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Human Resources for Health

Learning Objectives

Upon completion of this chapter, the student should be able to:

1. Define criteria for determining the supply of personnel in the health sector;
2. Define criteria for evaluation of health personnel training programs;
3. Define criteria for development of new training facilities and new health workers;
4. Define licensing, regulatory, and accreditation functions in the New Public Health.

INTRODUCTION

The health workforce can be defined as “all people engaged in actions whose primary intent is to enhance health” (Dal Poz et al., 2009). These people include clinical care providers, nurses, doctors, pharmacist, and many others, as well as public health, management, and support staff. All are vital to the work of maintaining and improving health. There are no absolute standards of need and there is wide variation in the health workforce, even in the industrialized countries. But there are clearly needs for supplies of health personnel to meet the needs of a population and methods to train them, employ them, and retain them. Those countries with exceedingly low levels of numbers of health workers will have difficulty achieving the Millennium Development Goals (MDGs) by the year 2015 and beyond. Developing adequacy in the quantity and quality of the health workforce is one of the essential aspects of public health.

Development and sustainability of the New Public Health and its ability to respond to old and emerging threats depend on the quantity and quality of human resources of the total and especially the public health workforce. The great achievements of public health of the twentieth century led to doubling of life expectancy in the industrialized countries and the emergence of important health advances even in the least developed countries. New challenges of globalization of diseases such as human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), severe acute respiratory syndrome (SARS), persisting tropical diseases and other emerging communicable diseases, and disasters, terrorism, genocide and pandemics of avian influenza present great challenges in the twenty-first century. But the

main causes of death are the non-communicable diseases (NCDs), where prevention has shown truly amazing positive results in cardiovascular diseases, cancer, and injuries. However, much remains to be done in the high-income as well as in middle- and low-income countries for primary, secondary, and tertiary prevention to reduce morbidity and avoidable deaths, i.e., deaths that may be prevented by risk reduction or preventive measures, such as lung cancer from cigarette smoking and exposure. The key to many of the future achievements in reducing the burden of disease lies in health promotion along with advances in the biomedical side of prevention with, for example, new vaccines to prevent or modify infectious diseases and NCDs, especially cancers. Despite improved prevention, NCDs, including mental and oral disease, are still a major public health problem in high-income countries and growing rapidly in low- and middle income countries (see Chapters 6 and 7).

It is vital to address the issues of human resources for health in all countries. While there has been much progress in this field, the challenges ahead are daunting. There is an increasing flow of trained health professionals from poor to rich countries, from rural to urban locations, from public to private sector services, and from poor countries to wealthy ones providing attractive financial and professional rewards. In low-income countries, development of infrastructures capable of providing community health services in poor urban and rural areas is a challenge requiring new approaches such as training and deploying well-supervised community health workers (CHWs) and university- or college-level trained public health managers and health promoters. Similarly, health promoters with various training backgrounds will be required in high-income countries to meet the growing demand from aging populations in need of extensive support systems in their homes and in the community.

The New Public Health is concerned with the total health system and related issues. It requires an understanding of issues related to the training, supply, distribution, and management of many kinds of human resources, including the balance between personnel working in institutions and in the community. It was for these reasons that the World Health Organization (WHO) World Health Report of 2006 noted “an estimated shortage of almost 4.3 million doctors, midwives, nurses, dental and optometric and other health professions and support workers worldwide” and

recommended a 10-year program to address this fundamental issue, particularly for the developing world. The developed nations are facing many shortages in critical areas such as nursing personnel, but also in other skills needed to care for an increasingly elderly population, as well as rising tides of diabetes and obesity, and their long-term sequelae.

Health systems require adequate numbers of well-trained, well-remunerated, and up-to-date providers working with adequate facilities and support systems. Health professions are made up of many disciplines working in a complex network of facilities and programs. Their range of activities includes provision of patient care in the community and in hospital or other institutional settings. They are also needed to promote health, prevent disease, treat illness, and rehabilitate in a compassionate, ethical, professional, and cost-effective manner. Health care providers at all levels must not only be educated for competence and humanness in clinical functions, but also be continuous learners, knowledgeable in the medical and social sciences of health including the economic aspects of health care. They must be aware of and able to synthesize knowledge from related fields such as epidemiology, economics, and management, as well as the social and behavioral sciences. The quality of the practitioner depends on the recruitment of socially motivated and talented people, on education, training, and professionalization as providers, as well as on the structure, content, and quality orientation of the health system in which they work.

Determining policy, need, and allocation of human resources is an important health planning issue. A relative oversupply or undersupply of one or more health professions creates a bias or imbalance in the health system and its economics. Mid-level practitioners and CHWs are being recognized as essential to ensure access to appropriate levels of service and to provide for unmet service needs in both developed and developing countries. The ongoing pandemics of AIDS, tuberculosis (TB), malaria, and comorbidities of infectious diseases with micronutrient deficiencies stretch beyond the limited capacities of existing resources. At the same time, public and political attention is unable to focus on health needs sufficiently to provide for developing and sustaining the human resources necessary to meet such challenges as the MDGs. Many countries will be unable to meet such goals, particularly in relation to child and maternal mortality, with the financial and human resources available, even with assistance from donor countries and organizations.

OVERVIEW OF HUMAN RESOURCES

Globalization has increased our awareness and understanding of the importance of building the essential health system governance, infrastructure, organization, funding, universal access with associated workforce needs. Threats and experience have shown the dangers of high levels of premature mortality from communicable and non-communicable

diseases, environmental and natural disasters, violence and terrorism, ongoing pandemics, with movements of diseases from one habitat crossing oceans via rapid transportation from one end of the Earth to the other. Unprecedented migration of the skilled health workforce from developing countries to developed countries is happening owing to perceptions of more attractive incomes, professional settings, and way of life. At the same time, with aging populations and new technologies revolutionizing medicine, new generations of health professionals and health workers are needed to meet rising demands and expectations.

In seeking efficient and effective ways of improving health, health systems have opened many new professional roles in new organizational frameworks. As definitions of health service were widened to include health maintenance, new health professions were added to the total health service spectrum. Continuing education is vital to maintain and upgrade quality in a health care system. Registration systems and databases are important to provide basic information on all relevant aspects of health personnel.

The World Health Report 2006 states the issue as follows:

“The world community has sufficient financial resources and technologies to tackle most of these health challenges; yet today many national health systems are weak, unresponsive, inequitable – even unsafe. What is needed now is political will to implement national plans, together with international cooperation to align resources, harness knowledge and build robust health systems for treating and preventing disease and promoting population health. Developing capable, motivated and supported health workers is essential for overcoming bottlenecks to achieve national and global health goals.” (WHO, 2006)

This report indicates that the world’s poorest countries, mostly in sub-Saharan Africa, have deficits of 4.3 million health workers, especially doctors, nurses, and midwives. Scaling up training programs as realistically suggested over a 10–20-year period is costly and is associated with major loss of graduates to migration to high-income countries, which actively recruit doctors and nurses from poor countries. Additional costs of training and employing the professional workers needed for low- and medium-income countries will require large-scale investment by the developing countries themselves and international donor aid. However, many policy makers, donors and health service agencies do not place infrastructure development on their agendas, so that the estimate by the WHO at hundreds of millions of dollars per country-year, and even more in incremental annual salary costs, is well beyond current levels of national and donor expenditures in developing countries.

In 2010, the WHO sharpened the focus on building sustainable health systems in low- and medium-income countries by calling for more intensive national and donor emphasis on a combination of issues: service delivery, health workforce, health information systems, access to essential

medicines, financing, and leadership-governance in a context of universal access to basic primary care and public health services to achieve the MDGs and their follow-up after 2015 (WHO: Monitoring the Building Blocks of Health Systems, 2010).

This chapter examines the importance of human resources for the New Public Health and the elements essential for training in relation to the quantity, quality, and changing interaction among the health professions. The global problem of human resources for health is not only a severe problem for developing countries but an ongoing issue in the industrialized countries as well. The numbers, types, and distribution of personnel supply are major determinants of access, availability, appropriateness, and costs of health care. The training, quality, and performance of health personnel and the technology they use are all important health planning issues. Every health professional needs knowledge of the principles and current standards of public health in order to perform his or her functions, as all of health care now routinely involves prevention, teamwork, management, quality assurance, cost containment, and related ethical issues.

In many countries, the major focus of education of health personnel has been to prepare clinicians, without equal emphasis on preparation of public health policy analysts, health managers, and public health professionals. Yet the latter are especially important when health reforms are under way and when health promotion and prevention are needed to cope with changes in the health needs of a society.

The principal problems in human resources development are not the same for high-income countries as for low-income countries, which also have low rates of expenditures on health (<5 percent of gross domestic product). While there is variation between countries, the following are common to the human resources issues generally:

- inadequate funding, training positions, salaries, incentives, safety, and support systems for health workers
- imbalance in training of health professionals; severe shortages of nurses and other health professionals, compared to the physician workforce
- insufficient training for medical and nursing personnel in developing countries; possibly excess capacity for medical training in post-Soviet countries
- excess of medical subspecialists, and insufficient incentives and training of primary care physicians, inflating health costs and compromising access to care
- geographic maldistribution of vital professional categories with concentration in urban centers and poor supply in rural areas
- underfinancing for public systems of health care in comparison to private services, fostering poor work conditions, low remuneration, and indifferent career opportunities, with low staff morale, performance, and patient satisfaction or compliance with needed care
- insufficient standards and length of training of specialist physicians to produce well-qualified professional leaders
- lack of public health orientation of policy makers and health providers with overmedicalization in the health field, and excessive influence of the pharmaceutical industry on medical education, practice, and health priorities
- lack of postgraduate accredited academic centers for research and training of public health specialists in epidemiology, health-related social sciences, health system policy analysis, or health system management, compromising the ability of a health system to monitor its outcomes and resource allocation, or to evaluate program effectiveness
- licensing of health providers by the government, which may allow for compromises in quality to ensure adequate numbers of graduates; conversely, delegation of licensing to professional syndicates may result in a protectionist approach, placing the interests of the profession above those of the public
- compromising the quality of human resources by inadequate recruitment and educational standards, inadequate continuing examination and recertification
- conflicts of academic, professional, government, or insurer interests with public and individual patient interests in training policies
- poor coordination and communication between government and managerial sectors involved in health policy
- developing countries, where they are most needed
- inadequate development of community health workforces as front-line access and outreach personnel in rural and underserved urban areas as integral participants in the health system, including for underserved high-need populations in developed countries
- resistance to addition of new health workers and transfer of tasks and responsibilities
- in underserved communities or health guides for high risk populations such as diabetics to supplement limited medical and nursing services and health needs to community-based workerstrained and supervised to provide for unmet needs
- inter-professional rivalries over distribution of tasks and skills for future professional workforce training needs
- addition of new health professional roles to improve efficiency in organized health care systems, such as accountable care organizations.

From the 1950s to the 1970s, few new medical schools were opened in the USA, while existing schools expanded to meet problems of access to care and the perceived shortage of doctors. However, none opened during the 1980s and 1990s. The number of medical schools in 1980–81 was 125 and 14 osteopathy schools, and in 2008–09, these increased to 131 and 26, respectively. Since 2007, more than a dozen schools have started working with the Liaison Committee

on Medical Education accreditation process; 10 more are under discussion, and five osteopathic medical colleges have opened. These will not meet the need for 125,000 physicians by 2025, an estimate that is debatable; however, a shortage does exist with an aging society and more Americans gaining health care entitlement coverage under the Affordable Care Act of 2010. Reliance on immigration of doctors from poor countries is problematic in other ways.

It was thought that increased numbers of doctors would increase competition and lower doctors' incomes; however, medical incomes continued to rise and problems of access to care were unresolved. With growing emphasis on health economics and health promotion and disease prevention, there was a realization that excess medical personnel would not contribute to the national health, and that in some countries the excess of medical personnel had become a liability. In both fee-for-service medicine and salaried health service, increases in physician supply generate increases in health expenditures. Supply and demand market forces do not adapt well to health care, because the consumer demand is to a large extent generated by provider decisions (e.g., for return visits, investigation, or hospitalization). Fees may be fixed arbitrarily or by negotiation with a public insurance mechanism; the service is paid by a third party, and the consumer is less knowledgeable about the medical condition and needs than the provider.

Each country addresses the issue of how many and what kinds of human resources to train for its own needs, related to the design and operation of its health system. During the 1970s, the province of Alberta, Canada, had relatively stable expenditures for medical services and physician-to-population ratios. During the 1980s, the province experienced a marked economic downturn and zero population growth, but the supply of physicians and services per physician increased by some 20 percent. The reduced numbers of clients per physician led to an increase both in fees and in volume of services per capita so that physician incomes were sustained. As a result, total and per capita expenditures for health care increased sharply. In many countries during the 1980s, policies were reformulated to reduce the size of medical school training entry classes.

Oversupply of medical specialists can also be a serious problem for a health system, promoting a bias towards a specialized medical orientation in health care at the expense of other more basic needs of public health, primary care, and fundamental support systems for vulnerable groups in society. An excessively specialized medical orientation fosters misallocation of limited resources by creation of tertiary care and high physician density in central cities, leaving rural and primary care underdeveloped. This situation is widely prevalent in developing countries such as India, Mexico, Colombia, and other Latin American countries. In some countries the problem is often compounded by an inability of the health budget to employ needed numbers

of physicians. Unemployment among young physicians is a substantial problem in many countries.

In developing countries, health workforce shortages are already at crisis levels. As both the populations and workforces of industrialized nations increase in age, these societies also face an increasing demand for health workers across the professional spectrum that outstrips supply. In 1996, the Association of American Medical Colleges (AAMC) in cooperation with the Council on Graduate Medical Education issued a call for a 30 percent increase in medical school capacity over the following decade. As the current workforce nears retirement age it becomes clear that even this may be insufficient to maintain basic health care services. The shortages encompass nearly every field, but are most pronounced for rural areas, primary care, and public health; fewer than 32 percent of physicians in the USA practice as generalists. The American Association of Family Physicians predicts a need for an increase of at least 40 percent of physicians in primary care alone by 2020. Increasing the percentage of female medical graduates has only partially met increased workforce needs as many work part time during parts of their careers because of family obligations, while there is a higher tendency for male graduates to leave the medical profession for other fields, and specialized medical practice makes a more attractive career than primary care.

The ratio of physicians in active medical practice per 10,000 population in the USA increased from 13.5 in 1975 to 18.0 in 1985, 21.3 in 1995, and 23.8 in 2005 (Health, United States, 2011), and is expected to rise to 29.2 by the year 2020. Concerns of shortages of both primary care and specialist doctors are based on current geographic and specialty training distribution, but also the changing demography of the aging population. These concerns are, however, based on current medical practice organization and should take into account more efficient methods of practice, such as prepaid group practice, full-time salaried physician staffing in hospitals, and increased potential for preventive care by nurse practitioners (NPs) and CHWs.

The debate on increasing graduate training positions by removing the current ceiling on their funding by Medicare is in full swing. Many argue that there has been a steady increase in medical personnel, but the geographic distribution favors the major population centers over rural and underserved remote areas. Furthermore, some medical specialties, such as anesthesia and primary care, have severe shortages. They further argue that increasing the output of medical schools increases current social disparities and only major reforms including national health insurance would reduce such inequities.

In the USA, mid-level health care providers fill more than half the supply of primary care clinicians. Compounded by a generalized nursing workforce shortage, NP graduation rates are decreasing at a rate of 4.5 percent each year. Policy studies in family medicine and primary care in the USA are needed to help determine future professional

workforce training needs, and the addition of new health professions to more effectively organized health care systems, such as accountable care organizations (ACOs) linking hospitals, primary care, and outreach services (see Chapters 10 and 12). There is a predicted similar decline in physician assistant (PA) graduations, reaching a 25 percent loss by 2020. Mid-level practitioners have grown in influence and have proven to be outstanding public health and primary care professionals, bringing needed health care to rural and other marginalized populations. Enhancement and support of the NP and PA professions are essential for successful efforts to meet health care workforce demands. As graduation rates for mid-level practitioners decrease, a crisis of unmet need arises. Current educational programs must be expanded, new programs developed, and incentives created to attract workers to public health and primary care.

While nearly all health professions face projected shortages, the situation for nurses is most severe. Throughout the world, the nursing workforce is far from sufficient to meet the public's needs. In sub-Saharan Africa, simply to accomplish immediate health intervention goals, an additional 600,000 nurses would be required. In the USA, the number of registered nurses (RNs) increased by 8 percent between 2000 and 2004 to a new high of 2.9 million, but this is increasingly a group approaching retirement age. The picture varies from country to country; however, every region of the world faces dramatic nursing shortages. A 2006 report by the International Council of Nurses presents policy guidelines for recruiting new workers, curtailing migration trends which have stripped impoverished regions of nurses, and improving working conditions and labor strength, a priority in the retention of the current workforce.

Table 14.1 highlights the imbalance between nursing and medical professions for several developed nations. While total physician supply varies greatly, there is a global pattern of severely unequal distribution of human resources, with greater than half of providers practicing in subspecialties and metropolitan areas. In terms of public health need, the shortage of both doctors and nurses is at crisis levels for rural and marginalized populations.

The achievement of the goal of Health for All through primary health care requires the effective and coordinated services of many types of health personnel within a national health system designed to reach this goal. Government policy is crucial for the preparation, composition, and work patterns of the health workforce. National expenditures on health are dependent on the political priority given to health compared to other issues that may be equally or more pressing to the governing power. A strong national health policy can nevertheless be constructed, even in a poor country, by well-defined health programs. Community and rural health policy in China during the 1950s was based on a number of elements: development of a 3-year family doctor training program for rural service, upgrading training of

TABLE 14.1 Physician and Nurse Density per 1000 Population for Selected Countries, 2010

Country	Physicians	Nurses
UK	2.7	9.6
Sweden	3.8	11.0
Germany	3.7	11.3
USA	2.4	11.0
Russian Federation ^a	4.3	8.1
Israel	3.5	4.8
Greece	6.1	3.3
Mexico	2.0	2.5
France	3.3	8.5
Canada	2.4	9.3

Note: Rounded to one decimal place.

^aFrom the WHO Health for All database.

Sources: Organisation for Economic Co-operation and Development. Health data, 2012. Health policies and data: frequently requested data. Available at: <http://www.oecd.org/els/health-systems/oecdhealthdata2013-frequentlyrequesteddata.htm> [Accessed 15 July 2013]. World Health Organization, European Region. Health for All database; January 2013. Available at: <http://data.euro.who.int/hfad/> [Accessed 3 July 2013].

village doctors to physician assistant level, and incentives to encourage work in the countryside and at a grassroots level. This program was successful in raising health standards in China beyond those that might have been expected from its economic level. With recent economic reforms, this system is going through profound changes (see Chapter 13).

HUMAN RESOURCES PLANNING

The health infrastructure of a country includes the resources available and their organization. Human resources are essential to any health system. The supply of personnel and facilities, economic support of the system, management and policy, methods of payment of providers, and organization of the services are therefore vital in health planning (Box 14.1).

Resources available and needed for health systems include facilities, personnel, and financial resources for health care. The organizational and financial structure of a health system determines how these resources are allocated or expended, in the public as well as the private health care sectors. Both structure and methods of payment affect how services are provided. Health systems require economic support sufficient for basic and continuing education of high-quality human resources, as well as managing their appropriate and optimum use.

Regulation of health personnel includes licensure and discipline and is an important governmental function. Measures to control or limit the supply of medical practitioners, along with incentives to promote more efficient health care, are important issues in rationalizing health care systems.

BOX 14.1 The Problem Statement of the Independent Commission: Education of Health Professionals for the Twenty-First Century

The “Frenck report”, published in *The Lancet* in 2010 as the report of an independent commission on education of health professionals for the twenty-first century, reviewed the history of medical education since the Flexner report of 1910 (see Box 14.3). The Flexner report initiated a rapid change-over from the poor-quality private medical schools common in the USA at that time to science- and university-based faculties modeled after successful medical education in then leading German schools. The new model medical faculties stressed the education of health professionals based on the integration of modern science into the curricula at university-based schools.

Following World War II, these reforms were reinforced by massive US federal funding of the National Institutes of Health, which promoted research and raised standards of medical education and research to leading levels globally. This helped to create the basis for medical, nutrition, and many other research fields, which took giant steps forward and contributed to public health successes that helped to double the lifespan during the twentieth century. Although raising general levels of health, these changes did not eliminate the gaps and inequities in health within the USA and between countries.

Equity in health is still far from having been achieved, and new health challenges are still unmet and unexpected. New infectious diseases, and the recurrence of those thought to have been controlled, such as measles, and demographic and epidemiological transitions, with potentially overwhelming climate and environmental risks, threaten health security of everyone. Behavioral risk factors and loss of support for public health initiatives create heavy burdens for health promotion and classical public health.

The commission noted that medical professional education is slow to change, with inadequate attention being paid to patient and population needs, and poor teamwork. There is gender stratification of professional status and a narrow technical focus lacking contextual understanding, with episodic rather than continuous care. Training is primarily in hospitals with little in primary care, and there is a lack of attention to improvement in health-system performance.

Efforts to change have been limited in their effect. Educational reforms include the introduction of science-based curricula and problem-based instructional innovations. A new reform movement should now address core professional competencies to specific contexts, based on evidence from global knowledge.

Source: Frenk J, Chen L, Bhutta ZGA, Cohen J, Crisp N, Evans T, et al. *Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. a global independent commission: education of health professionals for the 21st century. The Lancet Commissions. Lancet* 2010;376:1924–58. Available at: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(10\)61854-5/fulltext?_eventId=login](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(10)61854-5/fulltext?_eventId=login) [Accessed 14 July 2013].

BOX 14.2 Issues in Health Personnel Planning

- Current and projected demographic changes, i.e., population growth and aging of the population.
- Current and projected supply of practitioners and their geographic distribution by specialty.
- Technological advances requiring new professions.
- Immigration and emigration, effects on personnel supply.
- Costs/benefits of increasing professional-to-population ratios versus prevention, health promotion measures.
- Changing epidemiological patterns, e.g., reduction of dental service needs by fluoridation of community water supplies, aging of population with increasing prevalence of chronic disease.
- Health system shift from institutional to ambulatory and preventive care.
- Shift of tasks from higher level to other personnel specifically prepared for needed health services, increasing range of health personnel, e.g., optometrists, psychologists, social workers, midwives, dental nurses, nurse practitioners, and community health workers.
- Migration of doctors and nurses from low income to high income countries and from rural to urban areas.

Continuing education is a vital part of health personnel planning. The rapid and continuous development of medical sciences (e.g., genetics and nanotechnology) and technology (e.g., new vaccines and health promotion techniques) requires health workers to have access to continuing education to keep up with new developments. The methods of doing this should include short courses, longer formal training periods, such as the Master of Public Health (MPH) degree for health managers, and development of distance learning with wide access to Internet resources. Increased access to well-developed consensus guidelines for both clinical care and public health policy is vital for human resource planning.

Fundamental to the process of determining labor needs is knowledge of the current personnel situation (Box 14.2). Essential for this are data systems based on periodic registration or census-taking of people practicing a health profession. Practitioners may retire, die, migrate, or leave the profession, and should be deleted from registries of those actively practicing. An accurate, up-to-date picture of actual human resources provides information on specialty, geographic distribution, age, gender, and current work activities. International comparisons of professional personnel help to place a national pattern in the context of other countries with similar socioeconomic and health standards. Human resources supply should be matched to the targets and resources of a country. Alternative approaches may be needed if the supply of workers is insufficient or inappropriate to meet health needs and targets.

Assessing current personnel supply and determining future needs are specific tasks of a government agency concerned

with comprehensive national socioeconomic planning. They may be assigned to a planning agency, board, commission, or committee empowered by authorities working with education systems, consistent with general health planning. Academic training centers play an important role not only in training but also in implementation of national human resource policies, so they are integral to determining policy.

Supply and Demand

A common form of quantitative human resources planning, or non-planning, is a market-oriented approach, based on the needs of the training institution and demands of trainees. The demand for training as physicians may be high, and the medical schools have an interest in training more students for financial or prestige reasons. The creation of new private medical schools, if unregulated, will be based on a profit motive and not take into account the needs or capacity of the country to absorb new graduates. This leads to the creation of excessive training capacity and a surplus of poorly trained doctors with little prospect of professional employment, as is happening in some mid-level developing countries.

During the 1950s and 1960s, planners in many countries thought that universal access to medical care would solve most health problems and more doctors would be needed to fulfill that dream. However, increasing the supply of medical graduates is costly to society and results in oversupply, especially in major urban centers, with increased utilization and subspecialization of medical care.

Increasing the supply of physicians was expected to increase access to health care and to increase the numbers of doctors entering less popular fields of practice, such as primary care, and moving to underserved geographic areas. This approach has been less accepted since the 1980s; even in free market societies, it inflates the costs of health care and fails to meet needs in underserved populations or specialties. Immigration and emigration of medical personnel, or departures from active practice, are also factors in the supply and distribution of health personnel. There were also concerns during the 1980s of a possible oversupply of doctors, and medical school enrollments were limited as a policy. This approach was promoted as part of the concern for rapid increases in health care costs and partially as a result of concerns in the medical profession of excess supply bringing more competition and possibly lowering the incomes of physicians. In the 1980s, health care costs rose rapidly, associated with increasing specialization and a search for new organizational patterns of health care such as the health maintenance organizations (HMOs). There was also a growing realization that population and personal health needs depend more on prevention and health promotion than on increased supply of physicians. This led to a trend to reduce numbers of new students entering medical schools, a decrease in subspecialty training positions, and

a greater reliance on immigration of doctors to the USA, Canada, and the UK. This created a growing migration of medical and nursing personnel and reliance of developed countries on importation of doctors and nurses from poorer countries, often with serious and destructive effects on poorer countries in Europe and especially in severely workforce-deficient countries in sub-Saharan Africa.

Comparing Canada to the USA and other countries in the Organisation for Economic Co-operation and Development (OECD) shows that in 2010 Canada and the USA each had a ratio of 2.4 practicing physicians per 1000 population, compared to the OECD average of 3.1 per 1000. In 2009 the USA had 10.8 nurses per 1000 population, compared to 9.4 for Canada and an OECD average of 8.4. As seen in Chapter 13, Canadians have better life expectancy than their US counterparts (80.8 versus 78.7 years), lower mortality rates, and better access to physicians. The difference seems to be in universal coverage still lacking in the USA, despite higher health expenditures there.

Medical and health profession schools are costly to establish and operate; they can generate high costs to a health system if they produce excess graduates. Founding new schools and maintaining existing schools at present levels of enrollment require careful consideration of the effects of the numbers of medical graduates on the health system. In either a regulated environment or a free market situation, the supply of human resources can be powerful in driving up health care costs. A period of restraint in health expenditures calls into question the wisdom of continuous increases in personnel and unlimited service as direct public service insured benefits. Even in free market settings such as the USA, government funding and regulatory powers are used to reduce the number of training positions in the specialties in favor of increased incentives and openings in primary care.

Trends in medical education and physician supply in the USA between 1970 and 2009 are shown in [Table 14.2](#). The number of medical graduates increased by 84 percent between 1970 and 1980 but has grown at a slower rate since 1990. Medical personnel per population increased by over 26 percent from 1970 to 1980, and by over 36 percent from 1980 to 2000, with only a 2.2 percent increase from 2000 to 2009. Some 25 percent of practicing physicians in the USA are graduates of international medical schools. The number of US medical graduates per 100,000 population during the 1980s was between 7.0 and 7.5, but declined to an average of 6.3 per 100,000 population in the 2000–2010 period. Countries such as Sweden and Switzerland average between 8 and 10 per 100,000 in recent years (OECD, 2012). Owing to population expansion and aging, the American Medical Association (AMA) and American Association of Medical Colleges (AAMC) now predict a growing shortage of physicians in the USA, particularly in primary care and underserved areas. This shortage is partially being addressed by the expansion of osteopathic schools and immigration

TABLE 14.2 Schools, Graduates, and Physician Supply, USA, 1970–2009

	1970	1980	1990	2000	2005	2008–09
Medical and osteopathy schools	110	140	142	144	145	157
Graduates (thousands) ^a	8.8	16.2	16.9	18.0	18.5	20.1
Doctors/10,000 population ^b	15.5	19.6	23.2	26.8	26.9	27.4

Note:

^aIncludes all graduating allopathic and osteopathic physicians.

^bIncludes all practicing and non-practicing physicians.

Source: National Center for Health Statistics. Health, United States, 2011: With special feature on socioeconomic status and health. Tables 109 and 114. Hyattsville, MD: NCHS; 2012. Available at: <http://www.cdc.gov/nchs/data/abus/abus11.pdf> [Accessed 15 July 2013].

of foreign graduates; however, the AMA and AAMC have called for a rapid increase in US medical school admissions, by 30 percent. Immigration of physicians from developing countries is providing an important source of medical personnel, but is contributing to the deficiency of physicians in the source countries.

A normative approach uses standards (or norms) derived in some systematic, arbitrary way. The standards may be based on empirical criteria of the number of physicians, nurses, or other health personnel required. This approach may be excessively rigid and unresponsive to changes in disease prevalence and technological changes in health service needs. Standards may also be adopted from ratios found in other countries or in other successful or “gold standard” areas of the same country.

Human resources planning may set certain goals intended to produce personnel in numbers maintaining or increasing the current supply-to-population ratio by a selected percentage, for example, by 5 or 10 percent within a chosen period. A country wishing to increase this ratio will need to take into account new training needs and loss due to emigration. This approach is less likely to lead to an oversupply but may maintain an arbitrarily high level of human resources despite changes in epidemiological patterns or increased efficiency of the services. For example, as TB declined, fewer TB specialists were needed, but as the disease recurs, there is a demand to improve the training and numbers of specialists in the field. Hospitals are becoming less the center of health care, and reduction in hospital beds has become part of restructuring of services. This should lead to a shift of personnel from institutional to community-based services, with provision for retraining and skilled system management.

Many countries require medical graduates to serve one or several years in rural or underserved areas. Young graduates are thus exposed to the realities of primary care as part of their professional development and, it is hoped, infused with concern for the harsh realities of the living conditions of rural poverty. However, this system places inexperienced young professionals in isolated locations without adequate collegial support or supervision, where they are unlikely to remain beyond a

compulsory period of service. Efforts to require young graduates to work in rural areas are temporary solutions, generally frustrated by the desire of doctors and nurses to live in urban areas and practice in clinical subspecialties.

Partly in search of methods to constrain cost increases and partly to find ways to improve access to care for high-risk groups, mid-level health provider training is increasingly accepted in human resources planning. Human resources planning should take into account the many different disciplines needed for both clinical care and public health, taking into account changing patterns of need, technology, and spread of health care responsibility among many professions.

Organization of care affects the numbers and types of different health workers required. Independent private practice and free choice of physician or specialist promote higher utilization patterns and create waiting lists, rapid cost increases, and an apparent shortage of personnel. Centrally controlled health systems such as the Soviet health system created inflated norms of staff-to-population ratios and low-efficiency health services (see Chapter 13).

Qualitative methods are as important as quantitative planning. Quality of training programs at the undergraduate and graduate levels, accreditation, licensure procedures, and ongoing quality assurance measures are important elements in the quality of national health systems.

The supply of medical doctors varies widely in European countries (Table 14.3) and has little relationship to health indicators, for example in comparing Austria and Belgium, or Greece and Israel. Greece has a very high doctor to population ratio (as well as acute care hospital bed to population ratio) compared to all other European countries and the supply is increasing even while the country is in a severe economic crisis. Greek life expectancy was above most European countries until the 1970s but its rate of increase has slowed to levels below those countries since 1990.

MEDICAL EDUCATION

The education of medical doctors and the training of specialists are, in principle, national commitments. Governments

TABLE 14.3 Physicians per 100,000 Population, Selected European Countries, 1980–2010

Country	1980	1990	2000	2010
Austria	222	299	381	478
Belgium	231	327	283	297
Czech Republic	226	271	337	358
Germany			326	373
Greece	243	338	433	610
Israel			339	350
Norway	197		340	407
Portugal	189	274	310	383
UK	132	162	196	273
European Region	247	291	301	329
EU	198	259	283	334
EU members before May 2004	193	260	290	356
EU members since 2004 or 2007	212	254	263	270
CIS	355	387	378	381

Note: Numbers rounded.

CIS= Commonwealth of Independent States (Russian Federation, Ukraine and others).

Source: World Health Organization. Health for All database; July 2012. Available at: <http://data.euro.who.int/hfadbf/> [Accessed 3 December 2012].

have a responsibility to ensure an adequate number of well-trained health professionals to provide services. This is a combined function of health and education authorities, carried out by providing financial support and standards for the universities or medical training institutes where education occurs. Funding support and accreditation of educational institutions provides mechanisms for applying national or state policy for both quantity and quality of educational programs. National or provincial departments of education set guidelines and standards for funding through a university grants mechanism or commission, often based on enrollment. Standards may be set for curriculum, faculty, basic sciences, and clinical training, as part of approval for funding or through non-governmental accreditation structures organized by the medical schools themselves (see Chapter 15).

The long tradition of multifaculty, university-based medical education is widespread in the industrialized countries and their former colonies, now independent states. Medical training gains from an environment that promotes research and service in an academic atmosphere with its associated standards. This tradition of linking research with education and service is important in promoting quality education. Having a research climate of peer-reviewed work raises the aspirations of the institution and its faculty and sets

BOX 14.3 The Flexner Report, 1910

“For twenty-five years there has been an enormous overproduction of uneducated and ill-trained medical practitioners in absolute disregard and without serious thought to the interests of the public.

Taking the USA, physicians are four or five times as numerous in proportion as in older countries like Germany. Over-production is due to the very large numbers of commercial schools.

Colleges and universities have failed to appreciate the great advance in medical education and the increased cost of teaching it along modern lines.

A hospital under complete educational control is as necessary to a medical school as is a laboratory of chemistry or pathology.

Trustees of hospitals, public and private, should, therefore, go to the limit of their authority in opening hospital wards to teaching. Progress for the future would seem to require a very much smaller number of medical schools, better equipped and better conducted and the needs of the public would equally require fewer physicians graduated each year better educated and better trained.”

Sources: Pritchett HS. Introduction. In Flexner A. *Medical education in the United States and Canada: a report to the Carnegie Foundation for the Advancement of Teaching*; 1910. Reprinted New York: Arno Press and New York Times; 1972.

Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, et al. *Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. Education for health professionals for the 21st century. The Lancet Commissions. Lancet 2010;376:1924–58.*

a standard for students for their life’s work. A university degree confers prestige to a profession, encourages the pursuit of peer recognition of excellence, and academic criteria for student selection, curriculum, and faculty standards. This is widely the case for medical schools, and increasingly for schools of nursing and other health professions. However, a university degree is not required for all health professions. Community colleges may more appropriately provide a multifaculty educational environment and a broad education base for some health care jobs.

In the nineteenth century, medical training in the USA was primarily carried out by private, commercial schools of medicine with poor facilities, staffing, and standards. The Carnegie Foundation sponsored a study of medical education in the USA and Canada, carried out by Abraham Flexner, a non-physician educator, who reported in 1910 on the poor quality of these commercial schools (Box 14.3). This report promoted university-based medical schools modeled on the Johns Hopkins University, which itself was based on successful, scientifically oriented German medical schools, combined with the strong clinical orientation of British teaching hospital medical schools. Most of the 450 commercial schools in the USA closed soon after this report and were replaced by the present 126 university-based medical schools with high standards of medical

BOX 14.4 Syllabus for Medical Education in Epidemiology, Clinical Epidemiology and Biostatistics

- Lectures
- Measures of disease frequency, morbidity, and mortality
- Rates and standardization
- Morbidity and mortality in Israel
- Research design I – cohort studies
- Measures of association
- Statistical inference
- Research design II – case–control studies
- Sample size
- Occupational epidemiology
- Clinical trials
- Analysis of clinical trials (multivariate models)
- Survival analysis
- Diagnostic tests
- Screening
- Meta-analysis
- Evidence-based medicine
- Class interactive exercise on diagnosis
- Causal and non-causal associations
- Summary and questions
- Small group sessions: prognosis; therapy; prevention
- Final written examination: short answers, multiple choice based on lectures and journal articles

Source: Paltiel O, Brezis M, Lahad A. Principles for planning the teaching of evidence-based medicine/clinical epidemiology for MPH and medical students. *Public Health Rev* 2002;30:261–70.

education and academic research. Since the 1950s, US medical schools have been stimulated by large amounts of federal funds channeled into research and training through the National Institutes of Health (NIH), as well as from non-governmental sources, including private and foundation donations.

Medical schools are resources for service to the community as well as being centers of training and academic research excellence. Their goal should be to provide a balanced education in an academic environment where teaching, research, and service interact to produce medical graduates competent and oriented to meet the needs of the population (Box 14.4). This requires a balance among the biomedical, psychological, population-based, and sociological perspectives on health care. Teaching methods should be designed to promote the objectives of the program. Many medical schools teach primarily by lecture to very large classes, with limited supervised clinical experience, which reduces the chance for the student to develop patient-oriented and problem-solving skills. It also promotes a didactic approach to medicine, and minimizes the opportunity for the student to work with multidisciplinary teams, or to see medical care as part of a diverse team. Working with students of other sciences and professions in a collegial fashion helps the

medical student to understand the team role of workers in the health care system.

The purpose of training medical practitioners is to have skilled professionals providing patient care and the professional leadership needed to develop and maintain high-quality health care and public health systems. In order to meet these goals, high standards are required in selection of candidates. Medical schools in the USA are graduate schools requiring a prior university degree for candidates. In other countries such as Canada and the UK, medical education includes 2 years of premedical studies followed by 4 years of medical school. Quality medical education requires continuous curriculum development and review, as well as highly qualified teachers, library access, clinical training, and examination during and at completion of training. The nature of undergraduate training will be a key factor in determining the lifelong practice habits of the providers, but equally important are the specialization period and ongoing education throughout their professional lives.

In most industrialized countries, enrollment of women and minority groups has increased dramatically in recent decades as part of social policy. There are social and political reasons to promote access to professional schools for all segments of a population, but this should be without compromising academic standards, and should not adversely affect the quality of services provided to the patient or the population as a whole. Private medical schools are a highly lucrative business in some developing countries, which, if unregulated, may contribute to overproduction of inadequately trained doctors, compromising national efforts to promote quality of training.

Where the language of instruction is not one used internationally for scientific literature, the local medical community may be limited in access to current textbooks and peer-reviewed professional literature, domestic and especially international journals, as well as Internet access. The language of instruction in most schools of medicine is the national language, but English is increasingly required as a second language in many European schools. Lack of English-language training prevents or hinders access to the world literature and participation in international exchanges and effectively holds back scientific progress in many countries.

During the transition period of the post-Soviet era, medical schools sought enrollment of foreign students to increase revenues, reducing the numbers of local students. However, they still produce graduates at levels well above the capacity of the system to absorb them if salaries of physicians are to rise above tradesperson levels. In some developing countries, private medical schools have sprung up with inadequate facilities and faculty producing large numbers of poorly trained doctors with little chance of employment in the profession in their own countries.

Curriculum reform, as in the days of Flexner's recommendations, must be an ongoing process to meet the health

needs of the population, in keeping with current international standards. Adequate attention must be paid to basic medical sciences, clinical experience and patient care, hospital and community-based training, and research. Access to libraries with an adequate supply of current international literature, textbooks, and computers with Internet services is essential to maintain acceptable standards.

Reform in medical education is focusing on producing practitioners to meet the needs of both primary care and specialized medical services including orientation to public health. In recent years, there has been growing concern that there has been an overemphasis on science and specialization in undergraduate training of US physicians, to the detriment of primary care. All medical students should be exposed to patient contact earlier in their training than in the past, in different health care settings, including teaching hospitals, outpatient clinics, and community clinics, as well as public health programs. They should also be familiar with community-based resources for the infirm, disabled, and poor. Training should include multidisciplinary components so the student is familiar with the professional elements of other disciplines including those in public health, health-related economics, and social sciences.

International conferences on medical education sponsored by the World Federation for Medical Education (WFME) in 1988, 1993 and in 2003 attempted to define a new direction for education of physicians to promote their role in promotion of health as well as treatment and prevention of illness (Box 14.5). This included a global perspective on damage done by migration of doctors and nurses from low income to high income countries. Quality and uniformity in standards for basic medical education were stressed as priorities at the global level. Sponsored by the WHO, United Nations Children's Fund (UNICEF), United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Development Programme (UNDP), and the World Bank, these conferences established an international forum for re-evaluation of medical education in the twenty-first century in the context of changes in medical and public health technology, organization of health care, and needs of the population. Change in medical education is often difficult because of competing concepts of what medical students should know and a lack of focus on how practicing physicians, especially for primary care, should be trained and encouraged to remain in this vital social role.

The costs of medical education are high and require public subsidies. University grant commissions are semi-autonomous bodies with financial grants from governmental education departments. Thus, both financial and regulatory powers are used to set criteria for standards and accreditation of faculties of medicine. This represents an important diffusion of power and responsibility from direct control

BOX 14.5 Medical Education Issues: The Edinburgh Declaration (1988) and the World Summit on Medical Education, 1993 (Reaffirmed in 2005, Standards Revised 2012)

- Conducted in relevant educational settings – hospital, community, workplace, homes
- Curriculum based on national health needs
- Emphasis on disease prevention and health promotion
- Lifelong active learning
- Competency-based learning
- Teachers trained as educators
- Integration of science with clinical practice
- Selection of entrants for social commitment, intellectual attributes
- Coordination of medical education with health care services
- Balanced production of categories of doctors
- Multiprofessional training
- Continuing medical education requirements
- Students involved in planning and evaluation of medical education
- A multi science-based medical graduate
- Ethical and moral basis of medical practice
- Curriculum options for dealing with information overload
- Postgraduate education in relation to community needs
- Health teams and multidisciplinary education
- Community participation in medical education
- Population-based education – care for individual patients in context of needs for a defined population

Sources: Adapted from World Federation for Medical Education. *World Summit on Medical Education: The changing medical profession; Edinburgh, August 1993, reaffirmed at Copenhagen in 2005. Promotion of accreditation of basic medical education: a programme within the framework of the WHO/WFME strategic partnership to improve medical education.* Copenhagen: WFME; revised 2012. The Panum Institute, Faculty of Health Sciences, University of Copenhagen; November 2005. World Federation for Medical Education. *Basic medical education. WFME global standards for quality improvement.* Copenhagen: WFME; 2003. Available at: <http://www.wfme.org> and <http://www.wfme.org/news/general-news/263-standards-for-basic-medical-education-the-2012-revision> [Accessed 19 November 2012].

by government. Regulation by accreditation of schools is also strengthened by national organizations which promote national standards of medical education.

The Medical Council of Canada (MCC) grants a qualification in medicine known as the Licentiate of the Medical Council of Canada (LMCC) to graduate physicians of accredited Canadian and US medical schools who have satisfied the eligibility requirements and passed the MCC Qualifying Examination Parts I and II. The MCC registers candidates who have been granted the LMCC in the Canadian Medical Register. Graduates of medical schools outside Canada and the USA are required to first pass the MCC Evaluating Examination. Physician licensing to practice in a province is delegated to the provincial medical

associations or a provincial college of physicians upon successful completion of national examinations.

In 2011, Canada had 2.4, the USA 2.5 and the UK 2.8 physicians per 1,000 population (OECD 2013). These countries augment local production of doctors by promoting immigration of foreign graduates, mostly from low- and medium-income countries, often through postgraduate education followed by retention processes fostered by teaching institutions. This policy causes grave concerns among developing nations and international organizations, which are calling for ethical practices to stop this promotion of a notorious “brain drain” from countries that are severely deficient in medical and other health professionals, pushed by poor conditions at home and pulled by wonderful conditions in the wealthy countries: the UK, Canada, the USA, Australia, and others. These issues are discussed extensively in the World Health Report 2006, and a Commission under the auspices of the Lancet (see Box 14.1) (Frenk et al., 2010).

Medical education needs should include exposure to the principles of evidence-based medicine and methodological training in epidemiology, biostatistics, economics, and research methods in order to cope with the explosion of medical information, and to appraise, interpret, and perform clinical research (see Chapters 3 and 15). There is growing interest in MD/MPH programs in the USA and Israel. There has also been an increase in clinical specialists taking MPH and other special programs, for example at the Harvard School of Public Health, to gain knowledge in these areas needed to advance clinical research capacity, in scientific writing, and providing potential leadership roles in the health system.

POSTGRADUATE MEDICAL TRAINING

Undergraduate medical training provides an educational base, but is not adequate preparation for a medical practitioner. Postgraduate training of high quality and adequate duration is essential to assuring quality in health care services (Box 14.6). Specialty training requirements should be regulated by a national or state authority, or a professional body (college or association) delegated the legal right to license practitioners. This includes designation of facilities accredited for training, academic, and research areas within the curriculum, clinical experience, duration of training, and requirements for examination at several stages during the training period.

National standards are needed to ensure equivalent quality and permit freedom of movement for professionals. However, this may put some areas at a disadvantage by promoting a brain drain, or loss of professionals, usually from rural to urban areas or from poor countries to wealthy ones. The rights of an individual practitioner to select place and type of practice are limited by open positions in training centers or in practice settings.

BOX 14.6 Standards for Postgraduate Medical Training

- Regulated by national board with professional, governmental, and public representation for quality, admissions/enrollment, and clinical and community-based training
- Duration of training of 4–6 years, depending on specialty
- Supervised independent clinical experience
- Accreditation of training centers based on academic and service criteria of licensing body
- Supervised research period in basic science laboratory or epidemiological study
- Required familiarity with relevant international literature
- Rotation with part of training in a different medical center
- Demonstrated high levels of clinical ability, responsibility, knowledge, and ethical standards
- Examinations in mid-training with written examinations based on international standards
- Examinations at end of training; clinical and written examinations based on international standards
- State board or professional college setting examinations and certification
- Recertification requirements

Source: World Federation for Medical Education. Post graduate medical education. WFME global standards for quality improvement. Copenhagen: WFME; 2003. Available at: <http://www.wfme.org/standards> [Accessed 29 November 2012].

Licensing of medical specialists is a state responsibility, but in some countries this is delegated to a professional association. In the USA, postgraduate training is under the control of state and national boards, made up of state-appointed officials and public and professional representatives. In Canada, postgraduate examinations and certification are under the authority of a professional body, the Royal College of Physicians and Surgeons of Canada. In the UK, licensing of physicians is under a state-appointed body, the General Medical Council (GMC), while specialty recognition is by a series of Royal Colleges, including a Faculty of Public Health.

Standards for specialty training must reflect the views of the specialty practitioners as well as the public interest. The public interest is best protected by a combination of state and professional supervisory systems with the force of law, including the regulatory and disciplinary measures needed to maintain professional and ethical standards demanded by the public interest. The specialist trainee requires supervised time and experience to mature as a professional. Supervised clinical experience, research, publication in peer-reviewed journals, and continuing peer review are all essential in the training process to produce motivated specialists who are capable of keeping up with the rapidly evolving standards of modern medicine. Clinical specialization time requirements vary widely from country to country. Eligibility for specialty boards in the

USA is generally 3–4 years of recognized training after graduation, with examination by member boards of the American Board of Medical Specialties.

SPECIALIZATION AND FAMILY PRACTICE

Good medical care depends on access to primary care and appropriate referral for specialty care. Most systems utilize the primary care physician as a gatekeeper for referral to specialty care. Insured service systems allowing non-referred access to specialty care face the difficulty of maintaining primary care medicine and continuing pressures on physicians to select specialty training as their career choice. Still too few graduating physicians choose a career in family practice, but specialists in internal medicine, pediatrics, and other fields are essentially providing primary care. The trend seen in Table 14.4 shows a relatively stable pattern of doctor to population ratio and nearly half of the medical workforce practicing primary care.

Uneven distribution of medical practitioners is widespread, with rural and urban poverty areas often suffering from a lack of access to primary care. In the USA, regional variation in practicing physicians in 2009 ranged from high ratios in Massachusetts (34.4 per 10,000 population) to a low rate of 18.6 in Nevada. Specialist physicians are less likely than generalists to live in rural areas. Distribution of physicians by specialty is another problem in medical resource planning. Regulations to redistribute the number of training positions are now operational in the USA and common in many countries. Medical teaching centers in the USA now come under regulations which require them to include primary care in their postgraduate training programs.

National health systems address these problems with regulations to mandate and financial incentives to attract physicians to underserved areas and understaffed specialties. In the UK, as in many other European countries, the National Health Service (NHS) uses the general practitioner (GP) as the key family practitioner (FP), primary care provider for all beneficiaries, with specialty access through the GP. Managed care programs in the USA also stress and require patients to see primary care physicians. The changing economic environment of health care will be associated

with changes in medical specialization more easily than the urban–rural inequities. These issues are leading to greater role delegation to nursing and new kinds of health workers.

TRAINING IN PREVENTIVE MEDICINE

Preventive medicine is defined by the American Board of Preventive Medicine (ABPM) as: “the specialty of medical practice that focuses on the health of individuals, communities, and defined populations. Its goal is to protect, promote, and maintain health and well-being and to prevent disease, disability, and death. Preventive medicine specialists have core competencies in biostatistics, epidemiology, environmental and occupational medicine, planning and evaluation of health services, management of health care organizations, research into causes of disease and injury in population groups, and the practice of prevention in clinical medicine”.

Preventive medicine is recognized as a clinical specialty in the USA. Promoted since the 1970s, this specialty attempts to bring public health and clinical medicine closer together. Preventive medicine training is one of 24 accredited clinical specialties in the USA, with physicians becoming board certified in one or more subspecialties: general preventive medicine and public health, occupational medicine, and aerospace medicine. These programs are part of the postgraduate training program system of the AMA, in conjunction with the ABPM. Master’s or doctoral degrees are earned in graduate programs situated in departments of community or preventive medicine within a medical faculty.

Preventive medicine is a specialized field of medical practice composed of distinct disciplines that utilize skills focusing on the health of defined populations to maintain and promote health and well-being and prevent disease, disability, and premature death. The ABPM requires trainees to have core competencies in biostatistics, epidemiology, administration, planning, organization, management, financing, and evaluation of health programs. Training also includes environmental and occupational health, and social and behavioral factors in health and disease and the practice of prevention in clinical medicine. It applies primary,

TABLE 14.4 Physician Workforce and Percentage of Primary Care Doctors, USA, Selected Years, 1950–2009

	1985	1990	1995	2000	2005	2009
Active physicians/10,000 population	20.7	NA	24.2	25.8	23.8	27.4
% in primary care	NA	44.6	45.6	47.3	46.2	48.1

Note: Primary care includes general primary care specialists and primary care subspecialists.
NA = not available.

Source: National Center for Health Statistics. Health, United States, 2011: With special feature on socioeconomic status and health. Tables 109 and 111. Hyattsville, MD: NCHS; 2012. Available at: <http://www.cdc.gov/nchs/data/abus/abus11.pdf> [Accessed 15 July 2013].

secondary, and tertiary prevention measures within clinical medicine.

Graduates in this field provide a supply of potential health planners, administrators, and teachers of preventive medicine, researchers, and clinicians applying preventive medicine in health care settings of practice. They may also serve in governmental (local, state, national, and international) public health departments, educational institutions, organized medical care groups, in industry, other employment settings, and the community, voluntary health agencies, and professional and related health organizations. Requirements include a graduate year of training and experience in a clinical area of medicine; a year of academic training in a fundamental aspect of preventive medicine; and a practicum or year of supervised practical experience (e.g., occupational health). Training of clinicians in health services research and clinical epidemiology also provides a potential career path for physicians entering one of the many fields of public health.

Preventive medicine specialty is not common in countries outside the USA as a combined clinical and public health specialty. UK and Canadian specialization in public health is also largely divorced from clinical practice. Social medicine is widely used as a specialty in Eastern Europe but is primarily non-clinical in orientation and function.

NURSING EDUCATION

Nursing is the backbone profession in hospital and community health care. The place of nursing in a health system reflects the cultural values of the society and has an important effect on the health system. Whereas medicine is generally a high-prestige profession, in many countries nursing is of low social status, with strong cultural biases against women entering nursing. Germany and Canada have more than four nurses per physician, while developing countries such as Pakistan, Nepal, and India have between 0.7 and 1.5 nurses per physician (2009 figures). This disparity reflects a widespread overemphasis on medical training and an underemphasis on training of nurses in developing countries.

The health system thus suffers from a lack of personnel to develop and operate primary care services, with biases towards high-cost secondary and tertiary care services. Furthermore, the lack of high-level professional nursing personnel prevents full development of quality secondary and tertiary care services. Lack of nursing at the professional level may be one of the biggest factors in retarding the development of health services in many countries. The OECD data in Table 14.5 show the wide range of nurse to population ratios in selected European countries, with the highest ratios in Belgium, Germany, Norway, and Ireland, and much lower ratios in Israel, Italy, and the Czech Republic. There is wide variation in the nursing workforce between registered nurses (RNs) and practical nurses. More than 75 percent of

TABLE 14.5 Nurse Density in Countries of the Organisation for Economic Co-operation and Development, 2000

	Practicing Nurses per 1000 Population	% Registered Nurses
Ireland	14.0	96
Australia	11.7	NA
Switzerland	10.7	84
Canada	9.9	76
Denmark	9.5	15
USA	9.1	NA
Denmark	9.5	15
Sweden	8.8	42
UK	8.8	81
New Zealand	9.6	88
Portugal	3.7	NA
Korea	3.0	47
Mexico	1.9	NA

NA = not available.

Source: Derived from Simoens S, Villeneuve M, Hurst J. Tackling nurse shortages in OECD countries. OECD health working papers no. 19. Paris: OECD; 2005. Available at: <http://www.oecd.org/health/healthpoliciesanddata/34571365.pdf> [Accessed 2 December 2012].

the workforce in Ireland, Belgium, New Zealand, Switzerland, the UK, and Canada are registered nurses. Practical nurses are the predominate group in Sweden, Norway, Netherlands, Denmark, and Korea with the proportion ranging from 53 to 85 percent of the nursing workforce.

In the USA, the number of nursing graduates increased by nearly 85 percent from 1970 to 2005 (Table 14.6). From 1996 to 2000, there was a decline in nursing graduates by 31 percent overall when nursing education moved from diploma to baccalaureate training as the basic qualification. But the demand is growing: the American Association of Colleges of Nursing (AACN) reports that nearly 300,000 jobs were added to the health care sector in 2011, with the largest demand for RNs. With more than 3 million members, the nursing profession is the largest segment of the US health care workforce. Adequate numbers and quality of nurses will be vital in implementing the 2010 Patient Protection and Affordable Care Act ("Obamacare"), the most important change in US health care in the USA since the creation of the Medicare and Medicaid programs in 1965.

The promotion of the academic aspects of nursing is seen in the growth of baccalaureate nursing education from 13 percent of all nursing graduates in 1960 to 26.5 percent in 2000. The decline in the number of nursing schools in the 1950s was due to closure or consolidation of individual hospital schools of nursing. North American schools for

TABLE 14.6 Nursing Schools and Graduates in the USA, 1970–2010

	1970	1980	1990	1996	2000–01	2003	2005	2010
Nursing schools	1340	1385	1470	1508	NA	1370	1446	1691
Total nursing graduates (thousands)	43.1	75.5	66.1	94.8	79.7	76.6	84.9	NA
Graduates with BA/BSc (thousands)	9.1	25.0	18.6	32.4	26.5	31.4	28.0	NA
Registered nurses/10,000 population	35.6	56.0	69.0	79.8 ^{a,b}	102	101	104	110

^aIncludes bachelor of sciences degrees.

^bData for 1995.

Note: Some schools have more than one program so the number of programs is larger than the number of schools. In 2011, there were very few (63) diploma programs, 1060 associate degree (AD) programs, and 677 baccalaureate programs for a total of 1800 programs in 1712 schools.

NA = not available.

Sources: US Department of Health and Human Services. Health, United States, 1998, 2006.

National League for Nursing. 2012. Nursing education statistics: annual survey of schools of nursing, academic year 2010–2011. Available at: <http://www.nln.org/researchgrants/slides/index.htm> [Accessed 8 December 2012].

Organisation for Economic Co-operation and Development. Health policies and data: OECD health data 2012 – frequently requested data. Available at: <http://www.oecd.org/health/healthpoliciesanddata/oecdhealthdata2012-frequentlyrequesteddata.htm> [Accessed 8 December 2012].

American Nurses Association. Nursing fact sheet. Registered nurses in the US 2011. [Accessed 8 December 2012].

nursing education are now largely associated with university or associate degree programs in community colleges. University-based schools in the USA provide academic degree programs at the bachelor, master, and doctorate levels. Nursing education at the master and doctorate levels provides the teaching, research, and management cadres needed for a progressive health care system. In 2008, 50.0 percent of the RN workforce in the USA held a baccalaureate or graduate degree while 36.1 percent earned an associate degree and 13.9 percent a diploma in nursing.

The first baccalaureate program in nursing was established at the University of Minnesota in 1909. By 1980 there were 377 and in 1995 521 bachelor's programs for RNs. Upgrading educational standards for existing professions, such as nursing or midwifery, involves consideration of the costs and effects on personnel supply as well as the desirability of raising professional standards. The advent of degree programs in nursing raised the level of prestige, leadership, research, teaching, and service of the profession. The transition from hospital apprenticeship training to university-based education (i.e., “academization”) was opposed by traditional interests such as hospital management and the medical profession, but this resistance subsided with the demonstration of greater capacity in the nursing profession to take responsibility and incorporate rapid scientific and technological advances. Table 14.7 shows a decrease in diploma-level training and increases in associate and bachelors (or higher) in the USA. The trend towards increasing nursing graduates at the baccalaureate level continues to the present time, with most other RNs being trained in 2-year community college programs. In recent years there has been an increasing flow of people entering the profession in their late twenties and early thirties, as well as in their

early twenties; nursing is attracting interest from different age groups and the entry classes are limited by capacity and not by shortage of qualified applicants. Expansion of the number of nursing educational programs and their capacity will require investment in facilities and faculty training. It is estimated that the shortages of nurses in the USA in 2020 will range from 240,000 to 600,000, but probably closer to the smaller number.

The scope of activities that professional nurses are authorized to carry out by law and custom has gradually broadened over the past several decades to include procedures previously performed only by physicians in the USA. This change is partly associated with increasing academization of the nursing profession and with the emphasis on bachelor's and master's degrees for nurses and PhDs for nursing teachers.

NPs are trained to diagnose and treat illness, usually under authorization from a supervising physician. In some developing countries, especially in rural areas, auxiliary nurses, as well as professional nurses, are expected to diagnose and treat common ailments, in addition to conducting health education and primary and secondary prevention. This role is vital, especially in areas without medical practitioners, and should be under the supervision and guidelines of the ministry of health or other public health agency.

Nursing specialization may be at a certificate or master's level. Certificate courses are in fields where the nursing role involves highly skilled practice crucial to patient outcomes such as in intensive care or emergency department nursing. Master's programs in areas such as pediatrics, geriatrics, or adult health produce a more broadly based and independent practitioner, researcher, or educator. Nursing specialties include ambulatory care, cardiac, critical care, education,

TABLE 14.7 Estimated Population of Registered Nurses by Graduation Cohort, USA

Initial Education	Graduated Before 2001 (%)	Graduated 2001–2004 (%)	Graduated 2005–2008 (%)
Diploma	24.6	3.5	3.1
Associate	42.7	56.4	56.7
Bachelor's and higher	32.7	40.1	40.3

Source: US Department of Health and Human Services, Health Resources and Services Administration. The registered nurse population: findings from the 2008 national sample survey of registered nurses, 2010. Available at: <http://bhpr.hrsa.gov/healthworkforce/rnsurveys/rnsurveyfinal.pdf> [Accessed 6 December 2012].

emergency, flight, forensic, geriatrics, holistic, home health, hyperbaric, management, maternal–child, medical–surgical, midwifery, military, neonatal, obstetrics, occupational health, oncology, orthopedics, pediatrics, perianesthesia, perioperative, psychiatric and mental health, private duty, and public health (AACN, 2012).

The AACN cites the US Bureau of Labor Statistics' Employment Projections 2010–2020 indicating that the RN workforce is the top occupation in terms of job growth to 2020. The number of employed nurses is expected to grow from 2.74 million in 2010 to 3.45 million in 2020, an increase of 712,000 or 26 percent. There is an additional need for 495,500 replacements in the nursing workforce, bringing the total number of job openings for nurses due to growth and replacements to 1.2 million by 2020 (AACN, 2012). A 2011 AACN survey found that total enrollment in all nursing programs leading to the baccalaureate degree was 259,100, an increase from 238,799 in 2010. Within this population, 169,125 students are enrolled in entry-level baccalaureate nursing programs. In graduate programs, 94,480 students are enrolled in master's programs, 4907 in research-focused doctoral programs, and 9094 in practice-focused doctoral programs in nursing (AACN, 2012). **Figure 14.1** shows the growth of the US nursing workforce and the distribution between registered and employed from 1980 to 2008. The nurse-to-population ratio increased from 56 per 10,000 in 1980 to 69 in 1990 and 78.5 in 1994. The number of employed RNs increased during the period 1999–2005 by an average of 1.2 percent per annum, from 2.2 million to 2.4 million (Health United States, 2007).

In 2009, the USA had 10.8 nurses per 1000 population compared to the OECD average of 8.4 per 1000. Nursing colleges and universities in the USA are expanding enrollment levels to meet the current nursing shortage and the rising demand for nursing personnel. The number of qualified applicants not accepted in nursing baccalaureate programs in the USA reached over 75,000 in 2011, raising the issue of providing more training capacity and qualified faculty to meet the growing need for nurses to meet anticipated shortages and expanded roles in nursing practice. The shortage of schools, qualified faculty personnel, and general funds makes it difficult to meet the challenge of nursing shortage

through private–public initiatives with governmental support. In the USA, 833 nursing schools offered baccalaureate and graduate programs, with a large increase in the number of available seats in entry-level baccalaureate programs, from 20,000 in 2000 to nearly 65,000 in 2010.

The hospital bed supply in 2010 in the USA was 3.1 beds per 1000 (a decline from 6.0 beds in 1980), compared to the 2010 OECD average of 4.9 (OECD Health Data, 2012). Acute care hospital bed supplies have been reduced and long-term beds for nursing care have increased (see Chapter 11), so the need for nurses does not decrease. Auxiliary personnel staff, including ward clerks, nursing aides, and personal care workers in nursing homes, are important in the team in institutional care, and should be strengthened in community health care as well.

In-hospital patient care focuses on more severely ill patients and intensive care, requiring increased nursing staff ratios. In 2010, the number of nurses employed in the USA was 2.74 million and this figure is expected to grow to 3.45 million in 2020 (AACN, 2012). In addition, there is an increasing range of specialties in nursing, with more career options than in the past. Demand for RNs is expected to grow by 2–3 percent each year. Some estimates indicate a need for 30,000 additional nurses to graduate annually in order to meet the nation's health care needs and that more than one million new and replacement nurses will be needed in the USA by 2016.

As health care copes with both an aging and a healthier total population, people with chronic diseases require care at the primary level, with increased roles (and needed retraining) for physicians and for nurses in home care and other outreach programs of care for people at high risk (e.g., secondary prevention for hypertension or diabetes). Expanding roles of nurses in the changing health care environment will be vital to meet the challenges. There is a need to address retention of nurses and prevention of burnout, as well as to produce greater training capacity to absorb qualified applicants. Nursing has become an attractive profession because of the expansion of its roles and because of academization with greater recognition for the profession, yet the profession remains underpaid in comparison to the crucial role of nurses in health systems and to other professions with similar

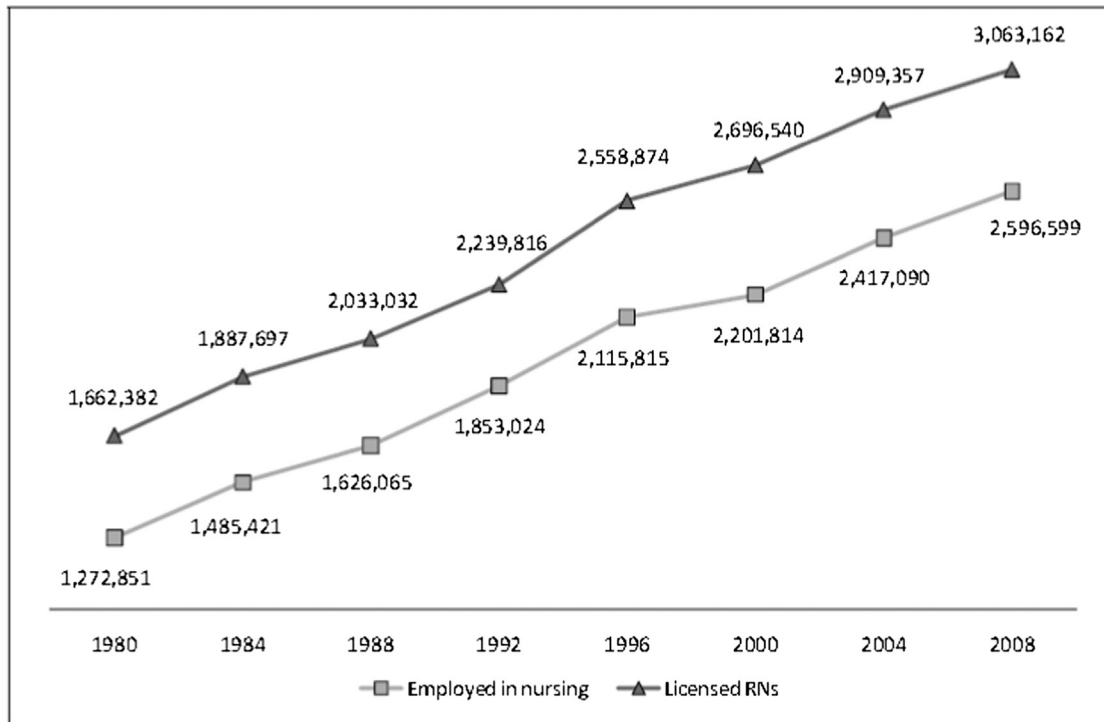


FIGURE 14.1 Nursing workforce, USA, 1980–2008. Source: US Department of Health and Human Services, Health Resources and Services Administration. The registered nurse population: findings from the 2008 national sample survey of registered nurses, 2010. Available at: <http://bhpr.hrsa.gov/healthworkforce/rnsurveys/rnsurveyfinal.pdf> [Accessed 6 December 2012].

qualifications. However, as economies shift from primary production to service-based industries, this may change the relative economic remuneration for this professional group.

National health authorities need to take professional views into account, but balance the vested interests of each profession with other factors such as the hospital bed supply and utilization, alternative forms of care (which can be labor intensive), aging of the population, changing disease patterns, and technological changes in prevention and health care. The development of training capacity for doctors, nurses, and all other health professions requires long-term planning and investment not only in building institutions for education, but also in developing faculty, research capacity, and scholarships for students along with modest tuition fees. Government has the key responsibility in this but private organizations and corporate, organizational, and individual donors can play crucial roles as well.

The medical and nursing professions have been in conflict over the numbers and roles of nurses. The nursing profession has struggled to establish greater autonomy and academic quality while the medical association has fought to maintain large numbers of nurses and a subordinate role for nursing. The conflict between need and demand is a matter of definition, viewpoint, and priority. Reorientation of the health system with greater emphasis on community care will provide more employment opportunities for nurses with expanded professional responsibilities.

IN-SERVICE AND CONTINUING EDUCATION

Rapid changes in all fields of medical science and practice make in-service and continuing education a necessity of any health program to maintain professional standards. In-service education increases the sense of self-esteem of workers and motivates staff to improve their performance. It serves to reinforce knowledge and introduce new information, and is essential to facilitate change in an institution. It also provides opportunities for the supervisory staff to reinforce and raise quality standards. The introduction of new programs and technologies should be accompanied by staff orientation as part of an ongoing in-service education program.

Continuing education refers to ongoing professional education in the form of courses, conferences, workshops, and literature. Medical graduates who complete requirements for specialization must continue to upgrade their training with periodic courses in specialty areas, where rapid advances are continuous. In public health, staff may take summer courses in epidemiology at schools of public health or departments of clinical medicine. Many medical, nursing, and other professional organizations require proof of continuing education for continued licensure and for professional advancement.

Recent advances in genetics, biotechnologies, patient safety, and many other important findings and discoveries

require continuing education for all health workers. Science is changing our health paradigms and professional education needs to provide continuous updating in new knowledge and professional skills.

Governments, educational authorities, professional associations, provider organizations, non-governmental health agencies, and the general public all have strong interests in continuing education for the health professions. In-service and continuing education should be part of the working schedule of a health institution and included in budgetary planning for all levels of health personnel, from laundry room staff to hospital managers and from CHWs to medical officers of health.

ACCREDITATION OF HEALTH PROFESSIONAL EDUCATIONAL OR TRAINING FACILITIES

All facilities training health professionals should be accredited to do so by the national or provincial authority or by an agency recognized by them for this purpose. In Canada, accreditation is carried out by the Medical Council of Canada (MCC), which is also the examining body for graduates of all medical schools. Provincial licensing bodies accept the Licentiate of the MCC (LMCC) as the basic requirement for licensure. In the USA, the AAMC provides guidelines and accreditation of existing schools and reviews applications for new schools wishing to be recognized. Medical schools are subject to the state educational boards governing higher education facilities. State boards are responsible for examination of graduates and their licensure. Similar accreditation agencies exist for nursing, dentistry, pharmacy, and other health professions, in addition to governmental licensing bodies.

Universities or colleges establishing schools for other health disciplines are subject to the requirements of the authorities governing postsecondary education. In the USA, the Accreditation Commission for Education in Nursing (ACEN) is the recognized body for accreditation of all nursing education programs. A university wishing to establish a medical, dental, nursing, pharmacy, or other professional school would need prior approval showing the need for the facility, financial resources, and a complete proposal including curriculum, staffing, facilities, organizational affiliations, and objectives. Recruitment standards and policies, clinical affiliations, quality of library and basic sciences facilities, and budget would be scrutinized. Staff qualifications, tenure procedures and requirements, publications and research, access to international professional literature, availability of textbooks, and students' ability to read them (e.g., in a foreign language) should be part of the accreditation process.

Many new medical schools have followed patterns set at schools such as McMaster University in Hamilton, Ontario, Canada, and Ben Gurion University in Beersheva, Israel,

with a focus on preparing primary care physicians, but it is not clear to what extent they have succeeded in this objective. Curriculum review has become widespread in schools of medicine, with a concern that there may be an excessive emphasis on basic sciences and specialty clinical services so that the graduate has little orientation towards family and community practice or public health.

THE RANGE OF HEALTH DISCIPLINES

New professions such as the NP are developed from graduates of degree programs and require a master's level of training in an accredited program. Establishing or recognizing new health professional roles, such as NPs, optometrists, or CHWs, is dependent on and related to the needs of the health system. Development of curricula, criteria for enrollment, and site of the training program should be governed by the objectives of the program, but also should ensure wide acceptance of the new profession and potential for career advancement. Acceptance by the community is important, especially in programs intended to improve services for people in high-risk groups with the health and social services systems. Traditional birth attendants and CHWs are categories of personnel providing health care where cultural adaptation is especially important.

Clinical medicine has evolved from primarily a medical and nursing service to involve a highly complex team of professionals. Similarly, in public health the range of professions is broad. Interdisciplinary training is important for adequate functioning of a department or service increasingly dependent on teamwork.

The complexity of modern public health and clinical services is shown in the number of different professions listed in [Table 14.8](#). This broad range of professions in public health requires graduate studies with an interdisciplinary approach to the preparation of leaders, teachers, and researchers for the field. Public health professionals work in a variety of settings. They need a wide base of training to understand the broad professional aspects of public health that relate to complex and rapidly changing professions and practices.

LICENSURE AND SUPERVISION

All countries have legal or regulatory systems by which newly trained health personnel are permitted to practice their profession. Requirements differ from country to country and for various types of personnel within a country. In some countries, health personnel must pass licensing examinations in addition to completing the prescribed training. In others, registration by the government is more or less automatic after the prescribed training, including the examinations, has been successfully completed. For some disciplines, such as medicine,

TABLE 14.8 Health Workforce

Category	Type
Physicians	Generalist and all specialist medical practitioners, including epidemiologists, laboratory, imaging, pathology, genetics, health systems analysis, policy and emergency care and systems specialists, researchers and academics, global health specialists
Nursing and midwifery personnel	Professional nursing, midwifery professionals, nursing associate and midwifery associate professionals
Dentistry personnel	Generalist and specialist dentists, dental hygienists, assistants, technicians and related occupations
Pharmaceutical personnel	Pharmacists, pharmaceutical assistants, pharmaceutical technicians, industrial pharmacists, quality assurance technicians and related occupations
Laboratory health professions and technologists	Laboratory scientists, biochemists, microbiologists, food scientists, toxicologists, geneticists, laboratory assistants, laboratory technicians, radiographers and related occupations
Public health professions and technologists	Occupational/industrial, environmental and public health officers, sanitary engineers, epidemiologists, public health nurses, geriatric, school, military, prison and other institutional health staff, health promotion specialists, public health nutritionists, environmental and public health technicians, sanitarians, hygienists, district health officers, public health inspectors, food sanitation and safety inspectors and related occupations, statisticians, medical anthropologists and sociologists
Community and traditional health workers	Community health workers, education and nutrition workers, family health workers, traditional and complementary medicine practitioners, traditional birth attendants and related occupations
Allied health professions and technicians	Medical assistants, dieticians, nutritionists, occupational therapists, medical imaging and therapeutic equipment technicians, optometrists, ophthalmic opticians, physiotherapists, personal care workers, speech pathologists and medical trainees, radiology, audiology and imaging technicians, occupational health therapists
Health management and support	Managers of health and personal-care services, health economists, health statisticians, demographers, lawyers, public relations, vital and medical records technicians, health information technologists, ambulance drivers, building maintenance staff, and other general management and support staff (kitchen, laundry, technical, janitorial and cleaning staff, many others)

Source: Modified from Technical Notes – Global Health Workforce Statistics database. Available at: <http://www.who.int/hrh/statistics/TechnicalNotes.pdf> [Accessed 2 February 2013].

dentistry, nursing, or pharmacy, the legal requirements for the license may be delegated to professional colleges or to state or national boards. Certification and relicensing of medical and other health care practitioners have become standard practice in the USA and some other jurisdictions to ensure that the health care provider meets the accepted professional standards of the day and public expectations.

Examination of undergraduate students is generally by the teaching institution itself, but examination at completion of training for licensing to practice medicine should be by external examination, preferably at a national or even an international level. National examinations are formulated and supervised by professional and governmental authorities, which establish and maintain the standards of medical graduates. In the USA, state boards govern medical licensure and specialty certification.

Licensing of health professions in some countries such as Canada allows the health professions self-government to set standards and govern the discipline within the profession as a form of peer review. National examinations and limitations of foreign graduates are spelled out in regulation

or by decisions of the governing body of the profession. Foreign schools may be accepted for equivalent status or examination requirements may be established. As many as 30 percent of doctors working in the UK NHS obtained their primary qualifications from a country outside the European Union (EU).

In Canada, the MCC, a consortium of provincial professional bodies, establishes and supervises medical graduation examinations, while licensure for medical practice is by a provincially authorized medical body. Other countries regulate medical licensure directly but delegate specialty training supervision to professional organizations. Many countries have developed national examinations for medical, dental, nursing, pharmacy, and other professional licensure to promote high-level requirements and avoid the conflict of interests of a school examining its own graduates.

In the USA, medical graduates of accredited medical schools are licensed by state boards. Graduates of US medical schools in one state are accepted in other states for postgraduate training but not necessarily for medical practice, although some states have agreements of reciprocity.

Canadian provinces used to accept graduates of British medical schools, but this was restricted in the 1970s to reduce the flow of immigrant doctors. In the UK, the GMC is the legislated body empowered to license local graduates and immigrant physicians.

Licensing of physicians, nurses, midwives, psychologists, optometrists, NPs, or other professionals must be based on legislation or regulation under public statutes to designate the scope of permissible functions in each profession, licensing and examination procedures, as well as a code of ethics. Diffusion of power in governance of medical practice has contributed towards setting high standards of practice.

Control of education and licensing by the same authority that operates the national service may compromise standards. The development of multiple systems of accountability in a previously totally state-controlled system, as in Russia, will require many changes in existing practices of medical education, examinations, licensure, specialty training, and examination and discipline, as well as the development of independent professional organizations, accreditation bodies and standards of care (see Chapter 16).

It is now widespread practice for high-income countries to be very open to accepting foreign medical graduates for training positions and then facilitating their remaining in the host country with family visas and highly attractive work or research positions. This results in the loss of a skilled workforce from needy countries and represents a very exploitive aspect of globalization.

CONSTRAINTS ON THE HEALTH CARE PROVIDER

Maintaining standards requires organized supervision of performance by public bodies, in written guidelines, based on accepted current standards of care. This is often based on a consensus of professional views and practices, as well as recommended guidelines of professional bodies. Care should be taken to avoid penalizing legitimate innovations or differences of professional opinion, such as whether simple lumpectomy is sufficient care for cancer of the breast as opposed to radical mastectomy. This is part of quality assurance, discussed in Chapter 15.

Ideally, the constraints that impinge on the health care providers are the sum of training, licensing, practice, collegial relationships, and self-governance of ethical, humanitarian, and professional standards. These constraints are under scrutiny and potential disciplinary procedure from a variety of sources, including legal responsibility and standards of care expected by the employer or institution in which the provider functions.

The provider is also under scrutiny in the eyes of the public or consumers where consumer choice is part of the

system. The total effect of peer review on a continuous basis, encouraging good standards of practice in the community, helps to assure basic standards, but at the same time may promote conformity, limiting medical innovation, especially in the areas of organization of health care. Recognition of new professions can lead to conflicts of interest with self-governing professions, as has happened in the case of optometrists and NPs. Similarly, professional groups may oppose changes in health care financing and organization, both for the public good and sometimes for professional self-interests.

Application of standard medical curricula, national standard examinations, national licensing and disciplinary boards, and standards of medical practice is essential for maintaining and improving health care. External peer review is consistent with the current emphasis on total quality management or continuous quality improvement. When entering medical practice, doctors seek access to hospitals where they apply for "hospital privileges" and are assessed by professional peers for experience and qualifications. Individuals are expected to be members of professional organizations in their specialty and participate in departmental staff meetings, quality improvement committees, infection control, error and unusual event investigations, and programs of continuing education organized by professional associations, hospitals, and medical schools.

Health insurance plans monitor the billing or practice patterns of physicians and investigate aberrant practice or potential fraud. Investigations may be followed by administrative action against the offending physician or, rarely, by criminal procedures for fraud. Monitoring of surgical procedures may point out poor practice that may lead to disciplinary procedures, while criminal conviction means a suspension of one's license to practice. Malpractice insurance is vital to protect any physician or other health care provider against litigation and may be very costly depending on the specialty. The National Vaccine Injury Compensation Program passed by the US federal government in 1986 is designed to compensate individuals quickly, easily, and generously so as to prevent litigation, which damaged the uptake of immunization in the USA. The no-fault insurance for injury protects the provider and the injured party and may be a model for a more rational system than court litigation against the provider and the manufacturer.

Professional accountability is specific to each country. In the UK, the GMC is empowered by the state to issue medical licenses and discipline practitioners. A Patient's Charter sets out the rights, entitlements, and standards of service that the citizen may expect in health care. This, coupled with the right to change GP, empowers the patient to seek redress of grievances. Complaints regarding hospital care are investigated and can be pursued through stages of investigation. Consumer satisfaction is a factor in the

recent innovation of GP fundholding in the UK (see Chapter 13), where the patient may, with the GP, select among hospitals or other support services. Health care is complex and requires a skilled and integrated team functioning with mutual trust, based on a common set of professional and ethical goals and standards. This is clear in the hospital dramas seen in popular television programs, but applies equally in the larger, real-world scale of health system organization and interaction among institutions, insurers, and public health networks. In addition to oversight by financial authorities and accreditation bodies, the scrutiny of the media, the political sector, the consumer, and the public at large is important. In short, the health provider and the health system are, and should be, under scrutiny, internally and externally.

OTHER HEALTH PROFESSIONS

There are other health professionals providing patient care that can be part of health promotion and health education. Pharmacists, for example (Box 14.7), can help to educate patients with long-term care needs, such as those with hypertension, diabetes, and obesity management, about risk reduction, complications, and compliance with medical management. Dental hygienists can help to reinforce health promotion messages such as smoking cessation, mouth care, healthful nutrition, and weight control, during routine dental hygiene care. The same can be said for physiotherapists, hearing technicians, and many other specialized ancillary care providers. Public health orientation should be included in the basic training of all health professionals and technicians in messages of how a healthful lifestyle is important for the prevention of many chronic conditions and their complications, for reinforcement of basic primary care messages for self-care.

Because health self-awareness is crucial to the successful prevention of many common diseases, and the promotion of healthy lifestyles is basic to self-care, it is more important than ever that all health professionals be participants in passing the key messages of health to their clients or patients on all possible occasions. Nurses, nutritionists, social workers, and many other caregivers should be enabled and encouraged to communicate dietary messages during care or routine follow-up. This is especially important for elderly patients, where nutrition and compliance with medication may be compromised by isolation, clouded memory, and confusion. It will require the introduction of public health topics or courses in the basic education of a broad range of health and social care giving professions in the New Public Health concept to recognize the cross-relationship of many social and health problems with health-promoting messages.

Cross-disciplinary work to promote health can be seen in many examples. One is the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), a federal

program of the US Department of Agriculture to provide states with support for nutritional support for eligible pregnant, postpartum, and breastfeeding women, infants, and children up to 5 years of age. Although primarily meant for nutrition support, since 2000 state WIC programs have also checked immunization status and promoted the completion of immunization, and played a key role in raising the immunization levels of low-income children in the USA (see Chapter 8).

Health promotion is a strong force in public health and its range is wide and broadening. It is part of the roles of all health professions and technical support services, but has a cross-disciplinary orientation to create the societal and legal basis of modern public health with understanding and capability to address individual and community concerns, knowledge, attitudes, and practice that harm health and hinder efforts to remediate the health risks of different communities and risk groups (Carter et al., 2012).

EXPANDING ROLES IN PRIMARY CARE

New professional roles have emerged and continue to do so as the health needs of the community evolve. Public health and health management professionals as well as health care providers are all essential, tailored to the community they serve. The health system needs to assure that traditional health workers are available in numbers sufficient to provide for community and national care needs. In addition, there has been a growing realization of the need for new levels of health workers, which will affect the planning for medical personnel. Perceived shortages of doctors may be addressed by training more health providers, including NPs and professional midwives, and expanding the roles of public health and health promotion personnel. Improved computer and telecommunication usage may also help to relieve shortages of highly trained health professionals, and extend the outreach capacity to underserved areas or populations.

Mid-level health worker experience in Russia with the *feldsher* (see below) was important in the provision of primary care in rural, underserved areas. In many developing settings, experience with CHWs has been growing, and this has also been applied in some developed countries. In the USA, NPs and PAs have emerged as new health professional roles to augment the medical workforce, provide health care in underserved areas, and in some cases provide health care for targeted underserved population groups such as the elderly and diabetics.

Nurse Practitioners

In the 1960s health care providers and planners in the USA became aware of the growth of specialization in medicine and the decline in the availability of general practitioners. The nursing profession promoted expansion of nursing roles to fill this gap, including examinations and initiation of treatment and follow-up without direct supervision of physicians.

BOX 14.7 Pharmacists as Health Promoters in Management of Cardiovascular and Other Non-Communicable Diseases

Compliance and safety of medical management is a major issue, especially in relation to health care for non-communicable diseases such as hypertension and cardiovascular diseases (CVDs), the leading cause of death in adults worldwide, or in the management of diabetes, a major and growing public health problem. Pharmacist skills are complementary to those of primary care physicians and nurses, and can contribute to health promotion and improved safety of care of chronic patients. On the basis of their knowledge of medications, communication skills, and high accessibility to the public, pharmacists are valuable resources, for example in the management of CVDs.

Pharmacists are well positioned to provide health promotion counseling, such as in smoking cessation, safe medication management and instructions to patients, and formulating and implementing medication plans with computerized records. Pharmacists can help to analyze reasons for non-adherence, and provide electronic reminders to support essential medication adherence, screening, and monitoring services, as well as vaccination or home care services.

Pharmacists can also serve the patient by conducting medication reviews and can act in liaison with the community care team (primary care physician, nurse) as well as hospital care. Pharmacists can therefore play an increased role in health care of chronic patients by assisting physicians and other health care professionals in patient care and by participating in prevention and management programs.

A recently published systematic review and meta-analysis showed substantial benefit of pharmacist interventions in the management of major CVD risk factors among outpatients in North America, Asia, Australia, and Europe. Patients allocated to pharmacist interventions achieved greater reductions in systolic and diastolic blood pressure, total cholesterol, and low-density lipoprotein cholesterol, and in the risk of smoking compared to the usual group.

The types of intervention that can be conducted by pharmacists, alone or in collaboration with physicians or nurses, include:

- patient education and counseling on medications, lifestyle or medication adherence
- recommendations to physicians regarding medication changes or problems of medication adherence

- medication management – reviewing patient medications directly from patient interviews or from medical records, assessing medication adherence or adjustment of medications
- scrutinizing and improving the quality of medication prescription among elderly people in the primary care setting to prevent common inappropriate medication prescriptions and multiple specialist consultations with risks for adverse events
- measurement of biomarkers and risk factors such as blood pressure and total blood cholesterol for screening and monitoring
- health care professionals' education.

Pharmacists can play a valuable role in the long-term care of patients with other chronic diseases, e.g., diabetes, heart failure, asthma, chronic obstructive lung disease, or cancer. Greater integration of pharmacists as part of a health care team is a potentially valuable resource for improving management of CVDs and other chronic diseases. The role of pharmacists in the community is slowly changing and, with appropriate training, pharmacists can become more effective and relevant health promoters.

Sources: Courtesy of: Valérie Santschi, Institute of Social and Preventive Medicine (IUMSP), Lausanne University Hospital, Lausanne, Switzerland. Personal communication.

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These factors and increasing costs of medical care fostered the wider role of nurses to provide medical services.

In 1965, the first program to train pediatric NPs was developed at the University of Colorado. Nurses were taught specific medical functions, not as a doctor, but as a logical extension to the nurse's traditional function of assisting patients to regain health and independence. In 1971, the federal government adopted the Nurse Training Act, which defined the role of NPs.

A nurse practitioner is a registered nurse who has advanced training and education in the medical field. NPs perform detailed physical examinations, order laboratory tests for diagnostic purposes, assess the results of such tests, write

prescriptions for medications, undertake investigations, make referrals, and perform other delegated medical functions within authorized limitations and medical supervision. An NP can provide care in hospitals or the community as part of a health team. The 2008 survey of practicing nurses in the USA reports that there were 158,348 NPs in practice in the USA in that year, of whom 88 percent held master's degrees.

According to studies commissioned by the US Agency for Healthcare Research and Quality (AHRQ) in 2010, the estimated number of NPs in the USA totaled 106,073 or 3.8 percent of the estimated 3 million RNs currently licensed, with 52 percent practicing in primary care and the others in subspecialty care. The NPs were 44 percent of all advanced

practice nurses (APNs), who represent some 6.3 percent of the total RN population. Applicants and enrollees more than doubled in the USA between 1993 and 1995, and the number of graduates nearly doubled, increasing by a factor of 1.8. More recent surveys show that this expansion has slowed, however, and NP graduation rates are currently in decline. The number of NPs may reach 10 percent of all RNs in the next decade as primary care roles for NPs increase. NPs serve in family practice; women, adult, and school health; pediatrics; nurse midwives, and gerontology. Specialty care tracks include neonatal and acute care, occupational therapy, psychiatric care, and others in institutional care settings.

In each state, the practice of nursing is established and regulated by nurse practice acts and common law. These acts establish educational and examination requirements. The acts also provide for licensing or regulation of individuals who have met these requirements, and define the functions of the professional nurse in general and specific terms. The criteria establish parameters within which an NP may practice. The Commission on Collegiate Nursing Education, an accreditation organization, has made great strides in standardizing NP training programs to ensure the quality of graduates.

Nurses constitute the largest single group of professionals among health personnel. The expansion of nursing roles is essential to improved quality of health care, especially in medically underserved areas. Equally important, NPs in underserved professional areas such as geriatrics and primary care have innovated programs and provided a research and theoretical basis for new directions in health care. With the growing use of clinical guidelines, the roles of the NP may be expected to increase in the twenty-first century. To meet this goal, NP programs must work to expand and attract nurses to the profession. The 2008 US National Sample Survey of Registered Nurses reported that there were 59,242 practicing specialist nurse midwives.

“Nurse navigators” are RNs, usually with a bachelor’s or master’s degree, who provide liaison and coordination among patients, particularly cancer patients, and their many doctors and other medical and related professionals, home care and other services. Patient safety nurses are increasingly appointed to develop safety measures, monitoring, and education for all health care staff, with duties expanded beyond in-service training, including implementation of safety, prevention of drug errors, and infection control. With increasing educational levels of bachelor’s, master’s and PhD levels in nursing, the expansion of roles will continue to be a positive force for meeting population and patient health needs as medicine and public health continue to evolve. Nurses specializing in public health usually take master’s degrees in this field.

Physician Assistants

In 1923, 89 percent of US physicians were general practitioners. By the mid-1960s, the figure had declined to about

25 percent. Concern over the shortage of primary care physicians in the country led Eugene Stead, at Duke University in Durham, North Carolina, to develop the first physician assistant (PA) 2-year training program in 1965 to provide care in rural areas without on-site general practicing physicians. PA training programs were developed for several reasons: to help alleviate a perceived shortage of primary care physicians, to compensate for the geographic and specialty maldistribution of physicians, to help control escalating health care costs, and to accommodate medics from the military returning to civilian life and seeking a continued role in health care.

PA programs are not part of nursing, and this has engendered conflict with NP programs and nursing authorities. There are currently 52 accredited PA training programs in the USA. The majority of PAs in the USA work outside public health and primary care; however, the profession is very adaptable. In addition to medical science, PAs are taught preventive health care, patient education, utilization of community health and social service agencies, and health maintenance. The main focus in basic PA training is patient care in the primary care practice setting. The first 6–12 months of training is devoted to preclinical studies and clinical laboratory procedures, followed by 9–15 months of clinical training. The curricula are reviewed regularly and modifications made in keeping with changes in the health care setting.

On completion of a PA training program, an entry-level competence examination is given by the National Commission of Certification of Physicians’ Assistants. When passed, it allows PAs to append the title PA-C (physician assistant – certified) to their names. PAs must register every 2 years, documenting 100 hours of approved continuing medical education. To ensure clinical competency, PAs must take a recertifying examination every 6 years.

PAs perform tasks such as history taking, physical examination, simple diagnostic procedures, data gathering, synthesis of data for a physician, formulation of diagnoses, initiation of basic treatment, management of common acute and emergent conditions, management of stable chronic conditions, patient and family counseling, supportive functions, and prescribing privileges throughout the country. Task delegation of PAs is determined by the State Board of Medical Examiners within each state. The PA is not a substitute for the physician or for an independent provider like an NP. The PA is not licensed for independent practice, and the physician must assume all responsibilities and bear all the professional and legal consequences of the PA’s actions.

Of the estimated 70,383 PAs practicing in the USA in 2010, 43.4 percent were working in primary care (AHRQ, 2011). The 2008 physician assistant census reported that some two-thirds had taken various baccalaureate degrees prior to PA training. Some one-third of respondents were employed in hospitals, another one-third in solo or group practice offices, and 9 percent in community health centers.

PAs work in over 60 specialty fields, with over 50 percent in general/family practice. Employment opportunities are increasing for PAs in various specialties and practice settings. A PA may be able to handle one-half to three-quarters of the clinical services provided by the supervising physician, indicating that they are productive and cost-effective in their employment settings. PA salaries are one-quarter to one-third those of physicians, so the costs and benefits of PAs are an attractive option for organized health systems, but this discipline should not be seen as an independently practicing profession. The literature on this topic reports that the quality of care offered by PAs is comparable to that given by a physician in a physician-supervised practice. The Joint Commission on Healthcare Accreditation (JCHA) allows for licensed advance practice nurses and physician assistants to perform medical history and examinations on admissions within the limitations of state laws.

The PA, although initially controversial, is now a widely accepted role. The nursing profession has regarded this as a method of increasing physician incomes, an infringement of nursing roles, and a reaction on the part of physicians to the growing professionalization of nursing. The medical profession defends the PA as a way of extending the possibility of medical care to larger population groups and improving the economics of medical practice. These factors will become increasingly important as the Affordable Care Act comes into full effect with promotion of prevention of NCDs and new methods of organizing and paying for health care in the USA (see Chapters 10, 11, and 13), with potential employment of NPs on a wider scale. The use of medics and emergency medical technicians with college-level training as first responders is becoming more widespread in the USA and other countries. Many begin with military training and continue in civilian life in emergency care services. This is generally seen as improving survival possibility in serious trauma and medical conditions requiring rapid intervention during transportation to hospital under the guidance of emergency room physicians or other specialist physicians.

The Israeli Ministry of Health in 2013 announced that it would accept and credential PAs and NPs licensed in the USA.

Feldshers

The feldsher is a unique Russian mid-level health worker. The role originated as military company-level surgeons introduced by Peter the Great in the seventeenth century. Retired army feldshers returned to rural areas not served by physicians, becoming the sole providers of rural medical care. The feldsher was adapted to the Soviet health system to provide care in rural areas still underserved by doctors, despite the increase in medical personnel.

The feldsher is trained in a course lasting for 2–3 years following intermediate school graduation. Feldshers

complement physicians in urban and rural practice, especially in small medical posts, in mobile emergency medical services, and in industrial health stations. Since the health reforms of the 1990s, the feldsher has become a declining profession, which may result in serious difficulties in maintaining rural health care.

Community Health Workers

The concept of the CHW is not new but has found new expression in health programs in many parts of the world as part of the primary health care initiatives springing from Alma-Ata. It is an adaptation of traditional village practice of midwives and healers to modern, organized public health services. CHWs were first developed to provide care in rural areas in developing countries without access to health care. More recently, there has been an interest in the CHW model for urban community health needs where access to health is limited for geographic or socioeconomic reasons. Another category of services providers comprises home care workers for patients not requiring inpatient services of hospital or nursing home, but needing assistance in the community and home setting. Paramedics and other emergency care technicians are also categories of health workers needed in a comprehensive care system. Training programs for such health care workers need to be supervised with state standards to assure capacity to provide quality of care.

CHWs include categorical or targeted health workers, and preventive CHWs. The exact functions of these personnel, the duration of training, and the framework within which they work have varied much more than their titles. The generalist village health worker programs in some areas lack close supervision, and may seek fee-for-service practice. CHWs, advisors, or *promotores* are commonly used in Latin American countries, often as volunteers. CHWs are recommended for rural locations in developing countries without supervisory or organized contact with professional health services, providing a wide range of diagnostic and treatment services (Box 14.8).

CHWs may provide services for categorical target diseases. These services include malaria and TB control, directly observed therapy, short-course (DOTS), providing medication under supervision to ensure compliance, support services, and counseling for families with multiple problems in inner-city poverty areas, follow-up of sexually transmitted infections (STIs), and promotion of immunization. Prototypes of the task-oriented CHW include malaria control CHWs in Colombia, and TB DOTS and AIDS case workers, TB case workers, and public health nurse assistants in New York State. In Africa, CHWs are crucial to programs for the eradication of guinea worm disease and river blindness.

A CHW program with a focus on preventive services was developed in 1985 in Hebron, in the West Bank, under Israeli jurisdiction, and later continued and expanded the

BOX 14.8 Community Health Worker (CHW) Program Models**Independent CHWs**

- Feldsher in Russia for rural health care.
- Barefoot doctors in China for rural health care.
- “Where There Is No Doctor” CHWs provide all health care in remote villages in Latin America.

Categorical CHWs

- Program-specific CHWs, e.g., providing malaria control in Colombia, Guinea worm disease and onchocerciasis in Africa; injectable contraceptives in Ethiopia, Kenya and Uganda; AIDS or tuberculosis care in New York City; immunization and discovery of unmanaged diabetes and hypertension in low-income housing in Los Angeles.
- Public health nurse extender CHWs, e.g., Albany County Health Department, New York State.

Preventive-Oriented CHWs

- Preventive village health workers provide on-site services as part of public health system, visiting medical-nursing services with continuing education and close supervision, e.g., Hebron, West Bank, Palestinian Authority.
- “Urban villages”, i.e., urban poverty area CHWs in USA, with CHWs as part of county health department or community-based organization services such as Housing Authority of City of Los Angeles.

The American Public Health Association defines a CHW as: “a frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served. This trusting relationship enables the CHW to serve as a liaison/link/intermediary between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery. A CHW

also builds individual and community capacity by increasing health knowledge and self-sufficiency through a range of activities such as outreach, community education, informal counseling, social support and advocacy.”

An extensive experience is building up in the use of CHWs in many settings with specific tasks and training, or as primary care coordinators in locations or conditions with poor access or follow-up in meeting community health needs. There is wide application of the CHW model in Ethiopia. A CHW program for cardiovascular health implemented in Colorado in the USA showed statistically significant improvements in diet, weight, blood pressure, lipids, and risk scores, with the greatest effects among those with uncontrolled risk factors and successful telephone interaction by the CHW in lowering risk scores on retests.

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Tulchinsky TH, Al Zir AM, Abu Munshar J, Subeih T, Schoenbaum M, Roth M, et al. A successful, preventive-oriented village health worker program in Hebron, the West Bank, 1985–1996. *J Public Health Manage Pract* 1997;3:57–67.

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Kong S, Brown M. USAID Knowledge Services Center. Community health workers: Ethiopia, 2008. Available at: http://pdf.usaid.gov/pdf_docs/PNADM019.pdf [Accessed 29 November 2012].

Krantz MJ, Coronel SM, Whitley EM, Dale R, Yost J, Estacio RO. Effectiveness of a community health worker cardiovascular risk reduction program in public health and health care settings. *Am J Public Health* 2013;103:e19–27.

under Palestinian Authority. CHWs act as preventive care workers as people of contact representing the government health service, providing on-site prenatal and child care, immunization, nutritional counseling, pregnancy care with a medical nurse support team, first aid, and emergency or non-urgent referrals to the district hospital or to nearby medical clinics. The CHW is trained and supervised to provide primary care and outreach services in a community as part of an organized health system. Visits by supervisory professional staff are vital to the function of this system of care. The emphasis may be on preventive and community services in small villages without on-site services, or as part of an outreach and support service in a large urban setting.

CHWs should be recruited from the community to be served and trained in settings with both didactic and field experience. Training of village CHWs may be very different from schools for training conventional health personnel. Training usually takes place in rural health centers or hospitals, to which classrooms and student living quarters have been added. The training is nearly always sponsored by the ministry of health, sometimes in collaboration with

ministries of education, academic colleges, bilateral aid agencies, or international organizations. Candidates for such training are typically young people from rural families, who have been selected by their communities. During training, the student should be salaried, and on completion of training return to work in the community of origin.

In the USA, public health nurses have been traditional providers of home visiting programs or outreach programs to provide health care and education for families in need. The emergence of community-oriented primary health care broadens this strategy, selecting and training community residents as CHWs. The CHW concept was used to carry out many Great Society programs in the USA in the 1960s and 1970s. Volunteer and paid workers worked as lay home visitors or health guides in programs in selected areas or target populations, such as pregnant women or parenting families. Other CHW programs in the USA included Navajo communities, urban health centers, rural Texas, and Alaska.

CHWs can be trained to provide outreach and case management in the complex environment of New York State, going into the community to assist high-risk families in

underserved areas of large cities and in AIDS, STI, and TB patient care, especially with DOTS for TB. CHW experiences working with the homeless and mental health patients have shown positive results. CHW projects have been developed in many urban settings such as in low-income housing units or “poverty urban villages” in Los Angeles, with backup services of the County Health department, and clinics or tertiary care centers with follow-up management for health issues found to be untreated, such as diabetes and hypertension.

Evaluation and cost–benefit justification of CHW programs are difficult in terms of establishing population denominators and control groups, and in determining changes in outcome measures in mortality, morbidity, and physiological indicators, such as growth patterns. This limitation is shared with many health programs, not only in primary care but perhaps even more so in highly technological medicine. The village health worker concept has received criticism as well as advocacy in recent years. The CHW as a health promoter and provider of both preventive and treatment services may be impossible to sustain and is undesirable conceptually. But, training to tasks and programs in a selective approach may be more feasible and manageable, with the CHW showing the promising potential to provide a new parameter in health care. CHWs resident in the villages they serve can provide many services to the rural population with little access to medical services (Tulchinsky et al., 1997; Haines et al., 2007). Training to tasks and continuing supervision with ongoing support and training are essential to promote standards and quality of CHW village programs.

In Ethiopia, Uganda, and other countries, the CHW is enabled to provide injectable birth control medications. The Ethiopian Health Extension Program, a community-based nutrition program, has trained some 34,000 health extension workers providing a package of health nutrition and sanitation services to rural populations in village health posts supported by volunteer CHWs. This program, which began in 2004, trained people in assessing, analyzing, and acting to teach and supervise volunteers CHWs to work in the village to promote breastfeeding and other good nutrition practices, vaccinations, vitamin supplements, deworming, and other preventive health practices such as reducing the practice of female genital mutilation and exclusion of AIDS patients from the community. This program has reached over a million village children, helping to improve mothers’ knowledge of good health and nutrition practices, and referring severely malnourished children to treatment centers to reduce child stunting and failure to thrive (UNICEF, 2010). In Rwanda, CHWs are active in promoting birth control and improved maternity care, and improving health insurance coverage in rural areas.

US experience with CHWs is also extensive. A study conducted in a statewide chronic disease prevention program in 34 rural counties in Colorado reported on successful CHW intervention to reduce cardiovascular risk factors and

diabetes management (Krantz et al., 2013). With a growing elderly population along with rising levels of diabetes and obesity, chronic care will require a greater emphasis on task sharing. Medical and nurse practitioner providers will be a part of health teams with many different skills and levels of training whose common purpose will be to help patients to cope with their conditions and retain maximum independent living.

ALTERNATIVE MEDICINE

The use of alternative medical treatment has become a widespread phenomenon in industrial countries and remains a mainstay of health care in preindustrial societies. Alternative medical care is based on the belief that illness includes physical, mental, social, and spiritual factors. Alternative medicine views health as a positive state, rather than as the absence of disease, and believes in the natural healing capacity of the human body. Its interventions are generally non-invasive and less technological than conventional medical care.

The growth in popularity of alternative medicine in part relates to a widespread disillusionment with the depersonalization and technological orientation of medical care. Other factors include medicine’s failure to treat the patient as a whole person, bias towards single causes, and “magic bullet” treatments for disease. Disappointment with medical outcomes is common, with failure of cures or complications of treatment itself as iatrogenic disease. In the USA, the number of visits to providers of unconventional therapies is greater than the number of visits to primary care doctors, with high levels of out-of-pocket expenditures. Users of alternative medicine are largely in the 25–49-year age group and are among better educated people in upper income categories. Alternative medicine categories include acupuncture, chiropractic, massage, commercial weight-loss programs, lifestyle diets, herbal medicine, megavitamin therapy, self-help groups, energy healing, biofeedback, hypnosis, homeopathy, and folk remedies.

Changing attitudes within conventional medical care are seen in a growing tendency to accept some previously excluded professions, including optometry, chiropractic, and acupuncture, in insured benefits or even multidisciplinary health care systems as complementary or supplementary to conventional medical care. Conventional medicine is itself in a process of change with the addition of many paramedical professions and awareness of the limitations of the biomedical model as the sole basis for health care.

Consumer demand plays an important role in this change, and so does willingness of medical practitioners to refer chronic health problems such as back and neck pain, stress and related problems, phobias and addictions, allergy

and skin disorders, and hormonal and menstrual disorders. Conversely, alternative practitioners seem to be increasingly aware of limitations in treatment of conditions such as cancer, hypertension, and chronic and hereditary disorders, and the need for referral for treatment by conventional medical methods. The nursing profession in the USA has promoted the use of touch therapy as an independent healing modality over the past several decades.

Absorption of “holistic methods” by medical practitioners has become widespread. Many major medical centers now include departments of alternative or holistic medicine, with acupuncture, hypnosis, and other non-traditional approaches in the roster of services. This increases recognition, legitimacy, status, and incomes of practitioners, but is only achieved over long periods of conflict and opposition by orthodox medical practice. In 1992, the US Congress mandated establishment of an office of alternative medicine within the NIH, which in 1998 was expanded to become the National Center for Complementary and Alternative Medicine. This move indicates the growing acceptance of alternative medicine as a significant element of community health, with recognition by insuring agencies. Issues of cost containment and competition with traditional medicine are thus raised, but gradual acceptance is happening. European medicine and health agencies, with long traditions of healing baths and rest cures, have been more open to complementary and alternative medicine than their North American counterparts.

CHANGING THE BALANCE

Health systems are under pressure to change for a number of reasons; one is cost, and other major factors are changing demography and morbidity patterns. Populations are aging so that a growing sector of the population is reaching ages where chronic diseases are more prevalent, but healthier aging is also more common. The health needs for care of the elderly, however, are growing and this will require a changing mix of services with greater emphasis on outreach and supportive care by paramedical health workers with physicians in the clinical role of guidance. Furthermore, population health needs are heavily influenced by social and economic factors which require political and societal attention to alleviate poverty, unemployment, and deterioration of urban and rural settings, to reduce the inequities found in most countries, even those with well-organized health care systems.

Health systems will need to adapt to these forces by making changes to the organization and financing of health care and placing much greater stress on health promotion and preventive care. Home care and patient advisory services will help many patients with long-term health problems to be sustained in their own homes with medical support systems, such as “patient homes” for comprehensive oriented

care. Advances in health technology will bring growing capacity for prevention, early diagnosis, and management of serious infectious diseases, cancer, and cardiovascular diseases. Trauma, violence, and mental illness will also be affected by societal factors, and addressed by improved diagnostic and support systems.

As cost containment becomes more important and many countries cut back on health expenditures in order to control rates of increase, the stress of readjustment falls on health workers. If such measures are implemented on an emergency basis rather than over time as part of transition and realignment, the process will generate hostility, defensiveness, and political opposition. If, however, long-term planning takes into account the issue of human resources in a changing balance of services, then the burden of the individual or group of health workers who suffer from the downsizing can be minimized.

During the 1960s, Canada was embarking on its national health insurance program, and leading thinkers of the day called for rapid expansion of medical and nursing schools to meet future needs of the population. They assumed that national health insurance would bring a significant portion of the population who lacked access to care to the health services, overloading the medical and hospital services. Removing financial barriers does not, however, remove differences in use of medical services and incorporation of changes in lifestyle in daily life to reduce health risk factors. Education and outreach need to be incorporated in health plans to reduce social inequities in health status that are prevalent in all countries, including those with well-established health insurance or service systems.

In the mid-1990s, Canadian provinces cut back on the hospital bed supply, creating unemployment for nurses and maintenance staff. Provinces are attempting to restrict the numbers of practicing doctors and to modify the payment systems away from fee-for-service. Inflation in health care utilization and costs has resulted in a crisis management approach, rather than structural reform to promote a more integrated population-oriented health care organization. Such an approach can lead to a great deal of public and professional dissatisfaction within a health care system. Public education is vital to raise consciousness and participation rates in preventive care such as influenza vaccination, screening for colon and cervical cancer, and many other aspects of health promotion and disease prevention.

EDUCATION FOR PUBLIC HEALTH AND HEALTH MANAGEMENT

In 1915, the topic of public health education was addressed in the Welch–Rose Report, sponsored by the Rockefeller Foundation. It set up different models: one based on national schools of public health in the governmental sector, and another promoting schools of public health within universities.

Both models exist to this day. The Welch university-based model was promoted and financed by the Rockefeller Foundation to create the Johns Hopkins School of Public Health and Hygiene in 1916, and the Harvard School of Public Health in 1922. Most schools of public health in the USA followed the Welch model as independent faculties in universities.

Successful implementation of the New Public Health requires that many health disciplines work together. The training milieu should have a capacity for interdisciplinary training in a comprehensive program, including fundamental and applied research, as well as a relationship with service programs and community health assessments. To facilitate service standards and teamwork, all public health practitioners need a background in the medical sciences, epidemiology, economics, social sciences, environmental and occupational health, health systems analysis, and management theory. It is important that they be familiar with the terms and concepts of fields other than their own specialized discipline. This arrangement is more likely to be found or created in a university atmosphere and is difficult to foster in separate, categorical institutes.

University resources are essential for a school of public health to provide teachers and courses from other faculties such as schools of business administration and the social, physical, and biological sciences. Schools that are unaffiliated with a degree-granting university lack the broad academic atmosphere and requirements, as well as the connection with parent disciplines, such as economics, sociology, microbiology, and business management faculties, and public recognition as a quality reputable and accredited school.

Preparation of personnel for public health and health management should be at the graduate school level followed by continuing education. The US Institute of Medicine's 1988, 2002, and 2003 reports on public health defined the need for schools of public health to teach not only professional and technical skills, but also an understanding of how a particular discipline relates to public health as a whole, and the value system that is part of public health's coherence.

Training of public health physicians began in the UK in 1871 in Dublin's Trinity College, which granted the Diploma in Public Health (DPH). The program was designed to provide for the training of medical officers of health to lead the work of the boards of health, which were established under public health legislative statute and were required to have qualified medical practitioners as medical officers of health. Other universities later offered DPH or equivalent training, supervised by the College of Physicians and Surgeons, as public health became a recognized medical specialty. In 1924, the London School of Hygiene and Tropical Medicine brought together several institutes and produced a major center of training and research in public health. Since the 1991 Acheson Report on schools of public

health in the UK, there has been a rapid growth in schools of public health under various names in a number of universities. This growth has coincided with the increased interest by the NHS in working towards health targets as opposed to simply managing health services.

The tradition of schools of public health is especially strong in the USA, where the Johns Hopkins and Harvard Schools of Public Health were founded in the early twentieth century. In 1915, the Rockefeller Foundation sponsored a national program to promote public health education at the University of Michigan, Yale University, and the University of Pennsylvania, and thus established graduate training for public health professionals to meet the needs of the crowded urban industrial cities of the USA. These schools saw their mission as the training of, primarily, public health practitioners, and secondly academics, educators, and researchers. They attempted to develop and assimilate new knowledge into public health practice. The development of public health as a multidisciplinary field made it vital to be independent from but affiliated with a medical faculty. Schools of public health in the USA produced many generations of well-trained epidemiologists, social scientists, health educators, practitioners, and leaders who were crucial for development of the field.

In the 1960s, schools of public health were criticized because of their separateness from and lack of influence on clinical medical training. In some jurisdictions, this led to closure and replacement by departments of community medicine within faculties of medicine. This occurred in the UK and in British Commonwealth countries. Canada's two schools of public health were closed, replaced by departments of social and preventive medicine or community health, developed within medical schools. Departments of community health within a medical faculty serve as only one department among many clinical or basic science departments. Such departments may lack prestige in the hierarchy of medical schools, in an environment promoting a narrow, medically oriented approach to public health, with an insufficiently multidisciplinary program and faculty. This model provides training at the undergraduate, MPH, and doctoral levels. The full academic potential of a graduate school of public health is most suited to be in an independent, multidisciplinary, university-based academic center for public health research and training.

Periodically, threats of absorption of schools of public health into other sectors of the university arise. In 1994, a plan to close the University of California, Los Angeles (UCLA), School of Public Health by transfer to the School of Public Policy was halted by university and nationwide protests. Health administration is sometimes considered as better integrated within schools of business, as happened at the University of Minnesota School of Public Health.

In Canada, two long-standing traditional schools of hygiene were closed during the 1960s on the idea that integration into medical faculties would provide greater acceptance of public health in the medical community. Epidemiology and health management were taught in different departments in medical faculties. This had the effect of limiting the growth of the public health workforce and research capacity, despite the development of departments of epidemiology and health management in medical faculties. In part as a result of serious deficiencies in the management of the SARS epidemic in 2003 and subsequent reviews of education in public health, since 2008 seven schools of public health and fifteen MPH programs have been established across Canada (Massé and Moloughney, 2011).

Since the 1980s, there has been a renaissance of schools of public health in the USA with an expanding market for graduates. The Association of Schools of Public Health (ASPH) represents the 46 accredited schools in the USA and many with associate member programs or schools not yet accredited through a formal review process of the Council on Education for Public Health (CEPH). Many other programs also provide postgraduate education in public health. The core curriculum themes include:

- *biostatistics* – collection, storage, retrieval, analysis and interpretation of health data; design and analysis of health-related surveys and experiments; and concepts and practice of statistical data analysis
- *epidemiology* – distributions and determinants of disease, disabilities, and death in human populations; the characteristics and dynamics of human populations; and the natural history of disease and the biological basis of health
- *environmental health sciences* – environmental factors including biological, physical, and chemical factors that affect the health of a community
- *health services administration* – planning, organization, administration, management, evaluation, and policy analysis of health and public health programs
- *social and behavioral sciences* – concepts and methods of social and behavioral sciences relevant to the identification and solution of public health problems (CEPH, 2005).

Policy analysis, advocacy, and health promotion should be woven through the studies in all fields, along with law, ethics, economics, and other issues in public health policy. They should provide the new-entry public health worker with competencies in basic tools of social analysis, as outlined in Roemer's classic paper and Gebbie's renewal of this approach, as seen in [Box 14.9](#). These include a broad education in the social sciences, history of public health, the statistical and epidemiological methods, as well as qualitative research, infectious and chronic diseases, nutrition, environment, risk groups, global ecology of disease, promotion of health and prevention of disease, accreditation

and quality promotion in health care, information systems, monitoring, and research methods for management, and global health.

A combination of an MPH with medical doctor training has become widespread among schools of public health, as has public health training for clinicians in many specialties including family practice. MPH training gives medical clinicians a good background in epidemiology, biostatistics, and economics, which are important subjects for authors of clinical studies intended for publication. Many schools offer multiple graduated degree programs in health administration, epidemiology, and other fields in the broad area of public health.

The success model for schools of public health since the 1920s provides postgraduate training in a multifaculty academic setting; a multidisciplinary approach; teaches problem-oriented skills training to identify targets and problem-solving management approaches; and links education, research, and service in public health. The organization and stakeholders for a teaching program at graduate levels are illustrated in [Figure 14.2](#), indicating the complexity of internal and external organizational relationships to achieve the support and environment to train and conduct important and responsible research, and to influence social and health policy. The complex of stakeholders and connections of a school of public health is part of the multiple roles of teaching, research, advocacy, and service.

Teaching programs include undergraduate (bachelor's), master's, and doctoral levels, with the MPH and PhD levels involved in the faculty research programs. School faculty members are frequently leaders in advocacy or consultants for topics in public health where their research and expertise are most relevant. They are able to speak publicly when public health officials of governmental authorities and non-governmental organizations cannot. This is a powerful tool in public dialogue on frequently controversial topics, but often comes to the aid of public servants in special meetings of parliamentary committees and other policy-making forums.

Students in schools of public health come from many different backgrounds, including medicine, dentistry, nursing, engineering, economics, social sciences, statistics, mental health, and veterinary sciences. In 2008, ASPH member schools of public health in the USA, Puerto Rico, and Mexico consisted of a combined 4000 faculty, with 19,000 students, and 7000 graduates per year. The most popular specialties were international health and epidemiology. The career outlook for graduates of schools of public health now includes other traditional public sector positions, but also higher paying positions in the private sector, including consulting firms and managed care organizations. In the 1996–1997 academic year, 14,007 students were enrolled in schools of public health in the USA.

BOX 14.9 Roemer's Elements of Public Health Training**Objectives**

- Prepare target-oriented practitioners, researchers, policy analysts, and managers.
- Provide continuing education for public health practitioners.
- Promote public health research and policy analysis.
- Advocate and promote health-related issues in public policy.

Requirements

- Postgraduate training in a multifaculty academic setting.
- Multidisciplinary approach.
- Problem-oriented skills training to identify targets and problem-solving management approaches.
- Link education, research, and service in public health.

Core Curriculum

- *Basic tools of social analysis* – history of public health, demography, medical sociology and anthropology, biostatistics, population sampling and survey methods, political science of health systems, principles of program evaluation and health economics.
- *Health and disease in populations* – vital statistics, major human diseases and zoonoses, epidemiology of diseases and risk factors, methods of clinical diagnosis and prevention, infectious and chronic diseases, nutrition, environment, special disease and risk groups, global ecology of disease and risk factors.
- *Promotion of health and prevention of disease* – communicable disease control, chronic diseases prevention, environmental and occupational health, maternal, child, adolescent, adult, and elderly health, mental health, STI/AIDS control, nutritional and dental health, health education and promotion; rehabilitation, refugee, migrant, and prisoner health, military medicine, and disaster planning.
- *Health care systems and their management* – organization and operation of national health care systems, health insurance and social security, health services and workforce development, health facilities and their management, drugs and their logistics, health planning, principles of management and application to health programs, budgeting, cost control and financial management, record and information systems, health systems research, health legislation and ethics, technology assessment, accreditation and quality promotion in health care, information systems, monitoring, and research methods for management, global health.

Sources: American Association of Schools of Public Health, <http://www.asph.org> [Accessed 3 December 2012].

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Core Elements for Master of Public Health Programs

The Council of Education in Public Health (CEPH) in the USA sets standards and accredits graduate schools of public health, which provide approximately 85 percent of the public health graduates in the USA.

The Association of Schools of Public Health (ASPH) in the USA identified core competencies for students, upon graduation, in Bachelor and Master of Public Health programs in response to the challenges of twenty-first century public health practice, with widening use of competency-based training in the field of public health, emphasis on accountability in higher education, growing incorporation of competencies into accreditation criteria, and voluntary credentialing examinations for public health graduates. The planning of curricula content tries to address the needs of the public health profession and discipline, which focuses on the role of the population and society in monitoring and achieving good health and quality of life.

The competencies are intended to serve as a *resource* and *guide* for improving the quality and accountability of public health education and training. They are not meant to prescribe the methods or processes for achievement, recognizing that implementation of the competencies may vary with the mission and goals of each school.

Five core discipline areas (biostatistics, environmental health sciences, epidemiology, health policy management, and social and behavioral sciences) are considered the foundation of public health education and competencies for graduates (Box 14.10). In addition, interdisciplinary, cross-cutting competency domains addressed in assessing educational content and competencies in public health education include communication and informatics, diversity and culture, leadership, professionalism, program planning, public health biology, and systems thinking. These seven areas, however, have become increasingly important to effective public health practice and, thus, are included along with the five discipline-specific competency domains in the ASPH model. Other disciplines that contribute to public health include ethics, economics, law, education, engineering, political science, psychology, business, and public administration.

In the USA, graduate schools of public health accredited by CEPH have grown from 28 in 1999 to 40 in 2008, with an additional 70 recognized MPH programs. They are all based on a multidisciplinary approach to training for public health, including technical and administrative leadership in epidemiology of communicable and non-infectious diseases, biostatistics, management of personal health services, environmental health, maternal and child health, health economics, health education, and other related fields. The interdisciplinary aspect of public health is emphasized by the wide range of backgrounds and experiences of the students and their many areas of specialization. Analysis

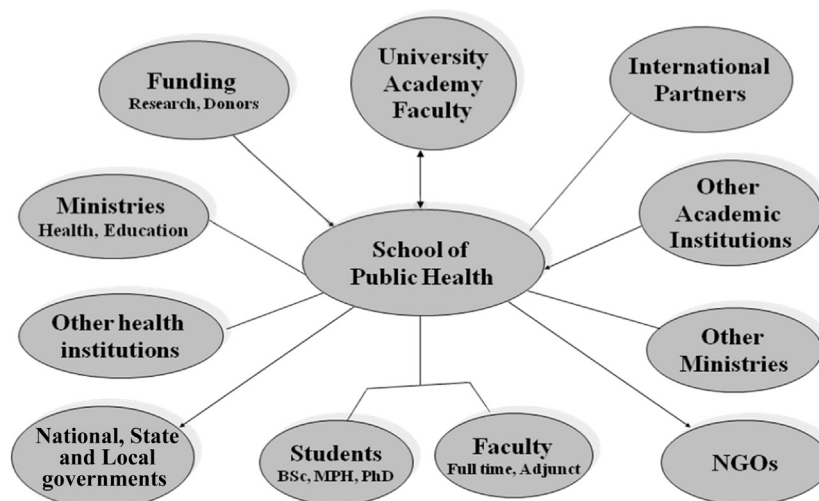


FIGURE 14.2 Structure and stakeholders in schools of public health. Note: NGO=non-governmental organization.

BOX 14.10 Council on Education for Public Health: Core Disciplines and Cross-Disciplines in Public Health Education

Core Disciplines

- Biostatistics
- Environmental health sciences
- Epidemiology
- Health policy and service management
- Behavioral science and health education

Cross-Disciplines

- Communication and informatics
- Diversity and culture
- Professionalism
- Program planning
- Systems thinking
- Public health biology
- Ethics (not yet included in APHA list)
- Law (not yet included in APHA list)

Note: APHA=Association of Schools of Public Health.

Source: Association of Schools of Public Health. MPH core competency model [updated 9 September 2010]. Available at: <http://www.asph.org/document.cfm?page=851> [Accessed 2 December 2012].

of problems with the skills of epidemiology, sociology, and other related disciplines permits the graduate to enter practice with a problem-solving approach. Another 26 university graduate programs in community health education, community health, and preventive medicine are accredited to extend public health training to most parts of the country.

The importance of newer training models for the public health workforce is one of the most urgent keys to successful, well-functioning, and well-managed health systems. This is reinforced and evidenced by the events and outcomes

of newly developing schools of public health in countries of Eastern Europe and Central Asia, as well as the new schools now in development in India and South-East Asia.

Accreditation involves external review of facilities, faculty, curriculum, student selection criteria, internships or field experience, and academic standards. An accredited school is better able to generate research and scholarship funds and is more attractive to students for future career advancement in an expanding job market. These schools, plus many other non-accredited schools or university departments, provide operating public health and health care agencies with well-trained personnel with a wide range of undergraduate and professional experience. This enriches the field not only with practitioners, but also with researchers, administrators, and policy analysts of high quality.

Schools of public health should have close working relations with state and local health agencies, recruiting part-time faculty from service agencies and conducting research in real public health problems that confront health agencies. Schools of public health can provide important services to departments of health in research, consultation, and assessment on public health issues.

The WHO addressed the “global crisis in health systems and health workforce needs” by choosing Human Resources for Health as the theme of the World Health Report 2006. The major stress was placed on the shortage of medical and nursing and other health providers, and the issues of training, conditions of work, and migration. There is also recognition that preparing a competent public health workforce is a key element for effective and sustainable health systems. There is no clear agreement on what the public health workforce is. Definitions vary for identifying the specific members of the public health workforce, and their corresponding roles within the health systems, as classifications and roles differ across countries.

The World Health Report 2006 states that the education of the health workforce requires attention to curricular content, pedagogical learning methods, training of teaching staff, research and service, and moreover, that “more schools of public health are needed”.

Public health workforce development is a crucial element in increasing the capacity of national health systems, allowing them to address present and future population health challenges. The development of advanced-level programs of postdiploma public health education in the Central and Eastern European region is an important innovation to help countries cope with public health crises of low performance of their health systems.

Ranking Universities

University and college education is a large, highly competitive industry. Students and their families are faced with difficult choices and admission requirements as well as the high costs of higher education. At the same time, education is a national resource vital to sustaining competitiveness in a global economy increasingly based on highly educated human resources, highly technical engineering, and sociological and biomedical research. This applies to public health no less than to other health and technical professions. The idea of ranking of educational institutions is also applied to colleges and even to schools.

Graduate schools of public health are ranked annually by surveys of deans, top administrators, and senior faculty conducted as part of continuous surveys of graduate schools in the USA which were initiated in 1983 by the weekly news magazine *US News and World Report*. There are many ranking systems for higher education, with *The Times* [of London] *Good University Guide* and the Shanghai Jiao Tong’s *Academic Ranking of World Universities* being the best known.

These surveys are based on annual assessments, including reputation among deans and senior faculty (40 percent), research activity (30 percent), student selectivity (20 percent), and faculty resources (10 percent). The rankings of US schools of public health are shown in [Table 14.9](#). In 2011, the top ranked schools of public health included Johns Hopkins, the University of North Carolina (Chapel Hill), and Harvard.

While these surveys and rankings have no official status, they can be very important for the recognition of achievements and excellence, and are widely used as guides for student selection of graduate schools, possibly affecting research grants, fundraising, and faculty recruitment. The CEPH provides a recognized accreditation system in the USA with requirements for standardized public health curricula and core content, and the process of accreditation ensures quality graduate education across the country, and some abroad (e.g., Mexico, and Alberta, Canada).

TABLE 14.9 Ranking of US Schools of Public Health, 2011

Rank	School Name	Score
1	Johns Hopkins University, Baltimore, MD	4.8
2	University of North Carolina–Chapel Hill, Chapel Hill, NC	4.6
3	Harvard University, Boston, MA	4.5
4	University of Michigan–Ann Arbor, Ann Arbor, MI	4.3
5	Columbia University, New York, NY	4.2
6	Emory University, Atlanta, GA	4.1
6	University of Washington, Seattle, WA	4.1
8	University of California–Berkeley, Berkeley, CA	3.8
8	University of Minnesota–Twin Cities, Minneapolis, MN	3.8
10	University of California–Los Angeles, Los Angeles, CA	3.7
11	Boston University, Boston, MA	3.4
11	University of Pittsburgh, Pittsburgh, PA	3.4
13	Tulane University, New Orleans, LA	3.3
13	Yale University, New Haven, CT	3.3
15	University of Texas–Houston Health Sciences Center, Houston, TX	3.2
16	George Washington University, Washington, DC	3.0
16	University of Alabama–Birmingham, Birmingham, AL	3.0
16	University of Illinois–Chicago, Chicago, IL	3.0
16	University of Iowa, Iowa City, IA	3.0
20	Ohio State University, Columbus, OH	2.8
21	Drexel University, Philadelphia, PA	2.7
21	University of South Florida, Tampa, FL	2.7
23	University of Arizona (Zuckerman), Tucson, AZ	2.5
23	University of South Carolina, Columbia, SC	2.5
25	Texas A&M Health Science Center, College Station, TX	2.4

Source: US News and World Report. Education, Grad Schools, Public Health. Available at: <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-health-schools/public-health-rankings> [Accessed 4 December 2012].

Field Epidemiology

Field epidemiology is an essential component of effective public health practice, and developing such capacity is a critical step in a country’s efforts to improve the health of its

citizens. The US Centers for Disease Control and Prevention (CDC) was founded in 1946 and Alexander Langmuir established its Epidemic Intelligence Service (EIS) program in 1951. It has made important contributions to training in and field investigation of many public health issues. EIS trainees and graduates have played important leadership roles in many domestic issues such as AIDS, Lyme disease, legionnaires' disease, foodborne and waterborne diseases, occupational health, NCDs, and trauma. Many trainees have become state epidemiologists and international trainees have become leaders in their own countries in the continuing struggles against infectious diseases (CDC Timeline, August 2013).

The EIS has played important leadership roles in international infectious disease control including smallpox eradication, measles control, and cholera epidemics. Since 1980, the CDC has established a total of 37 field epidemiology training programs (FETPs) worldwide, including 2 years' full-time classroom and field supervised training. FETPs are based on partnerships among CDC, host country health agencies, the WHO, the US Agency for International Development (USAID), and others. Modeled on CDC's EIS, FETPs follow the EIS approach of combining service with training. FETPs also participate in training programs in the epidemiology and public health interventions network, which provides a venue for information sharing, program development, and quality improvement. FETPs have graduated approximately 2100 field epidemiologists, most staying in public service and many reaching leadership positions in their ministries of health (CDC, 2012).

Public Health Education in Europe

In Europe, there is a growing trend towards public health education at the master's, PhD, and increasingly the bachelor's levels. The Association of Schools of Public Health in the European Region (ASPHER) represents this movement and is promoting peer review, mission and values statement, competency standards, and an accreditation program. ASPHER now includes over 80 member schools or programs offering MPH programs. These are mostly housed in faculties of medicine as departments of social medicine, occupational health and others, with a health economics and planning orientation. ASPHER offers a constructive role in promoting core curricula development, competencies, and PhD program development. It also promotes studies in public health ethics and is currently working to develop bachelor's degree training in public health, as is already common in such countries as Germany, Sweden, and Albania.

In 2011, ASPHER initiated the establishment of an independent accreditation body, the Agency for Accreditation of Public Health Education in Europe, which has established an organization, criteria, and procedures for accreditation of MPH programs, initially with the London School of Hygiene and Tropical Medicine and the Kazakhstan School of Public

Health. This new movement is beginning to work in alliance with the European Public Health Association (EUPHA) to promote public health policies, research, and educational standards. Similar organizations are working in other regions such as in South-East Asia, where new schools of public health are developing, for example in sub-Saharan Africa and India.

In former Soviet countries, public health training is a stream within medical training institutes or academies at the undergraduate level. The Sanepid doctors provide communicable disease control, and food and environmental hygiene, and are the main cadre of public health practitioners in the Semashko system (see Chapter 13). Postgraduate training is provided as a medical specialty through *Ordinatura*, *Aspirantura*, and *Candidat* levels in the medical academies. Research institutes in various fields of public health provide graduate-level training up to the doctoral (PhD and Doctor of Science) levels.

Most former Soviet countries provided specialization during basic medical training (i.e., internal medicine, pediatrics, or sanitary epidemiology). Specialized graduate training takes place in various departments of medical academies, with criteria including length of training and examinations established by the Ministry of Health. Newly established graduate schools or programs in public health are providing training at the MPH level in many countries of Eastern Europe, the former Soviet Union, and Central Asia, including Hungary, Poland, Romania, Macedonia, Bulgaria, Moldova, Albania, the Czech Republic, Ukraine, and in the Central Asian Republics of Kazakhstan, Uzbekistan, and Tajikistan, with several in the Russian Federation developing in Russia.

The MPH degree is not yet recognized in all these countries, but is recognized in Western and Central Europe, in keeping with the Bologna Agreement on postgraduate education as agreed to by most of these countries. In many countries in transition from socialist systems, the model of public health continues to be one largely focused on infectious disease and is hospital oriented, although there is advent of compulsory health insurance and elements of privatization of services in some countries. Non-infectious disease issues are seen as clinical problems and left to medical practitioners to resolve; health promotion remains a vague concept. As a result, the populations of countries in transition suffer the tragic consequences of high rates of preventable morbidity and mortality from chronic diseases.

In continental Europe, training in public health was largely traditionally through a job-oriented, vocational approach carried out in government or independent institutes as courses for medical officers of health or hospital managers, except for several outstanding examples such as the London School of Hygiene and Tropical Medicine, and counterparts in the Netherlands, Scandinavia, and others, as well as many medical school or university-based research departments.

In Europe there has been a burgeoning of schools of public health since the 1990s and increasingly this is also occurring in countries of Eastern Europe and Central Asia. Associations of schools of public health have promoted these new schools with help from the Open Society Institute (Soros Foundation) of New York. The economic and political consolidation of Europe has highlighted the need for uniformity, standardization, and reciprocity in the EU's systems of higher education.

Europe recognized a need to modernize its university education standards. This came at a time when the health workforce was becoming an increasingly urgent issue recognized by the WHO and many individual countries as crucial to health policy. Global threats to population health, such as HIV, SARS, threatened bioterrorism, and the avian flu pandemic, have increased public and political recognition of the vital importance of a trained cadre of public health experts.

Following a series of meetings initiated by the EU, in June 1999 the European ministers of education issued what has come to be known as the Bologna Declaration. By this agreement, signatory states agreed in principle to work towards a European Higher Education Area (EHEA), to improve the quality of higher (i.e., post-secondary) education, and to provide for enhanced movement of students and academics within the EU. The motivation was to harmonize and raise European standards of postsecondary education to competitive levels in an education-based world competitive economy. The three overall objectives of the Bologna Process have been from the start: introduction of the three cycle system (bachelor/master/doctorate), quality assurance, and recognition of qualifications and periods of study. The Bologna Declaration initiated a "series of reforms needed to make European Higher Education more compatible and comparable, more competitive and more attractive for Europeans and for students and scholars from other continents. Reform was needed then and reform is still needed today if Europe is to match the performance of the best performing systems in the world" (European Commission, 2012) (Box 14.11).

The implications for public health education are great. The creation of new schools of public health has been initiated in several countries, particularly in Eastern and South-Eastern Europe, where the need for trained health workers is perhaps greatest. The Bologna Declaration allows for widespread recognition of the MPH degree and clarification of the public health worker's role as a professional. There are similar consequences for nursing, medicine, and allied health professions, which will move towards common nomenclature, educational standards, and academic exchange.

Since the 1980s and early 1990s, European schools of public health of the broader model have been established in Germany, the Netherlands, France, Spain, Poland, and Romania, and in countries of the former Yugoslavia and South-Eastern European region (Box 14.12). ASPHER has developed and promotes the idea of standardization and reciprocity for MPH degrees in the EU.

The Bologna Agreement of 1999 was intended to promote equality, not only in the context of health standards, but also in educational standards, in recognition of qualifications and accreditation systems, and in improving the health of the peoples of Europe. Many European countries are still in transition or development with currently poor standards of public health. Training in professional aspects of public health is vital to the educational goals of participating members, but also to the public health movement as a whole, within basic principles of ethics and values for the modern public health movement,

BOX 14.11 Bologna Declaration: Unified Standards of Postgraduate Education in the European Union

The Bologna Declaration initiated reforms in the study structure of the European higher education area, for both undergraduate and graduate university education.

Accreditation is a key instrument to support the processes of changes in Europe's higher education systems. The Bucharest Communiqué builds on the previous Leuven Communiqué of 2009 to establish the following priorities for 2010–2020:

- Ensuring a quality higher education system in the European Union.
- Adopting a two- or three-cycle system of study (BA, MA, PhD).
- Promoting the mobility of students and academic and administrative staff.
- Introducing a credit system (ECTS) for the assessment of study performance.
- Recognition of levels: adopting a system of easily identifiable and comparable levels.
- Active involvement of higher education institutions, teachers and students in the Bologna Process.
- Student participation in the management of higher education.
- Promoting a European dimension in higher education.
- Promoting the attractiveness of the European higher education area.
- Lifelong learning.
- A European higher education area and a European research area – two pillars of a society based on knowledge.
- Accreditation or certification of a degree program requires a review of the standards for content and vocational relevance of the degree to be awarded for a limited period within the frame of a transparent, formal, and external peer review.

Sources: Declaration 19 June 1999 by European Ministers of Education in Bologna, Italy. Available at: <http://ec.europa.eu/education/policies/educ/bologna/bologna.pdf> [Accessed 4 December 2012].

European Commission. Education and training: the Bologna Process – towards the European higher education area [updated 29 May 2012]. Available at: http://ec.europa.eu/education/higher-education/bologna_en.htm [Accessed 29 November 2012] and <http://www.bologna-berlin2003.de/en/glossary/index.htm> [Accessed 3 December 2012].

BOX 14.12 Principles of Public Health Education Standardization for Europe

- Public health as an organized system is vital for societies for long-term improvement in health of the population and to meet emergency situations of pandemics, disasters, and bioterrorism.
- Public health depends on laws, organizational structure, resources, planning, and training.
- Many countries in Europe lack clear differentiation of powers between different levels of government.
- Trained workforce is crucial to an effective public health network.
- Training, licensure, and accreditation are all needed in Europe in the western and eastern countries, especially in their transition stages.
- Development of schools of public health as multidisciplinary settings with autonomy as separate faculties of semi-autonomous status within medical faculties is vital for them to succeed in their mission of training, research, and service.
- The WHO must take a leadership role in promoting public health reform and education, networking with organizations already active in this field such as ASPHER, EUPHA, and others.
- Ministries of Health should be proactive in developing robust structures and training programs for public health in conjunction with sister ministries and academic organizations.
- Europe-wide standards and health targets will help individual countries to cope with these challenges.
- Europe-wide funding to promote new organization and training capacities in member countries is essential to enable this process to happen and to implement the intent of the Bologna Declaration in higher education.

Note: WHO=World Health Organization; ASPHER=Association of Schools of Public Health in the European Region; EUPHA=European Public Health Association.

Sources: Dubois CA, McKee M, Nolte E. *Resources for health in Europe*. Buckingham: Open University Press; 2005.

Paccaud F, Weihofen A, Nocera S. *Public health education in Europe: old and new challenges*. *Public Health Rev* 2011;33:66–86.

and of the highest standards of public health practice. In 2011, ASPHER established the Agency for Public Health Education Accreditation (APHEA) in association with other prominent public health organizations to accredit MPH programs in Europe. The core subject domain criteria for accreditation are shown in Table 14.10 and the first two European MPH programs underwent accreditation in 2012. At the same time, strong interest is evolving in defining competencies of graduates of MPH programs (Box 14.13).

Schools of public health are of special importance for developing countries because of the prime importance of public health approaches in meeting their health needs. Nigeria is a very populous country where the main health

TABLE 14.10 Core Subject Domains to be Included in Master of Public Health (MPH) Curricula as Required by Agency Public Health Europe Accreditation

Core Subject Areas	Curriculum Content	ECTS Credit Ranges
Introduction	Introduction to public health	2
Methods in public health	Epidemiological methods, biostatistical methods, qualitative research methods, survey methods	18–20
Population health and its determinants	Environmental sciences (including physical, chemical and biological factors), communicable and non-communicable disease, occupational health, social and behavioral sciences, health risk assessment, health inequalities along social gradient	18–20
Health policy, economics, and management	Economics, health care systems planning, organization and management, health policy, financing health services, health program evaluation, health targets	16–18
Health education and promotion	Health promotion, health education, health protection and regulation, disease prevention	16–18
Cross-disciplinary themes (mandatory and/or elective courses)	Biology for public health, law, ethics, aging, nutrition, maternal and child health, mental health, demography, information technology use, health informatics, leadership and decision-making, social psychology, global public health, marketing, communication and advocacy, health anthropology, human rights, program planning and development, public health genomics, technology assessment	21–23
Internship/final project resulting in thesis/dissertation/memoire	Supervised by faculty (full time and/or adjunct)	24–26

Note: ECTS is the European Credit Transfer System, allowing transfer of students between universities and some degree of standardization of education at bachelor's level in keeping with the Bologna Agreement. Source: Otok R, Levin I, Sitko S, Flahault A. European accreditation of public health education. *Public Health Rev* 2011;33:30–8.

issues are those in the public health sector, yet there are over 20 medical schools and no school of public health. Departments of social or community medicine, primarily teaching medical students, are common in most medical schools, but

this fails to provide students at the graduate-school level with an academic environment and the multidisciplinary training and specialization that the field requires to provide the professional leadership needed to meet the health challenges of their societies.

Leadership positions in health systems at the local, state, and federal levels are now held by doctors trained in clinical medicine, often with added training in public health. Few, however, have training in management and many received training focused on subspecialties of public health. In contrast, schools of public health at the doctoral level focus on the preparation of scholars in research and teaching rather than health leadership and management. Some seek preparation in Master's of Business Administration (MBA) programs. Preparation at the PhD level of doctors in public health requires post-baccalaureate training with broad areas of knowledge: tools of social analysis, health and disease in populations, promotion of health and prevention of disease, and health care systems and their management (see [Box 14.10](#)). Some schools of public health are moving in this direction by providing special part-time programs for working health executives. These will be especially important in the preparation of leadership capable of coping with the complexities of managed care or district health programs which are developing in many countries facing the organizational, economic, and ethical aspects of individual and population health.

The impact of public health and preventive medicine on national health has gained prominence since the 1980s, with the idea that medical need can be reduced by decreasing the burden of illness. This led to an increase in demand for preventive medicine and public health training, as medical care costs were thought by economists to be a function of need and demand. Health education programs designed to reduce health risks and reduce costs were shown to have documented effectiveness, with reductions in claims of 20 percent in some health insurance systems in the USA. Specific program features including chronic disease self-management, risk reduction, and increased self-efficacy appear important. This concept was further supported by the review by the CDC of public health achievements in the twentieth century, in which reductions of the burden of disease were directly related in large measure to public health programs. In the late 20th and first decade of the 21st century, new challenges with important achievements were seen with HIV, SARS, bioterrorism, and natural pandemics heightened the sense of concern, need, and urgency to strengthen public health training in the USA and internationally.

Countries of Eastern Europe and the Commonwealth of Independent States are facing a combination of high rates of mortality from preventable diseases and pressures for reform of the health care systems. The development of schools of public health as independent schools within single- or multifaculty universities should be an important priority for international aid and for national authorities. The challenge lies in integrating experience

from many countries in the industrialized world with local academic centers in the field of public health. Traditional departments of social hygiene within medical academies need to evolve to educate new generations of doctors and other health professionals to cope with challenges facing the health systems in these countries. Postgraduate centers of training are essential to provide the leadership and professional staffing to address the New Public Health.

For developing countries, such as India and Nigeria, with vast populations and poor health, the need for schools of public health is even more crucial for creating the infrastructure to meet the health needs. Achieving the MDGs in many countries will not be possible without developing and sustaining a strong workforce of well-trained public health analysts, leaders, and field workers. This will require academic centers capable of training, research, and service to prepare such public health workers and to advocate policies and priorities to achieve these targets.

The essential competencies for public health are those outlined by the American Public Health Association (APHA) and discussed in Chapter 10. These are skills acquired through training and experience and not part of the skills of physicians per se. They include what the APHA calls the essential public health services:

- Monitor health status to identify community health problems.
- Diagnose and investigate health problems and health hazards in the community.
- Inform, educate, and empower people about health issues.
- Mobilize community partnerships to identify and solve health problems.
- Develop policies and plans that support individual and community health efforts.
- Enforce laws and regulations that protect health and ensure safety.
- Link people to needed personal health services and assure the provision of health care when otherwise needed.
- Assure a competent public health and personal health care workforce.
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
- Research for new insights and innovative solutions to health problems.

These are the elements essential for public health practice and a training curriculum to address those needs. A professional, qualified, and multidisciplinary workforce, in sufficient numbers, is vital to the organization and management of effective public health systems in Europe and around the world. Such a workforce is essential to evaluate and respond to growing threats to population health, to address health inequalities between and within countries, and to develop and implement scientifically based interventions in a timely and appropriate manner within the limits of available resources.

BOX 14.13 Competencies in Public Health Education and Practice

- Competencies denote the potential for specific, defined performance standards of knowledge and skills based on public health theory and science.
- Competencies must be observable and transparent through appropriate performance patterns required for their achievement, related to appropriate methods to meet existent public health challenges.
- In public health, competencies are needed throughout complex interactive systems for achievement of goals in the mission of public health.
- Patterns of competencies can be assigned to individuals, professional groups, and public health organizations – thus both to individual public health professionals and to accreditation of public health institutions, systems, and other organizations, e.g., those serving specific geographic areas or populations.
- European lists of public health competencies cover the education levels defined by the Bologna Process, i.e., bachelor's, master's, PhD and continuing professional development (CPD).
- Documentation of satisfactory demonstration of competencies can be used as effective indicators of progress through education and training programs, leading to certification of fitness to practice in either service or academic public health careers.
- Certification or licensing of public health professionals, especially in countries with established coherent public health systems and well-defined career structures, can be based upon effective completion of a systematic education and training program.
- Lists of public health competencies have been developed by public health organizations in the USA, Canada, Australia, and Europe, as well as by groups and associations concerned with public health in general or specialties of public health such as health promotion.
- Such lists have many practical applications, e.g., in planning, delivery, and evaluation of education, training, and service programmes, in demonstration of completion of training, or to support employment in construction of job descriptions and in annual reviews of performance.
- Even with similarities, there are variations in the structure of lists of public health competencies, e.g., between two UK lists (one designed for training, the other for employment), and the lists produced by the US Association of Schools of Public Health (ASPH).
- European lists produced by the Association of Schools of Public Health in the European Region (ASPHER) cover population health as well as health systems and public health operations; the latter classifies and subdivides public health competencies into:
 - methods in public health
 - population health and its social and economic determinants
 - population health and its material (physical, radiological, chemical, and biological) determinants
 - health policy; economics; organizational theory and management
 - health promotion: health education, health protection and disease prevention
 - ethics.
- ASPHER's European Core Competencies Programme has, since its initiation in 2006, involved about 100 researchers/teachers at member schools, European Ministries of Health, civil servants, and public health practitioners. International conferences were devoted to discussion of competencies, workshops at European and global public health conferences, as well as practitioner-school workshops in a series of European countries, with support by the EU in collaboration with public health partner organizations.
- As of September 2012, ASPHER's European lists of expanded core competencies (population health, health systems, and public health operations) have been endorsed by member states of the World Health Organization's European Region.
- Development, implementation, and use of lists of competencies and their interaction with public health practice and research is a continuing process rooted in well-established organizational structures.

Sources: Anders Foldspang, School of Public Health, Aarhus University, Denmark; Christopher Birt, Department of Public Health, University of Liverpool, UK. Personal communication; December 2012.

Birt C, Foldspang A. The developing role of systems of competences in public health education and practice. *Public Health Rev* 2011;33:134–47. Available at: www.publichealthreviews.eu [Accessed 12 December].

Faculty of Public Health. Learning outcomes for public health. Available at: http://outcomes.lph-groups.org.uk/learning_outcomes/ [Accessed 12 December 2012].

Calhoun G, Wrobel CA, Finnegan JR. Current state in US public health competency-based graduate education. *Public Health Rev* 2011;33:148–67. Available at: www.publichealthreviews.eu [Accessed 12 December].

Birt C, Foldspang A. European Core Competences for MPH Education (ECCMPHE). ASPHER publication no. 6. Brussels: ASPHER; 2011.

World Health Organization, European Region. European action plan for strengthening public health capacities and services. Copenhagen: WHO Europe; 2012. p 18.

HEALTH POLICY AND MANAGEMENT OF HUMAN RESOURCES

Preparation for policy and management roles in public health and health systems has become widespread in schools of public health and in business schools in the USA. This trend will undoubtedly increase as managed care increases, and as intersectoral mergers or other

functional arrangements become more common. Departments of management and policy or health services in schools of public health have the mission to study and seek methods of improving efficiency and effectiveness of personal and population-based health organizations. As academic fields, they share a population perspective that includes interdisciplinary faculty from economics, law, management, medicine, history, sociology, and policy

analysis. They focus on societal, population, economic, and organizational perspectives.

Personnel and managerial costs are the largest single component of total health expenditures, so that management and utilization of this resource is of prime importance to a health system. Health personnel should be recruited, trained, and utilized in a manner appropriate to meet the health needs of the population. This means employing their skills under conditions that promote effective work. Human resource management includes determining which category of worker can best provide specific services, how many are required, and which organizational frameworks are required to provide needed care most effectively. This requires not only delegation of responsibility, but also the resources with accountability to carry out the tasks.

Human resources management includes determination of numbers and types of health personnel needed for the health system now and in the future. Responsibility for planning, management, financing constraints, licensing, discipline procedures, quality control measures, and so on, can be delegated from professional levels to appropriately qualified paraprofessionals. Accountability for performance is essential for any system dedicated to provision of quality care and to meeting its goals of improved health outcomes.

Restricting numbers of professionals is sometimes done in the self-interest of a professional group to restrain competition. Oversupply can be costly and destructive to the public interest by misdirecting health resources in non-productive or even harmful ways. An excess supply of surgeons generates higher rates of elective surgical procedures than necessary or safe, while shortages of primary care physicians prevent adequacy in basic health services. Poor supply or quality of nursing personnel compromises the quality of hospital care and primary care in the community. Long-term retraining and redeployment policies are required, which are developed and implemented over time, rather than spasmodic mass layoffs of nurses and other hospital workers.

Managed care in the USA and similar comprehensive service programs in other countries provide the opportunity to seek a new balance of services and introduce new roles in health care. Physicians, NPs, CHWs, and many other kinds of health care professionals and technicians will be part of the complex of health care provision when the economics of care necessitate cost-effectiveness, where prevention and treatment are part of the same complex, and where a health promotion approach is fundamental to the objectives of the organization. In turn, public health workers should take active roles informing and participating in health systems management.

The evolution of public health is discussed in Chapter 2 and its organization in Chapter 10. The preparation of public health leaders and professional staff is well described by the ASPH. The ASPH represents 46 graduate schools of public health, which provide approximately 84 percent of the public health graduates in the USA. ASPH identified core competencies for MPH students upon graduation. These focus

on the role of the public health graduate, as a professional in a discipline that addresses population health and society's role in monitoring and achieving good health and quality of life. Public health professionals work in many settings, as defined by the ASPH, to achieve:

- optimal human growth, development, and dignity across the lifespan
- respect for community participation and preferences in health
- air, food, and water safety
- workplace, school, and recreation safety
- timely detection of disease outbreaks and public health threats
- science-based responses to public health problems
- health care access, efficiency, and effectiveness
- encouragement of healthy choices that prolong a high quality of life
- design and maintenance of policies and services to meet community and individual needs for physical and mental health.

Public health professionals also recognize the contributions of other disciplines, including but not limited to the health professions. Public health education should be included in all undergraduate education programs as part of preparation of students for fields as diverse as business, economics, education, engineering, law, political science, psychology, sociology, anthropology, urban planning, and public administration.

The CDC established a Prevention Research Centers Program, offering training courses for public health practitioners working in the field. These include training program offerings: evidence-based public health, physical activity and public health, and social marketing. These courses illustrate the commitment of the Prevention Research Centers Program to helping in creation of a better trained public health workforce. The Moldova Ministry of Health, working with the WHO local office, developed a program for public health workers in control of NCDs; and the Moldova School of Public Health in Chisinau provides distance learning technology to support the spread of this knowledge to all parts of this small and very poor country in Eastern Europe. The Braun School of Public Health in Jerusalem provided support materials for use in a "training of trainers" program, a distance learning initiative implemented by the local WHO office in Moldova.

The demographic and epidemiological transition from acute diseases to chronic health problems is now moving to what Breslow called "the third era of health" (see Chapter 2), which is basically a health promotion model. This will necessitate a shift in the health workforce education policies. The traditional emphasis on diagnosis and treatment will need to shift to producing educational and supportive health workers at different levels of training to help the elderly and people with chronic health problems such

as cancer, diabetes, asthma, and congestive heart failure, not in place of medical providers, but augmenting what is now being called a “patients’ home” (Shortell et al., 2010) to “a new set of core competencies (knowledge, skills, abilities, personal qualities, experience, or other characteristics”, with a mix of professional and paraprofessionals providing comprehensive care over long periods of duration of the most prevalent health problems (Pruitt and Epping-Jordan, 2005).

New information technology and medical devices will change the face of health care as patient monitoring and educational support will become key to the long-term well-being of people even with chronic medical conditions, helping to improve life quality and preventing unnecessary hospitalization and disabling health status. The educational approaches will need to shift towards the creation of more mid-level and CHW capacity to be part of the teams that will enable a more comprehensive approach to health and patient care with efficiency and support.

The rapid decline in mortality from coronary heart disease, stroke, cancer, injury, and other leading causes of death has prolonged and improved quality of life over the past half century. The health workforce will need to change to cope with these and other new challenges of disease, trauma, mental health, and newly evolving technologies to improve disease control and healthy quality of life. New technologies such as robotics will change surgical practice, as genetics will change medical practice, but health promotion and disease prevention will still be the keys to a healthier and longer life. The health workforce needs to be prepared to deal with these challenges.

SUMMARY

Education and training of medical and allied health personnel are important issues in health care systems development, and include issues of both quantity and quality. Regular reassessment is needed lest the numbers of practitioners produced become larger or fewer than the needs of the services, and as a result health care standards may decline or the system may become excessively costly while needed health promotion is inadequate. Preparation of managers and planners skilled in data and program analysis and leadership is as important as training health care providers.

Training of health professionals should be accompanied by orientation to the broad sweep of the New Public Health, including its management and evaluation skills. New health professional roles will evolve based on individual patient and community health needs. This is crucial in low- and medium-income countries struggling with both communicable and non-communicable diseases with insufficient health workforce and educational capacity while international donor aid focuses mainly on specific diseases rather than on building capacity and political support.

The build up of an adequate supply, quality and distribution of health workers is a matter of life and death in developing countries which lose many of their trained personnel through migration to high income countries. The receiving countries absorb many such emigre health personnel to meet their own needs without compensation to the countries losing their badly needed health personnel trained at great cost. The need for training of health personnel at levels appropriate to their country needs such as community health workers and bachelor degree public health personnel. This is a vital issue to continue and expand progress toward the MDGs and their followup health goals.

Management in the New Public Health is confronted with many difficult challenges in human resource policy. These include not only the quantity and quality of training but also flexibility in utilization, including redeployment of personnel from institutional care settings to community health and health promotion activities. Personnel and management expenses constitute some 75 percent of costs of patient care; any program for reallocation of resources towards community and preventive care must necessarily involve health workers, not only as an economic issue but as a qualitative one. These professional and personnel issues must be treated with care and sensitivity.

A health care system depends on the quality, ethics, pride, and professional skills of its team members. The training and retraining of such personnel are therefore fundamental considerations of the New Public Health. The training and work situations of the people who make up the complex of the New Public Health and provide its monitoring and services are crucial to the workings of the system and in networking with the multiple partners in health for an individual and for a community. New human resource issues will need to be addressed in facing the challenges of changing demographics and epidemiological patterns and to overcome still enormous inherent regional and social inequalities in health globally.

NOTE

For a complete bibliography and guidance for student reviews and expected competencies please see companion web site at <http://booksite.elsevier.com/9780124157668>

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