

Human Resources for Pharmacy Sector in India

A report by

Advent Healthcare Group, New Delhi

In collaboration with

**Central Drugs Standard Control Organization, MoHFW, GOI
*and***

World Health Organisation - India Country Office

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July 2007

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Foreword

Globally health care systems are undergoing dramatic changes. As population's age and disease burden increases there is a growth in demands on health systems and patient needs. The increased pressure on health care systems stretches the health workforce to meet the accelerating demand for health care providers, services and managed care facilities.

In many countries including India, pharmacists are the most accessible of all healthcare workers and as such play a key role in the delivery of healthcare services at all levels. In an era of rapidly changing healthcare delivery systems, the roles of pharmacists are being constantly redefined. As roles change, competency and training requirements change. Adequately skilled, competent, motivated and professionally fulfilled pharmacy workforce is of pinnacle importance in the safe and effective delivery of healthcare.

This report will provide a snapshot of the current workforce issues in pharmacy and give direction on required actions to build capacity and strengthen the profession amidst the constantly changing profile of pharmacy human resources in India and may be useful while creating health care policies and workforce planning..

Advent takes this opportunity to applaud the profession of pharmacy practice and hope this report will have some impact on the profession and planning for its future direction.

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Acronyms

ACPE	Accreditation Council for Pharmacy Education (USA)
AICTE	All India Council for Technical Education
ANDA	Abbreviated New Drug Applications
APC	Annual Practicing Certificate
AYUSH	Ayurvedic, Yoga, Unani, Siddha and Homeopathy
B Pharm	Bachelor of Pharmacy
CAGR	Compound Annual Growth Rate
CDSCO	Central Drugs Standard Control Organisation
CPD	Continuing Professional Development
CPE	Continuing Pharmacy Education
CRO	Contract Research Organization
D Pharm	Diploma in Pharmacy
FIP	International Pharmaceutical Federation
GMP	Good Manufacturing Practices
IPR	Intellectual Property Rights
M Pharm	Master of Pharmacy
NAAC	National Assessment and Accreditation Council
NBA	National Board of Accreditation
NCE	New Chemical Entity
NDA	New Drug Application
NIPER	National Institute of Pharmaceutical Education & Research
PCI	Pharmacy Council of India
R&D	Research & Development
UGC	University Grants Commission
USFDA	United States Food & Drug Administration
WHO	World Health Organisation
WHPA	World Health Professions Alliance

Executive Summary

Over the years the importance of planning and preparing health workforce for the health systems has been gaining momentum worldwide. Pharmacists play a crucial role in any health system as they are responsible for providing solution related to medication. The rapid growth and diversification of pharmaceutical industry coupled with growth of health sector has thrown open a sea of opportunities for pharmacists. These emerging opportunities have prompted deeper look into the human resources for the pharmacy sector. In this context the study on Human Resource for Pharmacy sector in India was undertaken by Advent healthcare Private Limited with financial assistance from WHO India Country Office.

The objectives of the study are:

- To understand the national landscape relating to the pharmacy sector in India with a focus on human resource.
- To analyse the factors influencing demand and supply of manpower in pharmacy sector.
- To recommend policy direction on issues related human resource development in pharmacy sector.

The study was conducted through analysis of secondary data & literature and interaction with key stakeholders in the pharmacy sector. Lack of data on pharmacy workforce in public and private sectors and limited access to some of the existing data were some of the crucial limitation of the study.

National Landscape of Pharmacy sector

Pharmacy education, profession and practice in India are regulated by the Pharmacy Act 1948. Provisions of the act are implemented through the Pharmacy Council of India (PCI) while State Pharmacy Councils have been constituted for the purpose of registration of pharmacists and regulation of pharmacy practice. Pharmacy education is regulated by the PCI as well as the All India Council for Technical Education (AICTE) established under the AICTE Act 1987. Besides, pharmacy practice is also governed by Drugs and Cosmetics Act 1940 together with Drugs and Cosmetics Rules 1945 (framed under the act). The Indian Medicine and Homeopathy Pharmacy Bill 2005 currently pending in the parliament will regulate dispensing by AYUSH practitioners in future.

Pharmacy education especially bachelor and higher studies have industrial leaning. The quality of education offered by pharmacy institutions in the country varies widely. Further, most of the institutions are away from practice environment resulting into graduates lacking in skills needed for industry, hospitals or in community setting.

The need for continuing pharmacy education on the lines of continuing professional development has been widely advocated by the stakeholders. However the current regulation does not mandate such knowledge/skill updation as prerequisite for continuing practice. Nor there exist any system by which such CPE can be undertaken regularly.

The spectrum of pharmacy profession in India is very wide. It covers opportunities in pharmaceutical industry – research & development, manufacturing & retail, healthcare sector, pharmacy education, and regulatory bodies. The current availability of pharmacists in terms of pharmacist to population ratio compares favourably with that in developed country. However, the number of registered pharmacists does not reflect the actual number of pharmacists currently involved in pharmacy practice. The actual number of pharmacists involved in practice is likely to be much lower due to migration, death, retirement, those getting into other areas of pharmacy profession such as industrial, regulatory, marketing etc.

The demand of pharmacists is further growing with the growth of pharmaceutical industry within the country and outsourcing from abroad. Among the biggest factors fueling the growth are contract research for pharmaceutical R&D and contract manufacturing for global pharma companies. Associated with these are requirement of professionals with expertise in national and international regulatory affairs. The retail sector is witnessing growth due to entry of major retail chains. The growth of national healthcare spending at 12% per annum through 2005–09 will impact the availability, accessibility and the demand for drugs which in turn will have direct impact on the requirement of pharmacists. This will also have impact on the requirement of hospital pharmacists and those getting into insurance sector. The shortfall in supply of pharmacists in developed countries such as US, Canada, European countries etc. and lucrative opportunities for employment will give rise to migration of Indian pharmacists to these countries. This will get further boost with pharmacy institutions getting accredited by foreign bodies. These factors will push the demand for pharmacists. The quantification of future man manpower requirement is difficult due to paucity of authentic data.

According to Pharmacy Council of India, there were 559408 registered pharmacists in India in June 2003. In 2003, there were 282 PCI recognized pharmacy institutes offering diploma courses whereas 222 institutes offered degree courses. These institutes have 12680 and 16835 seats for degree and diploma courses respectively. The distribution of registered pharmacists and pharmacy educational institutions show that states like Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu etc. have higher availability where as states like Assam, Bihar, Chattisgarh, Jharkhand and Uttar Pradesh under served. The uneven growth of pharmacy institutions reflect lack of education planning based on the manpower requirement in different regions.

Besides the demand and supply issues, there are several other areas affecting pharmacy practice in the country. Pharmacists in India do not have any laid down norms on competencies and quality of services. Unlike many developed countries, there is no system of evaluating pharmacist's competency. Hence the level of competencies and the quality of services provided are likely to vary among Indian pharmacists.

In spite of existence of legislative framework for registration and regulation for nearly six decades not much of data is available on availability and practice status of pharmacists across the country. Acquisition of additional and higher qualifications, migration from one state to another, changes in the profession etc are not reported to the state pharmacy councils and hence the register is not

updated. This is primarily due to the lack of system of periodic renewal of registration and automatic updating of master register at national level.

Recommendations

1. Role of PCI

The current arrangement of PCI and AICTE playing complementary role in regulating pharmacy education should be further strengthened by clearly specifying the role of each agency. In case the PCI is made the sole authority to regulate pharmacy education as per the provisions of the Pharmacy Act (PCI has proposed amendments to pharmacy act), it should also undertake all functions related to faculty development currently undertaken by AICTE. While doing so PCI and state pharmacy councils needs to be strengthened in terms of infrastructure, manpower and resources.

2. Redefining the role of pharmacists

Pharmacists have the potential to fill (at least partially if not fully) the gap created due shortage/unavailability of doctors and nursing personnel in health facilities in rural areas. This can be achieved through a policy initiative to redefine the role of pharmacists in the Indian healthcare system so as to better utilize their capabilities.

3. Licensing Chemist Shops

- a) The criteria for license to chemist shop should be redefined which would take care of various factors such as population, disease profile etc. Government should also take necessary steps to promote planned growth of chemist shops in the country.
- b) Secondly B. Pharma should be the minimum requirement for licensing of chemist shops under the Drugs and Cosmetics Act. However, the transition should be gradual and the diploma holders should be given an opportunity to upgrade their skills and hence widen the scope of practice. Further the economic feasibility of such a policy change should also be carefully looked into.

4. Need for diploma courses

- a) As it is proposed that the chemist shops should have a graduate pharmacist, the existing diploma pharmacists should be given an opportunity to upgrade their knowledge and skills to the level of graduate pharmacists. This task can be undertaken by securing seats in degree courses for those who opt for regular programme or by developing specifically designed long duration, part-time programme.
- b) Going by the experience of several countries around the globe pharmacy technician or assistant will be required to assist the graduate pharmacists. Therefore the existing diploma courses should be reoriented for pharmacy assistant with reduced duration of training. The existing institutions conducting diploma courses should be given the option of upgrading to degree courses or to reduced technician/assistant courses in a phased manner.

5. Changes in curriculum

In order to cater to both industrial and healthcare aspect of pharmacy, the graduate level courses should be separated as B Pharm – Industrial and B Pharm Healthcare. The curriculum should be reoriented to fulfill practice requirement in both industrial as well as healthcare settings.

6. Improving quality of education & training

- a) There exist a mechanism to regularly monitor the infrastructure, manpower and other critical inputs for delivering quality education and training, however PCI and AICTE needs to strengthen the implementation of the monitoring mechanism.
- b) There exists a system of teachers training & skill enhancement to develop teaching faculty for short and long term requirement implemented by AICTE and UGC. However, it should be ensured that all teachers in the pharmacy sector should undergo training and skill enhancement on a regular basis.

7. Continuing Pharmacy Education

The PCI should initiate measures to make CPE mandatory for all practicing pharmacists. This should be linked to periodic renewal of license for practice. PCI should also develop accredited CPE programmes at select centres. The involvement of professional bodies associated with pharmacy besides the PCI will be crucial in establishing and sustaining CPE activities on a long term basis

8. Demand, supply and existing numbers

- a) The government should institute a comprehensive study to map out the existing pharmacy manpower in the country. This data will help in understanding the existing manpower and planning future human resource development.
- b) PCI should undertake a drive to update the practice status of registered pharmacists. Further licensing should be made compulsory renewable every year or every two years. The renewal would be granted on the basis of certain minimum level of CPE undertaken. This when enforced strictly, will also help in maintaining and updating data on workforce status in the pharmacy sector. This will help in maintaining active register of practicing pharmacists.
- c) The orientation of pharmacy courses based on feedback from the industry and health sector professionals should be undertaken on a continuous basis. Promoting affiliation with foreign institutions will also help in updating the curriculum and bringing it to international standards.
- d) PCI should undertake educational planning in order to promote setting up pharmacy institutions in underserved areas so as to remove regional imbalances.

9. Setting benchmarks

- a) There is a need for establishing benchmark for availability of pharmacists in different areas of practice for example community pharmacists vis a vis population, hospital pharmacist as per number of beds etc. This will help in forecasting the future demand

- b) There is also a need for benchmarking performance parameters for services and competency of pharmacists. These benchmarks should be publicised so as make people aware regarding expectations from a pharmacists. This should be supported by a system of monitoring and audit.

Conclusions

Indian healthcare is witnessing a rapid growth it will be critical to manage the human resources to support this growth. The Pharmacist is a key component of healthcare and touches patients at every level from high ended hospitals to the doorstep where they provide medications in the community. Further many of them work behind the scene in areas such as drug research, drug distribution, in regulatory and teaching and training roles.

In order to cater to the growing demand for quality healthcare services in the country, there is a need for concerted efforts from all stakeholder to promote community practice and change peoples perception of a pharmacist from being a trader or shopkeeper to that that of a true health professional as in many of the developed country.

1 Introduction

1.1 Context

Health workers save lives and are the interface between health systems and the community. Imbalances in human resources for health exacerbate imbalances in access to quality health care and compromise patient safety. “Sufficient investment in the recruitment, training, retention and involvement in health policy of healthcare professionals is the key to the quality and safety of care”¹ Over the years the importance of planning and preparing health workforce for the health systems has been gaining momentum worldwide. In 2002, the World Health Professions Alliance partners (FIP, International Council of Nurses and the World Medical Association) called for increased attention to patient safety, a health care challenge that is inextricably linked to human resources for health. The WHPA urged WHO, governments and others to examine ways and means of attracting and retaining appropriately qualified health workers.

The 2006 World Health Day was celebrated with the theme of Human Resources for Health. WHO identified deficiencies in Human Resources as one of the key areas for action in healthcare delivery and thus was coined slogan for the year “Working together for Health”. During this year the mandate of WHO has been to cover issues relating to health professionals such as pharmacists, physicians, nurses, dentists and allied healthcare workers. This together with other activities leading up to the day, aim to raise awareness of the need to address issues relating to the distribution, training, competence, capacity, and migration of health professionals.

Pharmaceutical science and technology had made commendable progress during the last 50 years worldwide leading to a dramatic change in the role of the pharmacist in the developed world. Traditionally, pharmacists have compounded and dispensed medications on the orders of physicians. More recently, pharmacy practice has come to include other services related to patient care including clinical practice, medication review, and drug information². The other areas in the wide spectrum of pharmacy profession include teaching & training, regulatory, roles in industry and research.

Indian economy is treading on a high growth path and India is poised to become third largest economy by 2025 with sustained growth of around 8 – 10% per annum. India has a leadership role amongst the developing economies of the world and linked with globalization and the WTO. Tremendous opportunities are likely to be thrown up with pharmacy and healthcare sectors being one of the sunrise areas.

¹ Ton Hoek, Health Professionals Call for Priority on Patient Safety, World Health Professions Alliance (WHPA) Press release April 2002, Geneva

² From Wikipedia, the free encyclopedia

These emerging opportunities have prompted deeper look into the human resources for the pharmacy sector. This will have its impact on the demand for healthcare coupled with the aspirations and expectations of her people.

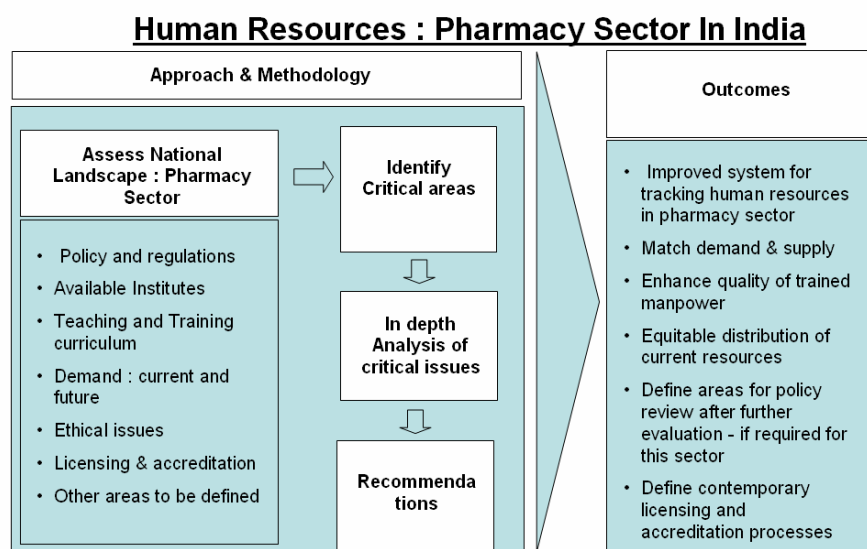
In the above context, Advent Healthcare Group, New Delhi has undertaken the study on Human Resources for Pharmacy sector in India in collaboration with CDSCO and the WHO India Country Office.

1.2 About the study

Scope:

- To understand the national landscape relating to the pharmacy sector in India with a focus on human resource.
- To assess current and future manpower requirements and analyse the factors influencing demand and supply of manpower in pharmacy sector.
- To recommend policy direction on issues related human resource development in pharmacy sector.

The approach and methodology for the study is illustrated below (for details see Appendix A)



2 National Landscape of Pharmacy sector

Pharmacists represent the third largest healthcare professional group in the world. The majority of pharmacists practice in community pharmacies, hospitals and other medical facilities. Smaller numbers of pharmacists are employed in the pharmaceutical industry³.

Pharmacy is a transitional field between health sciences and chemical sciences and a profession charged with ensuring the safe use of medication. Pharmacists are the experts in medications within the health care team and their education and training is directed to delivering quality drug therapy to their patients.

Pharmaceutical service is a sub-system of healthcare which continuously helps to combat death, disease, disability, dissatisfaction and social disruption. A large section of the community interacts with the pharmacies/ drug stores and the pharmacists for healthcare necessities, products and advice.

Pharmacy practice is a collection of curative, preventive, rehabilitative and promotive services and in addition, it has a social and economic endeavor encompassing activities by providers, consumers, financiers and government within their respective value systems.

Historical

The pharmacist's profession has existed in some form or the other since times immemorial and always attempted to enhance quality of life, health, longevity and the prevention and cure of diseases. The existence of pharmacists is known since the earliest traditional system of medicine in India which is Ayurveda and Siddha. The Unani Medicine came from West Asia and the European colonizers brought with them the western form of medicine called allopathic or modern.

During the nineteenth century there were subordinate classes of hospital assistants and apothecaries who performed medico-pharmaceutics functions. These European chemists and druggists proved to be successful "businessmen" and added other profitable lines to their businesses such as general merchandise leading to the perception of pharmacists as "shopkeeper" or merchant and this image persists to date.

The pharmacy sector and especially pharmacy practice during pre independence era was highly unregulated and full of malpractices. There was a big outcry regarding the prevailing situation which prompted the then government to constitute Drugs Enquiry Committee 1930-31. It was only in 1940 that the first Drugs Act was enacted and in 1948 finally the comprehensive pharmacy act came into being.

The pharmacy profession in India has come a long way from colonial past to the present day which is full of contrast. On one side is the pharmaceutical industry which is of global standards and on the other side pharmacy practice has remained behind time. The public in

³ Global Pharmacy Workforce & Migration Report, International Pharmaceutical Federation (FIP), 2006

general is not aware that a pharmacist is a competent professional and this is possibly due to a lack of initiative shown by the regulatory system, educational institutions and the government. The following sections attempt to examine the national landscape of pharmacy sector in India.

2.1 Policies and Regulations

Pharmacy education, profession and practice in India are regulated by the **Pharmacy Act 1948**. Under the act, a person fulfilling the prescribed eligibility criteria has to get registered with the state pharmacy council in order to practice pharmacy. The Pharmacy Council of India (PCI) is a main regulatory body formed under the Pharmacy Act to implement its provisions. The act also mandates the constitution of State Pharmacy Councils for the purpose of registration of pharmacists and regulation of pharmacy practice. The act provides authority to the state pharmacy council to inspect any premises where drugs are compounded or dispensed, enquire whether a person who is engaged in compounding or dispensing of drugs is a registered pharmacist and institute prosecution under the order of the Executive Committee of the State Council. (for details see appendix B)

For the purpose of regulating pharmacy education under the Pharmacy Act, the first Education Regulation was framed in 1953 and amended in 1972 and 1981. Currently the **Education Regulation 1991** is in force which regulates diploma course in pharmacy. The Education Regulation 1991 has defined minimum qualification for admission in diploma course and curriculum for the same. The pharmacy council of India provides approval and regulates diploma (D Pharma) & degree (B Pharma) courses.

Pharmacy education is also regulated by the All India Council for Technical Education (AICTE) which has been established under the **AICTE Act 1987**. The AICTE focuses on maintaining norms and standards in technical education which also include pharmacy. It regulates the degree, post graduate and other higher level courses. However an educational institution imparting pharmacy training needs to be recognized and approved by the PCI for the qualifications to be accepted for registration as a pharmacist.

Besides the pharmacy act, pharmacy practice is also governed by **Drugs and Cosmetics Act 1940** together with Drugs and Cosmetics Rules 1945 (framed under the act). The act regulates the import, manufacture, distribution and sale of drugs.

The practitioners of Indian system of medicine and homeopathy together called AYUSH, roughly equals the number of allopathic practitioners in the country. These practitioners are also the drug dispenser and in some cases engaged in compounding. In order to regulate the profession and practice of pharmacy under these schools of medicines, the government has introduced the **Indian Medicine and Homeopathy Pharmacy Bill 2005** in the parliament. Once passed by the parliament, the bill will become an act. This act will lead to constitution of pharmacy council for AYUSH similar to PCI.

Currently, the focus and priorities of the government in the health sector is governed by the **National Health Policy 2002 (NHP)**. Pharmacy being an important component of the health sector is also governed by the national health policy. The main objective of this policy is to achieve an acceptable standard of good health amongst the general population of the country. The policy gives overriding importance to ensuring a more equitable access to health services across the social and geographical expanse of the country. The policy also emphasizes on rational use of drugs within the allopathic system. The policy does not explicitly state the role of pharmacists in achieving the policy objectives, however pharmacist as a part of the healthcare team have an important role to achieve the policy goals. In order to bridge the gap in availability of doctors in rural areas, the policy suggests that some of the public health functions be taken up by the existing healthcare personnel in those areas. Pharmacists would be ideally suited to undertake this expanded role because of their training in drug therapy.

More recently, the Government of India has launched the **National Rural Health Mission (NRHM)** in 2005 to carry out necessary architectural correction in the basic health care delivery system. The National Rural Health Mission (2005-12) seeks to provide effective healthcare to rural population throughout the country with special focus on 18 states, which have weak public health indicators and/or weak infrastructure. Some of the core strategies of NRHM include strengthening of public health infrastructure as per the Indian Public Health Standard (IPHS) and formulation of transparent policies for deployment and career development of Human Resources for health. The mission's emphasis on filling up all positions as per IPHS will lead to employment opportunities for the pharmacists.

National pharmaceutical Policy 2002 & draft policy 2006 are the only policies having bearing on the human resources in the pharmacy sector especially those in industrial pharmacy. The pharmaceutical policy emphasizes on strengthening production capabilities, quality assurance and encouraging research & development in pharmaceutical industry. These policies are likely to increase employment opportunities for pharmacists. Further the policy also emphasizes on the role of National Institute of Pharmaceutical Education and Research (NIPER) in upgrading the standards of pharmacy education and R&D and plans to open more such institutions.

There is no specific policy for promoting the role of pharmacists in the Indian healthcare system. While the health related policies are governed by the ministry of health & family welfare, policies related to drugs and pharmaceutical industry are placed under the ministry of chemical & fertilizer.

2.2 Pharmacy education

Formal pharmacy education in India started much before the enactment of Pharmacy act (1948) and the education regulations (1953). As discussed earlier, the pharmacy education is currently regulated by the pharmacy council of India under the provision of the Pharmacy Act.

The present education regulations (1991) framed under the Act prescribes 10+2 in science stream as minimum qualification for admission to diploma or degree courses. The diploma course is of 2 years duration. On completion of which, a candidate has to undergo 500 hours of practical training in a pharmacy organization for not less than three months duration for obtaining the minimum registrable qualification-Diploma in Pharmacy. Bachelor in Pharmacy is a four year course with 10+2 in science stream as minimum qualification for admission. A diploma holder can get lateral entry into IIInd year B Pharm course. A bachelor in pharmacy becomes eligible for two-year masters course (M Pharm) and subsequently for PhD degree which is of variable duration.

Pharmacy education especially bachelor and higher studies have industrial leaning. During 1940s and 50s, hospitals and industries were established in large numbers in India. Consequently, there was great demand for qualified pharmacists and pharmaceutical chemists. Hence pharmacy education was developed in such a way to satisfy the requirement of industry and hospital i.e. D. Pharm course for hospital and medicine shops and B. Pharm course for the industry were started. This is proved by the fact that in the last few decades D. Pharm holders are not employed by the industry and B. Pharm holders are not in great numbers in hospitals or medical shops.

It is a common belief that the medical practitioner is better placed for pharmacists' job than the pharmacists themselves. Several arguments have been put forward regarding scrapping diploma courses as it does not fulfill the task of producing pharmacists who can advice doctors as well as patients regarding the right drugs and regime. It has been further argued that the bachelor's course in pharmacy should be separated into B Pharm-clinical and B Pharm-Industrial where the syllabus should be oriented towards hospital/community pharmacy and industrial pharmacy respectively.

The quality of education offered by pharmacy institutions in the country varies widely. There are only a few institutions which maintain internationally recognized standard. The main drawback is that the graduates emerging from the pharmacy institutions, lack the skills needed for practice. Most of the academic institutions providing education in pharmacy are away from practice environment. Much of what is taught, though pedagogically relevant, does not offer the student a feel for what to expect in industry, hospitals or in community setting. There is very little, if any, interaction with industry and healthcare organization to know of its needs and include whatever is possible and appropriate, into the educational system.

Quality issues in teaching and training have not received adequate attention. Shortage of trained and committed teachers is a major problem in pharmacy institutes. This impacts the quality of teaching and training. Academic position in pharmacy institutes is not an attractive option for the pharmacists as compared to many areas of industrial pharmacy.

The quality of education and training in pharmacy institution can be effectively improved through accreditation. The process of accreditation helps in assuring minimum quality in education and training. Currently the pharmacy programmes (diploma, degree & post graduate programmes) are accredited by National Board of Accreditation (NBA) constituted by

the All India Council for Technical Education (AICTE), as an Autonomous Body, under Section 10(u) of the AICTE Act, 1987. NBA conducts periodic evaluation of the programme on the basis of guidelines, norms and standards specified by it. The aim is to develop a quality conscious system of technical education where excellence, relevance to market needs and participation by all stake holders are prime the major determinants.

Besides NBA, the National Assessment and Accreditation Council (NAAC) an autonomous body established by the University Grants Commission (UGC) of India also accredit institutions of higher education in the country. While NBA accredits programmes/courses, NAAC provides accreditation to universities/colleges/institutions. NAAC promotes establishment of quality system within institutions that can undertake quality improvement on a continuous basis.

The PCI is exploring the option of tying up with the US Accreditation Council for Pharmacy Education (ACPE) with a view to help Indian Pharmacists get job openings in the US. The spin off benefits of updating curriculum, training, and improving the quality of education, would also help recognition of Indian pharmacy education in other countries of the world.

Continuing Pharmacy Education

The recent report on “Global Pharmacy Workforce & Migration” by FIP states “maintaining competence throughout a career during which new and challenging professional responsibilities will be encountered, is an ethical requirement for all health professionals”. FIP has recognized in its Code of Ethics for pharmacists “to ensure competency in each pharmaceutical service provided by continually updating knowledge and skills”.

In India, there is complete lack of any training or incentive to professionalize among retail pharmacists - as a result of which even the most enthusiastic pharmacists gradually convert into mere traders. This is also fuelled by the lack of expectation in the community for services other than mere dispensing. Attempt to keep one’s knowledge updated and work professionally is perceived as strong economic disincentives in Indian retail pharmacy practice.

The current regulations do not require pharmacists to periodically update their knowledge and skills. In developed countries like US, UK, Germany, and Japan CPE is mandatory for licensing continued competency to practice the pharmacy profession.

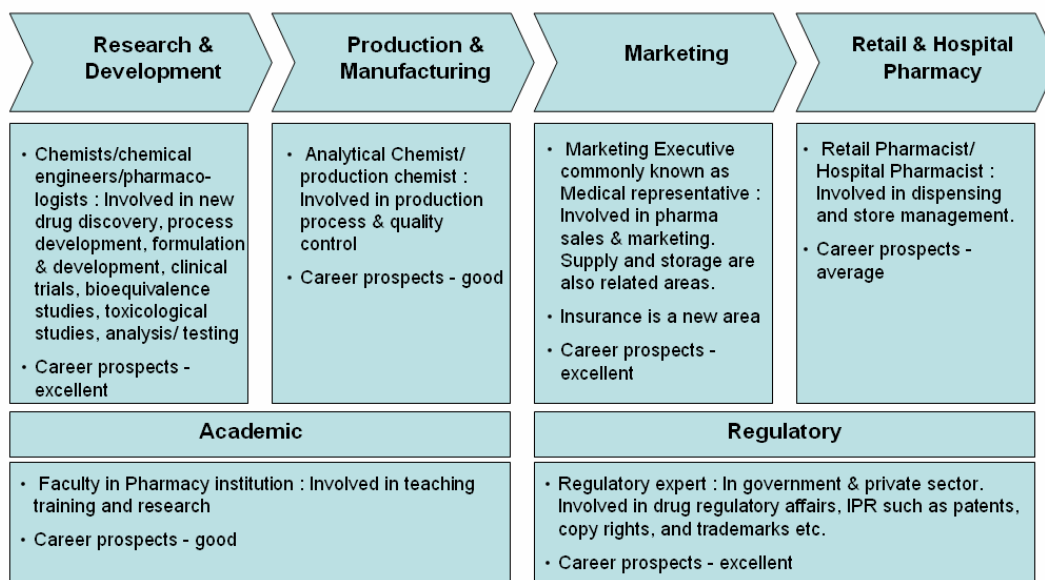
There exists a system of continuing education for academic staff of pharmacy institutions. The AICTE and University Grants Commission (UGC) provide opportunities for up-gradation of knowledge and skill of teachers in Pharmacy institutions. The continuing education is in the form of induction programme and periodic refresher courses. These courses are also linked to salary increments, promotions and career development. AICTE has established centres for undertaking in-service training and CPE. Besides the AICTE also provide various grants and assistance for attending conference/seminar/symposium at national/international levels, assistance for short term training in new emerging areas and master/doctoral programme and other incentives under various schemes.

The need for CPE has been widely felt and advocated by the stakeholders in the pharmacy sector. PCI has initiated a number of measures for updation of knowledge bank of pharmacists by conducting refresher courses in collaboration with State Pharmacy Councils, sourcing of books from Commonwealth Pharmaceutical Association, London and free of cost distribution to pharmacy institutions and State Pharmacy Councils for dissemination of scientific and professional knowledge. PCI has requested financial assistance from the Planning Commission under the 11th Five Year Plan for important professional activities like continuing education for teachers and working pharmacists, travel grants for exchange programmes between India & Foreign countries, grants to institution for upgradation of infrastructural facilities etc.

2.3 Areas of Pharmacy profession

The spectrum of pharmacy profession in India is very wide. It covers opportunities in pharmaceutical industry – manufacturing & retail, healthcare sector, pharmacy education, and regulatory bodies. While more than 98% of individuals with D Pharm degree are mainly engaged in dispensing medicine at retail or hospital pharmacies, those with B Pharm or higher degree have a variety of opportunities to choose from. Some of these areas are given below:

Career options for pharmacists



2.4 Demand of Pharmacists

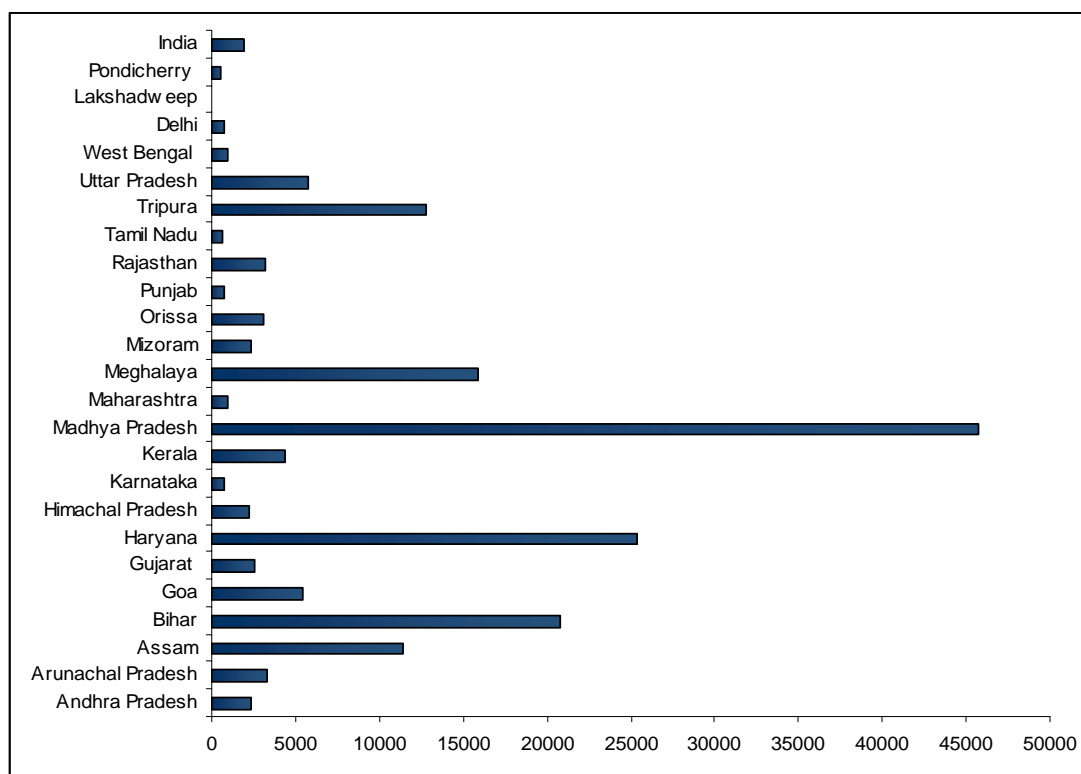
The study examined some of the important factors influencing the demand of pharmacists in India. These factors include population, expanding pharmaceutical & bio-technology industry, widening role of pharmacists and standardization of healthcare services in public sector.

Population: Pharmacist ratio

There is no internationally established minimum recommended pharmacist to population ratio. Many countries have developed their own recommendations based on demand for pharmaceutical services. The demand for pharmacists is determined by a range of factors including the population demographics; disease burden; economic status; market forces; pharmacist roles and competencies; legislation relating to medicines dispensing and prescribing; roles of other health workers; health systems and technology.

In 2003 India had a population of around 1.1 billion and 559408 registered pharmacists⁴ in the country, there by achieving a ratio of 1 pharmacist per 1909⁵ person (or 52.4 pharmacists per 100,000 people). However, there exist a wide inter-state variations ranging from 1:580 in Pondicherry to 1:45,772 in Madhya Pradesh. (see figure below)

State wise pharmacist population ratio



According to the World Health Organization (WHO), the average ratio of pharmacist to the population in industrialized countries is 1:2300⁶. The average ratio of registered pharmacists to the population compares favourably with that in developed countries. However, the number of registered pharmacists does not reflect the actual number of pharmacists currently involved in pharmacy practice. The actual number of pharmacists involved in practice is likely to be

⁴ Pharmacy Council of India, 2003

⁵ Ratio based on projected population in 2003, Source: Registrar General of India

⁶ As quoted in Financing and Delivery of Health Care Services in India, Background Papers of the National Commission on Macroeconomics and Health, MoHFW, Govt. of India, 2005, P-158

much lower due to migration, death, retirement, those getting into other areas of pharmacy profession such as industrial, regulatory, marketing etc.

Further, the diploma-trained pharmacists which constitute a majority of the pass outs currently 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 is inadequate for community practice.

Growth of Pharmaceutical Industry

The Indian Pharmaceuticals sector has come a long way, being almost non-existing during 1970, to a prominent provider of health care products, meeting almost 95% of country's pharmaceutical needs. The domestic pharmaceutical output has increased at a compound growth rate (CAGR) of 13.7% per annum. Currently the Indian pharma industry is valued at approximately \$ 8.0 billion. Globally, the Indian industry ranks 4th in terms of volume and 13th in terms of value. Indian pharmaceuticals industry has over 20,000 units. Around 260 constitute the organized sector, while others exist in the small scale sector⁷.

In the present product patent regime, Indian pharmaceutical industry is poised for even bigger gains. Some of the potential areas of growth are as follows

Research & Development: Research & Development is the key to the future of pharmaceutical industry. Before the patent regime, the R&D expenditure by the Indian pharmaceutical industry is around 1.9% of the industry's turnover. This obviously, is very low when compared to the investment on R&D by foreign research-based pharma companies. They spend 10 - 16% of the turnover on R&D. However, now that India has entered into the new patent protection era, companies are rapidly increasing their R&D budgets aimed at NCEs (new chemical entities) and new drug delivery systems.

India is fast becoming the contract research hub for Pharmaceutical R&D. According to a survey by the Pharmaceutical Outsourcing Management Association and Bio/ Pharmaceutical Outsourcing Report, pharmaceutical companies are utilizing substantially the services of Contract Research Organizations (CROs). In 2002, the industry for clinical trials in India was \$ 70 million. This market is growing at a rate of 20% per annum. According to experts, it will be an industry worth anywhere between \$500 million to \$1.5 billion by 2010. The global R&D spend is to the tune of \$60 billion, of which the non-clinical segment accounts for \$21bn and the clinical segment accounts for \$39bn. In terms of Indian prices, this translates into \$7bn (at 1/3rd of US/EU costs) and \$7.8bn (at 1/5th of US/EU costs) respectively. This constitutes a total potential of \$14.8bn for the Indian pharma companies⁸.

R&D in the pharma industry is multi-faceted and draws upon the expertise of chemists, chemical engineers, pharmacologists and medical practitioners. The different activities include

⁷ FICCI, Competitiveness of the Indian Pharmaceutical Industry in the New Product Patent Regime, 2005

⁸ FICCI, Competitiveness of the Indian Pharmaceutical Industry in the New Product Patent Regime, 2005

drug development (synthesis and manufacture), formulation, clinical trials and evaluation and finally, launch. Closely associated with these are regulatory and quality assurance functions. If the above functions are translated into manpower requirements, it will lead to increased demand for pharmacists besides other professionals.

Manufacturing: The Indian pharmaceuticals industry with over 20,000 units globally ranks 4th in terms of volume. The domestic pharmaceutical output has increased at a compound growth rate (CAGR) of 13.7% per annum. Further, many global pharmaceutical majors are looking to outsource manufacturing from Indian companies, which enjoy much lower costs (both capital and recurring) than their western counterparts. Many Indian companies have made their plants GMP compliant and India is also having the largest number of USFDA-approved plants outside USA. The Pharma companies are going for compliance with International regulatory agencies like USFDA, MCC etc. for their manufacturing facilities. The Boston Consulting Group estimated that the contract manufacturing market for global companies in India would touch \$900 million by 2010. Industry estimates suggest that the Indian companies bagged manufacturing contracts worth \$75 million in 2004 (FICCI, 2005).

Retail Pharmacies: The retail sector remains the biggest employer of diploma pharmacists. There are about 500,000 community pharmacists in the country⁹. As per the statutory requirement under the Drugs & cosmetics act, each pharmacy has to be manned by a registered pharmacist. The retail sector is fast expanding as new license is liberally granted even in places already having retail shops and also as a result of entry of major retail pharmacy chains. These factors are likely to push the demand for community pharmacists

Healthcare Sector

National Healthcare spending in India is expected to rise at 12% per annum through 2005 – 2009 and will double over the next 10 years¹⁰. The spending in terms of GDP is expected to rise from about 5.2 % in 2004 to 5.5 % in 2009. Other estimates suggest that by 2012 healthcare spending could contribute 8 % of the GDP. This large increase in Healthcare spending will also have impact on the availability, accessibility and the demand for drugs which in turn will have direct impact on the requirement of pharmacists from manufacturing, marketing to dispensing.

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 2002.¹¹ The National Rural Health Mission is making all out efforts to fill up all vacant positions and further augment the existing workforce in the rural areas.

In recent times hospitals especially in the private sector are focusing on quality of care. Medication being an important aspect of the patient care, there has been emphasis on

⁹ Indian Pharmaceutical Association, Pharmacy in India, 2005

¹⁰ Healthcare in India: The Road Ahead, CII-Mckinsey, 2002

¹¹ Financing and Delivery of Health Care Services in India, Background Papers of the NCMH, MoHFW, Govt of India, 2005

knowledge and skill of pharmacists to suggest appropriate drugs and the regimen. Also the hospitals are taking steps to reduce medication error. All these factors are pushing the demand for adequately trained pharmacists in hospital pharmacies.

Hospital sector is witnessing a strong growth and expansion. The number of hospital beds in the country is currently estimated to be 1.2 million¹² which includes public and private beds in urban and rural areas. The beds strength is likely to expand to approximately 2.2 million by the year 2012. As per the Indian Public Health Standard (IPHS), there should at least 5 pharmacists for 200 bedded secondary care hospital¹³. Hence there is a requirement of 25000 additional pharmacists in the hospital sector by 2012.

The growth of hospital sector is also fueled by gradual expansion of health insurance in the country. This has opened a new opportunity for pharmacists who are in demand because of their expertise in understanding prescription and other hospitalization issues.

Regulatory

The report of the expert committee on a comprehensive examination of drug regulatory issues 2003¹⁴ concluded that the problems in the regulatory system in the country were primarily due to inadequate or weak drug control infrastructure at the state and central level, inadequate testing facilities, shortage of drug inspectors, non-uniformity of enforcement, lack of specially trained cadres for specific regulatory areas, non-existence of data bank and non-availability of accurate information. The Committee has suggested for strengthening the State Drug Control Organizations which will include provision of additional personnel, with top class technical and investigative skills, appropriate infrastructure and adequate resources. Implementation of the recommendations of the committee will raise the demand for adequately qualified pharmacists specializing in the regulatory areas.

The new IPR regime, growing outsourcing of R&D, manufacturing and growing exports have generated the need for understanding and conforming to national and international regulations. These regulations are important for submission of Investigational New Drugs (IND), New Drug Applications (NDA) and Abbreviated New Drug Applications (ANDA). Apart from the drug regulatory affairs, Intellectual Property Rights such as Patents, Copy Rights, and Trademarks etc. for global licensing of drugs and pharmaceuticals are important areas. India is fast emerging as a major hotspot for the pharmaceutical research and global drug companies increasingly outsourcing the function of data management and regulatory needs resulting in surge in demand for experts in regulatory affairs. However this area requires specialization after graduation in pharmacy.

International demand

¹² Opportunities in Healthcare: Destination India – FICCI and Ernst & Young, 2007

¹³ IPHS for 101 to 200 bedded district hospital, MoHFW, Govt of India, 2007

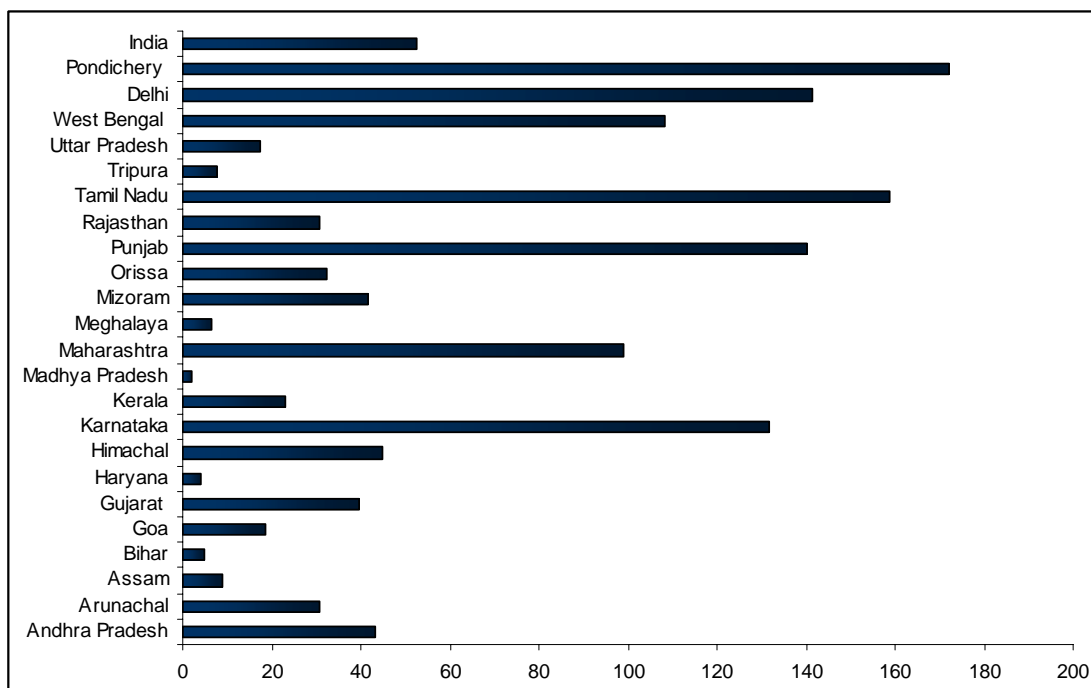
¹⁴ Report of the expert committee on a comprehensive examination of drug regulatory issues, including the problem of spurious drugs, MOHFW, Govt of India, November 2003

Despite having a high population to pharmacist ratio, it has been observed that there is high demand in western countries and they are unable to meet this demand. A shortfall of over 150,000 pharmacists by 2020 in the USA was projected in a study. Similarly, in Australia the demand for pharmacists is projected to increase between the years 2000 to 2010 from 13,000 to 17,200; thus leading to a shortfall of about 3,000 pharmacists by 2010¹⁵. The European Union needs to address a shortfall of around 700,000 researchers, or 1.2 million, research-related personnel, to accomplish its goal of becoming a powerhouse knowledge-based economy by 2010¹⁶. These projections include pharmacists also.

2.5 Supply of Pharmacists

According to Pharmacy Council of India, there were 559408 registered pharmacists in India in June 2003. Accordingly there is one pharmacist for 1909 person. The distribution of pharmacists in states is highly skewed. States like Tamil Nadu, Pondichery, Karnataka, Maharashtra, west Bengal and Delhi with highest density of registered pharmacists whereas states with the lowest density are Madhya Pradesh, Haryana, Bihar, Assam, Meghalaya etc.

Figure: State wise pharmacist to population ratio as number of pharmacists per 100,000 person (2003)



The availability of pharmacists in different states is closely linked with the number of pharmacy institutions in the state and hence the supply of pharmacists. In 2003, there were 282 PCI recognized pharmacy institutes offering diploma courses whereas 222 institutes offered

¹⁵ Global Pharmacy Workforce & Migration Report, International Pharmaceutical Federation (FIP), 2006

¹⁶ Mr. Philippe Busquin - European Research Commissioner

degree courses¹⁷. Most of these institutes offer both diploma as well as degree courses. These institutes have 12680 and 16835 seats for degree and diploma courses respectively (see table 1 for details).

States like Andhra Pradesh, Maharashtra, Karnataka, Goa, Sikkim, Uttranchal, Punjab and Tamil Nadu have higher availability of seats for degree and diploma courses while J&K, Mizoram, Assam, Bihar, Chattisgarh and Jharkhand lack adequate training facilities for pharmacists. States like Uttar Pradesh, and West Bengal lack training facilities in terms of population to seat ratio (see table below)

Table 1: State wise distribution of Pharmacy Institutes in India

S. No.	State	Degree Colleges			Diploma Colleges		
		Total No of Colleges	Admission / Year	Seat to population ratio	Total No of Colleges	Admission / Year	Seat to population ratio
1	Andhra Pradesh	25	1440	55218	42	2340	33979
2	Assam	1	40	714286	3	200	142653
3	Bihar	1	30	2941176	2	120	746269
4	Chandigarh	1	50	19810	2	100	9905
5	Delhi	2	120	129870	8	480	32468
6	Chattisgarh	2	120	186916	3	187	120048
7	Goa	1	60	24888	1	60	24888
8	Gujarat	11	700	77160	9	640	84388
9	Haryana	6	360	62972	14	875	25907
10	Jharkand	1	60	478469	2	120	239234
11	Karnataka	12	720	77042	18	1040	53362
12	Kerala	5	300	110742	21	1310	25361
13	Madhya Pradesh	11	660	99305	11	670	97847
14	Maharashtra	50	2770	37078	24	1540	66667
15	Orissa	11	640	60314	28	1620	23832
16	Pondicherry	1	60	17117	0	0	0
17	Punjab	10	470	54585	18	1030	24913
18	Rajasthan	8	440	139276	17	1080	56754
19	Sikkim	1	60	9542	1	60	9542
20	Tamil Nadu	37	2190	29525	19	1480	43687
21	Tripura	1	30	112486	1	60	56243
22	Uttar Pradesh	18	1030	175131	13	680	265252
23	Uttaranchal	4	210	43197	12	490	18512
24	West Bengal	2	120	704225	10	490	172712
25	Jammu & Kashmir	0	0	0	1	100	112613
26	Manipur	0	0	0	1	30	84317
27	Mizoram	0	0	0	1	33	28571
Total		222	12680	86505	282	16835	65189

Source: Pharmacy Council of India, 2006

¹⁷ Approved diploma & degree institutions, Pharmacy council of India, <http://www.pci.nic.in> accessed on November 16, 2006

2.6 Quality of Pharmacists in India

Pharmacists in India do not have any laid down norms on competencies and quality of services. In countries like New Zealand, a pharmacist has to maintain his competencies through out his career. In order to practice, the pharmacist has to obtain Annual Practising Certificate (APC) from the pharmacy council. The APC has to be renewed every year by undertaking accredited rectification programme which is on the lines of continuing professional development (CPD). Besides the council conducts audit of competencies of 20% of randomly selected pharmacists every year. In contrast, the minimum qualification for registration ensures minimum level of competency at the time of registration. However, there is no system of evaluating pharmacist's competency later in their career. Hence the level of competencies and the quality of services provided may vary greatly among Indian pharmacists.

2.7 Additional Issues

Database for Pharmacy Manpower

In spite of existence of legislative framework for registration and regulation for nearly six decades and subsequent setting up of pharmacy councils at national and state levels, not much of data is available about the availability and practice status of pharmacists across the country. Acquisition of additional and higher qualifications, migration from one state to another, changes in the profession etc are not reported to the state pharmacy councils and hence the register is not updated. This is primarily due to the lack of system of periodic renewal of registration and automatic updating of master register at national level. Besides the updating, the data need to be shared, analysed to understand trends and used for planning future manpower development.

Ethical issues

Some of the ethical issues in various fields of pharmacy practice are:

- Embryo & Stem Cell Research – Source of obtaining the research material and processes the material is subjected to, has been the subject of debate and expression of reservations in several communities
- Animal Experimentation & concern with animal rights & prevention of cruelty to animals
- Misrepresentation of research studies in order to promote sale of drug
- Spurious Drugs & adulteration
- Faulty Quality Control regarding weights, measures & constituents of drugs & formulations
- Pricing of drugs under patent protection is in conflict with humanitarianism at a time when potential life saving or life prolonging drugs are not available or within the reach of people in developing countries.

3 Analysis and Insights

This section will look at the several facets governing the human resources of the pharmacy sector in India. The points that will help analysis and develop an insight into the varied aspects are enunciated.

3.1 Policies and Regulations

Unlike its counterpart the Medical Council of India which regulates Medical education & practice in the country, PCI has not been as successful in regulating pharmacy education and practice. Lately, PCI has realized the need to strengthen and upgrade the pharmacy curriculum to produce competent pharmacist workforce which is able to meet the growing demands of the industry and community. Looking at the changed scenario, it has proposed amendments in the Pharmacy Act (see the following box).

Major amendments proposed for Pharmacy Act

- Pharmacy education to be regulated by PCI alone to avoid duplicity and dichotomy
- Upgradation of minimum registrable qualification from Diploma to Degree in pharmacy
- Introduction of “Pharmacy Practice Regulations” for the first time in the country.

The regulation of practice for the practitioners of Indian system of medicine and homeopathy together called AYUSH is long imperative as these practitioners are involved in dispensing and compounding of drugs. Further AYUSH practitioners are catering to a vast majority of people in rural area. It is important to integrate them and regulate their practice so as to achieve standardization of medication provided by them. In this regard “Indian Medicine and Homeopathy Pharmacy Bill 2005” has been introduced in the parliament

The National Pharmaceutical Policy 2002 takes care of promoting the pharmaceutical industry and drugs availability in the country. There is no specific policy for promoting the role of pharmacists in the Indian healthcare system. While the health related policies are governed by the ministry of health & family welfare, policies related to drugs and pharmaceutical industry are placed under the ministry of chemical & fertilizer giving rise to the need for greater coordination between the ministries to take care of health needs of the population. Such coordination is difficult to achieve.

Over the years, pharmacists have escaped the attention of planners and policy makers. Their role in the Indian healthcare system has been gradually marginalized. The Indian Public Health Standards formulated recently under the National Rural Health Mission does not lay much emphasis on the role of pharmacists as compared to other categories of personnel such as nurses, lab technicians etc. They are currently seen as mere dispenser of drugs. There is a need for a policy to redefine and promote the role of pharmacists especially in the public health system and in rural areas so as to better utilize the capabilities of pharmacists. They

have the potential to fill (at least partially if not fully) the gap created due shortage/unavailability of doctors and nursing personnel in health facilities in rural areas. However this would also require a change in the pharmacy curriculum giving more emphasis on pharmacy practice.

Another important issue related to regulations is the haphazard growth of retail pharmacies. A chemist shop can be granted a license under the Drugs and Cosmetics Act and Rules by Inter alia having a diploma holder on their rolls. Liberal granting of retail drug licenses has led to too many medicine shops coming up too close to one another in urban areas, thus causing unhealthy competition. A large proportion of owners who are not pharmacists, are reluctant to hire pharmacists and trained staff. Further pharmacists are absent from the outlet throughout their working hours. There is need for proper planning before granting permission to start a pharmacy store and to ensure that dispensing is done by qualified pharmacists.

The PCI is mandated to recognize and approve all pharmacy education and institutions under The Pharmacy Act. The existence of AICTE in the same sphere of regulation has a potential for undue burden on the pharmacy institutions to meet the approval criteria. However, a closer look at the tasks performed by each agency show that they are performing complementary functions. While PCI is more involved with regulating diploma courses, AICTE is more involved with regulating graduate and post graduate courses in pharmacy. Further the AICTE supports pharmacy education with its know how in technical education and support in enhancing quality of teaching and training. AICTE also helps institutions to obtain accreditation from National Board of Accreditation. Therefore strengthening the partnership between PCI and AICTE would help in strengthening the pharmacy education and training. In case PCI is made the sole regulatory authority (as proposed by PCI), it should be ensured that PCI is provided all the resources and capabilities to undertake functions currently performed by AICTE. The regulatory authority needs to have greater capability in terms of infrastructure, manpower and resources to cope with ever increasing demand for regulation of pharmacy institutions and bring about uniformity in standards of teaching and training.

3.2 Pharmacy Education

There is a growing opinion regarding raising the minimum standard for registration of pharmacists. It is argued that the minimum qualification for registration should be B Pharm. In such a scenario, diploma course in pharmacy will lose its relevance. However all over the world, there is a category of pharmacist who is called as pharmacy technician or assistant. It is therefore reasonable to understand that there is a need for a category of personnel whose training is at a lesser level than a graduate degree holder. This also implies a requirement for personnel who can work under the supervision of a graduate pharmacist. This would be in keeping with lower responsibilities and accountability. The cost of training and its duration would be lesser as also cost to the organisation. Therefore the diploma course could be reoriented to train pharmacy assistant/technician.

Most of the institutions are away from practice environment resulting into graduates lacking in skills needed for practice in industry, hospitals or in community setting. This require orientation of the curriculum to fulfill practice requirement and standardization of teaching training through accreditation.

Continuing Pharmacy Education

The need for continuing pharmacy education on the lines of continuing professional development has been widely advocated by the stakeholders. However the current regulation does not mandate such knowledge/skill updation as prerequisite for continuing practice. Nor there exist any system by which such CPE can be undertaken regularly. The current initiatives on providing opportunity to pharmacists to undergo CPE are only few. There is a need for developing a system taking into account the number of pharmacists practicing in the country to take care of CPE requirements on a continuous basis. The involvement of PCI and professional bodies associated with pharmacy will be crucial in establishing and sustaining CPE activities on a long term basis

3.3 Demand of Pharmacists

The current availability of registered pharmacists in terms of pharmacist to population ratio compares favourably with that in developed country. However the actual number of practicing pharmacists is much lower as change in practice status is not updated in the register. Thus, there exist a gap in demand and supply as compared to standards in western countries.

The demand of pharmacists is further growing with the growth of pharmaceutical industry in the country and outsourcing from abroad. Among the biggest factors fueling the growth is contract research for pharmaceutical R&D and contract manufacturing for global pharma companies. Associate with these are the requirement of professionals with expertise in national and international regulatory affairs. The retail sector already is also witnessing growth due to entry of major retail chains The growth of national healthcare spending at 12% per annum through 2005–09 will impact the availability, accessibility and the demand for drugs which in turn will have direct impact on the requirement of pharmacists. This will also have impact on the requirement of hospital pharmacists and those getting into insurance sector.

Although the quantification of future man manpower requirement is difficult due to paucity of authentic data, the effects of above mentioned factors are already evident in terms of establishment of new research facilities and better placement of pharmacy graduates.

The shortfall in supply of pharmacists in developed countries such as US, Canada, European countries etc. and lucrative opportunities for employment will give rise to migration of India pharmacists to these countries. This will get further boost with pharmacy institutions getting accredited by foreign bodies.

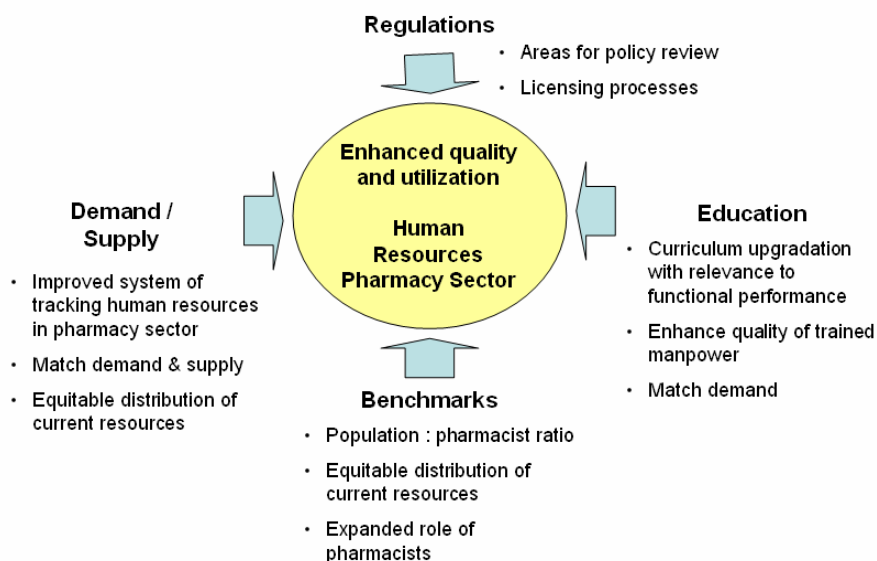
3.4 Supply of Pharmacists

Currently there are more than 550,000 registered pharmacists in India as per Pharmacy Council of India (PCI 2005) achieving a ratio of one pharmacist for 1909 person. The actual number of pharmacists involved in practice could be much lower. The D Pharm courses which mainly caters to the retail pharmacy stores, are available in 282 institutions with 16835 seats where as degree courses are offered by 222 institutes having 12680 seats (PCI 2003). The number of institutes providing M Pharm degrees stood at 132 with intake capacity of 2678 students (AICTE 2005).

The distribution of registered pharmacists and pharmacy educational institutions show that states like Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu etc. have higher availability where as states like Assam, Bihar, Chattisgarh, Jharkhand and Uttar Pradesh under served. The uneven growth of pharmacy institutions reflect lack of education planning based on the manpower requirement in different regions. Since PCI and AICTE are currently regulating the pharmacy education, the function of educational planning should be undertaken by them in order to promote setting up such institutions in underserved areas. Further there is a need to assess the future manpower requirements, skills needed in the profession and develop a plan to meet the requirements.

4 Recommendations

The areas with defined recommendations are illustrated in the following diagram.



The recommendations are as follows:

1. Role of PCI in regulating pharmacy education

The current arrangement of PCI and AICTE playing complementary role in regulating pharmacy education should be further strengthened by clearly specifying the role of each agency. In case the PCI is made the sole authority to regulate pharmacy education as per the provisions of the Pharmacy Act (PCI has proposed amendments to pharmacy act), it should also undertake all functions related to faculty development currently undertaken by AICTE. While doing so PCI and state pharmacy councils needs to be strengthened in terms of infrastructure, manpower and resources. The strengthening should lead to capacity development of the PCI and state pharmacy council to respond to the need for orienting pharmacy education to fulfill the demand and opportunities in this vast sector and maintaining standard.

2. Redefining the role of pharmacists

Pharmacists have the potential to fill (at least partially if not fully) the gap created due shortage/unavailability of doctors and nursing personnel in health facilities in rural areas. This can be achieved through a policy initiative to redefine the role of pharmacists in the Indian healthcare system so as to better utilize the capabilities of pharmacists. This would also necessitate a change in the pharmacy curriculum giving more emphasis on community practice. The national health policy 2002 has also envisaged such role for nursing and paramedical personnel including pharmacists.

3. Licensing Chemist Shops

- a) Crowding of chemist shops due to liberal grant of license often leads to unhealthy competition where pharmacists indulge in unethical practices for promoting sales and boosting revenue. However granting license to only a few may adversely affect the availability of medicines and lack of competition may lead to monopoly practices. Therefore the criteria for license should be redefined which would take care of various factors such as population, disease profile etc. Government should also take necessary steps to promote planned growth of chemist shops in the country.
- b) Secondly the demand for defining B. Pharma as the minimum requirement for licensing of chemist shops under the Drugs and Cosmetics Act has been gaining momentum to widen the scope of pharmacy services. However, any such initiative should take into account diploma holders currently manning most of the pharmacies across the country. The transition should be gradual and the diploma holders should be given an opportunity to upgrade their skills and hence widen the scope of practice.

Further the economic feasibility of such a policy change should also be carefully looked into. Factors such as willingness of graduate pharmacists to practice in rural & remote areas, cost of employing graduate pharmacists and the paying capacity & willingness of rural population for pharmacist's services are relevant to such a policy decision.

4. Need for diploma courses

- a) It has already been proposed that the chemist shops should have a graduate pharmacist. However, a large chunk of pharmacists currently working in chemist shop or hospital are diploma holders. The existing diploma pharmacists should be given an opportunity to upgrade their knowledge and skills to the level of graduate pharmacists. This task can be undertaken by securing seats in degree courses for those who opt for regular programme or by developing specifically designed programme for the existing diploma holders. These programmes should preferably be a part time course and staggered over a long duration. The flexibility in timings is necessary as most the diploma holders are practicing.
- b) Going by the experience of several countries around the globe pharmacy technician or assistant will be required to assist the graduate pharmacists. Therefore the existing diploma courses should be reoriented for pharmacy assistant with reduced duration of training. The existing institutions conducting diploma courses should be given the option of upgrading to degree courses or to reduced technician/assistant courses in a phased manner.

5. Changes in curriculum

- a) The current pharmacy curriculum has industrial leaning. The training for community pharmacy practice is clearly lacking. The industrial pharmacy itself is becoming a highly specialized field. Whereas in healthcare the expectations are different. In order

to cater to both industrial and healthcare aspect of pharmacy profession, the graduate level courses should be separated as B Pharm – Industrial and B Pharm Healthcare. Likewise the syllabus should also be reorganized with the later giving more emphasis on training in hospital pharmacy, community pharmacy and healthcare management.

- b) Most of the institutions are away from practice environment resulting into graduates lacking in skills needed for industry, hospitals or in community setting. This requires orientation of the curriculum to fulfill skill requirement in both industrial as well as healthcare sectors.

6. Improving quality of education & training

- a) In spite of having uniform provisions for curriculum and teaching infrastructure, the quality of education offered by pharmacy institutions in the country varies widely. There exist a mechanism to regularly monitor the infrastructure, manpower and other critical inputs for delivering quality education and training, however PCI and AICTE needs to strengthen the implementation of the monitoring mechanism.
- b) There exists a system of teachers training & skill enhancement to develop teaching faculty for short and long term requirement implemented by AICTE and UGC. However, it should be ensured that all teachers in the pharmacy sector should undergo training and skill enhancement on a regular basis.

7. Continuing Pharmacy Education

The current regulation does not mandate knowledge/skill updation as prerequisite for continuing practice. The PCI should initiate measures to make CPE mandatory for all practicing pharmacists. This could be linked to periodic renewal of license for practice. PCI should also develop accredited CPE programmes at select centres. The involvement of professional bodies associated with pharmacy besides the PCI will be crucial in establishing and sustaining CPE activities on a long term basis

8. Demand, supply and existing numbers

The present study falls short of quantifying the current & future demand and supply. However, by all accounts the demand for Indian pharmacists will definitely go up not only within the country but also abroad. Lack of planned approach will lead to haphazard growth of pharmacy manpower with varying skills. Following steps are needed to capitalize on the growing opportunities in the pharmacy sector:

- a) The government should institute a comprehensive study to map out the existing pharmacy manpower in the country. The study should also reflect their training and practice status. This data will help in understanding the existing manpower and planning future human resource development.
- b) PCI should undertake a drive to update the practice status of registered pharmacists. Further licensing should be made compulsory renewable every year or every two years. The renewal would be granted on the basis of certain minimum level of CPE

undertaken. This when enforced strictly, will also help in maintaining and updating data on workforce status in the pharmacy sector. This will help in maintaining active register of practicing pharmacists.

- c) Catering to the demand of pharmacists would need producing skills suited to various areas of opportunity. The orientation of pharmacy courses can be continuously improved and adapted through a dynamic process of interaction with the industry and health sector professionals. Such interaction should also be undertaken at the level of institutions. Promoting affiliation with foreign institutions will also help in updating the curriculum and bringing it to international standards.
- d) There exist a strong regional imbalance in the distribution of pharmacy institutions. PCI should undertake educational planning in order to promote setting up pharmacy institutions in underserved areas.

9. Setting benchmarks

- a) The demand for pharmacists is determined by a range of factors including the population demographics; disease burden; economic status; market forces; pharmacist roles and competencies; legislation relating to medicines dispensing and prescribing; roles of other health workers; health systems and technology. There is a need for establishing benchmark of availability of pharmacists in different areas of practice for example community pharmacists vis a population, hospital pharmacist as per number of beds etc. This will help in forecasting the future demand
- b) There is also a need for benchmarking performance parameters for services and competency of pharmacists. These benchmarks should be publicised so as make people aware regarding expectations from a pharmacist. This should be supported by a system of monitoring and audit

5 Conclusions

Indian healthcare is witnessing a rapid growth it will be critical to manage the human resources to support this growth. The Pharmacist is a key component of healthcare and touches patients at every level from high ended hospitals to the doorstep where they provide medications in the community. Further many of them work behind the scene in areas such as drug research, drug distribution, in regulatory and teaching and training roles.

In order to cater to the growing demand for quality healthcare services in the country, there is a need for concerted efforts from all stakeholder to promote community practice and change peoples perception of a pharmacist from being a trader or shopkeeper to that that of a true health professional as in many of the developed country.

Appendices

Appendix A: Scope, approach and methodology of the study

The **scope of the study** are as follows:

- To understand the national landscape relating to the pharmacy sector in India :
 - the prevalent regulations and policies ,
 - teaching training and practice facilities ,
 - possible career paths for pharmacists
 - all other aspects of pharmacy sector in general
 - special emphasis on assess the existing human resource in pharmacy sector in India.
- To analyse the factors influencing demand and supply of manpower in pharmacy sector .This would include areas which are
 - Influencing demand such as growing requirement in pace with healthcare delivery market, increasing research by Indian companies and over seas opportunities.
 - Influencing supply such as available teaching institutes, the teaching standards, skill up gradation and performance monitoring.
- To recommend policy direction on issues related human resource development in pharmacy sector.

The possible **outcomes from this study** - recommended policy direction for:

- Improved system for tracking human resources in pharmacy sector in India to enable more accurate forecasting of shortfalls for planning purposes
- Match demand & supply
- Enhance quality of trained manpower
- Equitable distribution of current resources
- Define areas for policy review after further evaluation - if required for this sector
- Define contemporary licensing and accreditation processes

Project Approach & Methodology

Approach of the study is as per the following:

Phase 1: Understanding the National Landscape of pharmacy sector

Carry out a situational analysis of the pharmacy sector in India covering the following areas:

- **Policy and Regulations**
 - Government bodies regulating this sector
 - Professional bodies who have a stake in this sector
 - Examine prevailing laws , regulations and policy documents
 - Examine implementation of the policies / laws
 - Evaluate efforts of policy makers to respond to changes in the healthcare sector in the country
 - International bench marks

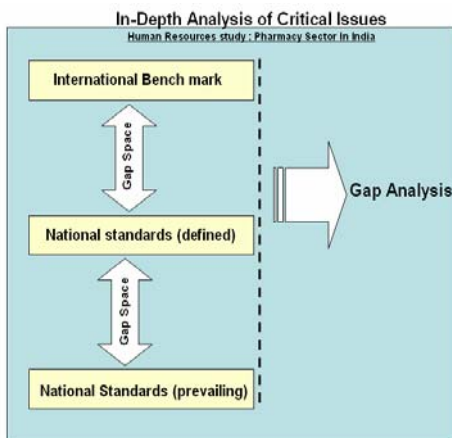
- **Supply of human resources for the pharmacy sector**
 - prerequisites for practice
 - Teaching and training resources
 - Standards of teaching institutes
 - Skill up gradation
 - Registry of trained manpower and available job opportunities
- **Demand of Human Resources for Pharmacy sector**
 - Current distribution for human resources in different areas of pharmacy profession
 - Current demand – supply ratios and gap assessment
 - Assess future demand
- **Additional areas**
 - Ethical issues
 - Areas which may emerge during preliminary analysis

Phase 2: Identify Core issues

During this phase the following activities are projected

- Identify core issues
- Prioritise issues
- Define issues and areas for In depth analysis

Phase 3: In depth Analysis and draft report



During this phase the following activities are projected

- In depth study analysis of the core issues defined above
- An understanding of International bench marks , defined national standards , prevailing national standards and the “Gap Analysis” between these standards
- Recommendations on the basis of this gap analysis.
- Prepare draft report and discuss with key stake holders

Phase 4: Recommendations and Final report

The focus of this phase is on following:

- Make changes in the draft report based on discussions with key stake holders
- Define distinct recommendation and future strategies
- Prepare and submit final report

Appendix B: Summary of Policies and Regulations

Legislative Framework

Various legislative framework regulating different areas of pharmacy practice are summarized as follows and this is followed by a brief overview on each area.

Pharmacy Practice	Areas of regulation	Regulation	Regulating Body
Community Pharmacy	Retail/sale of drugs	– Drugs & Cosmetics Act, 1940 and Rules framed under the act, 1945 & The Pharmacy Act, 1948	– State Drug Control Organisations & CDSCO
Hospital Pharmacy	Drug Dispensing	– Drugs & Cosmetics Act, 1940 and Rules framed under the act, 1945	– State Drug Control Organisations & CDSCO
Clinical Pharmacy	Effective, safe & economical drug therapy	– No regulation	– None
Pharmacy Education	Teaching & Training	– The Pharmacy Act, 1948 – AICTE Act, 1987	– Pharmacy Council of India – All India Council for Technical Education
Profession and practice of pharmacy in Indian medicine and Homoeopathy	Profession and practice of pharmacy in Indian medicine and Homoeopathy	– Drugs & Cosmetics Act, 1940 and Rules framed under the act, 1945 – The Indian Medicine and Homoeopathy Pharmacy Bill, 2005	– State Drug Control Organisations & CDSCO

The Pharmacy Act, 1948

The Pharmacy Act 1948 was enacted on 4th March 1948 with the following preamble-
“An Act to regulate the profession of pharmacy. Whereas it is expedient to make better provision for the regulation of the profession and practice of pharmacy and for that purpose to constitute Pharmacy Councils”

The objectives of Pharmacy Act are

- Regulation of the Pharmacy Education in the Country for the purpose of registration as a pharmacist under the Pharmacy Act.
- Regulation of Profession and Practice of Pharmacy.

Some of the important provisions under the act are as follows:

A: Qualification for registration as a pharmacist

- The minimum qualification for registration as a pharmacist is a pass in "Diploma course in Pharmacy" (D Pharm) from an institution approved u/s 12 of the Act. D Pharm is a two years course after 10+2 (science academic stream) followed by 500 hours of practical training spread over a period of 3 months.
- "Degree course in Pharmacy" (B Pharm) from an institution approved by the PCI u/s 12 of the Act. B Pharm is a 4 years course after 10+2 (science academic stream).

B: Regulation of pharmacy profession under the Pharmacy Act

- Registration as a pharmacist is done by the State Pharmacy Council constituted under section 19 of the Pharmacy Act.
- Minimum Statutory requirements for registration as a pharmacist under the Pharmacy Act. (Ref. section 32(2) of the Pharmacy Act) -
- Applicant should have attained the age of 18 years & pay the prescribed fee.
- Applicant should reside or carry on the business or profession of Pharmacy, in the State.
- Applicant should have passed an approved examination. Or should possess a qualification approved under section 14 of the Pharmacy Act. Or is a registered pharmacist in another state.
- An approved examination is "Diploma in Pharmacy" or "Degree in Pharmacy" from an institution approved under section 12 of the Pharmacy Act.
- Section 42 of the Pharmacy Act states that no person other than a Registered Pharmacist shall compound, prepare, mix, or dispense any medicine on the prescription of a medical practitioner and whosoever contravenes it shall be punishable with imprisonment for a term which may extend to six months, or with fine not exceeding one thousand rupees or with both.
- Section 26A of the Pharmacy Act empowers the State Pharmacy Council, with the previous sanction of the State Govt. to appoint inspectors, who may -
- Inspect any premises where drugs are compounded or dispensed.
 - a) Enquire whether a person who is engaged in compounding or dispensing of drugs is a registered pharmacist.
 - b) Investigate any complaint made in writing in respect of any contravention of this Act.
 - c) Institute prosecution under the order of the Executive Committee of the State Council.
 - d) Exercise such other powers as may be necessary for carrying out the purposes of Chapters III, IV and V of this Act or any rules made there under.

C: Regulation of pharmacy education under the Pharmacy Act

- By prescribing minimum qualification for registration as a pharmacist.
- By prescribing norms to be fulfilled by the pharmacy institutions seeking approval for the purpose of registration as a pharmacist.
- Uniform implementation of prescribed norms all over the country.
- Verification of the prescribed norms by inspecting pharmacy institutions.
- Granting approval or otherwise (withdrawal of approval/rejection of application) depending on the merits of the case.

D: Education Regulations 1991

- The Education Regulations are framed under section 10 of the Act and prescribe:-
- Qualification for pharmacists. (Ref.: Regulation 2)
- Minimum qualification for admissions to Diploma Course in Pharmacy, Duration of the course, No. of hours to be covered for theory and practical, mode of examinations, eligibility for appearing in the examinations, minimum pass marks for passing examination etc. (Ref.: Chapter II)
- Period and other conditions for practical training etc. (Ref.: Chapter III)
- Detailed syllabus of Diploma in Pharmacy. (Ref.: Appendix A)
- Conditions to be fulfilled by the institutions for approval of course of study under section 12 of the Act. (Ref.: Appendix B). These conditions include details of infrastructural facilities which an institution seeking approval of the course of study has to create i.e. accommodation area, qualification, experience and No. of teaching staff, staff-student ratio, non teaching staff, equipments, museum, library etc.
- Conditions to be fulfilled by the examining authority conducting examinations of the students. (Ref.: Appendix C)
- Conditions to be fulfilled by the institutions to be recognized for giving practical training. (Ref.: Appendix D)
- Practical training contract form for pharmacists. (Ref.: Appendix E)
- Presently, the "Education Regulations 1991 For the Diploma Course in Pharmacy" (E.R.91) are in vogue.

The All India Council for Technical Education (AICTE) Act 1987

- Pharmacy education is also regulated by the AICTE Act 1987 besides the Pharmacy Act.
- The AICTE Act provides for establishment of All India Council for Technical Education with a view to the proper planning and coordinated development technical education system

throughout the country, the promotion of qualitative improvements of such education in relation to planned qualitative growth and the regulation and proper maintenance of norms and standards in technical education system and for matters connected therewith.

The Indian Medicine and Homoeopathy Pharmacy Bill, 2005

- The Indian Medicine and Homoeopathy Pharmacy Bill, 2005 is a bill to provide for the regulation of the profession and practice of pharmacy in Indian medicine and Homoeopathy and for that purpose to constitute Pharmacy Councils and for matters connected therewith.
- The bill once passed by the parliament will become an act called Indian Medicine and Homeopathy Pharmacy Act. The act will be similar to the existing Pharmacy Act.

The Drugs & Cosmetics Act, 1940

- The object of the Act is to regulate the import, manufacture, distribution and sale of drugs. Under the provisions of this Act, the Central Government appoints the Drugs Technical Advisory Board to advise the Central Government and the State Governments on technical matters arising out of the administration of this Act.
- The board can constitute subcommittees for the consideration of a particular matter. The main objective of the act is to ensure that the drugs available to the people are safe and efficacious and conform to the prescribed quality standards.
- The Drugs & Cosmetics Rules 1945 framed under the act prescribes regulations for sale and dispensing of drugs by registered pharmacists.

Policies & Plans

National Pharmaceutical Policy 2002 & 2006 (draft)

The main objectives of this National Pharmaceutical Policy 2002 are:-

- Ensuring abundant availability at reasonable prices within the country of good quality essential pharmaceuticals of mass consumption.
- Strengthening the indigenous capability for cost effective quality production and exports of pharmaceuticals by reducing barriers to trade in the pharmaceutical sector.
- Strengthening the system of quality control over drug and pharmaceutical production and distribution to make quality an essential attribute of the Indian pharmaceutical industry and promoting rational use of pharmaceuticals.
- Encouraging R&D in the pharmaceutical sector in a manner compatible with the country's needs and with particular focus on diseases endemic or relevant to India by creating an environment conducive to channelising a higher level of investment into R&D in pharmaceuticals in India.

- Creating an incentive framework for the pharmaceutical industry which promotes new investment into pharmaceutical industry and encourages the introduction of new technologies and new drugs.
- The National Drug Policy 2002 also emphasizes on the role of National Institute of Pharmaceutical Education and Research (NIPER) in upgrading the standards of pharmacy education and R&D. Besides tackling problems of human resources development for academia and the indigenous pharmaceutical industry, the institute will make efforts to maximize collaborative research with the industry and other technical institutes in the area of drug discovery and pharma technology development.
- The draft National Pharmaceutical Policy, 2006 seeks to strengthen the Drug Regulatory System and the patent office. It focuses on research and drug development with clinical trials. The policy lays emphasis on developing human resources in pharmaceutical sciences by opening more institutions on the pattern of the National Institute of Pharmaceutical Education and Research (NIPER). The policy aims at providing a better access to anti-cancer and anti-HIV/AIDS drugs to the patients. The draft is in the process of finalization.

Regulatory bodies

A: Pharmacy Council of India & State Pharmacy councils

- The pharmacy council of India is the main regulatory body for the pharmacy education in the country. The main objective of the council is: -
- Regulation of the Pharmacy Education in the Country for the purpose of registration as a pharmacist under the Pharmacy Act.
- Regulation of Profession and Practice of Pharmacy.

The functions and duties of Pharmacy council of India are:-

- To prescribe minimum standard of education required for qualifying as a pharmacist
- Framing of Education Regulations prescribing the conditions to be fulfilled by the institutions seeking approval of the PCI for imparting education in pharmacy
- To ensure uniform implementation of the educational standards through out the country
- Inspection of Pharmacy Institutions seeking approval under the Pharmacy Act to verify availability of the prescribed norms
- To approve the course of study and examination for pharmacists i.e. approval of the academic training institutions providing pharmacy courses
- To withdraw approval, if the approved course of study or an approved examination does not continue to be in conformity with the educational standards prescribed by the PCI.

- To approve qualifications granted outside the territories to which the Pharmacy Act extends i.e. the approval of foreign qualification.
- To maintain Central Register of Pharmacists

B: All India Council for Technical Education (AICTE)

- All India Council for Technical Education (AICTE) was set-up in November 1945 as a national level Apex Advisory Body to conduct survey on the facilities on technical education and to promote development in the country in a coordinated and integrated manner.
- Technical education in India contributes a major share to the overall education system and plays a vital role in the social and economic development of our nation.

C: Central Drugs Standard Control Organization (CDSCO)

- Central Drugs Standard Control Organisation (CDSCO) is a part of Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, for monitoring and administering drug standards. Under the Drug and Cosmetics Act, the regulation of manufacture, sale and distribution of Drugs is primarily the concern of the State authorities while the Central Authorities are responsible for approval of New Drugs, Clinical Trials in the country, laying down the standards for Drugs, control over the quality of imported Drugs, coordination of the activities of State Drug Control Organisations and providing expert advice with a view of bring about the uniformity in the enforcement of the Drugs and Cosmetics Act.
- The main functions of the Central Drug Standard Control Organization (CDSCO) include control of the quality of drugs imported into the country, co-ordination of the activities of the State/UT drug control authorities, approval of new drugs proposed to be imported or manufactured in the country, laying down of regulatory measures and standards of drugs and acting as the Central Licensing Approving Authority in respect of whole human blood, blood products, larger volume parenterals, sera and vaccines. Drug Controller General of India is responsible for approval of licenses of specified categories of Drugs such as blood and blood products, I. V. Fluids, Vaccine and Sera.

Professional bodies/associations

Name	Headquarters	Objective
Indian Pharmaceutical Association (IPA)	Mumbai	<p>To promote the sciences & arts of Pharmacy in all aspects</p> <p>To impact suitable education & training to the members preparing for the profession of pharmacy or to those already engaged in the profession</p> <p>To undertake and promote scientific and technical research, experiments and tests of all kinds in pharmaceutical and allied sciences</p> <p>To edit & publish, journals, books, magazines and documents & other publications for promoting the causes of profession in pharmacy</p> <p>To hold seminars, conferences and exhibitions for the promotion of pharmacy</p>
Association of Pharmaceutical Teachers of India (APTI)	Bangalore	<p>To provide a common platform to discuss various issues of Pharmacy Education.</p> <p>To identify the current needs of pharma industry and adapt the syllabus pattern as per the needs.</p> <p>To honor Pharmacy Educators and Researchers. To impart Continuing Pharmacy Education (CPE).</p> <p>To establish a novel pharmacy teachers' training institute.</p> <p>To arrange lectures, exhibitions, etc, to focus on pharmacy profession through publications.</p> <p>To undertake consultancies and projects</p>
All India Organization of Chemists and Druggists (AIOCD)	Mumbai	<p>To provide Safety, Security and Prosperity to our members.</p> <p>To provide platform for broadening their knowledge of Trade and to resolve common, mutual problems by collective endeavor.</p> <p>To bridge the gap between Industry & Trade by arranging company wise stockiest meetings, exchange their view points and arrive at mutual understanding, sign memorandum of understanding to eliminate hurdles in our day – to- day activities.</p> <p>To collect, publish, distribute and make available to the members vital information related to our Trade.</p> <p>To encourage members for collective and co-operative activities and give them an opportunity for participation so that they can express their views on important matters.</p> <p>To establish links with other similar bodies and like minded associations and interactions with them and maintain harmonious relationship for common benefits.</p> <p>To represent at various forums try to mitigate any such issues of Govt., Semi-Govt., Industry and /or any bodies who tries and implements law or norms which may be harmful or adversely affecting our trade.</p> <p>To have interactions with Food & Drug Administration and implement good trading practices by complying with Drug Act and Rules and to draw their attention on such laws/rules which may not be appropriate in present context and request them for its modifications.</p>

Name	Headquarters	Objective
		<p>To create harmonious relationship amongst members and also to create confidence amongst each other which is very important for maintaining unity.</p> <p>To guide and prepare our members to face the challenges arising out of great changes taking place in Pharmaceutical Trade due to the impact of GATT, TRIPS, EMR, Mergers & Acquisitions, Co-Marketing etc.</p> <p>To collect sufficient funds and arrange for regular income to meet the day to day expenses and other activities of our organization</p>
Organization of Pharmaceutical Producers of India (OPPI)	Mumbai	<p>It supports scientific research by professional and academic institutes.</p> <p>OPPI is actively engaged in designing and conducting training programmes for managers working in the Pharmaceutical Industry to equip them for competing in the global setting.</p> <p>It organizes national and international seminars and workshops relating to key issues of the pharmaceutical industry and healthcare.</p>
Indian Drug Manufacturers' Association (IDMA)	Mumbai	<p>It plays a vital role in the growth and development of the industry, by taking up with the Government major issues such as Price Control, Patents and Trade Marks Laws, Quality & GMP, R&D, Exports, etc.</p> <p>It promotes better understanding with the consumer organizations, the press and other media on problems faced by the industry</p>
All India Drug Control Officers' Confederation (AIDCOC)	Mumbai	<p>To Unite and Organize the drugs control officers in the State , Central Government and Union territories and their associations with an object of coordinating their activities for establishment of social justice and regulating the relations of the officers with the Government.</p> <p>To Safeguard and promote interest of the drugs controls officers of India.</p> <p>To redress the grievances of the drugs control officers.</p> <p>To promote a sense of fraternity, feeling of belonging and brotherhood among its constituents.</p> <p>To operate and federate with the associations, federations, confederations in the state, central and U.T. Governments and international bodies having similar objectives.</p> <p>To achieve professional excellence through better coordination amongst drugs control officers.</p> <p>To achieve uniform status, uniform organizational structure and uniform pay scales.</p> <p>To have an independent and separate drugs control organization headed by a technically qualified person</p> <p>To offer Better service to the public.</p> <p>To make dedicated efforts for welfare of the drugs control officers</p> <p>To take up any other activity conducive to the betterment in the discharge of their functions effectively and efficiently.</p>

Appendix C: Registered Pharmacists in India

S. No	States/UTs	Pharmacists as on June 2003
1	Andhra Pradesh	33938
2	Arunachal Pradesh	347
3	Assam	2429
4	Bihar	4163
5	Goa	255
6	Gujarat	20948
7	Haryana	874
8	Himachal Pradesh	2818
9	Karnataka	71736
10	Kerala	7531
11	Madhya Pradesh	1381
12	Maharashtra	99614
13	Meghalaya	150
14	Mizoram	382
15	Orissa	12159
16	Punjab	35290
17	Rajasthan	18214
18	Tamil Nadu	101240
19	Tripura	257
20	Uttar Pradesh	30276
21	West Bengal	89630
22	Delhi	20978
23	Lakshadweep	3082
24	Pondicherry	1716
	Total	559408

Source Pharmacy Council of India, 2003