Strengthening Postgraduate Medical Education in Peripheral Medical Colleges through Telemedicine. Telemed J E Health;10:S 55-56, 2004

24. Misra UK, Kalita J, Mishra SK, Yadav RK. Telemedicine for distance education in Neurology – Preliminary experience in India. J Telemed Telecare ;10(6):363-5, 2004

25. Ayyagari A, Bhargava A, Agarwal R, Mishra SK, Mishra AK, Das SR, Shah R, Singh SK, Pandey A. Use of telemedicine in evading cholera outbreak in Mahakumbh Mela, Prayag, UP, India: an encouraging experience. Telemed J E Health;9(1):89-94, 2003

26. Kapoor VK. Should telemedicine be integrated into the existing health care delivery systems in India?Natl Med J India.;14(6):371-2., Nov-Dec 2001

Case report

1. Pradeep PV, Mishra SK, Vaidyanathan S, Nair CG, Ramalingam K, Basnet R. Telementoring in endocrine surgery: preliminary Indian experience. Telemed J E Health 2006; 12(1): 73-7.

Book Chapters

1. Tele-mentoring in India: Experience with Endocrine Surgery; Saroj K Mishra, Puthen V Pradeep, Anjali Mishra, Chapter 11, Telehealth in the Developing World, ISBN 978-1-85315-784-4, P109-118, 2008

2. Teleneurology: Past, Present and Future; Usha K Misra, Jayantee Kalita, Chapter 24, Telehealth in the Developing World, ISBN 978-1-85315-784-4, P252-261, 2008

3. Telemedicine in Developing World: Experience at SGPGIMS, Lucknow -a tertiary care academic medical center, Kapoor Lily, Chand Repu Daman, Singh Indra Pratap, Mishra S K: Chapter 13, Telemedicine concepts & applications Book , The ICFAI University Press, ISBN 978-81-314-2089-8, P 151-160, 2008

4. Telementoring in Endocrine Surgery, Mishra SK, Mishra A, Pradeep PV; Chapter 11,Telesurgery Book, Edited by Kumar S/ Marescaux J Springer-Verlag GmbH, Heidelberg/Germany. ISBN no. 978-3-540-72998-3, 2007

5. E health – India Case Report, S K Mishra; "Making better access to healthcare services" published by International Telecommunication Union, Geneva , ISBN 4-87739-120-7, P. 164-80, October 2005

6. Application of Telemedicine in Surgery, S.K. Mishra in "Telemedicine Manual" published by Indian Space Research Organization, Bangalore, First Edition, P 83-90, 2005

**5.0 Invited Lectures:**

1. Satcom based Distance Education in Medicine – Technological concepts, ISRO Telemedicine Users Meet, Bangalore, 21 April 2003

2. Telemedicine Usage Experience at SGPGI, Lucknow - ISRO Telemedicine Users Meet, Ahmedabad, 20-21 November 2003

3. Dr Phanidhar Memorial Oration on Telemedicine- Technique and Application at RAPICON, Gorakhpur, 20-21 September 2003

4. SGPGI Experience in Telemedicine, ISRO Telemedicine Users Meet, Imphal, February 2004

5. Telemedicine at SGPGI, Lucknow: Current Programmes and Future Perspective at Indian Institute of Technology, IIT Delhi, March 2004

6. Capacity Building, R & D, Quality Assurance in Health-IT Sector and Health IT Initiatives at SGPGI", Workshop on Bio Tech Park, Lucknow, 8 April 2004

7. SGPGI's experience with Telemedicine and various concept models for Rural health care delivery through ICT - Workshop on ICT, Delhi, 2 June 2004

8. Telemedicine and Tele-pathology - 3rd CME in Pathology, PGIMER, Chandigarh, 3 October 2004

9. Current Applications of Telemedicine Technology - International Conference on Human Machine Interfaces – 2004, Bangalore, 20-23December 2004

10. Telemedicine: SGPGIMS Experience - Conference on Quality Healthcare in Changing Environment: Opportunities & Challenges organized by Seth G S Medical College & KEM Hospital, Municipal Corporation of Greater Mumbai in Collaboration with Nuffield International Health and Development Group, University of Leeds, UK, 4 - 6 Feb 2005

11. Applications of Telemedicine Technology – ELITEX organized by Dept. of IT, Govt. of India , New Delhi -26 April 2005

12. Health Care Informatics & Telemedicine Practiced at SGPGIMS - Army Hospital, New Delhi, 8 May 2005

13. Telemedicine in India-Current Scenario - Gangaram Hospital, New Delhi-29 June 2005

14. Outcome of case study (project completed) on Field Telemedicine Application in Indian Setting, Rapporteur's Group Meeting, Tokyo, Japan, 20-21 June 2005

15. Telemedicine Application in Surgery : Indian Experience and Update on Telemedicine Activities in India**,** Rapporteur's Group Meeting, Tokyo, Japan, 22 June 2005

16. Telemedicine application in surgery and CME; ISRO Telemedicine Workshop for Rajasthan, Jaipur, 14 February 2006

17. Practical Guidelines and Design Implementation and Evaluation Telemedicine projects with case studies, ISRO User's Meet, ISRO, Ahmedabad, 3–4 May 2007

18. Current Telemedicine Infrastructure, Network, Applications in India, ITU Rapporteur's Meeting, Okinawa, Japan, 17-18 June 2007

19. Invited Speaker's in 11th National Conference on eGovernance "Telemedicine & eHealth- Initiatives of Ministry of Health & Family Welfare, Govt. of India" ,Punchkula, Hariyana 7-8 February 2008

20. Current Status of eHealth Initiative in India, Meeting of the ITU Rapporteur's Group of Q-2/2, Tokyo Japan, 3-4 July 2008

21. Advanced Technology in Medical Education-CMEs on Advance Technology in Medical Education in the event of 75th Platinum Jubilee Celebration of Medical Council of India, RMC, Kanpur, 11 January 2009

22. High Performance Computing & Network for Healthcare, Education & Training Research, S K Mishra, Meet on Cancer Informatics Biomedical Informatics Grid: Cooperation for Cancer Research – C-DAC, Pune, 11-12 February 2009

23. Medical Electronics in Endocrinology & Endocrine Surgery; S K Mishra, 2nd International Conference on Medical Electronics, FICCI – 2009, New Delhi, 19-20 February 2009

24. Telemedicine, EMR & Remote Connectivity; 2nd International Conference on Medical Electronics FICCI – 2009, New Delhi, 19-20 February 2009

25. Post-operative care through tele follow-up visits in patients undergoing thyroidectomy & para thyroidectomy in a resource-constrained environment; Asia Pacific Advanced Network – Taiwan (APAN-TW), through Videoconferencing from Lucknow, 4 March 2009

26. Exchange of Information on Health care system and services; Workshop on ASEAN e-Network project for CLMV Countries , New Delhi, 25-26 March 2009

27. Telemedicine Status of Technology, Applications and HRD Issue in India, Summer School on e-Healthcare, IIIT, Allahabad, 08-12 July 2009

28. A Network of Cancer Education, Research and Treatment Centers in India – Current Achievements, caBIG Annual Meeting 2009, 22 July 2009

29. Satellite based Telemedicine Applications in Surgery: SGPGIMS Lucknow Experience Workshop on Applications of Tele-health to Service Delivery in Public Health and Environment, Thimphu, Bhutan, 27-30 July 2009

30. India Country Report on Tele-health Initiatives, Workshop on Applications of Tele-health to Service Delivery in Public Health and Environment, Thimphu, Bhutan, 27-30 July 2009

31. SAARC Telemedicine Network Project: User Perspective, Workshop on Applications of Tele-health to Service Delivery in Public Health and Environment, Thimphu, Bhutan, 27-30 July 2009

32. Impact of Space Technology on Countering Infective Disease Epidemics – An Opportunity for India, OOSA Workshop on Space Technology Contribution to Infection Surveillance and to the Health-related MDG Goals, Verona, Italy, 9 September 2009

**6.0 Conferences/ workshops Organized**

1. Org. Secretary, National Conference on Telemedicine, Lucknow – 23-27 April,2001

2. Org. Secretary, First Annual Conference of Telemedicine Society of India , Lucknow–22 – 24 November 2002

3. Chairman, 2$^{nd}$ Asia Pacific Tele-community Telemedicine Workshop, New Delhi - 25-26 February 2004

4. Chairman, 8$^{th}$ International Conf. on e Health Networking, application and services (Healthcom2006), technically sponsored by IEEE, New Delhi, 17-19 August 2006

5. Global Expo on Telemedicine & e-Health Industry, New Delhi,17-22 August 2006

6. 2nd National Conference of Telemedicine Society of India, New Delhi, 20-22 August 2006

7. Regional Workshop on Uttar Pradesh Medical College Telemedicine Network - 27-28 September 2008

8. United Nations / India Regional Workshop on using Space Technology for Tele-epidemiology to benefit Asia and the Pacific region  - 2008

## 7.0    Participation in Policy Initiative meetings and assignments of National and International Agencies

1. Design, configuration and implementation of Orissa Telemedicine Network Project: 2001 - ongoing

2. Design, configuration and implementation of Uttaranchal Telemedicine Network Project: 2003-ongoing

3. National Task Force on Telemedicine, Govt. of India: 2005 - continuing

4. WHO meeting on Research methodology on evaluation of electronic health delivery system in developing countries, Schenzen, China - 24-28 June 2006

5. Telemedicine in the Reconstruction of Afghanistan through Telemedicine Technology  under India/ USA/ UNOOSA (United Nations Office for Open space Affairs), Expert Meeting - Amritha Institute of Medical Sciences, Kochi, India Vienna - 29-31 August 2006

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8. WHO Consultant for e-Health in Maldives  - May 2007

9. Invited Speaker as e-health expert in the Expert Group Meeting on "Regional trends in health services and their impacts on health system performance in the Asia and Pacific region" organized by UNESCAP at Bangkok on 9-11, September 2007

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13. WHO Consultant for e-Health in DPR Korea - September, 2008

14. Design and Development of Orissa Rural Telemedicine Network on PPP Model by Orissa State Government – 14 December 2008

## 8.0. Honors

a. Nominated by Ministry of Information Technology, GOI as member of National Review Committee for IT related Health projects for the year 2000.

b. Visited France in December 2000 as a member of Indo-French Delegation in the field of Telemedicine and visited several Telemedicine Centers and established research collaboration.

c. Co-Convener and Founder Secretary, Telemedicine Society of India April 2001

d. Nominated as Corresponding Member for India to the Asia-Pacific Association for Medical Informatics in September 2001

e. Travel Grant Award from World Bank to attend MEDINFO 2002, 10th Triennial Meeting of International Medical Informatics Association held at London in September 2002

f. Nominated as Member of National Committee on Standardization in Telemedicine in July 2002

g. Travel Award of Asia-Pacific Association of Medical Informatics (APAMI) to represent India in APAMI Triennial Conference held at Daegu, Korea in October 2003

h. SGPGIMS has been invited as country representative in telemedicine to represent India at Telecommunication Development Bureau (BDT) of International Telecommunication Union for Developing Countries (ITU-D), Geneva at it's meeting held in Japan in July 2004 & Korea in July 2005 and Asia Pacific Telecommunity Telemedicine Meetings held at Kualampur, Malaysia in January 2005 and Rawalpindi, Pakistan in January 2006.

i. Member of the National Task Force on Telemedicine formed by Ministry of Health, Govt. of India in 2005**.**

**9.0 Visiting Scientists:** The following visitors visited Telemedicine Center

1. Prof. Peter Yellowlees, Director, Center for Online Health, University of Queensland, Australia – 2001

2. Prof. Bernad Fleutiaux, Counsellor for Science and Technology, Embassy of France in India, New Delhi – 2001

3. Pof. Bernard Comet, Clinique Spatiale – MEDES, Institute De Medicine et de Physiologie Spatiales, CHU Rangueil, Toulouse, Cedex 4, France – 2001

4. Prof. Jacques HM Cohen, Lambo Immunologie, Hospital R DEBRE, 51100 REIMS, France - 2001

5. Prof. Albert Claude Benhamou, Deptt. of vascular Surgery, Groupe Hospitalier Pitie Salpetriere, Boulevard Dr Hospital, Paris, France - 2001

6. Prof. Andre Lacroix, Deptt. of Medicine, University of Montreal, Quebec, Canada - 2001

7. K C Lun, President Elect, International Medical Informatics Association, Director, Medical Informatics Programme National University of Singapore, Singapore – 2001

8. Prof. Abha Agrawal, Harvard Medical School, Brigham & Women's Hospital, Boston, Massachusets, USA - 2002

9. Prof. Ph. Arbeille, UMPS (Unite Med Physiol Spatiale), Dept. Medecine Nucleaire & Ultrasons, CHU. Trousseau, France - 2002

10. Prof. Benzamin Demiere, Dept. of Scientifique, Service de Cooperation ETD Action Culturelle, Ministere D es Affairs Etragers, France  - 2002

11. Prof. Anthony Guell, Programmes & Industrial Affairs Directorate, Space Science & Exploration Office, Life Sciences Program Manager, Centre Spatial de Toulouse, CNES, France - 2002

12. Prof. Steiner Pedersen, Chairman, Norwegian Center for Telemedicine, Tromso, Norway - 2002

13. Prof. Nicholas Poirot, Head, Telemedicine, Centre National d' Etudes Spatiales (CNES) DEE-NSA 18, MEDES, Toulouse Cedex 4, France – 2002

14. Prof. Gael Scot, Centre National d' Etudes Spatiales (CNES) DEE-NSA 18, MEDES, Toulouse Cedex 4, France –2002

15. Prof. Garry L Warne, Royal Children Hospital, Melbourne, Australia – 2002

16. Dr. Gro Harlem Brundtland, Director General, WHO – 2003

17. Dr Abdullah Bagot, John Hopkins University – 2003
18. Mr. B S Bedi, Scientist 'G' Deptt. of IT, Ministry of Communication & IT – 2004
19. Prof. Isao Nakajima, Tokai University School of Medicine, Japan – 2002, 2004
20. Prof. Leonid Andruchko, Rapporteur, Q. 14 ½, ITU-D, International University, Geneva – 2004

21. Prof. Pradeep Ray, School of Information Sciences, University of NSW, Australia - 2005
22. Prof. Parvati Dev, SUMMIT Group, Stand ford University, California, USA – 2005
23. Dr APJ Abdul Kalam, President of India - 2005
24. Dr B Vikarm, IAEA, Viena, Austria – 2005
25. Mr. Suresh Paryani, University of Technology, Sydney – 2006
26. Mr Heneri Bismuth, - 2007
27. Mr. Richard Watters
28. Mr Yashitaka Shibasaki, Senior General Manager, Broadcast & Professional Products Division, Sony India Limited - 2007
29. Prof A K Padhi, General Hospital, Singapore - 2007

30. Dr.Narendra Mehrotra, ED,MP Consultant of Science& Technology, Bhopal – 2007

31. Prof.G.Rath – Department of Radiotherapy, AIIMS,Delhi -2007

32. Prof. Diana Sehmidt, Prof. from University of Heidelberg & Heilbrown, Germany – 2008

33. Mr.B.Bedi – Advisor - C-DAC, Pune- 2008

34. Prof.Narong Namaskul – Bangkok - 2008

35. Dr.Anil K Agarwal - Professor & Head Dept. of GI Surgery, GB Pant Hospital & Maulana Azad Medical College, New Delhi – 2008

36. Dr.Neeta Singla, LRS Institute of TB and Research, New Delhi – 2008

37. DR.(col) Harish Bhatia, Dept of Radiology Himalayan Institute of Medical Science, Dehradun

38. Ajay Kumar, Group Co-ordinater, CDAC, Pune – 2008

39. Ambareesh Dixit, Sony India Pvt.Ltd, New Delhi – 2008

40. Tanmoy Bose, Joint Director, FICCI, New Delhi – 2008

41. Mr.Christian Grabnor & team,GE Healthcare, EUROPE – 2008

42. Dr.Uthapala Amarasinghe, Health Education Bureau, Srilanka – 2009

43. Dr Abdul Azeez Yoosat, Ministry of Health, Maldives - 2009



Fig 39 : Visitor at Telemedicine Resource Center - Dr. Gro Harlem Brundtland, Director General, WHO and Dr APJ Abdul Kalam former President of India and Shri Rajeswar, Hon'ble Governor of U.P.

### 10.0 Future Plans

1. Starting degree and PhD Courses in the School of Telemedicine and Biomedical Informatics

2. Up gradation of existing laboratories

3. Establishment of New laboratories – Virtual Reality and Simulation, Surgical Informatics, Tele-presence, Nanotechnology for Telemedicine, Cancer Informatics, Public health Informatics, Tele-epdemiology, mHealth, Rehabilitation Informatics etc.

4. Collaboration with academic, medical, scientific organizations and Industry to carry out Inter-disciplinary Research. Development of low cost e Health devices / products and service models for developing countries

5. Creation of Health Technology and Knowledge Park

**11.0 Telemedicine Projects – In house Resource**

| S. N. | Name of the project | Year | Application |
|-------|---------------------|------|-------------|
| 1. | 1st Endocrine Tele- surgery workshop (Tele medical education) | 25-29 Oct' 99 | Proof of Concept project - 1st medical education program (Live Surgical Workshop) transmitted live to two locations across the country with the high quality of transmission of data, image and voice |
| 2. | Tele-consultation at hospital in the hill region | Sept'00 | Proof of Concept project - Video clippings of the patient, ultrasound and X-ray images, typed and hand written notes and audio clippings were transmitted via PSTN- Store & forward |
| 3. | Tele-consultation at District hospitals (Balrampur and Civil Hospital, located in Lucknow ) | Sept'00 | Proof of Concept project - to judge the efficacy of Telemedicine technology i.e. image & data quality, doctor & patient satisfaction, time gap, cost-affectivity and technological performance |
| 4. | Tele-radiology consultation between SGPGIMS and remote hospital | Sept'00 | Proof of Concept project - to look at the feasibility of using telemedicine technology to transmit the images to SGPGIMS and get the reports in shortest possible time |

**Extramural Sponsored Telemedicine Projects**

| Name of the project | Year | Funding Agency | Funds Received (INR) | Application |
|---|---|---|---|---|
| Tele-health care for the Kailash Mansarovar Pilgrims | Aug'00 | KMVN, OTRI & SGPGI | 2,00,000 | Demonstration project - test the feasibility to provide tele-consultation & transfer of medical images (ECGs)at the higher altitude |
| Application of telemedicine technology to provide tele- health care during Mela / Festival & Disaster | Jan-Feb'01 | Dept. of Information Technology (DIT) Ministry of Communication & IT, Govt of India | 80,00,000 | Demonstration project - to find out the benefits of telemedicine technology over and above the traditional health care delivery system |
| Development of Telemedicine Technology & it's implementation towards optimization of medical resources | 2002-2005 | DIT, Ministry of Communication & IT, Govt of India | 38,54,000 | Pilot Project -To develop indigenous telemedicine software &its application in collaboration with technical partners Center for Development of Advanced Computing &Centre for Electronics Design & Technology |
| Orissa Telemedicine Network Project | Mar'03-ongoing | Indian Space Research Organization (ISRO) | 20,00,000 | Pilot Project -Tele-education & Tele-health care for the three medical colleges of Orissa state |
| National Informatics Center (NIC) Tele-CME Project for North East | Jul'03-Oct'04 | National Informatics Center, New Delhi | 20,00,000 | Demonstration Project - Tele-education for peripheral doctors of 8 District Hospitals & 450 community centers of remote North East region of India |

| | | | | |
|---|---|---|---|---|
| Uttaranchal Telemedicine Network Project | Apr '04-Apr'08 | Govt. of Uttaranchal State | 73,18,000 | Pilot Project -Tele-education & Tele-health care for the peripheral doctors of 2 Base hospitals of hilly Uttranchal state |
| Raebareli Telemedicine Network Project | Apr' 06-Mar'07 | Gas Authority India Limited | 40,00,000 | Pilot Project -Tele-education & Tele-health care for the doctors of District Hospital Raibareli, Uttar Pradesh |
| School of Telemedicine & Biomedical Informatics | Jun'03-Aug '06 | Govt. of Uttar Pradesh state | 28,00,00,000 | Capacity Building – Training, diploma & degree courses in the field of telemedicine |
| National Telemedicine Resource Center | Feb'05-ongoing | DIT, Ministry of Comm. & IT, Govt. of India | 5,15,58,000 | Creation of various Laboratories in the field of Telemedicine and Biomedical Informatics for inter-university research and development center |
| eHCD Research project | 2007-2008 | WHO | 3,36,000 | Survey of eHealth delivery system in India |
| UP Tele-radiotherapy Network | 2007 – ongoing | Dept. of Science and Technology | 97,00,000 | Pilot Project -Tele-education & tele-consultation in the field of to the 5 Medical Colleges of Uttar Pradesh |
| Dev. & Maintenance of e-seminar Web Portal on "National Knowledge base on Telemedicine &e- Health" | 2007-2008 | Sony, Japan | 10,00,000 | Creation of web portal which is going to be a knowledge base on telemedicine and e-health in India |
| | | **TOTAL** | **36,99,66,000** | |

**12.0 List of Tele-CMEs conducted by various departments of SGPGIMS, (1999- 2008)**

| S/N | Name of Tele-CME Program | Year | Organizing Department | Network Node | Communication Media |
|---|---|---|---|---|---|
| 1. | 1st Endocrine Tele-Surgery Workshop | 25th-29th Oct-1999 | Endocrine Surgery, SGPGIMS | AIMS-Kochi & European Institute of Telesurgery, Strasbourg, France. | ISDN line of 384 kbps |
| 2. | Tele-CME in Gastroenterology | December 1999 | Dept. of Gastroenterology, SGPGIMS | Amrita Institute of Medical Sciences, Kochi | |
| 3. | Tele-Endocrine Pathology Workshop | February 2000 | Dept. of Pathology | PGIMER, Chandigarh | |
| 4. | Tele-Endocrine Imaging workshop | September 2000 | Dept. of Endocrine Surgery,SGPGIMS | PGIMER, Chandigarh | High bandwidth ISDN line |
| 5. | 2nd Endocrine Telesurgery Workshop | 18th-22nd March 2002 | Dept. of Endocrine Surgery, SGPGIMS | SCB Medical College Cuttack, Orissa | ISDN line of 128kbps bndwidth |
| 6. | 3rd Endocrine Telesurgery Workshop | 13th-17th October 2003 | Dept. of Endocrine Surgery, SGPGIMS | SCB Medical College Cuttack, Orissa Bangalore, Chennai | VSAT at 384kbps |
| 7. | 28th Annual conference of Indian Association of Medical Microbiologist | 25th-28th November 2004 | Dept. of Microbiology, SGPGIMS | SCB Medical College Cuttack, Orissa | 3 ISDN lines of 128kbps |
| 8. | 1st SGPGI Breast Course | 5th-6th March 2005 | Dept. of Endocrine Surgery, SGPGIMS | SCB Medical College Cuttack, Orissa & AIMS, Kochi | 3 ISDN lines of 128kbps |
| 9. | 4th Endocrine Telesurgery Conference | 6th-10th November 2005 | Dept. of Endocrine Surgery, SGPGIMS | SCB Medical College Cuttack, Orissa & AIMS, Kochi Ranguel University, Toulouse, France | 3 ISDN lines of 128kbps<br><br>3 ISDN lines of 128kbps |
| 10. | Diabetics Footcare Workshop - | 14th November 2005 | Dept. of Endocrine Surgery, SGPGIMS | SCB Medical College Cuttack, Orissa  AIMS, Kochi,Base Hospital Almora & Srinagar | ISDN & VSAT telecommunication link |
| 11. | 2nd Postgraduate Clinic 'Clinical Problem Solving' in Immunology | 20th November 2005 | Dept. of Immunology SGPGIMS | SCB Medical College Cuttack, Orissa | VSAT telecommunication link |
| 12. | Video Broadcasting of AROI conference proceedings from Gujrat Cancer & Research Institute,Ahmedabad | 1st-4th December 2005 | Association of Radiation Oncologists of India (AROI) | Dept. of Radiotherapy,SGPGIMS Lucknow | VSAT telecommunication link |

| 13. | 3rd Annual Conference of Indian Thyroid Society and International symposium on recent advances in management of thyroid disorders | 4th-5th March 2006 | Dept. of Nuclear Medicine SGPGIMS | SCB Medical College Cuttack, Orissa Holy Family Hospital, Rawalpindi, Pakistan | ISDN & VSAT telecommunication link |
|---|---|---|---|---|---|
| 14. | XIV Surgical Gastroenterology Week | 24th-26th March 2006 | Dept. of Surgical Gastroenterology SGPGIMS | AIMS, Kochi | VSAT telecommunication link |
| 15. | 2nd Diabetics Footcare Workshop | 24th-25th November 2006 | Dept. of Endocrine Surgery, SGPGIMS | SCB Medical College Cuttack, Orissa | VSAT telecommunication link |
| 16. | 2nd SGPGI Breast Course | 25th-26th November 2006 | Dept. of Endocrine Surgery, SGPGIMS | SCB Medical College Cuttack, Orissa & Orange, California,USA | |
| 17. | Workshop on cancer pain management vis-à-vis oral mor | 17th March 2007 | Dept. of Anesthesiology & Cancer AidSociety | SCB Medical College Cuttack, Orissa | VSAT telecommunication link |
| 18. | Tele-Conference of The Mid-Term conference of Indian Society of Gastroenterology | 1st-2nd September 2007 | Dept. of Gastroenterology SGPGIMS | AIMS, Kochi | ISDN using bandwidth of 128kbps |
| 19. | 8th Postgraduate Course in Endocrine Surgery & 8th Annual Conference of Indian Association of Endocrine Surgeons (IAES) | 22nd-25th Nov 07 | Dept. of Endocrine Surgery SGPGIMS | SCBMC Cuttack, MCKG Medical College Berhampur, AIMS,Kochi, & CMC Vellore | VSAT telecommunication link |
| 20. | 39th Annual Conference of Society of Nuclear Medicine, India & CME International Symposium on Molecular Imaging | 6th –9th Dec 07 | Dept. of Nuclear Medicine SGPGIMS | Received from UPENN, Philedelphia | |
| 21. | WEBCASTING on "Terrapeptide medicine used in Ostoporosis." | 4th Dec 2007 | Eli Lilly & Co.,Gurgaon (Dept. of Rheumatology, Endocrinology, Neurosurgery) | Lecture from Indiana, US. | |

| 22. | CME on Issue & Challenges in Disinfection & Sterlisation practices in Hospital | 16<sup>th</sup> February 2008 | Hospital Administration SGPGIMS | Received from AIIMS,Delhi | |
|---|---|---|---|---|---|
| 23. | Tele-conference with USA, Canada | 27<sup>th</sup> February 2008 | Dept. of Radiology & Dept. of Cardiology SGPGIMS | US | |
| 24. | XIVth Surgical Gastroenterology (SGE) Week | 28<sup>th</sup>-30<sup>th</sup> March 08 | Dept. of Surgical Gastroenterology SGPGIMS | AIMS, Kochi | VSAT telecommunication link |
| 25. | Tele CME on Venous Thromboembilism | 26<sup>th</sup> April 2008 | Dept. of Surgical Gastroenterology SGPGIMS | Varanasi(BHU), Allahabad,Gorakhpur | transmitted through Reliance Web World using Global IP |
| 26. | CME on Legal & Ethical Issues in Medical Practices | 30<sup>th</sup> April | Hospital Administration SGPGIMS | Received from AIIMS,Delhi | at 256 kbps using ISDN line |
| 27. | CaBIGTM Cancer – India Tele-Conference | 6<sup>th</sup> June 2008 | Dept. of Endocrine Surgery, SGPGIMS | US (Canada) | Through Internet & using ISDN Phone |
| 28. | Audio Conference (Discussion) Upcoming Making the eHealth connection, Global Partnership, Local solutions conference series | 16<sup>th</sup> June 2008 | Telemedicine SGPGIMS | US-Eastern Zone | |
| 29. | Tele-CME on Surgical Prophylaxis | 21<sup>st</sup> June 2008 | Dept. of Surgical Gastroenterology SGPGIMS | Reliance Web World with its 7 sites Gomti Nagar Lucknow, Ludhiyana, Kanpur, Agra, Pitampur, Jaipur | Using 256kbps/ ISDN Line |
| 30. | CME on Rational uses of Antifungal Agent at diff centers | 20<sup>th</sup> Sept2008 | Microbiology | Reliance Web World with its 4 sites – Kanpur, New Delhi, Jaipur, Ludhiyana | 256kbps IP |
| 31 | Diabetic foot Care | 22 & 23 Nov 2008 | Endosurgery | SCBMC, Cuttack Orissa | 256kbps IP |
| 32. | Endovascular Management of Dural AVM | 13<sup>th</sup> Dec 2008 | Neuro Cathlab | SRMC, Chennai | VSAT telecommunication link |

| 33. | "Addressing Palliative care Through Improved Cancer Pain Policy in the state of UP | 10th February 2009 | Cancer Aid Society | SCBMC, Cuttack Orissa & MKCG, Berhampur | IP & ISDN |
|---|---|---|---|---|---|
| 34 | Molecular Technique in clinical Microbilogy | 7,8 March 2009 | Microbiology | | |
| 35 | CME Cum CBFMR Foundation Day | 9 March 2009 | CBMR | Berkley | ISDN |
| 36 | Nephrology Technique | 28 March 2009 | Nephrology | Reliance Web World, Mumbai | Global IP |
| 37 | Transplant Immunosuprission For India | 24 April 2004 | Immunology | GYNYME | ISDN |
| 38 | Maximizing Insulin Therapy in Type 2 Diabetes | 11 August 2009 | Lilly Diabetes | Minneapolis MN,USA | Global IP |
| 39 | Tropical Calcific Pancreatitis | 21 August 2009 | Endomedicine | CMC Vellore & AIMS Cochi | Global IP |
| 40 | Intralase Keratoplasty | 27 August 2009 | Neuro-Ophthalmology | SRMC,Chennai | VSAT,IP |