

Human Resources for Health

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ODERN TECHNOLOGY HAS THE POWER TO PREVENT SICKNESS AND ASSURE EARLY cure. However, its delivery requires a vibrant health system based on the strong foundation of a well-trained, motivated and professional human infrastructure, which includes a wide array of community-based workers, nurses and other paramedics and doctors—persons who actually deliver care and transform inputs into dynamic outcomes. Human resources are the critical variable for the effective implementation of health programmes and delivery of quality health care to achieve the national health policy goals in India. The availability of an adequate number of health personnel to effectively and efficiently manage and implement health programmes cannot be overemphasized. However, numbers alone may not necessarily lead to the desired change in health status and outcomes.

In keeping with the growth of the health infrastructure and the expanding scope of the health services human resource needs have been increasing. Several new health programmes have been introduced or strategies of existing programmes revised. The changing constellation of health services and strategies have led to an urgent need to develop new competencies and skills among the health personnel, in addition to increasing the critical mass of human resources at various levels. This section deals with the training, skills, competencies and professional development of the five critical categories of human resources for health—the village health worker, nurses, paramedics and finally, doctors and specialists.

The community

Historically, the health of communities in India were in the hands of local healers who practised holistic medicine. The vaidis and hakims combined healing skills with counselling and concern for the well-being of the family. Modern technology has changed this and led to the increasing institutionalization and urbanization of health care. The resultant vacuum, barriers of cost and distance, combined with the gradual shift in perception towards allopathy as symbolizing good quality, resulted in the proliferation of a large number of unqualified or unregistered practitioners of health care, estimated to be 36% as per the 57th Round of the National Sample Survey Organization (NSSO).

Individuals and communities play an important role in their own health. Experience, knowledge of their environment and traditional practices form a strong foundation for most communities to address minor ailments and short episodes of sickness. The low cost of medication for such treatment makes travelling long distances unaffordable and expensive. Communities also need to be provided information on health risks and guided on healthy lifestyles. Such information dissemination aimed at behaviour change strategies have been demonstrated to have a long-term impact on avoiding diseases and well-being. The need to restore the community base for the health system has been recognized for a long time (Bhore Committee, Srivastava Committee, NHPI, etc.). These concerns that require active participation of the people, led to the institution of the Village Health Guide (VHG) Scheme in 1977. The VHG was to be a person from the village, who was imparted a short training and provided Rs 50 per month for medicines. The experiment failed as no follow-up training was imparted and the scheme has since been abandoned.

After the VHG Scheme, the second intervention for community mobilization on a countrywide scale was carried out in 1993. The Department of Family Welfare intro-

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duced the Mahila Swasthya Sangh (MSS Scheme), under which women representatives from 20 households were made into a women's health group and the auxiliary nurse midwife (ANM) was provided with seed money for local health education activities. MSS have been constituted since 1990-91 in villages with a population of more than 1000, or 200 households in the plains, and for a population of 500 or more in hilly areas. The MSS comprises five grassroots-level functionaries and 10 prominent women from the village community. The MSS helps the ANM in educating and motivating the community for the welfare of women and children.

The results have been mixed across the country and in several places defunct. Such initiatives of village-level committees have to be viewed not from the narrow perspective of provision of health services, but as part of a wider social mobilization process. Some attempts towards community mobilization have also been made in different states—Jan Swasthya Rakshaks (JSR) in Madhya Pradesh (MP), Mitanins in Chhatisgarh, Jan Mangal Couples in Rajasthan, community-based workers under SIFPSA in Uttar Pradesh (UP) etc. (Annexure I). There have been other isolated experiments by NGOs to deliver health services to communities through village-based workers.

Under the National Rural Health Mission there is now a renewed commitment to provide in every locality a trained health worker—a married woman, preferably educated, trained to promote good health behaviour, recognize early signs of the onset of disease (for treatment if minor or referral if serious), run a drug depot to provide essential medicines for minor ailments and help communities access health care services. The vision is for her to be from the community, responsible and accountable to them.

Evaluations have, however, indicated that community-based health workers need to be periodically trained, closely supervised and integrally linked to the organized health system to ensure sustainability and credibility. As shown in the JSR initiative of MP, absence of such a nurturing framework resulted in the worker losing focus and being reduced to another quack providing some curative care to make money. Similarly, in areas with a high maternal and infant mortality and where the system is unable to provide effective access to professional services, it is essential to focus on improving the skills of traditional birth attendants (TBAs). Such training, however, needs to be not for a single six-day loop but intermittent and closely supervised. Such intensively monitored upgradation of skills among community health workers in selected areas through special interventions would require substantially more resources than are now provided but will have greater dividends. However, in the ultimate analysis the success of such interventions, so vital to the people particularly those living in remote areas, is dependent on the support and sustenance received from the health providers in the health system.

The first health posts: Multi-purpose health workers

The first rung of the professionalized cadre of health services

are the 2 multipurpose workers (MPWs) manning a subcentre. The male worker is given 6 months' training in public health. With virtually no scope for in-service training, low motivation, high absenteeism and over 60% of posts lying vacant, this cadre is the most neglected.

Of equal importance is the female multipurpose worker, or ANM. Though originally conceived to address maternal and child health care in the community, over the years, there has been a systematic dilution of skills and functions. With several states (Rajasthan) and categories (STs) opting to reduce the educational qualification to standard VIII pass and no back-up training in human anatomy and basic sciences, the initial handicap was worsened by reducing the training period from 2 years to 18 months. Training schools were established under political compulsions, without adherence to staffing norms or quality. Over the years, ANMs lost their clinical expertise. Finally, as a multipurpose functionary, her nursing and midwifery skills got eroded, affecting her credibility with the community—a factor influencing the increased level of absenteeism.

The low competencies and poor skills among these front-line workers is largely the result of the consistently low priority that was accorded to training, both pre- and in-service. For example, the ANM training centres (ANMTCs) conduct basic training for ANMs/health workers (female). The syllabus is outdated and the physical condition of the buildings pathetic. The training is usually conducted in the district hospitals and does not make the ANM skilled enough to handle a delivery on her own in a house located in a remote village—a reality in most of rural India.

To understand the knowledge and skill gaps of ANMs, a survey was undertaken among ANMs and Lady Health Visitors (LHVs) in the cadre of supervisors. Results of the survey revealed a grim picture of poor knowledge and wide skill gaps (Table 1).

It is clear from the above that there is practically no in-service training of these health care providers. The training is of low quality and inadequate to provide them with the required skill base. It also reflects on the effectiveness of the recent in-service clinical training of ANMs and LHVs under the Reproductive and Child Health (RCH) Programme, which made no serious efforts to provide hands-on clinical practice.

Given the very high burden of neonatal mortality and the urgency to bring down the levels to make a breakthrough in the IMR, a similar analysis of skills was undertaken with respect to neonatal mortality. As can be seen from Table 2, the situation is as disturbing. Neonatal deaths are closely associated with the obstetric process and require effective obstetric and essential newborn care skills among ANMs and LHVs. Birth asphyxia and birth injuries, important causes of neonatal death, can be easily avoided by efficient obstetric care and subsequent newborn care including aspiration of mucus and amniotic fluid. Easy interventions are available for acute respiratory infections ((ARI), diarrhoea and neonatal tetanus; however, health functionaries and supervisors had limited skills in preventing and managing these. Hypothermia, an important cause of neonatal death, was not considered a

Table 1

Maternal deaths: Select causes, main interventions and skill levels

Causes of maternal deaths	Interventions	Current levels of skills of ANMs and LHVs
Antepartum haemorrhage (APH)	Early identification of bleeding during pregnancy Counselling Continued risk assessment Referral	Poor knowledge of APH Poor APH management skills
Postpartum haemorrhage (PPH) manual removal of the placenta	Prevent and treat anaemia in pregnancy (prophylactic and therapeutic) Early identification and risk assessment Skilled attendant at birth Manual removal of placenta Prevent/treat bleeding with appropriate drugs Replace fluid loss by IV drip/transfusion, if severe Early referral and transport	Poor knowledge of PPH Poor skills to diagnose and manage PPH including Poor skills to give blood/IV transfusion
Puerperal sepsis	Skills in aseptic delivery Clean practices during delivery Administration of antibiotics	Poor knowledge of puerperal sepsis and its management
Pregnancy-induced hypertension (PIH) Eclampsia/toxemia	Early identification of risk in pregnancy Counselling Treat eclampsia with the appropriate anticonvulsive drug Urgent delivery—caesarean section if needed	Poor knowledge of PIH Poor counselling skills Poor management skills
Obstructed labour	Pelvic assessment Referral Assisted delivery or caesarean section as per indications	Poor pelvic assessment Poor management skills of obstructed labour
Complications of abortion	Identify and diagnose complications Treat sepsis with antibiotics Fluid replacement if necessary Referral	Poor knowledge and skills in managing complications

Note: Number of teachers estimated on basis of norms from Medical Council of India

(1) This is the number of subject-wise faculty members required for imparting undergraduate training in the medical colleges where undergraduate medical education is being imparted

(2) There are at least 105 medical colleges imparting undergraduate medical education that also impart postgraduate training. As per MCI's Postgraduate Medical Education Regulations, 2000 for conducting postgraduate courses, extra staff is required in the departments of Anatomy, Physiology, Biochemistry, Pharmacology, Pathology, Microbiology, Community Medicine, Radiodiagnosis, Radiotherapy, Anaesthesia and Forensic Medicine (four additional teaching faculty in each of these departments, in addition to those prescribed for undergraduate education).

(3) There are also some institutions that impart only postgraduate training, and information on the faculty requirement of such institutions has not been incorporated in this table.

priority by these functionaries.

Is the system prepared to meet the challenges of developing human resources with the requisite competencies and skills, based on an effective training policy? Is there an adequate and effective training infrastructure? Is there a functioning and efficient training system and process? The answer is No. A survey conducted by the IIHMR, Jaipur for the NCMH, in two states of Andhra Pradesh and Rajasthan and a review of training policy in India brought out several disturbing facts:

No state has a separate manpower planning division in the State Directorate of Medical and Health Services though most have an elaborate training infrastructure—state Institutes of Health and Family Welfare (SIHFW), Health and Family Welfare Training Centres (HFWTC), District Training Centres (DTC) and ANM Training Centres (ANMTC), etc. However, most of these institutions suffer for want of good faculty or adequate budgets for any meaningful training. For example, the Rajasthan SIHFW, created under IPP-IX as a Society to ensure autonomy and flexibility for planning, designing and coordinating training in the state, has had no regular director for about four years. There is no regular faculty available and

most of the faculty positions are vacant. The physical infrastructure has been created but yet to be developed to the desired level. The SIHFW does not have its own field practice area to provide hands-on training and undertake operational research in health systems as well as training interventions. There is no training budget in the state and for the Institute. Funding from the World Bank has come to an end thus bringing uncertainty in staff salary and continuation of training programmes. There is no software development activity, such as designing new training programmes and curricula, learning materials development and new training pedagogy. The present situation of the premier training institute reflects not only the apathy to training but also the level of priority accorded to capacity development in the state. Most SIHFWs are in a similar position.

Male workers get their initial training the HFWTCs, established and funded by the Government of India. The HFWTCs conduct in-service training of medical officers besides training of trainers of DTCs. These HFWTCs have their own field practice areas but these are scarcely visited or utilized. The HFWTCs are neglected, suffer from gaps in infrastructure,

Table 2**Infant (neonatal) deaths: Select causes, main interventions and skill levels**

Cause of death	Interventions	Current levels of Skills of ANMs and LHV's
Birth asphyxia	Safe delivery practices Proper newborn care	Inadequate skills for obstetric care Lack of skills in newborn care
Birth injury	Safe delivery practices Newborn care	Inadequate skills for obstetric care Lack of skills in newborn care
Prematurity	Proper antenatal care Supplementary nutrition (IFA) Proper newborn care	Inadequate skills to assess foetal growth Inadequate newborn care skills
Congenital malformation	Proper counselling Screening during antenatal care (ANC) Newborn care	Poor counselling skills Inadequate newborn care skills
Neonatal jaundice	Proper newborn care	Inadequate newborn care skills
Neonatal tetanus	Aseptic delivery Immunization of mother with TT	Inadequate skills in aseptic delivery
ARI-pneumonia	Proper management of ARI	Poor diagnostic and assessment skills for severity of ARI
Diarrhoea	Proper management of diarrhoea	Poor assessment skills for severity of diarrhoea

IFA: iron-folic acid; ARI: acute respiratory infection; TT: tetanus toxoid

training equipment and aids, training material, and lack of qualified and experienced trainers. The libraries are not equipped and virtually non-functional.

Training carried out so far functions on the implicit assumption that generating knowledge, rather than building competencies for action, would empower the health care provider to deliver high-quality services effectively. No effort has been made to build an appropriate training environment which is conducive to learning, raising concerns and developing commitment of health personnel towards health care. There is no behaviour change. There is no monitoring and follow-up to assess changes in performance and effectiveness of programmes. Training programmes are overwhelmed with the assumption that participants' acquisition of knowledge means greater competence; learning is a simple capacity of participants to understand and the ability of trainers to teach; and individual improvement leads to improvement in the organization.

An assessment of the knowledge and training needs as perceived by key functionaries was highly revealing. A questionnaire was administered to all health care personnel to assess their knowledge on health and diseases of public health importance; their role, and other related aspects (Table 3). The study revealed that while the level of knowledge regarding immunization was almost 100%, it was deficient regarding important public health programmes such as tuberculosis (TB), HIV/AIDS, malaria eradication, leprosy, etc. Only medical officers had knowledge of these aspects. The ANMs, the MPW (M), and almost all pharmacists and laboratory technicians did not possess adequate knowledge of national programmes. Further, the majority of PHC staff was not aware of their job responsibilities.

The review revealed glaring inadequacies in the human

resource development process and training of health personnel. Some salient observations are summarized here:

- Training institutions and training receive a low priority. There is a generalized apathy towards training and capacity building. Training is not recognized as an intervention to improve performance. Owing to lack of nominations, training programmes are frequently cancelled.
- The training function is seen in isolation. There is no proper planning and implementation of training programmes. Training is organized as thrust upon by the Central Government or donor agencies. The training needs and expectations of the participants are not considered. Most of the programmes are lecture-based and didactic in nature. There is no focus on practical skills' development. Even in clinical skills' development programmes for ANMs and LHV's, there was scant attention on practice to the participants.
- The morale of trainers is low. There is no training cadre in the states, or system for appointing trainers. Persons are posted or deputed to training institutions as trainers rather than regularly selected. There is no career stream in training. There are no facilities for the regular professional development of trainers.
- The SIHFWs, HFWTCs and DTCs are poorly equipped with hostels, training infrastructure and libraries. The physical facilities at ANMTCs are appalling.
- Trainings of various types is offered under different programmes and a health worker is nominated more than once to attend different training programmes. This multiplicity of training has been a constraint in work performance.
- Incompetent trainers and lack of technical guidance to training institutions has resulted in poor quality training, thus

lowering the credibility to training institutions.

- Trainers of various training centres feel that there are no formal linkages amongst these institutions and they feel left out.
- There are financial constraints. The payment of TA/DA to participants, procedures/facilities for inviting guest faculty and lack of funds for developing good quality training material are major problems.
- The training is not taken seriously by the trainees as it has no relationship with the career development of health professionals; the current appraisal system does not take into account the training received for placement or promotion.
- There is no system of nomination for training. It is highly centralized and, more often than not, based on personal fancy or preference of the concerned officer.
- There are no norms for in-service training. Some health personnel attend training programmes irrespective of their utility in their job.
- The training is not seen as an intervention for improved job performance by most trainers. This is because there is a mismatch between organizational and personal goals.
- The need for management training is seldom felt by functionaries and health administrators. It is thrust upon them.
- There is no linkage between service providers and trainers. Training is viewed as a constraint in achieving programme objectives rather than facilitating them.
- There is no training or personnel information system in the states. As result, there is no proper planning.
- Operational research is not carried out in training institutions.

Paramedical personnel

Two critical paramedical functionaries in the primary health care system are laboratory technicians and pharmacists. In the absence of a separate council, the training of most categories of paramedical personnel has been unregulated except for pharmacists, whose functioning is governed by the Pharmacy Council of India.

- Training of most categories of paramedicals has been unregulated as there is no council for regulation of training except the Pharmacy Council of India. The quality of training of most of these categories of personnel is poor.

Laboratory technicians

Laboratory technicians (LTs) are an important human resource. Although some institutions offer graduate (BSc) courses for Laboratory Technology Technicians, most institutions continue to impart a nine-month diploma course. However, in the absence of a regulatory body, there is no information on the numbers of diploma and graduate LTs. Any XII-standard pass student can take up this course, even students with an Arts/Humanities background in the short duration of nine months, the student, especially one with an Arts background, will not be able to acquire the skills required of him/her.

Table 3

Perceived knowledge about skill and actual gap

Area	Staff interviewed	Perceived awareness (%)	
		Andhra Pradesh	Rajasthan
National Programme on Women and Child Malaria, TB, AIDS, leprosy, etc.	Doctors	50	47
	ANM	5	10
	MPHW/LHV (M &F)	16	25
	Staff Nurse	37	13
	LT/Pharmacist	10	8
Maternal health Enumerate the correct process for providing antenatal care (ANC)	Doctors	93	94
	ANM	94	90
	MPHW/LHV (M &F)	72	62
	Staff Nurse	100	87
	LT/Pharmacist	25	—
What do you do in ANC?			
Screen for risk factors and medical conditions	Doctors	100	100
	ANM	55	60
	MPHW/LHV (M &F)	72	62
	Staff Nurse	100	100
Record BP	Doctors	86	88
	ANM	55	0
	MPHW/LHV (M &F)	0	0
	Staff Nurse	100	100
*Weight and height	Doctors	64	80
	ANM	67	0
	MPHW/LHV (M &F)	32	0
	Staff Nurse	100	100
Screen for anaemia	Doctors	71	88
	ANM	55	70
	MPHW/LHV (M &F)	0	75
	Staff Nurse	100	87
Give Tetanus Toxoid	Doctors	100	100
	ANM	100	100
	MPHW/LHV (M &F)	0	0
	Staff Nurse	100	100
Provide education on nutrition	Doctors	43	70
	ANM	67	90
	MPHW/LHV (M &F)	68	87
	Staff Nurse	62	87

*Only weight taken

There is a need, therefore, to upgrade the training courses for LTs to graduate level-BSc (Laboratory Technology).

There are a large number for LTs at PHCs and CHCs although as per norms, every PHC and CHC should have one. There is a shortfall of 48.9% in the number of sanctioned posts for LTs, out of a requirement of 25,885 LTs for PHCs and CHCs. Of the sanctioned posts, 15.2% were vacant in 2002. Under the RCH Programme, funds were provided to states for hiring the services of LTs on contract, due to which the gap was

filled to some extent. In the public sector, once an LT is recruited and placed in an institution, there is usually no in-service training and no system of continuing education for him/her, despite the fact that in-service training and continuing education is required due to rapid advances in the field of medicine, e.g. automation of laboratory investigations and procedures. There is no supervision of the work of the LT. Under the RNTCP, LTs at many CHCs have been trained in standard procedures for examination of sputum slides for AFB, and there is a supervisor to supervise the quality of work.

Most institutions for the training of Laboratory Technicians conduct a diploma course of nine months. Students from the Arts or Humanities stream can also take up this course. There are large number for vacancies of Laboratory Technicians in the public sector and there is no system of continuing education for them.

At the PHC and CHC levels, the LT usually performs basic investigations such as routine blood examination, urine examination, examination of a blood slide for malarial parasite, sputum examination for AFB, etc. However, at the district hospital and in medical colleges, there are a number of departments, and for better patient care or research, the LT needs to be posted to different departments by rotation. This helps to enhance his/her skills in different areas. However, there is usually no such system of posting and a LT posted in a particular department continues to be in that department for many years, in many instances throughout his service.

Pharmacists

The Pharmacy Council of India (PCI) regulates the education and training of pharmacists under the provision of the Pharmacy Act. The present education regulations framed by it prescribe a curriculum of 2 years after the 10+2 (entry) stage followed by practical training of 500 hours over a period of not less than three months for obtaining the minimum registrable qualification—Diploma in Pharmacy. Consequently, training of most of these categories of personnel has been unregulated and many centres for training these categories have opened up all over India, with permission from the states.

There are over 5.5 lakh registered pharmacists in India giving a ratio of one pharmacist for 1840 population, with wide inter-state variations ranging from 1:567 in Pondicherry to 1:43,000 in Madhya Pradesh (Table 4). These pharmacists could work as community pharmacists or as retail pharmacists in retail pharmacy outlets. According to the World Health Organization (WHO), the average ratio of pharmacist to the population in industrialized countries is 1:2300. The average ratio of registered pharmacists to the population compares favourably with that in developed countries. However, these diploma-trained pharmacists are at best equivalent to pharmacy assistants or technicians in developed and many

developing countries (Ghana, Fiji, Nigeria, etc.) but perform a variety of tasks normally reserved for registered pharmacists. The knowledge and expertise of diploma holders (and those with degrees as well) is inadequate for community practice. Thus, while the number of pharmacists may appear adequate, their quality requires urgent attention and upgradation.

The pharmacist working in the pharmacy should have a diploma or preferably a degree in pharmacy, registered with the Pharmacy Council of the States where he/she is practising, have adequate practical training in community pharmacy and should have communication skills and capabilities to advise regarding proper use of medicines. The pharmacist must have the competence to assess prescriptions, advise patients on appropriate selection and use of over-the-counter medicines, appropriate use of prescribed medicines, advise on drug-drug and drug-food interactions, anticipate adverse drug reactions, comprehend the client's condition and advise on the proper use of the prescribed medication and diet, and decide when to refer to a doctor, etc.

In the public sector in rural areas, every PHC and CHC should have a pharmacist. Out of a requirement of 25,885 pharmacists for PHCs and CHCs, there is a shortfall of 25.8% in sanctioned posts at these levels; 10.7% of the sanctioned posts lay vacant in 2002.

The major reasons for inadequacies in the quality of and services provided by the pharmacist could be

- Inappropriate education and training at the college level
- Lack of facilities for continuing education
- Inadequate remuneration
- Unhealthy competition among pharmacies because in most places they are too many and too close to one another, which compels the owners of the pharmacies (often non-pharmacists) to treat pharmacy as a trade (and not a profession).
- Lack of implementation of existing drug laws, which make it mandatory for medicines to be sold under the personal supervision of a pharmacist, and prescription medicines only against a valid prescription.

Nursing Services*

Shortage of nurses

Nurses and midwives are major health care providers. Overall, there is a shortage of nurses and midwives in India. In 2004, the nurse to population ratio in India was 1:1264 while in Europe the nurse to population ratio is 1:100–200. The nurse to doctor ratio is about 1.3:1 compared to a ratio of 3:1 in most developed countries (Table 5).

In most states, there is no system of re-registration of nurses. As of March 2003, there were 839,862 nurses registered with State Nursing Councils. However, only about 40% of registered nurses are active because of the small number of sanctioned posts, poor working conditions, low pay scales and migration, retirement or death. At the community level there

* Based on background paper on Nursing Services

Table 4**State-wise number of registered pharmacists**

State/Union Territory	Number of registered pharmacists	Population 2001	Pharmacist: population ratio
Andhra Pradesh	33,938	75,727,541	1:2231
Arunachal Pradesh	347	1,091,117	1:3144
Assam	2429	26,638,407	1:10966
Bihar	4163	82,878,796	1:19908
Chhattisgarh	NA	20,795,956	NA
Goa	255	1,343,998	1:5270
Gujarat	20,948	50,596,992	1:2415
Haryana	874	21,082,989	1:24122
Himachal Pradesh	2818	6,077,248	1:2156
Jammu and Kashmir	NA	10,069,917	NA
Jharkhand	NA	26,909,428	NA
Karnataka	71,736	52,733,958	1:735
Kerala	7531	31,838,619	1:4227
Madhya Pradesh	1381	60,385,118	1:43725
Manipur	NA	2,388,634	NA
Maharashtra	99,614	96,752,247	1:971
Meghalaya	150	2,306,069	1:15373
Mizoram	382	891,058	1:2332
Nagaland	NA	1,988,636	NA
Orissa	12,159	36,706,920	1:3019
Punjab	35,290	24,289,296	1:688
Rajasthan	18,214	56,473,122	1:3100
Sikkim	NA	540,493	NA
Tamil Nadu	101,240	62,110,839	1:613
Tripura	257	3,191,168	1:12417
Uttaranchal	NA	8,479,562	NA
Uttar Pradesh	30,276	166,052,859	1:5484
West Bengal	89,630	80,221,171	1:895
Andaman and Nicobar Island	NA	356,265	NA
Chandigarh	NA	900,914	NA
Dadar and Nagar Haveli	NA	220,451	NA
Daman and Diu	NA	158,059	NA
Delhi	20,978	13,782,976	1:657
Lakshadweep	3082	60,595	1:19
Pondicherry	1716	973,829	1:567
Total	559,408	1,027,015,247	1:1840

NA, not available
Source of number of pharmacists: Pharmacy Council of India

Table 5**Health manpower (per 100,000 population) across some countries**

Country	Physicians	Nurses	Midwives	Pharmacists	Nurse: doctor ratio
Australia	249.1	774.8	60.2	72.1	3.1:1
Canada	209.5	1009.9	1.2	79.7	4.8:1
China	164.2	104.2	INA	29	0.6:1
Cuba	590.6	744.2	INA	INA	1.3:1
India	59.7	79.1	47.4	52.7	1.3:1
Sri Lanka	42.8	79.1	41.9	4.5	1.8:1
Thailand	30.1	161.7	INA	INA	5.0:1
United Kingdom	166.5	496.6	43.3	58.9	3.0:1
United States of America	548.9	772.6	INA	68.8	1.4:1

Source: WHO website www.who.int, updated figures obtained from MCI and INC used for India
Reference year: 2004

are no positions for nurses and health services are delivered mostly by ANMs. There are 502,503 registered ANMs and 40,536 registered LHV in India.

The optimum nurse:patient ratio norms recommended by various committees (Annexures II, III, IV and V) for better patient care have not been implemented, thereby resulting in overload on the existing nurses, affecting the quality of patient care. In many instances, even sanctioned posts are not regularly filled.

Roles and responsibilities

There are small categories of nurses and midwives with overlapping roles and responsibilities. Nurses in a hospital setting spend most of their time in non-nursing tasks such as inventory control, record maintenance, etc. Most nurses in service are diploma holders; some are graduate nurses. There are no specialist nurses in clinical areas in India. In other countries, besides the professional nurse who is a graduate, there is the advanced practice nurse (APN) who is a postgraduate. APNs are further categorized into Clinical Nurse Specialist (CNS),

Nurse Practitioner (NP), Nurse Anaesthetist, and Midwife. The APN has many roles—a clinician expert, educator, researcher, consultant, and manager, with competency of clinical judgement and leadership qualities. The APN is an agent of change, and can collaborate and communicate. In the United States, the post of APN has been in existence for more than 20 years and it has been found that the APN can make an early diagnosis so that the patient can receive proper treatment in time, have a shorter length of hospital stay, fewer complications, and satisfaction with the care provided. As part of the health care reform in the US, the production of NPs has increased because of a shortage of doctors in general practice. In Australia, NPs work at the community level as case managers as well as independent practitioners. In Australia and New Zealand, there are midwives whose training is at the postgraduate level.

Nursing and midwifery education: Inadequacy and poor quality

India has 635 nursing schools and 165 nursing colleges. Some nursing colleges are attached to medical colleges. The Indian Nursing Council (DNC) has set standards for education by identifying curriculum structure and syllabi for all educational programmes and conducts inspection of nursing education institutions every 3–5 years. The quality of nurse training is affected by an inadequate number of nurse teacher specialists, non-adherence of the INC teacher:student norm, inadequate infrastructure, insufficient budget, lack of commitment and accountability among educators for clinical supervision and guidance, inadequate and improper clinical facilities and inadequate exposure to hands-on experience for students. In 2004, it was found that 61.2% of nursing schools/colleges were unsuitable for teaching. De-recognition by the INC has no effect on any institution as it continues to function with permission of the State Nursing Council. The result is the production of nurses and midwives with inadequate skills and who later work in an environment of ineffective regulation. Thus, the INC does not have effective control over the nursing services.

Many private health care institutions train their own health workers on the job instead of hiring qualified and trained nurses due to a shortage of trained nursing personnel and because hiring the services of non-qualified persons is less expensive. The INC has no control over such practices, as this issue is not addressed in the INC Act.

Teaching faculty in nursing schools and colleges and higher education

There is a shortage of teachers with master or doctoral degrees and the postgraduate curriculum in nursing is inappropriate. There is limited research with regard to nursing services and nursing education. In Thailand, 30 years ago, the master's programme in Nursing aimed to produce nurse educators and nurse administrators and later nurse specialists. A master's programme for APNs is offered in many faculties of nursing to respond to the growing demand for more competent nurses.

Nurse leaders in Thailand submitted a 10-year nursing and midwifery plan to the government in the early 1970s as a result of which 331 scholarships were granted to the nursing faculty for doctoral study outside the country and sufficient funds were also granted for libraries and computers.

Quality of nursing services and research evidence in nursing and midwifery

In the absence of proper nursing standards the quality of nursing services in India varies from hospital to hospital. There is no system of accreditation of hospitals contrary to what happens in countries such as Thailand where hospitals are accredited by an autonomous organization. The nursing component is included in the assessment criteria, which focuses on nursing activity, nurse's notes, participation of nurses in the patient care team, and nursing activity in infection control. Nurses are members of the hospital surveyor team. This accreditation activity stimulates nurses for quality improvement. In 2004, the INC conducted a workshop to develop a quality assurance model for the nursing services but this is yet to be implemented. The model focuses on the code of ethics and professional conduct of nurses, nursing standards, the nursing process and nursing care plan, patient teaching, management techniques, continuing education, research and the nurse's role during disaster.

There is, in general, no emphasis on conducting research or creating evidence that could be cost-effective, or improve the nursing and midwifery services. As a result, there are no advocacy efforts for increasing the scope of work of nursing personnel and empowering them. Although there is a Nursing Research Society of India to promote research and there are a number of Indian nursing journals, the number of nursing research studies and publications is small. The reasons for the nursing staff not conducting research are lack of capacity to do research, heavy workload and lack of time, inadequate resources, lack of support from administrators, and because they are not aware of the significance of research.

Continuing education for nurses and midwives

There is no formal continuing education system for the training of nurses and midwives to keep them abreast of the latest developments in the field of nursing and public health. There is no system whereby clinical nurse specialists can be produced in India. In India, there is also no quality assurance (QA) system for nursing education as opposed to Australia, Thailand and the UK, which have a quality assurance system for the quality of input, process, output and outcome.

Leadership in the nursing profession and empowerment of nurses

Nursing personnel lack leadership and negotiating skills and are rarely, if at all, involved in planning and policy formulation for nursing services, education, etc. at all levels even though they are vital members of the health care team. Nurses

and midwives are not easily accepted and recognized as leaders and administrators. In most Indian states, the Director of Health Services, a doctor, is the President of the State Nursing Council, and the highest rank to which a nursing person can be promoted is up to the level of a Deputy Director. This is ample evidence of suboptimal empowerment of health personnel from the nursing profession. By contrast, in 1988, the New Zealand Government invested heavily in multidisciplinary, experiential leadership and management development programmes to create a number of nurse leaders in the changing health care system. Bangladesh, Myanmar, Nepal, Sri Lanka and Thailand have also provided a leadership and management programme for nurses and midwives.

In India, midwives working in the community setting are not allowed to administer injectable drugs even in an emergency, although they are allowed to inject vaccines to children. The roles of NPs include health promotion, disease prevention, therapeutic nursing interventions and rehabilitation. Nurses perform some tasks independently and some under supervision. Independent Tasks include all procedures that do not penetrate the body such as providing comfort, pain relief without medication, suction, education, counselling, health assessment, developmental assessment, primary care, midwifery and measurement of vital signs. Dependent tasks include giving medications, injections, immunization and withdrawing blood.

Regulations in nursing and midwifery

The INC was constituted by Indian Nursing Council Act, 1947 to set a uniform standard of regulation for minimum requirements of courses in nursing education, inspection and accreditation of institutions for quality of education, and maintaining information on nurses, midwives and health visitors by compiling data from the State Nursing Councils. It has an important role in accepting and recognizing qualifications or certificates awarded by universities within and outside India. There are 22 State Nursing Councils whose functions are to inspect and accredit schools of nursing in their state, conduct examinations, prescribe rules of conduct, take disciplinary action and maintain a register of nurses, midwives, ANMs and health visitors in the state. In some states the Examining Body and the Registering Authority are one and the same. The INC has requested State Governments to create or establish separate examining bodies and have a separate registering authority.

- The Indian Nursing Council has not been able to regulate the quality of training in nursing schools and colleges because it lacks control over the State Medical Councils. Nursing personnel are not actively involved in policy formulation in India, even on matters that affect nursing practice, unlike in other countries.

The enforcement of provisions of the Indian Nursing Council Act, 1947 is poor as there is lack of uniformity in many State Nursing Council Acts which were enacted prior to the Indian Nursing Council Act, 1947. Some powers prescribed in the Central Act are similar to those prescribed in some of

the State Nursing Council Acts. These are major hindrances to the maintenance of uniform standards by the Indian Nursing Council.

In Canada, the US, the UK, Australia, New Zealand, Thailand, Korea, and Norway, nurses and midwives have either been elected or appointed to Parliament. The President and members of the Thailand Nursing Council sit on many national health committees, such as the National Universal Health Coverage Committee to set policies on health care services and reimbursement, subcommittee on quality control of health care services, subcommittee on health manpower development, etc.

Doctors

Availability of doctors

The Mudaliar Committee (1961) recommended a doctor:population ratio of 1:3000. Till September 2004, 633,108 doctors had been registered with different State Medical Councils in India (Table 6). This gives a doctor to population ratio of one doctor for every 1676 population in India (or 59.7 physicians for 100,000 population). In comparison, the number of physicians per lakh population in Australia, Canada, the UK, the US and Sri Lanka was 249.1, 209.5, 166.5, 548.9 and 42.8, respectively (Table 5). The doctor-population ratio in India is, however, skewed, with rural, tribal and hilly areas being underserved as compared to urban areas. However, the Medical Council of India (MCI) and State Medical Councils do not maintain a live register with updated figures taking into account attrition due to death, migration outside the country, or non-practising of medicine by qualified doctors. Various committees set up by the government from time to time have recommended that data related to health manpower should be made available to facilitate health manpower planning.

Production of doctors: The medical colleges

The Mudaliar Committee recommended establishing one medical college for a population of 50 lakh. This comes to 218 medical colleges according to the current estimated population. As of July 2004, there are 229 medical colleges in India, out of which 125 are in the government sector and remaining 104 in the private sector (Table 7). Of these 229 medical colleges, 67 have been permitted under Section 10A of the MCI Act. There is wide inter-state disparity in the number of medical colleges and the admission seats available every year. The admission capacity in these colleges is 25,500 students per year—7700 undergraduate seats in north India compared to 18,000 in the south. Viewed from the norm of one medical college for 50 lakh population, Andhra Pradesh, Karnataka, Maharashtra and Tamil Nadu have an excess of medical colleges while states such as Uttar Pradesh, West Bengal, Chhattisgarh, Madhya Pradesh, Orissa, Assam and Rajasthan have a shortfall (Table 8). These are also the states where the health indicators are relatively poor.

Table 6**Cumulative number of allopathic doctors registered with State Medical Councils till 30 September 2004**

State Medical Council	Number of registered doctors	Projected population on 1 April 2004	No. of registered doctors per lakh population
With < 50 registered doctors /lakh population			
Haryana	1285	21,000,000	6.1
Uttar Pradesh	44,927	186,293,000	24.1
North-eastern states	15,723	49,389,000	31.8
Bihar and Jharkhand	35,110	107,362,000	32.7
Madhya Pradesh and Chhattisgarh	29,003	86,681,000	33.5
Orissa	14,712	37,520,000	39.2
Rajasthan	22,506	57,463,000	39.2
With 50-100 registered doctors per lakh population			
Andhra Pradesh	48,402	78,892,000	61.4
West Bengal	52,274	83,079,000	62.9
Gujarat	36,521	514,24,000	71.0
Jammu and Kashmir	7,993	10,716,000	74.6
Maharashtra	90,855	94,839,000	95.8
Kerala	32,412	33,444,000	96.9
With > 100 registered doctors per lakh population			
Tamil Nadu	71,157	64,991,000	109.5
Karnataka	65,789	54,692,000	120.3
Goa	2,332	1,768,000	131.9
Punjab	33,705	25,526,000	132.0
Delhi	28,402	16,047,000	177.0
Total	633,108	1,061,126,000	59.7

Source for number of registered doctors: Medical Council of India

- As per the norm of one medical college for 50 lakh population, 218 colleges are required.
- There are 229 colleges in India which 45% are in the private sector.
- There are wide inter-state variations in the number of colleges, with Karnataka, Maharashtra, Andhra Pradesh and Tamil Nadu having an excess, and Uttar Pradesh, West Bengal, Chhattisgarh, Bihar, Orissa and Madhya Pradesh having a shortage.

Both private and government medical colleges have a shortage of teachers. Often governments resort to a mass reshuffle of teachers of different specialties from one medical college to another on a temporary basis at the time of inspection by the MCI. Keeping a fake roll of medical teachers and showing expenditure under the salary head is a common tactic adopted by managements of private medical colleges, which has an adverse impact on the quality of instruction. The problem of shortage of medical teachers is more acute in private medical colleges, especially in pre- and paraclinical specialties such as Anatomy, Physiology, Biochemistry, Pathology, Microbiology, Pharmacology, Forensic Medicine, Community Medicine.

Requirement of teaching faculty for imparting training in medical colleges

The MCI has laid down Minimum Standard Requirements for medical colleges for 50/100/150 Admissions Annually Regulations, 1999, which also contain the requirement of minimum number of teachers for imparting training in the colleges. Based on the MCI Regulations, the minimum number of teaching faculty required (total, and annually on an assumption of 30 years of service as a teacher) for different subjects is shown in Table 9. However, the current levels of production of postgraduates in some disciplines clearly falls short of meeting the present and future needs of the teaching faculty is Anatomy, Physiology, Biochemistry, Pharmacology, Forensic Medicine, Community Medicine, Radiotherapy, and Physical Medicine and Rehabilitation (Table 10).

Quality of training in medical colleges and factors associated with it

One challenge in medical education is to induct and retain competent teachers who can transfer their expertise to the students. However, under the current system of recruitment only the technical knowledge of the person is assessed and

not his/her aptitude for teaching. The medical curriculum is meant to help decide what knowledge needs to be given to the students. Due to very high emphasis on passing examinations, students tend to focus only on those areas that would be covered in the examination. Often teachers fail to determine what the students should know, what would be interesting to know and what the student need not know. Consequently, instead of focusing on community needs depending on local health problems, students have no option but to focus more on recent advances, which are of limited relevance to the needs of the population at large.

- The medical curriculum helps to decide what knowledge needs to be given to students, what skills they should acquire and what methodology needs to be adopted to impart these skills.
- Training of MBBS students should be skills-oriented for dealing with the needs of the community, keeping in view the demographic and epidemiological transition.
- Teachers need to differentiate between what the student should know, what would be interesting to know and what the student need not know.
- Training during internship should be oriented towards the acquisition of skills.

Another problem contributing to the poor quality of training of doctors is the vacant posts among the teaching faculty. The process of filling up vacant posts is tedious and time-consuming. It takes almost a year from the date of advertisement to the appointment of a specialist doctor as a teaching faculty by which time the selected person may have joined elsewhere. Vacancies adversely affect the quality of training of doctors and, in many colleges, the position is very serious—there are some government colleges with just two to three faculty members in pre- and paraclinical departments. An Assistant Professor may have to work as Head of the Department; in such cases, often teaching faculty members from some other college are deputed as internal examiners for examination purposes. In addition to regular teaching faculty, many medical colleges have posts of Senior Residents who serve as a vital link for the training of medical students. However, about 30% of the posts of senior residents are lying vacant, which affects both the quality of training and patient care.

The development and training of the faculty of medical colleges has been a greatly neglected area. There are no avenues or incentives for the teaching faculty to undertake research, or introduce innovative methods of training to effectively transfer skills to undergraduate and postgraduate medical students. Doctors getting an opportunity to attend conferences/workshops abroad without any financial liability on the government, whether Central or State, often undergo the unpleasant experience of obtaining clearance to leave the country. Only a few states have time-bound promotions for teaching doctors; there are doctors who have not been promoted for over 10–20 years. Because of the mushrooming of medical colleges in the private sector which require teaching

doctors and are willing to pay higher salaries with other benefits as well, many senior in government medical colleges opt for voluntary retirement and move to private medical colleges. As mentioned earlier, it often takes years to fill up these vacant posts. These have a demoralizing effect.

Large vacancies exist of teaching doctors in pre- and paraclinical specialties because there are insufficient postgraduate seats in these specialties, and students do not find it worth their while to undergo postgraduate training in these subjects as they are non-practising branches. Consequently, often students join post-graduation in these subjects as a stop-gap arrangement till they get a seat in one of the clinical subjects.

In States that have an excess of medical colleges as per norms prescribed by the Mudaliar Committee, almost two-thirds (63.4%) are private medical colleges. Their basic objective is to earn money. These private medical colleges charge exorbitant fees from students, for which students often raise money through loans. It is understandable that these students treat the expenses on their training as an investment, and would later want to recover their investment, and are likely to be

Table 7

State-wise number of medical colleges in India (as on 30 July 2004)

State/Union Territory	Number of medical colleges			Total number of seats
	Government	Private	Total	
Andhra Pradesh	10	17	27	3475
Assam	3	-	3	391
Bihar	6	2	8	510
Chandigharh	1	-	1	50
Chhatisgarh	2	-	2	200
Delhi	5	-	5	560
Goa	1	-	1	100
Gujarat	8	5	13	1625
Haryana	1	2	3	250
Himachal Pradesh	2	-	2	115
Jammu and Kashmir	3	1	4	350
Jharkhand	3	-	3	190
Karnataka	4	27	31	3905
Kerala	6	8	14	1600
Madhya Pradesh	5	2	7	820
Maharashtra	19	19	38	4200
Manipur	1	-	1	100
Orissa	3	-	3	364
Pondicherry	1	4	5	475
Punjab	3	3	6	520
Rajasthan	6	2	8	800
Sikkim	1	-	1	100
Tamil Nadu	13	7	20	2315
Uttar Pradesh	9	3	12	1262
Uttaranchal	-	2	2	200
West Bengal	9	-	9	1105
Total	125	104	229	25,682

Source: Medical Council of India

disinclined towards primary health care or public health.

The Re-orientation of Medical Education (ROME) Programme was ambitiously launched in 1977 to prepare doctors to contribute effectively to the improvement of community health. To support this programme each medical college was assigned three rural development blocks where buildings and hostels were constructed to provide teaching complexes. It was a very well conceived programme with political will but before its actual implementation it got lost in oblivion.

Major hindrance to good quality training of undergraduate and postgraduate medical students is the private practice that most States permit. While the MCI and State/Central governments and most professional bodies have endorsed the need for teachers of medical colleges to be full-time and non-practising, clandestine or officially sanctioned private practice is commonplace. The logic behind banning private practice was to ensure that medical teachers are available for improving and sustaining the quality of care in teaching hospitals. However, in several states this objective has been overwhelmed by market forces that make clinical practice more remunerative than teaching.

Skills mix

India is passing through demographic and epidemiological transition. Hence, an MB,BS doctor should be able to provide care for such communicable diseases as TB, malaria, respiratory infections, diarrhoea, etc. and non-communicable diseases such as accidents/injuries, hypertension, diabetes, psychiatric illness, other heart diseases. As a minimum, therefore, a doctor must have the competency to diagnose and provide basic emergency obstetric care for maternal complications and neonatal care. In addition, he/she should be able to provide services such as normal delivery, medical termination of pregnancy (MTP), cardiopulmonary resuscitation, etc.

For a student to acquire these skills, he/she has to have adequate exposure to and interaction with patients. However, with many colleges admitting over 150 students annually, not all students obtain adequate exposure and acquire enough skills to be able to handle most problems independently in a primary care setting. Besides, about 45% of medical colleges are in the private sector and many of them do not have a sufficient caseload of different diseases for good quality training of medical students. For example, an MB,BS doctor should have acquired the skills to perform vasectomy which implies that he/she should be able to perform about two vasectomy operations under supervision. For over 25,000 admissions to medical colleges annually, this implies over 50,000 operations by MB,BS students under the supervision of a surgeon, while it is well known that only about 1.4 lakh vasectomy operations are conducted every year in India, a large number of these District Hospitals.

The quality of training of postgraduates should also be given due importance. It has been observed that postgraduate doctors posted as specialists do not perform surgeries, e.g. an ophthalmologist not doing cataract surgeries, or an obstetrician-gynaecologist not performing caesarean section operations.

Box 1

Medical education should remain a charitable enterprise

Christian Medical College (CMC), Vellore is an institute of excellence for medical education that is at par with other national and international training institutes. It admits 60 students annually through a rigorous selection procedure that includes an assessment of the aptitude; suitability of the candidate and the tuition fee is also very low. There is considerable emphasis on community-based training through the Community Health and Development (CHAD) programme. Faculty members of the Medical College go to the field practice area under CHAD and provide services to people and training to students. In addition, there is a linkage between CHAD and medical college hospitals wherein a referral system is functional. This kind of a linkage does not exist in most medical college areas and community-based training is also poor.

The training of students at CMC is such that two-thirds of the MB,BS alumni work in India and 80% of them in non-metropolitan areas of the country. The students and faculty members are required to stay within the campus. Although the payment structure for faculty members is not at par or competitive with the private sector, they are provided excellent housing facilities and a good working environment, thereby contributing to their motivation and job satisfaction. This is evidence that quality of training and non-financial incentives matter far more than financial incentives to provide better health services to the masses.

trician-gynaecologist not performing caesarean section operations. This is probably because private practice is allowed in some states; thus, private patients of some specialists who teach in medical colleges are admitted to hospitals in the government sector and postgraduate trainees do not get an opportunity to examine or operate upon them. Moreover, the training environment for postgraduate students in medical colleges is different from what they find in District Hospitals or in CHCs, which have a relatively poor infrastructure.

Duration of training: Is it adequate?

The four-and-a-half years of undergraduate medical education is followed by 12 months' internship wherein students are meant to enhance their clinical skills and understand health care delivery in a community/rural setting. Internship is currently implemented only on paper, particularly since various universities have started the Pre-PG (MD/MS) entrance examination, making internship redundant. Throughout his/her internship, a medical graduate prepares for the MD/MS postgraduate entrance examination.

Increasing trend for postgraduation

It is estimated that almost half the medical graduates opt for postgraduation and settle in urban areas. So serious is the problem that currently most states have failed to ensure the

Table 8

State-wise number of required and existing medical colleges

State/Union Territory	Population as on 1 April 2004	Number of medical colleges required colleges required @ one per 50 lakh population	Existing number of of medical colleges	Difference between existing and required number
States/UTs with more than the required number of medical colleges				
Karnataka	54,692,000	11	31	20
Maharashtra	94,839,000	19	38	19
Andhra Pradesh	78,892,000	16	27	11
Kerala	33,365,000	7	14	7
Tamil Nadu	63,755,000	13	20	7
Pondicherry	1,236,000	0	5	5
Gujarat	51,057,000	10	13	3
States/UTs with an adequate number of medical colleges				
Delhi	16,047,000	3	5	2
Jammu and Kashmir	10,716,000	2	4	2
Punjab	24,536,000	5	6	1
Himachal Pradesh	7,270,000	1	2	1
Chandigarh	990,000	0	1	1
Goa	1,768,000	0	1	1
Sikkim	621,000	0	1	1
Uttaranchal	9,051,000	2	2	0
Arunachal Pradesh	1,327,000	0	0	0
Manipur	2,798,000	1	1	0
Mizoram	1,061,000	0	0	0
Nagaland	1,884,000	0	0	0
Andaman and Nicobar Island	429,000	0	0	0
Dadra and Nagar Haveli	212,000	0	0	0
Daman and Diu	155,000	0	0	0
Lakshadweep	79,000	0	0	0
Haryana	21,000,000	4	3	-1
Tripura	4,203,000	1	0	-1
Meghalaya	2,705,000	1	0	-1
States/UTs with a fewer number of medical colleges				
Chhattisgarh	22,205,000	4	2	-2
Jharkhand	26,315,000	5	3	-2
Rajasthan	57,463,000	11	8	-3
Assam	27,520,000	6	3	-3
Orissa	37,091,000	7	3	-4
Madhya Pradesh	64,476,000	13	7	-6
Bihar	81,047,000	16	8	-8
West Bengal	83,079,000	17	9	-8
Uttar Pradesh	177,242,000	35	12	-23
TOTAL	1,061,126,000	212	229	17

Source of information on existing number of medical colleges: Medical Council of India

availability of anaesthetists, obstetricians and surgeons for effective delivery of emergency obstetric care services including newborn care through the public health facilities. There is a shortfall of 10.1% in the number of sanctioned posts for doctors at PHCs and even out of the sanctioned posts, about 13.4% are lying vacant.

Induction training and in-service re-orientation training in the public sector

Doctors who join services in the public sector should be oriented and indoctrinated so that they can manage the health services effectively and efficiently. However, most states do not impart an indoctrination/induction training to fresh

Table 9**Number of teaching faculty for Undergraduate Medical education in 229 Medical colleges**

Subject	For U/G education	Additional for P/G education	Total	Number of new faculty members required annually
Anatomy	2346	315	2661	89
Physiology	2346	315	2661	89
Biochemistry	1216	315	1531	51
Pathology	3476	315	3791	126
Microbiology	1273	315	1588	53
Pharmacology	1931	315	2246	75
Forensic Medicine	1230	315	1565	52
Community Medicine	2618	315	2933	98
General Medicine	2961	0	2961	99
General Surgery	2961	0	2961	99
Paediatrics	1545	0	1545	52
TB and Chest Dis.	687	0	687	23
Skin and VD	687	0	687	23
Psychiatry	687	0	687	23
Orthopedics	1545	0	1545	52
ENT	687	0	687	23
Ophthalmology	687	0	687	23
Gynaecology/Obstetrics	2003	0	2003	67
Radiodiagnosis	1688	315	2003	67
Radiotherapy	744	315	1059	35
Anaesthesia	2575	315	2890	96
Physical Medicine and Rehabilitation	959	0	959	32
Total	36852	3465	40317	1344

Note: Number of teachers estimated on basis of norms from Medical Council of India

(1) This is the number of subject-wise faculty members required for imparting undergraduate training in the medical colleges where undergraduate medical education is being imparted

(2) There are at least 105 medical colleges imparting undergraduate medical education that also impart postgraduate training. As per MCI's Postgraduate Medical Education Regulations, 2000 for conducting postgraduate courses, extra staff is required in the departments of Anatomy, Physiology, Biochemistry, Pharmacology, Pathology, Microbiology, Community Medicine, Radiodiagnosis, Radiotherapy, Anaesthesia and Forensic Medicine (four additional teaching faculty in each of these departments, in addition to those prescribed for undergraduate education).

(3) There are also some institutions that impart only postgraduate training, and information on the faculty requirement of such institutions has not been incorporated in this table.

appointees and, therefore, they tend to concentrate more on curative services than on following a preventive and promotive approach. In view of the changing demographic and epidemiological situation, and developments in the field of medicine, doctors need to be re-oriented from time to time to keep them abreast of the latest changes in programme management. At present, individual vertical programmes impart in-service training to doctors in the public sector but these are fragmented. The training is disease-specific and there is no integrated retraining of doctors.

Regulation of training in medical colleges: The incompletely addressed agenda

The MCI is the apex body for ensuring maintenance of uniform standards of medical education, both graduate and post-graduate. In 1997, the Council revised Graduate Medical Education Regulations dealing with eligibility criteria for admission to the MB,BS course, a detailed curriculum for the MB,BS course as well as internship. The regulations also provide for

integrated teaching, objectives of the study in each subject and the skills that a student shall acquire at the end of study of a particular subject. The MCI has also stipulated Minimum Qualifications for Teachers in Medical Institutions Regulations, 1998, which prescribe the minimum qualifications required for a person to be appointed as an Assistant Professor, Associate Professor or Professor. However, the basic problem in the MCI structure is that since education is a state subject, it is the primary responsibility of the states and their universities. Effectively, the MCI can only recommend de-recognition of a particular college for the MB,BS course. However, in the prevailing sociopolitical environment no medical college has so far been de-recognized on account of the reported deficiencies.

The MCI has recommended to the Government of India to make the necessary provisions in the MCI (Regulations) Act for renewal of registration of medical practitioners every five years, linking such renewal with attendance of compulsory continuing medical education (CME) programmes. Such CME programmes have been found to be beneficial in keeping med-

ical practitioners up to date with the latest developments in the field of medicine.

The MCI has a limited role in prescribing regulations for undergraduate and postgraduate education and inspecting the sites to verify on a set checklist the resources required to start and continue running a medical college. In the context of the norms available at present, MCI inspectors tend to concentrate primarily on infrastructure and staff position rather than quality/methodology/orientation of medical education. Hence, even in colleges reputed to impart excellent education, the quality is declining because of shortage of teaching staff, inadequate laboratory facilities and budgets to update libraries, lack of research, inadequate clinical load and lack of first-hand experience in examining and managing patients, etc. To compound the problem the facilities at medical colleges are not upgraded on a regular basis. While shortage/non-availability of funds is one important factor for non-upgradation of facilities, the apathy of the teaching faculty due to their commitment to private practice is another factor contributing to the continuous decline in standards of medical education.

Over the past 1-2 years, the MCI observed that a large

number of doctors were claiming employment as medical teachers in more than one medical college at the same time, apparently to show to the inspection team of the Council that the colleges concerned fulfilled the minimum requirement for teaching staff for seeking permissions/renewals under Section 10A of the MCI Act. To curb this practice, the MCI introduced Declaration Forms to be signed by doctors claiming employment as medical teachers in any given medical college, and a provision for endorsement by the Dean/Principal of the medical college was also introduced. To seriously deal with the persisting problem, in 2004 the Council unanimously decided that the names of 65 erring doctors furnishing more than one declaration form and claiming teaching employment in more than one medical college at the same point of time be erased temporarily from the Council up to 31 July 2007. Of these 65 doctors 59 (90.8%) are from pre- or para-clinical specialties.

Just as the MCI has not been able to fully discharge its responsibilities, so is the case with respective State Medical Councils. The scope of work of State Medical Councils should be increased and they should be brought under the purview of the MCI by amending the concerned Act(s) so that the State Medical Councils can act as extended arms of the MCI.

Table 10

Teaching faculty requirement and production of fresh postgraduates annually for Medical Colleges in the country

Speciality	No. of faculty required annually	Average No. of Postgraduate Degrees awarded during 1999-2000 & 2000-2001*	Shortfall in teaching faculty required annually
Anatomy	89	23	66
Physiology	89	29	60
Biochemistry	51	21	30
Pathology	126	141	-15
Microbiology	53	57	-4
Pharmacology	75	33	42
Forensic Med.	52	11	41
Community Med.	98	39	59
General Medicine	99	346	-247
General Surgery	99	324	-225
Pediatrics	52	162	-111
TB & Chest Dis.	23	32	-9
Skin & VD	23	53	-30
Psychiatry	23	28	-5
Orthopedics	52	123	-71
ENT	23	76	-53
Ophthalmology	23	126	-103
Gynae / Obs	67	286	-219
Radiodiagnosis	67	82	-15
Radiotherapy	35	11	25
Anesthesia	96	197	-100
PMR	32	2	30

* Source: Health Information of India 2000 & 2001, Ministry of Health & FW, Government of India, 2003

Many Medical Colleges also impart M.Sc. courses in pre- and para-clinical specialties, but there was no information on these aspects and these have not been considered for the calculations

After obtaining a postgraduate degree a person may join as a teaching faculty, provide health services in public or private sector, or migrate to another country. There could also be attrition due to non-practicing of medicine. These factors have not been factored. This interpretation is also based on the assumption that the doctors, after obtaining postgraduate degree, would opt first for a teaching post and only after such posts have been filled would doctors opt for joining the health care delivery system.

Medical and health universities

The professor Rais Ahmed Committee recommended setting up a University of Health Sciences to help medical colleges maintain high standards by upgrading facilities, instituting faculty development programmes, adopting a multidisciplinary approach to professional development relevant to the socioeconomic conditions of India and vigorous research activity. In an effort to make medical teachers appreciate the basic shift in medical education and draft an action plan to bring about needed corrections in the curricula at every level of medical education, a system of establishing separate medical universities in each state was started. Andhra Pradesh took the lead in this direction by setting up a medical university in 1986. Some other states have also recently set up health universities to improve the quality of training in medical colleges as well as other nursing and paramedical disciplines.

Accreditation

There is no system of accreditation of medical colleges to ensure that that training at these institutions meets acceptable levels of quality. The Srivastava Committee

(1975) noted that it was necessary to restructure the entire programme of medical education, as the existing system did not prepare the right type of personnel needed for a national health services programme. The Committee recommended that immediate steps be taken to set up a Medical and Health Education Commission, comprising the MCI, INC, DCI, PCI, representatives of Central and State Governments, and leading persons in the field of health services and medical education. Its role was suggested to be promotive. However, no action has been taken to establish such a Commission.

Specialist services in the public health care delivery system: adequacy and availability

As per norms, at the CHCs, there are four specialists—a general physician, a general surgeon, a paediatrician and an obstetrician-gynaecologist. There is a shortfall of 61.3% in the number of sanctioned posts of specialists (surgeons, obstetrician-gynaecologists, physicians and Paediatricians) at CHCs, and of these, 37.7% are lying vacant. It may be noted that very few CHCs have sanctioned posts for anaesthetists.

- The number of postgraduate degrees or diplomas being awarded today in India is not adequate for effective delivery of specialist services (anaesthesiologists, public health specialists, paediatricians, gynaecologists and psychiatrists).
- The number of seats for admission to postgraduate degree and diploma courses should be determined according to the health needs of the people and this should be a dynamic process.

Specialist services could be rendered by a postgraduate degree or diploma holder. The number of specialists required in some fields and those being produced annually are shown in Table 11. There is a severe shortfall of specialists in all dis-

ciplines, and this shortage is more worrying in the case of Community Medicine/Public Health, Paediatrics, Anaesthesia and Ophthalmology.

If we are to achieve the Millennium Development Goals as well as the goals laid down in the National Health Policy 2002, in addition to focusing on primary health care, there is an urgent need to rationally create posts for specialists (Anaesthetists and ophthalmologists) at CHCs (and of paediatricians and gynaecologists if they have not already been created). Posts should also be created for public health specialists at all levels from the Centre to the districts, and all vacant posts filled up. Efforts should be made to keep the specialist workforce motivated, especially by way of non-financial incentives. This is essential because brain drain was estimated to have reached an alarming 30% of the annual output in 1986-87 (IAAME, 1992). The migration of doctors—both external (from India to other countries) and internal (from the public sector to the profit-oriented private sector)—has shown an increasing trend.

Integration with indigenous systems of medicine

Ayurveda, Unani, Siddha and Homeopathy are the four broadly recognized Indian systems of medicine (ISM). Successive committees set up by the Government have highlighted the competitive advantage of ISM doctors due to their easy accessibility to and acceptability by the masses, especially in rural areas. There is a need to 'integrate' ISM&H in the health care delivery system and national programmes, and ensure optimal use of the vast infrastructure of hospitals, dispensaries and physicians.

- There are almost 7 lakh registered ISM practitioners in India.
- They have widespread availability and better acceptability in communities.

Table 11

Requirement versus availability of specialists in selected disciplines for delivering health services in the public sector in India

Subject	PGs available for health delivery system annually (1)	Average number of diplomas awarded during 1999-2000 and 2000-01 (2)	Number of new specialists for the health care delivery system				
			Available annually (3) = (1) + (2)	Net available annually after migration*(4) = (3) x 0.6	Total required(5)	Required annually@ (due to attrition) (6)=(5) .30	Shortfall(7) = (6)-(4)
Community Medicine	0	11	11	7	3750	125	118
Paediatrics	111	153	264	158	7952	265	107
Skin and VD	30	29	59	35	1200	40	5
Psychiatry	5	21	26	15	1200	40	25
Ophthalmology	103	71	174	104	4296	143	39
Gynaecology/Obstetrics	219	198	417	250	7952	265	15
Anaesthesia	100	171	271	162	7952	265	103

* Considering migration of 10% of specialists to other countries and 30% of specialists to the private sector in the country, thereby implying availability of 60% manpower for providing service in the public sector
 @ Considering average length of service to be 30 years
 Number of specialists required has been based on the following assumptions:
 a) Community Medicine: One CMO at each district headquarter, assisted by four other public health specialists (5 per district x 600 districts = 3000; 35 States/ UTs- 20 per State / UT Hq = 700; 50 for national level)
 b) Paediatrics, Obstetrics/Gynaecology, Anaesthesia: 3 at District Headquarters and 2 at CHCs = 3 x 600 + 2 x 3076 = 7952
 c) Skin/VD and Psychiatry: 2 at District Headquarters = 2 x 600 = 1200
 d) Ophthalmology: 2 at District Headquarters and 1 at CHC = 2 x 600 + 1 x 3076 = 4296