

Provisioning tertiary care within a system of Universal access to health care for India: some reflections

Anand Zachariah

In July 2011, I was asked to be on the working group on tertiary care for the Planning Commission, and to make some recommendations. What follows is a summary of my proposals and some reflections on their possibility, the planning commission process and the feasibility of implementing these proposals in our context.

A key pin in the provision of Universal access to health care in the 21st century is the aspect of tertiary care. Tertiary care in a functioning health system may be required only for 1% of cases, but plays a determining role for the rest of the health care system. Tertiary care supports primary and secondary care, and hence is necessary for effective care at the level of PHC and CHC. The high cost of most health systems is due to the expense involved in tertiary care. Tertiary care is the setting within which medical education and medical research take place. While primary and secondary care in the public health system in India is weak, publicly funded tertiary care is even more scarce. For all these reasons it is important to consider the issues of tertiary care in relation to Universal Access to Health Care (UAHC).

Tertiary care developed in the context of Western Health care systems post 1940, with large hospitals, technology oriented tertiary care investigations and expensive treatments. It was the governmental intent to provide universal access to health care and the budgetary investment into health care through the Beveridge plan that made this possible. In western health systems tertiary care developed for their diseases, using tests and treatments that were affordable by their health systems. In western countries, this has resulted in escalating health expenditures consuming up to 8-10% of the health budgets, making it almost unaffordable for most countries. Recent developments in the UK and the United States show that there is a crunch on funding. One implication of this is that the mode of provisioning health care in these countries has resulted in expenditures that are difficult to sustain under conditions of economic distress.

In India we have witnessed the converse phenomenon. The government in its planning had focused on primary health care, conducting immunization, maternal and child health and family planning at the expense of hospital based care. The provision of government funded hospital based care in the taluk, district and medical college level has developed in a skeletal manner. With the liberalization of the economy post 1980, there has been the proliferation of private tertiary care first in the big cities and then in the smaller towns starting with the Apollo hospitals. Therefore private tertiary care has developed with the active support of government (provision of land, tax concessions etc) and due to absence of government investment in hospital based care. These private hospitals have transplanted the western mode of tertiary care to the Indian setting focusing on diseases, investigations and treatments that enhance profitability. This is one of

reasons for catastrophic health expenditure and debt that is resulting from patients accessing hospital based care in the private sector.

Any move to redress the problem of universal access, has to confront the issue of how to provide tertiary care to all citizens. Is there another mode of imagining tertiary care for India? How will it pull away from the current system of market oriented tertiary care? What would be its characteristics? How would it be provisioned within the existing health system?

In this paper, I will attempt to answer the following questions

1. How to define tertiary care for the Indian setting?
2. How can tertiary care be provided by the existing health system in India?
3. What are the implications of universal access to health care for medical education?
4. Reflections on health planning processes in relation to tertiary care

1. Defining tertiary care for the Indian setting

An important aspect to understand is that tertiary care medical knowledge undergirds the edifice of the western medical system. Today all medical knowledge, evidence based guidelines, primary and tertiary care management protocols are based on the knowledge format of tertiary care. And this knowledge format has been universalized to all countries, including the Indian setting, examples of which are scans, testing facilities, angiograms and endoscopies. This is the difficulty of redefining tertiary care medicine for the Indian setting.

In order to define tertiary care in India we need to define the common public health conditions in India that require large hospital care, both outpatient and emergency conditions. Emergency conditions (eg. head trauma, strokes, heart attacks, organophosphate poisoning, neonatal emergencies) and chronic conditions (eg. cancer treatment, palliative care, stroke rehabilitation) require provisioning of tertiary care at the district level or within the neighborhood of the district. These services particularly for emergency conditions should be available to the public as close as possible to their residence.

Therefore the definition of tertiary care should focus on:

1. Public health conditions requiring tertiary care
2. Tests and treatments that are cost-effective and can be provided to everyone at different levels of the health system (PHC, CHC and medical college)

Such a redefinition requires data on:

- i. Epidemiological prevalence of different diseases at the level of the community in different districts, states and regions, current and future projections.

ii. Cost-effectiveness data of different tests, treatments and technology interventions.

The above data is not currently available and an important task for the government is to institute a technical group to define the parameters for tertiary care in India. The experience of NICE¹ in UK is one approach to the problem.

In this paper I have attempted to outline the scope of tertiary care for the Indian setting: List of common conditions that require hospital based health care, and the requirements of technology, specialists and paramedical staff (table I), and tertiary care services that should be provided at a medical college level for a district (table II). The tables are constructed based on the common diseases that occur in a district and the requirements of tertiary care for a district. The difference between these tables and the current MCI guidelines for medical colleges, is that medical colleges are planned based on educational requirements. The tertiary services shown in the table should be available in a medical colleges, but are currently available only in private hospitals. These services should no longer be available only in specialist centres or superspeciality hospitals, but should be accessible at the point of need in a medical college within the district. Hence it is suggested that medical colleges should be located at a district level and should be planned based on the tertiary care requirements of a district.

In defining tertiary care we need to consider not only prevalence and cost-effectiveness, but also appropriateness. Some treatments, while they may be appropriate for the western setting, may be inappropriate for the Indian patients. For example coronary artery disease which is a common public health condition, according to standard treatment guidelines require angioplasty, stent placement and CABG. However these interventions may be inappropriate for the Indian setting because of cost, the lack of centres and trained cardiologists and cardiothoracic surgeons to perform these procedures. Since most treatments evolved in western settings, the research base to evolve evidence and management guidelines for the Indian setting does not exist. Therefore we need research into the management of common conditions appropriate for our settings. We need innovations that address the issue of cost and appropriateness. Examples such as the Jaipur foot, Aravind eye care and the Sri Chitra valve, the ARI protocols for children and ORS are treatments that turn tertiary care on its head. They provide new management paradigms appropriate for our own setting. To define such a knowledge base of we need to reset research agendas, involve

¹ NICE- National Institute for Health and Clinical Excellence (NICE) was set up in 1999 to reduce variation in the availability and quality of NHS treatments and care. Their guidelines help resolve uncertainty about which medicines, treatments, procedures and devices represent the best quality care and which offer the best value for money for the NHS. Every piece of NICE guidance and every NICE quality standard is developed by an independent committee of experts including clinicians, patients, carers and health economists.

medical colleges in research in the community, and private practitioners and PHC doctors in the study of their practice. There is need to reconceptualise "evidence" and "quality" in more real settings taking into account not only short term but also longer term impacts in multiple dimensions.

However such a re-orientation could face hurdles. With the legislation on blood banks to address issues of quality, many of blood banks in rural hospitals closed down because they could not meet the standards of space, air conditioned rooms and personnel. This has led to lack of access to blood transfusion for life threatening conditions in rural areas. Similarly the standards for ultrasound machines require a radiologist to operate it, making it difficult to do ultrasounds in rural areas. Mosquito mesh is a cheaper and equally effective implant material for hernia repair in comparison to commercial mesh. However medical college surgical departments are reluctant to implement such a non-western solution. Redefinition may face pressures from professional bodies, regulatory agencies, corporate hospitals and pharmaceutical companies.

2. How can tertiary care be provided with the existing health system in India

Ideally tertiary care should be well integrated within a functioning health system. Most conditions would be taken care of at the primary and secondary level. Patients would be referred to tertiary care when required, and referred back to primary and secondary level after completing of their tertiary care treatment.

However in India, tertiary care is not well integrated with the functioning health system. The health system functions up to the district hospital level (PHC, CHC, Taluk hospital and district hospital). Against this chain the medical college functions as a stand alone entity under the Department of Medical Education, and not as part of a functioning health system. Publicly funded tertiary care varies in availability depending on the presence of a medical college in the region. While government medical colleges are supposed to provide tertiary care, they may not have the infrastructure, resources and staffing, and are often functioning at the secondary level.

Therefore in order for tertiary care to be provided the following steps are necessary:

- a. Medical colleges should be responsible for the health provision of given geographical area (one district or set of districts) for which it provides tertiary care services in liason with the district health services.
- b. Strengthening of district hospitals to provide effective secondary level care
- c. Strengthening of medical colleges to provide tertiary care for the district

- a. Medical Colleges should be responsible for the health provision at the tertiary level for one district or set of districts

For a medical college to be responsible for tertiary care of a district, it is suggested that there should be one medical college for every district or 3-4 districts depending on population, geographic area and existing availability of hospital based services. The medical college should support the secondary and primary level services through referral linkage and training. The district health system would in turn offer for the medical college the opportunity to expand its training base. Undergraduate and postgraduate students could be trained not just in the medical college, but also at the district hospital, taluk hospital and PHC level. This arrangement would solve the problem of economic viability of tertiary care at the district town level. Normally the problem of providing such medical care in the rural area is that the patient catchment is low. If the district tertiary care centre is also a training establishment, the patient base need not in itself be economically rewarding.

This change would require that medical colleges be conceived as part of the referral system of the government health services. Functioning of this referral system would require referral guidelines, training, referral linkages, patient information transfer and mechanisms of ensuring quality and accountability.

When medical colleges are responsible for a functioning health system, the priorities for medical education will need to change. Today the MCI board and postgraduate boards comprise mainly of specialists. Hence specialist courses and number of their seats receive undue emphasis. Integration of medical colleges with the health system, will require a reorientation of medical training from one based on western requirements, to a medical training to meet the human resource requirements of the health system. This may require that there is expansion of paramedical training (village health nurses, nurse practitioners, physician assistants, paramedics) and setting up Family Medicine departments in every medical college to train multi-competent GPs.

- b. Strengthening of district hospitals to provide effective secondary care

For tertiary care to be provided at the district level, this requires strengthening of district hospitals to provide high end secondary care and strengthening of linkage between district hospital and the medical college.

Many specialist conditions can be effectively managed at the district level and can reduce the need for referral. This requires good referral linkage with a medical college which can support the district hospital in a referral continuum. Medical colleges could support district level care through telephone and telemedicine, consultant visits and specialist clinics. They could also be involved in the training of district hospital staff in specialist care. Ambulance services and electronic transfer of patient information can enhance the referral linkage.

The Tamil Nadu health system project has shown that obstetrics and neonatal care can be upgraded through a health systems approach, with improvements in infrastructure, staffing, guidelines and training and health system management. In many parts of the country maternal and neonatal services have improved through similar approaches. With similar attention improvements could occur with medical, surgical and emergency care, chronic disease care, cancer detection and prevention, rehabilitation, mental health and palliative care. Appendix I provides details of how the secondary level at the district level can be strengthened in specific areas.

What are the difficulties in doing this with the district hospitals? It is difficult to get doctors to stay in the districts. Medical students usually come from cities and more elite backgrounds. There is a cultural expectation that the graduate will specialize, go abroad for further studies and will gain financially. Working in districts will not fulfill these expectations. Doctors working in district find it difficult to look after the schooling of their children and feel socially and academically isolated. Therefore strengthening of the district health system also requires selecting students from the local area, orienting training to the needs of the district, supporting doctors working in the area long term and providing suitable incentives.

c. Strengthening of Medical colleges to provide tertiary care a district

Medical colleges in planning and regulatory terms are defined by their role as medical education institutions and not as service institutions. Hence the standards that define medical colleges and planning requirements are based on the requirements for education (infrastructure, staffing, and patient care facilities).

If medical colleges are to provide tertiary care services for the district, then it is necessary to define the standards of care and services based on the requirements of the district. There are several specialist services that are required for the public in medical colleges at a district level which are not requirements for undergraduate medical education. For example, general medicine services should be upgraded in the areas of cardiology (Echocardiogram, cardiac catheterization, pacing), nephrology (haemodialysis and peritoneal dialysis), gastroenterology (upper and lower GI endoscopy) and critical care. General surgery services should be upgraded in relation to urology, neurosurgery, and cancer surgeries. This may require specific skills training of general specialty faculty (endoscopy, echocardiography) and employment of superspecialists in specific areas (eg. Neurosurgery, Cardiology, Urology). Radiotherapy, palliative care and rehabilitation departments should be established in each medical college. In some cases, a specialist service (Eg. Cardiology, Neurosurgery, Urology) may provide for the needs of 2-3 districts. Infrastructure development and technology up gradation for provision of tertiary care services in each medical college is necessary to facilitate the development of specialist services. Table II provides details of the nature and requirements of such services in a medical college.

In each of these areas the medical college would provide tertiary care services for the district. The medical college would in turn support the services of the district and sub-district level through telephone, telemedicine, training for district level staff and strengthening the referral linkage. Hence the planning of the requirements of the medical college should keep in mind the health service requirements of the district. For the provisioning of universal access to health care, if there is no medical college, or the medical college does not have the facilities to provide some essential service, then it is necessary of the government to contract such services from the private sector hospitals.

How would these services be different from tertiary care services that are currently provided in private hospitals. The structure of these many of these services in the private hospitals today is driven by the profit motive, which results in an exorbitant cost. However today many of these services, for example echocardiogram, or dialysis or endoscopies are no longer esoteric in nature to be available in apex referral centres. Work from the non-governmental sector, shows that when these services are provided in sufficient load and efficiently, it is possible to use the economy of scale to reduce cost. These examples show that it is possible to provide tertiary care in a cost-effective and accessible manner. We argue that it is possible to reinvent tertiary care to be provided in a district medical college in a manner that uses resources judiciously and efficiently.

3. Implications for medical education within a system of Universal access to health care

The concept of Universal access to health care has many implications for medical education. The principle of Universal access to health care raises the issue of the social accountability of medical education. If health care is a social good that should be provided to every citizen and medical colleges are involved in the task of making sure that this happens, this necessitates asking similar questions of medical education. How can medical colleges in their practice of education, incorporate the principle of social accountability to ensure that universal access to health care takes place?

- a. Each medical colleges should be responsible for the health care of a district or set of districts with formal linkages to the district hospital, taluk hospitals or other community hospitals for supporting clinical service and training.
- b. Postgraduate and undergraduate students would receive their training not just in the medical college, but also at the district, taluk and primary health centres with involvement of the medical teachers in training and service at these different levels .
- c. Each medical college should have a Family Medicine department with clinical services at the medical college and district hospital and running postgraduate courses in Family medicine.

- d. Preference should be given in selection for students from the local area who are motivated to work long term to meet local needs.
- e. Graduates after they finish their medical training should be required to provide compulsory service at the district or taluk hospital, thereby supporting the local health service.
- f. Each medical college should focus its research agenda towards identifying and answering priority health issues and questions and strengthening health services in the district.

On the surface these recommendations read very much like the Bhore committee report and for that very reason are utopian in their imagination. However, unlike the Bhore Report, the proposals here are about upgrading and reorienting what already exists. What would be the problems in trying to implement these administrative proposals?

There are many practical difficulties. The organization of the government administration consists of State health service (in charge of district hospitals, CHCs and taluk hospitals), the Department of medical education (in charge of medical colleges) and the department of public health (in charge of primary health centre) each with its own centralized administration. The proposals envisage better linkages between these different departments. However bureaucratic difficulties between departments may make them difficult to implement.

The imperatives and difficulties of each of the levels are different. The focus of medical colleges is not on improving health services in the district, but on training medical students and taking care of the patients who come to the medical colleges. The government medical colleges are overloaded (patients on the floor, 100-250 medical students) and underprovisioned (lack of equipment, drugs and staff and teachers) and hence working under trying conditions. State governments are unwilling to invest in the infrastructure required for a good medical college. Hence medical colleges would hardly be keen to take on the responsibility of improving services in the district. Teachers are transferred from one college to the other, often posted in a different department from their original specialty and specialists posted in towns where they cannot practice their specialty. Professors in state medical colleges are underpaid in comparison to the central UGC scales. Therefore medical colleges teachers are for the most part interested in facilitating their private practice. Patients are often taken care of by the postgraduates and medical officers and the commitment to good patient care does not exist.

District hospitals and CHC are even weaker in infrastructure, staffing and supplies. The same issues of private practice apply at these levels. Doctors stay in one place and are posted in another.

So even if we were to establish rural medical colleges in every district, would health services improve? District hospitals are being converted into medical colleges, depriving districts of a

functioning district hospital which is often moved to a more remote area. Teachers commute from big cities every day to mark attendance in rural medical colleges.

Would private hospitals be keen to provide tertiary care services to people from the district. They would be interested to do this, to earn profits rather improve health care as has happened with the Aarogyasri scheme. As the examples of Andhra Pradesh (Aarogyasri), Tamil Nadu (Kalijnar scheme), or Gujarat (Chiranjeevi) scheme have shown, the private public partnerships improve access of public to private services, but without necessarily strengthening public health services.

4. Reflections on health planning processes in relation to tertiary care

There are several limitations in the planning process and its ability to tackle actual issues on the ground.

a. The delink between planning and implementation

The planning commission makes plans and advises the government regarding allocation of funds to ensure implementation. However the planning commission has no control over the implementation of activities. For example, The Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) was started in 2006 to address the imbalances in the availability of tertiary care. Under this scheme, budget was allotted for setting up 6 AIIMS like institutions. However at the end of the 11th five year plan all these AIIMS are yet to be functional, citing implementation delays.

The evaluation of the implementation is in terms of budgets spent and outputs of implementation (eg. x number of medical colleges upgraded). However there is little data regarding the outcomes of quality of service or education in these institutions.

b. Centre vs State

Medical colleges and district health infrastructure are under the state government. Therefore improvements in infrastructure, staffing and linkages can only be done by the state government. The central government can allocate funds to the state governments to upgrade services, staffing and infrastructure but has no control over the implementation and the quality of services and medical education in state medical colleges.

c. Accountability

There are different levels of lack of accountability in the planning process. First, the composition of the planning groups has experts, but may not have representation from the end users. Second, public accountability does not enter the process in which the planning commission makes plans and the government implements these plans. How does the public give their view regarding a new AIIMS, a medical college or district hospital? What would be the processes to ensure accountability to the local people?

d. Focus on AIIMS like institutes

Central planning has little control over state health care institutions. Therefore the focus of central planning is on the centrally funded institutions, the AIIMS like institutions. The premise is that the presence of AIIMS like institutions would improve the availability of tertiary care services in disadvantaged regions where they are located. Questions that are not answered are: What is the exact role of AIIMS like institutions? How will it improve health care provision in a region? How will its training activities enable development of health manpower for the region? How will it answer pertinent research questions for the region?

e. Private public partnerships

Governmental concerns are that it does not have the budgetary resources for publicly funded health care. Therefore PPP is one way of infusing funds and meeting budgetary deficits. Supporting the private health sector is also seen as an important way to ensure high rate of economic growth.

PPP is conceptualized as a management problem. If there is mutual equality between partners, mutual commitments and mutual benefits, then the profit orientation of private players can be addressed. If the conditions are good and the partnership is well managed well then PPP can work. The problem of profit orientation of the private sector, the need for a social commitment to provide UAHC and therefore the importance of regulation of private players is glossed over. The government plays a benevolent and passive role towards the private sector.

For example in the Arogyasri programme, the private corporate hospital in collaboration with the policy maker determines which high technology procedure is offered to the patient. In this relationship the equality is between the medical provider and the insurance agency supported by the government and the patient has little say in what treatment they should receive.

f. Research issues

The problem of research is seen as one of setting up national level research institutes in priority areas such as cardiovascular diseases or diabetes. What questions will the research institutes answer? How will the availability of these research institutes make a difference to the management of the health problem across the country?

What about the research that needs to be done in every medical college to answer local questions? A useful research agenda for the planning commission would be to set up experimental models across the country (for example linkage of medical colleges to district health care system), to see what works and does not work.

g. Lack of sufficient data and difficulty of planning for the country as whole

For a planning process of such gargantuan proportions, there is lack of adequate information on the basis of which to plan. For instance what are common public health diseases in different parts of the country, what is the current availability of tertiary care services in different medical colleges and in different specialties. The planning commission visualizes one solution for the whole country, although the requirements of each state are different.

5. Conclusions

In this article it has been argued that the problem with provisioning tertiary care is a *systemic* problem related to the structure of medical knowledge as it has developed in the west, the market driven mode of private tertiary care as has occurred in India and the lack of development of public curative services. Despite the structural nature of the problem, it is possible to re-envisage and redistribute the problem for the Indian health system, so small but concerted changes can result in improvements of health care provision.

Our suggestion is that we attempt to re-define what is tertiary care in relation to the common diseases, what would be considered cost-effective and feasible treatments to provide all citizens of the country- *an appropriate tertiary care for India*. The problem of *cost* is not necessarily one of actual cost of technology or a drug but the mode of market medicine to maximize profit. We argue that it is possible to provide tertiary care at an affordable cost, working on economy of scale and common sense approach of treatments that can feasibly be provided across the health system.

We suggest that tertiary care can be provided in a non-market mode, through medical colleges servicing a district population and supporting a district health system. Today the district hospital is the apex referral hospital of the health system and the function of the medical college is primarily for training and isolated from the health system. Upgrading the district hospital and improving linkages between the medical college and district hospital can work to support a functioning health system within which tertiary care can be provided. The use of a functioning district health system for teaching and service, can make it economically viable and fulfill the twin goals of providing universal access to health care and training future doctors and health professionals in the practice of an appropriate medicine for India.

Table 1 : Projections on requirements of tertiary care at a District level for common diseases requiring hospitalisation

This table is based on data on common diseases that require hospitalization in India. In relation to each of these diseases, projections are made regarding the requirement of specialists, paramedical staff and requirements of technology. They are based on an understanding of the staff competence, tests and treatments that doctors consider should be available for all patients in a health system. These are suggested requirements for tertiary care in the geographic area of district.

Common diseases requiring hospitalization NSS 60 th round, report # 507, year 2006	Requirements of specialists	Requirements of paramedicals (DM)	Requirements of technology
Diarrhoea/ dysentery	Gastroenterologist		Upper GI endoscopy
Gastritis/ gastric or peptic ulcer	Cardiologist	Technicians trained in all the adjoining procedures	Echocardiography, angiography, interventional procedures, tread mill test, Cathlab
Hepatitis/Jaundice	Physical medicine and rehabilitation	Physiotherapist for cardio, locomotor and neuro disorders rehab., Ortho and even gynec	Bronchoscopy, pulmonary function tests
Heart disease	Orthopaedics		EEG
Hypertension	Neurosurgeon		ICU and ventilators
Respiratory incl. ear/nose/throat ailments	Anaesthetist	Dialysis machine operators	Dialysis machines
Tuberculosis	Nephrologist		Cystoscopy
Bronchial asthma	Urologist		Ultrasound
Disorders of joints and bones	ENT specialist	CT scan operators	CT scan, MRI
Diseases of kidney/urinary system	Ophthalmologist		Hormone Tests

Gynecological and Obstetric Disorders	Oncologist/radiotherapist/ Oncosurgeons		
Neurological disorders	Palliative care		
Psychiatric disorders	Psychiatrist	Psychological Counselors	
Cataract and visual disorders like strabismus, squints etc.	Respiratory physician	Ophthalmic Asst., Optometrists Radiological Assts for radiology and radiotherapy	Laser
Diabetes mellitus	Radiologist		
Malaria	Microbiologist		
Fever of unknown origin	Pathologist	Lab Asst.	
Locomotor disability	Biochemist		
Accidents/injuries/burns/etc.	Pediatrician		
Cancer and other tumors	Hematologist		
Pediatric incl neonatal disorders	Endocrinologists		NICU
AIDS	Hospital Administrators		T4 count
	General surgeons		

Appendix I – Requirements of hospital based services at a District hospital

The current efforts to strengthen district level health care in relation to maternity and neonatal care have shown that it is possible to provide, what was previously considered as tertiary care at a district level. Much of this has been achieved through training, guidelines, improved infrastructure and functioning of health system. It is possible to take these lessons to other areas such as chronic diseases, rehabilitation, palliative care, trauma care and intensive care. Much of these suggestions are already part of guidelines for district hospitals but are not implemented because of lack of infrastructure, personnel and expertise. By strengthening of district hospitals, it is possible to decrease the tertiary care load on medical college. Medical college can support the upgradation and provision of services at the district hospital. Similarly, medical colleges can use the district hospital for training of undergraduate and postgraduate students in general specialities and family medicine. Better linkages between medical colleges and the district hospital through telephone, video-conferencing, electronic medical record and ambulance services can result in a better functioning health system.

1. Emergency obstetrics and neonatal services

Obstetric care:

Every District hospital should have facilities to do instrumental delivery, caesarian section, anaesthetic support and blood bank facilities.

Neonatal care

Each medical college should establish a Level 2 neonatal care unit (600 sq. foot). It should have basic equipment for resuscitation, infusion, phototherapy and thermoregulation, a variety of sophisticated equipments like blood pressure monitors, infusion pumps and, pulse oximeter. It should be manned by 3 doctors (paediatricians or trained in new born care) and 12 nurses. They should have skills for giving intramuscular injection, intravenous catheterization, umbilical vein catheterization and naso-gastric feeding. They should be trained in guidelines and protocols and improving infection prevention.

2. Emergency services

Each district should have a level 2 ICU in common area with 5-15 beds. The ICU should have multiple parameter monitoring (ECG, pulse oximeter), infusion pumps, mechanical ventilators and non-invasive ventilation facilities. It should have 3 doctors and one MD Medicine or Anesthetist, nurse patient ratio of 1:2 and one respiratory/critical care therapist. The district should be able to handle single/dual organ dysfunction and short term mechanical ventilation for acute reversible illnesses. It should be able to manage road traffic accidents, poisoning and snake bite, acute cardiac and respiratory emergencies, stroke, acute febrile illness and infectious disease emergencies.

3. Chronic disease care

District hospitals should have good quality services for chronic disease care which is protocolised for Diabetes Mellitus, Hypertension, Coronary artery disease, Bronchial asthma and COPD. The team should include doctor, nurse educator, social worker and dietitian. The services should include chronic disease prevention, screening and patient education.

4. Rehabilitation services

Each district hospital should have a centre for rehabilitation. With increasing rates of road accident and vascular accidents as well as the aging population, it is necessary to provide rehabilitation services at the district hospital. Establishing district rehabilitation services has been done in Kerala.

Each district hospital should be manned by PMR qualified person or a doctor with some PMR experience (MD Medicine or MS orthopaedics), speech therapy, occupational therapist and physiotherapist, and social worker. The facility should have sufficient ground area space for therapy, basic OT and PT equipment, and a prosthetic and orthotic set up. It should have inpatient facilities for admission. The centre should be involved in training of CHC, PHC staff and village health workers in identifying disability and providing solutions through local resources. The centre should be linked to local communities to provide Community based rehabilitation services..

5. Cancer prevention, early detection and palliative care

The district hospital should offer services for cancer prevention and early detection in relation to tobacco related cancers (head and neck, lung), carcinoma cervix and breast cancer. The early detection services should include pap smear, colposcopy and self-breast examination and oral examination. Patients who are detected to have cancer should be referred to the medical college or regional cancer centre for management.

Each district hospital should have the basic provision of palliative care with one doctor and two nurses. They should be trained to be able to administer morphine and advise on palliative care including teaching relatives in care of bed ridden patient. Oral Morphine should be available at the district hospital level. They should be involved in training health workers in basic principles of palliative care. The district hospital palliative care should be linked to NGOs involved in cancer and geriatric care and elderly self-help groups. This has been done in Kerala state which has a State palliative care policy with trained district level staff, district hospitals stocking morphine and community groups providing palliative care supported by Panchayats.

6. Mental health

Each district hospital should have a mental health clinic. The mental health clinic should be manned by a psychiatrist who can manage common mental health illnesses, and refer where required. The district mental health clinic should be linked to services at the CHC and PHC level.

7. Strengthening of laboratory and radiology services

For the district hospital to provide for all the above, reliable district level laboratory services and radiology services are required. Specific strengthening and quality assurance is required.

8. Ambulance services

One of the significant advances in district health services in Tamil Nadu is the availability of free or subsidized 108 ambulance services right across the state. This is crucial for the linkage between district hospital and the medical college. It is recommended that such services be established across the country.

Table II- District medical college- Development and requirements for speciality care

This table is based on an understanding of services that need to be provided by district medical college in order to take care of majority of tertiary care problems of a district. These are services that most physicians would agree should be provided to all patients with a particular disease. These are different from the MCI guidelines for medical colleges which are based on the requirements of undergraduate and postgraduate training. In this case the suggested planning requirement of a medical college should be based on health services to be provided for a geographical area. Many of the suggested services (eg. Cardiac care, dialysis facilities, neurosurgery, PMR, neonatal ICU) would not be available in specialist centres in the government health system but are commonly available in private hospitals in small towns and cities. Therefore it is suggested that district medical colleges should develop the capability to provide many of the much needed specialist services that are currently provided by the private hospitals.

Speciality	Infrastructure/technology	Staffing	Conditions and procedures	Specific training programmes	Other comments
Cardiology	TMT Echocardiography Cardiac catheterisation laboratory and interventional set up Thoracic surgery backup	DM in cardiology with training in interventions Thoracic surgeon Cardiology technicians	MI management Pacing Balloon valvotomy Stent placement		One medical college for every few districts should have interventional facilities

Nephrology	Dialysis facility	MD in Medicine with fellowship or DNB in Nephrology Dialysis therapist	Haemodialysis for ARF	Post MD Fellowships Dialysis technician training	
Respiratory medicine	Complete Pulmonary function tests Bronchoscopy ICU facilities- Non-invasive and invasive ventilation	MD/DM, respiratory therapist and nurse educator, social worker	Complicated pleural effusion, pneumonia, TB and ILD Severe asthma/COPD	Training of MD in respiratory medicine/respiratory therapist	
Neurosurgery	Operating microscope, high speed drills, microinstruments. CT and MRI ICU with ventilators	2 neurosurgeons	Head injury Hydrocephalus Brain abscesses, Subdural hematomas Disc disease, Benign brain tumors		
Urology	Ureteroscope, TURP resectoscope, image intensifier, PCNL equipment	Urologist	Surgery for stone stones urteroscopy TURP		One dept for every few districts
Radiotherapy	Radiotherapy set up-Linear accelerator/Cobalt	RT MD Surgeons RT physicist Nurse educators	Head and neck Breast Cancer cervix		
Palliative care	Availability of morphine	Experience in palliative care Social worker, nurse and ANM	Administer morphine and advise on palliative care	Starting MD programme in palliative care Training UGs (MBBS and nursing), PGs, staff at district and community level.	One medical college in each state to start palliative care; stock morphine

Physical medicine and rehabilitation	Beds Physical area for therapy	PMR MD PT/OT/Speech therapy/Social worker	Spinal cord injury Head injury Stroke Locomotor disorders	Training of doctors in district, CHC and health workers	Community linkage
Critical care	10-15 beds Infusion pumps Ventilators Invasive monitoring Level III ICU	3 doctors One consultant MD Medicine/Anaesthetists 1:2 nurses per patient 1 therapist	Critical care Multi-organ dysfunction	Training of MBBS doctors in intensive care Training of intensive care technicians	Good ambulance services
Neonatology	Level III ICU	MD paediatrician Expertise in neonatology Nurses	Infections Prematurity Congenital anomalies	Training of medical and nursing staff at district and subdistrict level	Linkage with district level facilities
Gastroenterology	Gastroscope Colonoscope Therapeutic endoscopy Virology lab for hepatitis Ultrasound	MD Medicine/ MS surgeon with training in endoscopy Endoscopy technician	Upper GI bleed Suspected malignancy Chronic hepatitis/cirrhosis	Training of MD Medicine in gastroenterology Training of doctors in primary and secondary level in endoscopy	Hepatitis B and alcohol prevention