From Education to Regulation:
Dynamic Challenges for the Health Workforce

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Denise E. Holmes
Editor

The Association of Academic Health Centers is a national nonprofit 501(c)(3) organization that represents the nation's academic health centers and is dedicated to advancing health and well-being through leadership in health professions education, patient care, and research.

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About the editor: Denise E. Holmes, JD, MPH is the Assistant Vice President for Policy and Program at the Association of Academic Health Centers.

Copies of this report may be obtained from:

Association of Academic Health Centers
1400 Sixteenth Street, NW, Suite 720
Washington, DC 20036
202/265-9600;Fax 202/265-7514
www.aahcdc.org

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Preface

From Education to Regulation: Dynamic Challenges for the Health Workforce, a set of papers commissioned by the Association of Academic Health Centers (AAHC), elucidates some of the thorny issues related to producing and retaining a 21st century U.S. health workforce. National experts delineate some difficult yet unresolved challenges, including workforce regulations, professional and educational standards and workplace practices and offer possible responses on multiple fronts. The AAHC commissioned these papers to inform its analysis and develop the observations, conclusions, and recommendations for its major report on the health workforce, *Out of Order, Out of Time: The State of the Nation's Health Workforce*.

Several papers in this volume highlight areas where national, systems-level thinking and approaches are needed for the sake of efficiency and maximization of capacity. Jean Moore substantiates the need for a federal framework for health workforce research and shares some recent examples of such research, yet paints a bleak picture emerging in the absence of a federal research agenda or funding for health workforce research. Don Detmer and Elaine Steen laud the promise that information and communication technology can offer to the health sector, yet caution that full maturation and diffusion are elusive and that the technology cannot meet its promise if a wide array of health workers are not trained in its use.

Catherine Dower and Stephen Collier examine regulatory mechanisms, both the time-worn approaches that are ill-suited to the United States' maintaining scientific and economic leadership in an era of globalized competition and recent education and workforce trends that are producing unintended, negative consequences. Dower argues that licensure on a state-by-state basis hinders mobility of health professionals, leads to 'wasted' education where people are trained beyond practice authority, and perpetuates entrenched turf battles between professions; she explores whether the U.S. might expand workforce capacity by aligning practice acts more closely with competencies. Collier suggests that recent trends in credentialing, including 'degree creep' and what he deems the bifurcation of the health workforce, should lead to enhanced access to care and levels of care. Yet, he concludes that the nation faces ongoing concerns in education and workforce distribution that are not being adequately addressed.

Bonnie Rogers, Jeannette South-Paul and Robert Like, and Robyn Stone focus on elements of the work environment to which the nation has not properly responded. Rogers assesses the nature, level and impact of workplace hazards and health risks that curtail careers and hinder expansion of the health workforce; she underscores that organizational structures and processes can mitigate these hazards and suggests that health employers take much-needed steps to this end. South-Paul and Like track the recent and growing realm of cultural competence and contemplate the consequences should these training efforts fail to expand to meet the needs of an increasingly diverse U.S. population; they also suggest avenues for government, academic institutions, employers and others to recognize the significance of this issue. Stone speaks to special challenges for the long-term care workforce--already facing shortages and ill-equipped for the looming tsunami of aging baby boomers--and sets forth goals and associated options to enhance this critical subset of the health workforce.

Although education represents a fundamental element for building workforce capacity, due to regulatory (e.g., accreditation) and logistical (e.g., faculty shortages) matters, academic health centers and other institutions struggle to produce sufficient graduates to meet the nation's rising demand or need for health professionals. Peter Kohler and Jon Parham cite the challenges in expanding educational capacity and offer a case study of a branch campus for an academic health center that is being established to address health needs in Arkansas; the case study is replete with lessons for other institutions, including factors for identifying a suitable location, the need for funding and strong local support, and how to navigate the accreditation process.

In exploring the complexities of the regulatory, educational and practice environments, this volume highlights the need for a policy framework and a national planning initiative. The papers in this volume assess aspects of the health workforce for which the national policy framework does not provide the appropriate or necessary mechanisms to address problems or develop crosscutting, comprehensive solutions. A multiplicity of players, often with conflicting agendas and opposing goals, emerges throughout the analyses. Two key subthemes are the relative inattention of policy makers and – despite many ambitious pilot programs and demonstration projects – the need for increased financial support.

Researchers, policymakers, and others will find this volume useful as a reference and as a basis for rethinking difficult issues impacting the health workforce.

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Contributors

Stephen N. Collier, PhD
Professor and Director
Office of Health Professions Education and Workforce Development
School of Health Professions
University of Alabama at Birmingham

Don E. Detmer, MD, MA
President and Chief Executive Officer
American Medical Informatics Association

Catherine Dower, JD
Associate Director for Health Law and Policy
Center for the Health Professions
University of California, San Francisco

Peter O. Kohler, MD
Vice Chancellor
University of Arkansas for Medical Sciences-Northwest

Robert C. Like, MD, MS
Professor, Department of Family Medicine and
Director, Center for Healthy Families and Cultural Diversity
Robert Wood Johnson Medical School
University of Medicine and Dentistry of New Jersey

Jean Moore
Director, Center for Health Workforce Studies
University at Albany, State University of New York

Jon Parham
Communications Specialist, Office of Communications and Marketing
University of Arkansas for Medical Sciences

Bonnie Rogers, DrPH, COHN-S, LNCC, FAAN
Director, North Carolina Occupational Safety and Health Education and Research Center
University of North Carolina at Chapel Hill

Jeannette E. South-Paul, MD
Andrew W. Mathieson Professor and
Chair, Department of Family Medicine
University of Pittsburgh School of Medicine

Elaine B. Steen, MA
Editorial and Research Consultant
American Medical Informatics Association

Robyn I. Stone, **DrPH**
Executive Director
The Institute for the Future of Aging Services
American Association of Homes and Services for the Aging

Changes in the Health Workforce: Trends, Issues, and Credentialing

Stephen N. Collier

With workforce shortages in many health professions and occupations, educational institutions and policymakers are attempting to meet the challenging demand for additional personnel. Health professional associations, state governments, and higher education bodies all are involved, in one way or another, in trying to address the changing needs of the health care system. Rather than moving ahead in a coordinated and singular direction, however, there are many contradictory forces operating, often in competition with each other.

As noted by the late John H. Knowles, M.D., former president of the Rockefeller Foundation and the former general director of the Massachusetts General Hospital:

> The health industry is pluralistic, competitive, and essentially committed to the tenets of a laissez-faire ethos. It involves sharing by public and private interests with diverse power centers; it is based upon multiple decision-making mechanisms; it tolerates multiple conflicts (although they are increasingly frustrating to all concerned).[1]

The statement might have been made yesterday since little appears to have changed from when Knowles made it 30 years ago.

Much public and professional attention has been directed to medicine, the most influential of the health professions, and nursing, the largest health profession; far less attention has been directed to some of the other health professions and occupations, many of which are undergoing rapid change. It is these other health professions and occupations that are the primary focus of this monograph. Some of the more salient trends and issues will be examined with a view of their impact on health workforce dynamics. Health workforce regulation is a key element in understanding the health care environment, and various forms of credentialing is an underlying theme in most of the health professions, particularly those that are experiencing considerable change.

Health Care Credentialing

Credentialing as a means of regulating health professionals begs the question: Across the continuum of levels and kinds of training, what is the appropriate mix of health professionals and workers needed in the U.S. health system? Depending on how the question is answered, the influence of the various forms of credentialing will be seen in practice acts, educational curricula, and third-party reimbursement policy. Related to this fundamental question are a host of others concerning the effect of credentialing on quality of care, salaries and wages of health personnel, educational preparation, and rigidity or flexibility within the health system.

Credentialing is a general term. In the context of this publication, it includes not only the areas of professional licensure, certification, and registration, but also accreditation of educational programs. Several related issues will be addressed, such as elevation of the educational degree-level required for entry to clinical practice; scope of practice in some

professions; credentialing as a quality assurance mechanism; and the perspectives of various entities regarding many of the issues and trends currently manifest in the health system.

Credentialing dichotomies: the example of medical assistants

Comprising one of the fastest growing and evolving health occupations, medical assistants (MAs), can be used to illustrate some of the complexities and dichotomies inherent in credentialing of health personnel. MAs are largely unregulated but make up an increasingly significant part of primary care. They perform a variety of both administrative and clinical functions with the nature of those duties determined by the amount and type of training and any regulations specified by the state. The administrative duties may include activities such as patient-scheduling and insurance-billing; the clinical responsibilities may involve conducting basic lab tests, administering EKGs and x-rays, giving shots, and drawing blood.

The U.S. Bureau of Labor Statistics estimates that in 2004 there were over 387,000 employed MAs, with a projection that the employment would grow to 589, 000 by 2014, a 52% increase, making it one of the fastest growing occupations in the U.S. economy.[2] Of the current number, however, Tache and Chapman[3] indicate there are only about 55,000 MAs certified through either of the two national credentialing bodies for the field. It appears that holding certification does not add appreciably to one's salary, and many employers do not require certification for employment.

According to Tache and Chapman, three major factors have contributed to the increase in medical assistant positions: the greater complexity of office practices where physicians are increasingly relying on their staff for assistance; shortages in the nurse workforce and greater salaries and incentives for them in inpatient settings; and healthcare cost-containment, including personnel costs. The roles and duties that MAs carry out are permitted under the license of a physician who is responsible for their supervision. If MAs perform some invasive functions such as providing immunizations or exposing patients to radiation via x-ray procedures, some states require a limited permit, but as of 2005, no state licensed MAs. The duties of MAs, then, are largely unregulated.

According to June 2006 data from the Bureau of Labor Statistics, mean earnings for MAs were $26,843, placing them well below many other health personnel, including nurses, clinical lab technicians, and radiographers. Therefore, if MAs can perform many of the basic clinical procedures as well as front-office functions, it is much more cost-effective for employers to hire them rather than employ higher-paid health professionals to perform many of the same functions. In addition, rather than having to hire a clinical lab technician, a radiographer, and a larger number of nurses for a small- to medium-size primary care practice, an MA can function in a multi-skilled role and at a lower cost.

The training of MAs is not uniform. Many are trained on-the-job, either by physicians, nurses, or other health professionals. Educational programs exist in the form of short-term or one-year programs in vocational or technical schools, or in a two-year associate degree in a community college. Some educational programs for MAs in community colleges and elsewhere offer on a continuing education or credit basis modules in areas such as coding for billing or specialized clinical tasks. Thus, even within the MA field, specialization is occurring. The lack of consistent training may lead to calls for greater standardization and as a result, create a push toward greater credentialing.

Even though MAs can add flexibility to staffing and utilization, the broad and variable scope of practice and the inconsistency in MA training raise concerns about evenness in the quality of care they provide. The dichotomy arises, then, as to whether there should be more standardization and uniformity in their educational preparation and their scope of practice. Greater standardization would lead to incorporating various forms of credentialing, such as

requiring the MA to go through a formal education program and requiring that program to be professionally accredited in order to qualify the MA as eligible for certification. The state could require employers to hire only MAs who hold national certification if they are to perform certain tasks, or even ratchet up the regulatory process and license MAs.

With each step in increasing the regulation of MAs and their practice, the standardization would assuredly lead to higher costs and less discretion and flexibility for employers. This dilemma of how much to regulate through the various credentialing mechanisms is central to the on-going quality, cost, and scope-of-practice debate.

Trends in the Health Workforce

Health workforce demand

Every two years the U.S. Bureau of Labor Statistics produces a ten-year projection of employment in many areas of the U.S. economy, including most of the health professions and occupations. The most recent report is for the number employed in 2004 and projections for employment in 2014. It is anticipated that by 2014 health care will comprise 1 of every 5 new jobs.[4] Thirteen of the 20 fastest growing occupations in the U.S. economy between 2004 and 2014, according to the BLS, are in health areas.

As Table 1 shows, there is strong employment growth in many health professions. The profession with the largest growth in number of positions is nursing, which is the largest health profession. The occupations with the largest growth on the basis of percent change are found at the lower end of the training continuum and include home health aides and medical assistants. At a higher training level, strong percentage growth, between 30 and 50 %, is anticipated for physician assistants, physical therapists, and occupational therapists.

Physicians and surgeons are expected to increase by 24% during the period, but that represents a large total number—an additional 136,000 individuals. However, if positions due to growth in demand and replacements due to retirements and other factors are included, the number of additional physicians and surgeons by 2014 rises to 212,000.

The growth in the health sector was dramatically illustrated in a *Business Week* article in which it was pointed out that since 2001, 1.7 million new jobs have been added to the health care field.[5] It was noted that this number also includes areas related to health like health insurance and pharmaceuticals. With demonstrated growth in health care jobs and projections for large increases, what is of great concern to policymakers is whether the capacity of the educational system is sufficient to meet the growth demand.

Changes in the workforce generally occur much more rapidly than educational institutions can respond to and change. Whether modifying the number and size of programs or modifying the curriculum, colleges and universities are often more reactive than proactive. The health workforce is sensitive to changes in federal or state governmental policy, especially changes in reimbursement policy for services rendered.

Table 1: Health Workforce Employment 2004-2014

Numbers listed are in thousands of jobs

Occupation	Employment Number 2004	Employment Number 2014	Change Number	Change Percent	Total job openings due to growth and net replacements, 2004-14
Registered nurses	2,394	3,096	703	29.4	1,203
Physicians and surgeons	567	702	136	24.0	212
Dentists	150	171	20	13.5	46
Pharmacists	230	287	57	24.6	101
Optometrists	34	40	7	19.7	16
Physician assistants	62	93	31	49.6	40
Dental hygienists	158	226	68	43.3	82
Physical therapists	155	211	57	36.7	72
Occupational therapists	92	123	31	33.6	43
Respiratory therapists	94	120	27	28.4	57
Radiologic technologists and technicians	182	224	42	23.2	76
Clinical laboratory technologists and technicians	302	371	69	22.7	150
Medical Assistants	387	589	202	52.1	273
Home Health Aides	624	974	350	56.0	431

Source: Prepared by Stephen N. Collier using data from the Bureau of Labor Statistics: Industry output and employment projections to 2014, *Monthly Labor Review*, November 2005.

Even with current workforce shortages, changes in healthcare reimbursement policy can create dramatic change in employment and demand in all of the professions within a relatively short period of time. The federal Balanced Budget Act of 1997 placed a cap on reimbursement for the rehabilitation professions that became effective in January 1999. This created a substantial impact by depressing the employment market for physical therapists and other rehabilitation professionals. When potential students learned of the change in the employment market, applications to educational programs in the rehabilitation disciplines dropped. As a combined result of the Balanced Budget Act and the transition of many programs to the clinical doctorate programs, enrollments in physical therapy went from a high of 22,563 in 1997-98 to a low of 15,984 in 2003-2004. Correspondingly, graduates went from a high of 7,411 in 1999 to a low of 4,913 in 2004. Now the situation has changed once again due to suspending, and then reinstituting but

modifying the reimbursement cap, resulting in a strong employment demand for rehabilitation professionals. The projection is that graduates in physical therapy will rise to 6,154 in 2007, a 25% increase in just a three year period.[6] Physical therapy and other health areas are very sensitive to changes in reimbursement policy by the federal Centers for Medicare and Medicaid Services and other third-party payers.

Assuming the workforce projections by the Bureau of Labor Statistics are accurate, the capacity of educational programs in the health professions to meet the future requirements is seriously lacking. The high vacancy rates in the health fields in the early part of this decade have eased somewhat, perhaps creating a lull and less concern on the part of some in education, but the rates are still high in many fields. What is of particular concern to analysts and planners is the anticipated high rate of retirements from the workforce that are expected to begin around 2010. The health workforce is aging and due to physical and other aspects of the work, many employed in clinical roles retire from health employment earlier than their counterparts in other industries.

Comparing existing program capacity and level of graduates to the projected requirements by the Bureau of Labor Statistics reveals a wide gap in most professional areas. Even though educational institutions try to be responsive to workforce needs, there is a delay between when a shortage is apparent and programs are created or expanded to meet the need. For a program of two years or longer its professional component, regardless of the degree-level of the program, may take four or more years to go through the process: identify the needed financial resources; go through the approval processes by state higher education governing and coordinating board; recruit and hire faculty; obtain initial accreditation approval; plan the program and enroll students; and graduate the first students in the new or expanded program.

The collective existing program capacity across the nation in nursing and the allied health professions appears to be seriously lacking when comparing the enrollment and graduates with the 2004-2014 BLS projections.[7] Such a comparison is especially troubling considering that 2014 is just little more than six years away and it generally takes four or more years to begin to see the graduate output as a result of ramping up aggregate national program capacity.

Bifurcation of the workforce

One of the trends apparently occurring in the U.S. is the development of a bimodal workforce. This bifurcation is seen in greater numbers of individuals trained at lower levels, along with substantial increases in those who are prepared at higher educational levels. Concurrently, there is a decline, in a relative sense, of individuals prepared at the baccalaureate degree-level. While those prepared at the bachelor's level to enter the health workforce are also increasing in overall numbers, their growth is overshadowed by the large surge in individuals both above and below them on the educational continuum.

As Table 2 shows, over the last twenty-five years there has been a significant increase in the number of graduates in the health professions and related clinical sciences. The total number of graduates rose until the mid-90s and then declined somewhat in the following five years. The numbers have risen again to new all-time highs at most degree-levels other than the baccalaureate. The 2003-2004 graduation data are the most recent data available from the National Center for Educational Statistics (NCES).

Table 2: Graduates, Health Professions and Related Clinical Sciences

	1980-81	1990-91	1995-96	2000-01	2003-04
associate	NA	80,659*	104,775	84,656	106,208
baccalaureate	63,665	59,875	86,087	75,933	73,934
master's	16,176	21,354	33,920	43,623	44,939
doctorate	868	1,534	1,651	2,242	4,361
Totals	80,709	163,422	226,433	206,454	229,442

Source: National Center for Education Statistics, tables 247, 249, 250, and 251. Accessed at http://nces.ed.gov/programs/digest/ May 23, 2007. Tables prepared 2005. The occupations included may be found under the heading "health professions and related clinical sciences" in table 252.
*Associate degree graduates are for 1991-92, the first year reported, rather than 1990-91.

The NCES category of Health Professions and Related Clinical Sciences includes nursing, most of the disciplines that usually come under the allied health category, plus public health, and related fields. It does not include first professional health degrees in areas such as medicine, dentistry, and pharmacy, or graduates of the biological sciences and its subfields, such as microbiology or anatomy.

Some of the disciplines that in previous years had their entry level to practice at the baccalaureate level, such as physical therapy and occupational therapy, have transitioned to the master's or clinical doctoral level. While the preceding data represent a large number of disciplines, there have been some baccalaureate fields that have seen substantial increases, such as athletic training. Other areas that represent large numbers of practitioners, such as radiography (radiologic technologists), with 182,000 employed in 2004, and respiratory therapy, with 94,000 employed in 2004,[8] have not increased their entry to practice level or made significant changes in the proportion of programs that prepare individuals at the associate degree-level rather than the baccalaureate level.

What drives the push for higher or lower degree-levels? It is both the desire by the professional organizations and their members to advance their professions and the desire by employers to control personnel costs, which constitute the largest component of health care expenses. These opposing forces are moving the health workforce in divergent directions.

Other factors also contribute to moving the educational level of the health workforce in divergent directions. As pointed out in FutureScan,[9] an environmental scanning study by the American Society of Radiologic Technologists, advances in technology are creating a setting where some basic health-imaging procedures can be done faster, using smaller equipment, and at a cheaper price than in the past. This, in combination with more sophisticated and expensive technology, is causing the career ladder in medical imaging to expand in opposing directions.

Another corollary of a bifurcating workforce is increasing centralization of some components of the health industry. For example, in the clinical laboratory environment a movement toward larger and more centralized laboratories outside of the hospital setting has created a new economy of scale for conducting lab tests. In combination with advances in technological equipment, this has allowed many tests that previously had to be conducted in a primarily manual manner with higher-skilled personnel now to become more automated and conducted by individuals with less training. This centralization is also occurring in other areas of the health system, such as in the pharmaceutical industry, with the increasing use of mail-order pharmacies and automated equipment to assist in filling prescriptions. While

clinical laboratories employ credentialed clinical laboratory scientists (medical technologists) and clinical laboratory technicians (medical laboratory technicians), they are also employing non-credentialed workers who have other training backgrounds. Whether this is a trend and whether it will impact the accuracy and quality of lab results remains to be seen.

Increasing degree-levels

Concerns have been expressed by a number of employers and those in positions of educational leadership about increasing degree-levels in several health professions, sometimes referred to as *degree creep*. There is apprehension about the effect such increases will have on the cost of health care and other health system dynamics. The concern is heightened about those professions that have moved to the clinical doctoral level, which in some professions is also referred to as the professional doctorate or practice doctorate. The term *clinical doctorate* is used here to refer to them all. The clinical doctorate is distinguished from the research doctorate by its emphasis on clinical practice.

Recent years have seen the emergence of two types of clinical doctorates—those that through the accreditation process for educational programs have changed the entry-into-practice level for new graduates, and those that constitute advanced practice beyond the entry level. Examples of those that have elevated the entry-into-practice for new graduates are the PharmD in pharmacy and the AuD in audiology. There are also professions that have seen a shift in degree-level without a mandate to have the entry-into-practice at the doctoral level, such as the DPT, the doctor of physical therapy. Even in the absence of a mandate from the profession or its educational program accreditation group, there has been rapid movement to the clinical doctorate due to market forces of educational programs competing for potential students. In physical therapy, the move has been particularly swift, moving from 19 DPT, 184 master's, and 9 baccalaureate accredited programs in 2000 to 179 DPT and 31 master's accredited programs as of July 2007.[10]

The DNP, the doctor of nursing practice, and the professional doctorate in clinical laboratory science are two examples of advanced practice doctorates. While the DNP degree is not an entry-to-practice degree, it will be required to become a nurse practitioner, which has separate licensure, thus making it required to practice at that level. Some other practice doctorates, such as those in clinical laboratory science and the clinical doctorate in occupational therapy, are not required for advanced practice. There is not a separate licensure process for advanced practice in those fields, although in these and other professions there are certification processes in place for specialized practice with the profession.

Amidst the controversy brought about by the increased degree-level are various pros and cons coming from a variety of parties--the professional organizations, employers, and academicians and educational leaders outside of the professions, including regional accreditation agencies. Those who support the move to advanced degrees point to an expanding knowledge base, technological progress, and the fact that educational programs have already expanded the program length and credit hours required for the degree beyond that required for comparable degrees in other fields.

Some allied health fields that exist predominantly at the associate degree-level also have programs at the baccalaureate level—for example, respiratory therapy and radiologic technology. Some, such as nuclear medicine technology, have seen a proportional shift toward the bachelor's degree over the last several decades, but the movement has been gradual. While some leaders within these disciplines advocate moving the entry-to-practice to the baccalaureate level, there does not appear to be widespread acceptance for such a change.

Several health fields that in recent decades have been primarily at the bachelor's degree-level have transitioned to the master's degree. Physician assistant studies that were predominantly at the bachelor's level as little as ten years ago are now primarily at the master's degree-level. Similar to what is happening with the associate-to-baccalaureate transition, some fields in other professions that are mainly at the baccalaureate level also have accredited programs at the master's degree. Clinical laboratory science is one such profession, and others, such as programs for the health information administrator, are strongly considering requiring a transition from the bachelor's to the master's level.

While instances of elevating the degree-level within a field have been occurring in a number of disciplines across the decades, in the last ten to fifteen years the more recent trend--a movement to the clinical doctorate in a number of professions--has been particularly troubling to some. Those who oppose the clinical doctorates state that the move to the doctoral level is professional aggrandizement rather than a response to market demand. Further, there is a general belief that moving a profession to the doctoral level will create greater workforce shortages, increase the cost of education for both students and the public, and create public confusion with the introduction of a number of new types of "doctors".

A common view held by employers is that increasing the degree-level and lengthening the educational program will cause a reduction in graduates and create or exacerbate a shortage of workers. Analysis of data for pharmacy and physical therapy that have moved to the clinical doctorate indicates that moving to a higher degree-level does not decrease the number of graduates except during the short-term transition of a program from one level to another.[11]

A program making the transition from two years of professional training, for example, to three might not graduate a class during the year of extending the length of the program. Not all programs nationally make the transition during the same year, so there may be a reduction overall for several years during the major part of the transition period within a profession. However, data for pharmacy and physical therapy indicated increased student interest in the programs at the higher degree-level, and the programs have maintained or increased their class capacity over the previous degree-levels.[12]

While pharmacy and physical therapy have seen increases in student demand for admission to programs and increases in graduates following the transition period to a higher degree, there may be exceptions where the new and higher degree is mandated for accreditation, such as with the AuD in audiology and the DNP in nursing. Such requirements to move to the clinical doctoral level may pose problems if the institution where the master's degree program resides either does not have doctoral-granting authority or, even if it does, chooses not to make the transition due to philosophical concerns about clinical doctorates.

Employers are concerned that increasing the degree requirements of any discipline will make staffing more costly and difficult. Since third party payers reimburse for the services provided and not the degree held by the provider, it is not possible to differentiate between the services provided by professionals who hold several different levels of degrees.

Educational leaders outside of the professions being elevated have concerns that the new degree programs have not been adequately justified for a move to a higher level. Some regional accrediting agencies have also expressed trepidation, particularly in regard to the creation of the clinical doctorates. The North Central Association of Colleges and Schools created a Taskforce on the Professional Doctorate. Among its findings: "While the various

professions have defined the nature of each program, there seems to be no obvious consistency among the various degrees as to length of study; rigor, substance, or content of the program; or the ultimate utility of the degree to the person who earns it."[13] Even though specialized or professional accreditation is the primary governing mechanism for the clinical doctorate, the regional accrediting agencies also can play a role.

State higher-education governing and coordinating boards also become involved since they have approval authority for new programs. The conversion of a program from a master's to a doctoral level can constitute a substantive change in an institution's mission if no other doctorates are offered in the institution proposing the change to a clinical doctorate. This has, in fact, posed a problem in many states where the institution proposing the change does not have existing authority to grant a doctorate of any kind. When the change to a clinical doctorate is mandated by professional accreditation, such as with the AuD, it places into jeopardy the continuation of the professional program. As a result, a number of audiology programs are closing. Also, some research universities that do have doctoral granting authority have chosen to close their program rather than convert it to a clinical doctorate due to a concern for the increased program cost or a philosophical opposition to clinical doctorates.

Growth of the frontline workforce

One of the often overlooked components of the health workforce is what is increasingly termed the frontline workforce. Depending on which groups are included, the frontline category constitutes a large proportion of the overall health workforce—4.7 million out of a total of 12.3 million individuals employed in healthcare, according to one source.[14] The defining criteria used in the report are that the education is generally at the bachelor's degree-level or below, with annual wages below $40,000, and considerable direct patient contact.

Such criteria would include a number of health workers prepared at the associate degree with somewhat stringent credentialing criteria, but the majority of workers in the frontline grouping are individuals who have minimal levels of training, much of which is short-term or on the job. A large portion of the frontline workforce consists of home health aides, nursing aides, and related workers who are employed in hospitals, long-term care facilities, and agencies providing care to individuals in their homes.

This collective set of occupations, sometimes called *the auxiliary workforce*, is characterized by certain distinguishing issues: relatively low wages and benefits; subcontracting and temporary workers; multi-skilling; high stress levels; lack of empowerment; and, in some instances, unionization.[15] With diverse skills, work settings, and training levels, the frontline workforce as a group is experiencing shortages, high turnover, and projected high growth. The aging of the U.S. population and the increased need for lower-level services to care for the aged are fueling much of the demand for additional workers. Increased demand for additional personnel and services to provide for this population group is present for most health professions, but it is especially true among the frontline occupations.

With some groups such as home health aides and medical assistants expected to grow by more than 50% between 2004 and 2014, growth in other frontline groups may be less, but still significant.

> This frontline workforce is growing rapidly; collectively it is growing faster (32.6%) than the growth rate of all health and health care occupations (28.3%), and significantly faster than the growth rate for all occupations (14.8%) in the United States workforce (Bureau of Labor Statistics, Occupational Employment Statistics,

> 2003)…Not all occupations document comprehensive demographic information; however, existing data do indicate that 80% of frontline workers in the occupations included in the study are female, and 32 percent are African American or Hispanic.[16]

If one looks at the provision of health care services as a continuum from lower-level care to higher level, with more sophisticated care provided by highly trained individuals, the realization of the intended outcome frequently depends on effective treatment at each level along the continuum. A simplistic example: if a physician prescribes certain drugs to treat a condition, the effectiveness of the care is dependent on the patient taking the medication at the times and in the way it is prescribed.

It is widely known that patient compliance can be a big problem, particularly with the aged, and may be compounded due to the patient's misunderstanding or cognitive status. Having home health aides and others assist with patient compliance is very important to achieving the desired result. The same may be said for a range of monitoring or treatment procedures that end up being dependent on the effectiveness of the frontline worker. If each health professional or worker is seen as a link in a chain, and effective outcomes are dependent on each link performing in an appropriate manner, then whichever is the weak link may compromise the quality and effectiveness of patient care. Due to limited training, high turnover, and lack of coordination among the various parts of the health system, frontline workers may frequently end up being the weak link in the chain. Yet they represent in many ways the foundation for quality care and are becoming an increasingly important component of the health system. Greater attention, more supportive policies and greater integration of the frontline workforce into the overall health system are essential if quality health care is to be provided.

Proprietary education

Proprietary, or for-profit, education has played a role in preparing individuals for the health workforce for many years. In the past, most of the for-profit educational activity has been directed to those prepared in short-term, post-secondary training programs of less than two years with minimal certification processes involved. The last decade or so has seen a significant increase in the number of proprietary health-professions programs at higher degree-levels.

From off-shore medical education programs primarily in the Caribbean area, to major increases in proprietary PharmD pharmacy programs in a number of states, for-profit education has expanded greatly. Professional education in physical therapy, physician assistant studies, occupational therapy, nurse anesthesia, and even dentistry have been created to meet the demand for needed health professionals.

Proprietary education in the health areas has been on the rise due to a very positive employment outlook, high salaries in many fields, and a shortage of educational programs in the not-for-profit public and private spheres of higher education. Proprietary schools can charge higher tuitions than in the non-profit educational sector due to market demand. Anecdotal comments by employers indicate that in most instances individuals prepared in professional programs at the graduate level fare as well as those coming from public and private non-profit institutions. Proprietary institutions have developed economic models that allow them to conduct expensive health-professions programs and still make a profit. They are able to do this in some cases by limiting their research mission, which is a significant component of non-profit programs. Thus by avoiding much of the expensive research enterprise, their cost per student is lower.

While for-profit education in the health professions has been around for a number of years, its growth appears sizeable in just the last several years, especially in pharmacy and some of the professions that frequently come within the allied health category. Within four-year colleges and universities, which also include graduate and research institutions, in 2003-2004 there were 28 for-profit institutions offering allied health programs (e.g., physical therapy, occupational therapy, physician assistant studies). This number rose to 37 institutions in 2005-2006.[17] The continued growth of proprietary education in the health professions can be anticipated as long as jobs are plentiful, there is a positive career outlook, and salaries remain attractive.

Gender composition

Nursing, most of the allied health professions, and the frontline health occupations are populated predominantly by women. Even though relatively good progress has been made to recruit more men, these fields remain principally female. By contrast, the traditional doctoral-health professions have historically attracted more males, but that is changing. Not only is this gender-shift true for the health professions, but it is also true for higher education in general at undergraduate, graduate, and professional education levels. Women comprise 57.2 % of the more than 17 million students enrolled in colleges and universities in 2004, including graduate and professional fields.[18]

When viewed over the past approximately thirty years, the shift is dramatic for both graduate and first-professional enrollments (Table 3).

Table 3

Graduate/First-Professional Enrollment: Graduate and first-professional enrollment in degree granting institutions in 1976 and 2005 and percentage increase between the two years, by sex

(Enrollment in thousands)

	Graduate Enrollment			First-Professional Enrollment		
Characteristic	**1976**	**2005**	**Percent Change**	**1976**	**2005**	**Percent Change**
Total	1333	2186	64	244	337	38
Sex						
Male	714	877	23	190	170	-11
Female	619	1309	112	54	167	207

Source: Trends in Graduate/First Professional Enrollments. The condition of Education 2007.

U.S. Department of Education

"Between 2000 and 2005, first-professional enrollment increased 17 percent for females and 4 percent for males. Women are projected to have exceeded 50 percent of total first-professional enrollment for the first time in 2006."[19] The results of this trend are reflected in the most recent available graduation data (2003-2004) for professional degrees, as shown in Table 4.

Table 4

Earned Degrees, First-Professional Programs 2003-2004

Professional Degrees	Men	Women	Total
Dentistry	2532	1803	4335
Medicine	8273	7169	15442
Optometry	543	732	1275
Osteopathic Medicine	1567	1155	2722
Pharmacy	2711	5510	8221
Podiatry, Podiatric Medicine	221	161	382
Veterinary Medicine	569	1659	2228
Chiropractic	1868	862	2730
Law	20332	19877	40209
Theology	3511	1821	5332
Other	42	123	165
All Fields	42169	40872	83041

Source: U.S. Department of Education

One of the commonly mentioned features of women in the health professions is that due to child bearing/raising and other factors, they tend to work fewer hours per week on average than males. If that is so, then more health professionals are needed to achieve the same output as in the past. What is also being observed, however, is perhaps a generational shift in values and attitudes whereby men in professional roles appear to be willing to forego higher salaries for more free time. The implication of a continuing gender-shift in the health professions, along with a possible shift in career expectations and values for both men and women, merits further study to determine the full impact on the future health workforce.

Workforce Issues

Root causes of workforce shortages

There are many factors that contribute to shortages of personnel for the health workforce. Some of the factors reside within the education sector; some within employment characteristics and the work setting; some within the professional organizations, particularly as they influence and are tied to personnel credentialing mechanisms; and some within governmental and other third-party payer policies. Just as there is not a one-size fits all solution, the nature of the problem differs according to the level of educational preparation.

For the frontline workforce, the factors influencing a shortage of workers are found in poor pay relative to other occupations requiring the same level of training. The jobs are often physically and emotionally stressful with little assistance for dealing with the stress. The jobs provide poor-to-no career-advancement, thus creating high job turnover or workforce attrition. In turn, this creates the demand for many additional entrants into this portion of the workforce to address not only job growth, but considerable job replacements.

At the post-secondary education levels of one-year technical training programs and two-year associate degrees, in many fields there are too few applicants who are qualified based on their preparedness to undertake the academic rigor of the curriculum. This results in high attrition in many programs. While there are poor comprehensive data to document attrition, individuals in North Carolina have studied the situation in that state and found great variability in attrition rates, ranging from 0 to 80%. The variability occurs both in the level and type of program. For example, there was a 10% attrition rate for medical

technologist programs (bachelor's degree) versus 47% for the medical laboratory technician (associate degree). The rate was 30% for respiratory therapy programs and 22% for radiologic technology programs.[20] Poor high school preparation or poor aptitude, particularly in science and math, have frequently been pointed to as prime reasons for attrition from health occupational programs.

At higher levels of education involving many professional programs, the time required to reach fully credentialed practice may be an impediment to many. An exception, however, appears to be in the newer clinical doctorates, such as in pharmacy and physical therapy where extending the education to the clinical doctoral level is correlated with increased student demand for the programs.[21]

Related to the conduct of professional education is the cost of the educational program, which frequently results in high levels of debt upon graduation. Such dynamics are especially prevalent in medicine which has a very elongated educational process, but it is also true, even if to a lesser extent, in many other professional areas. For individuals who desire to enter the medical profession and have the appropriate aptitude but do not wish to invest as many years in education as would be required, other alternatives such as physician assistant studies are appealing, and as a result, student interest in such programs is very high. Earning potential, authority and autonomy are certainly less than if one were a physician, but the work is still attractive, financially rewarding, and the length of the educational program is more acceptable to many who either cannot or choose not to pursue a lengthier educational program.

Professional organizations can either knowingly or unknowingly contribute to the shortage of workers. Because of their link to credentialing standards—especially personnel certification and program accreditation, but also including licensure—they exert considerable influence on workforce dynamics. The audiology profession's mandating the clinical doctorate for the entry-to-practice degree by only accrediting programs at that level after 2012 is an example of zealous credentialing via control of program accreditation. With the closing of some programs, the number of graduates nationally will be reduced, probably resulting in a shortage. The awareness of such shortages by colleges and universities that can grant a doctoral degree may stimulate new programs and graduates, or there may be unintended consequences. The ability of health professional organizations to dictate such changes without effective counter balances gives them the ability to be overly profession-centric to the potential detriment of health system effectiveness and optimum benefit to the public.

The root causes of health workforce shortages are varied, complex and intertwined. Whether normal free market forces have the ability to correct some of the imbalances, even with normal waxing and waning in supply and demand, is open to question. Additional governmental regulation is a possible option, but incentives provided by government or others are generally seen as preferable alternatives in our pluralistic economic and political system.

Who will deliver primary care?

The effective delivery of primary care is considered to be essential to the health of the nation. Various health professionals are involved in the delivery of primary care—e.g., physicians, nurses, nurse practitioners, and physician assistants. However, the cornerstone of primary care is patient-care delivered by physicians. While nurse practitioners and physician assistants are involved in both primary and specialty care, they are becoming a larger component of primary care, partially due to health system necessity.

A recent report indicates that between 1996-1997 and 2004-2005, the percentage of patient care physicians delivering primary care dropped from 38.9% to 36.7%, a statistically significant reduction.[22] The report also raises concern about the potential for reductions in the primary-care physician workforce due to declines in income relative to specialty physicians and the flight of male physicians from primary care. The males are being replaced partially by increases in primary-care female physicians, but the latter work fewer hours per week on average than their male counterparts. "If real incomes from primary care physicians continue to decline, there is a risk that the exodus from primary care will accelerate and trigger or aggravate a workforce shortage."[23]

In some states, previous gains in the ratio of primary care providers to the population are being eroded. For example, in North Carolina:

> [G]rowth in the number of primary care providers per population is decreasing and is unlikely to keep pace with the growing population in coming years. Primary care providers are not well distributed across the state. In many counties, the supply of primary care providers to population is getting worse…While the scope of primary care practice has increased, inflation-adjusted reimbursement for primary care services has decreased over the last ten years. As a result, fewer physicians, physician assistants, and nurse practitioners are choosing to enter primary care fields, instead moving towards specialization. Fortunately, osteopathic physicians, physician assistants, and nurse practitioners are experiencing rapid growth and offer some opportunity to address the shortage of allopathic physicians entering primary care.[24]

Basic health screening, such as blood pressure-monitoring and diet and exercise recommendations, is increasingly being done on an ancillary basis by a larger proportion of non-physician health professionals, as well as those outside of direct patient-care services. As a minimal form of non-prescriptive primary care, fundamental procedures also act as a referral mechanism into more traditional primary care. As health professionals other than physicians expand their scope of practice, there will be an increase in some primary care functions performed by those individuals. And as growth in the nurse practitioner and physician assistant workforce continues, they can be expected to assume a larger role in the provision of primary care services.

The health workforce as state economic development

Although all states are concerned about having adequate numbers of health personnel to provide services to residents of the state, few are conducting any type of comprehensive analysis of the health workforce in their state. Nevertheless, many states are becoming much more aware of the importance of the health workforce to the economic viability of the state.

A number of states have periodically conducted studies to assess the ability of the educational system to meet the need for health-professions and -occupations graduates,[25] and most states monitor and analyze specific components of the health workforce, whether in relation to primary care and associated shortage areas, or data related to specific professional groups such as physicians and nurses.

One example of the attention the health labor force is receiving regarding its relationship to the state's economy is found in a 2006 report in Oklahoma from the Governor's Council for Workforce and Economic Development.

> As one of Oklahoma's most important industries, healthcare continues to be a key element in the state's ability to recruit and retain new and expanding businesses…In 2004, health care was the second largest employing industry in Oklahoma, comprising 14% of the state's total employment.[26]

Even when health workforce studies are conducted by states, they tend to be a "snapshot" and focus on the status at a given point in time. Few provide complete and continuous monitoring. One state that perhaps comes the closest to having an ongoing health-personnel surveillance system in place is North Carolina. The Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill maintains the North Carolina Health Professions Data System.[27] As a result of the research and analysis done in the state, it has been shown that between 1990 and 2005, North Carolina lost 255,971 manufacturing jobs, but gained 230,476 jobs in health care and social assistance.[28] Through such studies and an emphasis on scrutinizing the status of the health workforce in the state, North Carolina is often pointed to as a best practice model for other states.

Whether a result of episodic or periodic studies, or continuous monitoring of components, or the whole of the health workforce, the magnitude and importance of any state's health workforce to the economic clout of the state is becoming clearer in the minds of state governmental officials and policymakers. As is true with almost all aspects of state-level behavior, there is considerable variance in the extent and nature of attention and action across the fifty states.

Where are We Headed? Implications of the Trends and Issues

Just as the U.S. health system is characterized by multiplicity with no single point of control or influence, the trends that are occurring are frequently dichotomous. There is an increasing concern for quality, which would imply stricter standards and credentials for those employed in health care. However, the occupations with the greatest growth are those that have lower levels of training and either weak or no credentialing. Part of this increase at the lower levels is to contain cost and create greater efficiency among the higher-trained professionals. Nevertheless, without effective coordination and communication across disciplines in inpatient and outpatient settings, both quality and efficiency may be compromised.

With some health professions moving to a higher degree-level for entry into practice, and others considering making such a move, along with an extended educational process comes increasing overlap in scope of practice among the professions. Moving to higher degree-levels also creates more advocacy for greater independence in practice. Whether this provides greater access and service to the public, or just greater friction and potential dysfunction within the health system, depends on one's perspective. The movement toward higher degrees, either for entry into practice or for advanced practice, is something that will continue. Its overall impact on access to services, quality of care, and cost-effectiveness, especially in view of an increasingly bifurcated health workforce, remains an open question.

Health professional organizations strive to perform a dual role of serving the public and advocating for the profession and its members. As a natural consequence of organizational dynamics and professional pride and desire, each profession attempts to expand its market share relative to the other health professions and expand its scope of practice. The most common way of justifying an expanded scope of practice is to increase the amount of education within the profession.

Higher education, particularly at the graduate and professional level, has seen a steady increase in the percent of women receiving degrees. A number of health professions that once had a clear predominance of men now have a majority of women graduates. Older standards of productivity are changing for both men and women health professionals who want to limit their work hours and achieve a greater balance in life. Consequently, there will be a need for even larger numbers of health professionals to conduct the same units of work. As a result, the total costs of education also will rise in order to graduate more individuals to conduct the same units of work.

States and their postsecondary education systems are facing dichotomies of realizing the importance of the health workforce to the state's economy, both in terms of having an adequate health workforce and also job-creation and the concomitant effect on economic vitality and tax revenues, as well as the higher-than-average costs to educate health personnel relative to many other types of graduates. With many competing demands for state dollars and, in many cases, greater increases in nondiscretionary areas of state spending, fewer dollars in a relative sense may be available for education, especially for the higher-cost health professions. One result is likely to be continued growth of health programs in proprietary education institutions, at least as long as workforce shortages and high salaries remain.

At the lower end of the employment continuum in health care, the frontline workforce is likely to continue to experience worker stress and high personnel turnover characteristic of some other lower paying jobs. To the extent that other areas of the U.S. economy are strong, the personnel turnover may increase as workers move from one environment to another, seeking higher pay and a less demanding work setting. With increased personnel turnover comes the higher cost of training, retraining and challenges to work-team cohesiveness. Due to pressures to contain health care costs, particularly personnel costs since they constitute the largest component for overall cost, additional hiring of non-credentialed or minimally credentialed personnel is likely to occur, including greater numbers of foreign-born individuals who are willing to immigrate to take the lower-paying jobs.

Education has always been seen as a key lever not only in providing adequately prepared graduates, but in providing a strong influence on professional identity and advocacy. Perhaps it is only natural that much focus within educational programs is profession-centric rather than collaborative with other health professions to form an integrated and highly functional health system truly indicative of the term *system*. More attention by all of the health professions to system characteristics and improvements, including multi-professional collaborative practice, is needed if quality, access and cost are to be brought into better balance.

Regulation of the health system consists of both governmental and voluntary processes. While health care reimbursement is heavily influenced by governmental action, the regulation of health personnel, even for licensure, is essentially a quasi-voluntary process controlled by the professions being regulated. The ability of the professions to govern themselves and balance their self-interest with the public interest is an issue of continuing debate. Yet because of the pluralistic nature of American governance, there is a reliance on many voluntary and self-regulating mechanisms.

Since the health professions exert strong influence in a competitive environment, there is an imbalance between the competing interests of the various professions and effective mechanisms to represent the overall public interest. Many believe a better balance is needed. Rather than rely simply on government at either the state or federal level to serve

as the arbiter or impose greater control, most within the health care establishment would prefer the continuance of predominantly nongovernmental processes to address whatever changes are needed. While governmental intervention will occur in a variety of ways, within the provision of health care, non-governmental methods in addressing the fundamental question of "who will be allowed to do what to whom" seem to be more consistent with the American way of addressing such issues and have the potential to provide knowledgeable self-governance within health personnel regulatory mechanisms.

Organizations that span multiple health professions are able to provide a multidisciplinary perspective and have an important role to play in addressing health policy and encouraging needed action in education, practice and governance. The Association of Academic Health Centers is such an organization, bringing together leaders from across the professions and service delivery settings. The Association can be instrumental in providing an appropriate forum for needed dialogue and working toward a more desired balance among the many forces that affect the nature and capacity of the health care workforce.

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Information and Communications Technology and the Future Health Workforce: Transformative Opportunities and Critical Challenges

Don E. Detmer and Elaine B. Steen

Introduction

Will information and communications technology (ICT) improve the efficiency and extend the capacity of the health workforce in coming years? Yes, but the potential for increased efficiency will be tempered by shifts in workload for some health professionals and in some instances additions to workload due to attempts to enhance quality through new ICT applications. Further, far more significant changes in work processes and culture must accompany ICT implementation if anticipated efficiencies are to result. Thus, it is impossible to predict precisely when major efficiencies will become widespread.

In the clinical domain, such improvements are not likely to occur until robust information technology that includes decision support is more widely diffused throughout clinical settings and until the workforce undergoes a transition period during which it adapts to the disruptive capabilities of ICT. Efficiencies may appear sooner in the research domain than in the clinical domain, but in some instances this will depend on access to patient data and new approaches to clinical research being embraced. Public health efficiencies will depend in large measure on availability of improved databases that will flow from improved clinical-care information systems and the infrastructure to enable that flow. Some new education models can be implemented independent of changes in other domains, but other education changes will be tied directly to the ICT-driven evolution of the clinical domain.

Achieving these advances will depend on much more than the diffusion of technology. A set of pivotal factors will ultimately determine whether the health sector is capable of leveraging ICT to transform its work processes as other industries have done. This paper presents a vision of an ICT-enabled health sector through a series of scenarios, explores how health information technology may affect the efficiency and capacity of the health workforce, identifies the critical challenges that must be confronted for the health workforce to extract the benefits of ICT, highlights several initiatives of the American Medical Informatics Association (AMIA) focused on the health workforce, and recommends actions for individuals and organizations involved in shaping and supporting the future health workforce.

What Will an ICT-enabled Health Sector Look Like?

Other industries that have utilized ICT heavily (e.g., travel, banking, and retail) have each reformed their work activities so that the "face" of the industry appears more simplified for the consumer or non-expert users, and efficiencies can be gained. Consider on-line airline booking and customer check-in as examples. These "gains" utilize the time of customers but also give them power (i.e., the opportunity to make changes themselves and to compare alternatives quite transparently). Health care is slowly heading in this direction with electronically integrated personal health records. (See below). However, making the face simpler for the patient may require making the computer software "behind the screen"

more complicated and thus may further complicate the systems to which clinicians must adapt. Evidence suggests that competitive pressures will force these changes despite the characteristically resistant nature of the health care workforce and its heavily regulated environment that often impedes innovations (Rouse, 2007).

The ICT-enabled health sector will be characterized by four important trends:

- Increased communication and collaboration, particularly with respect to patients and informal caregivers
- Integration of previously distinct disciplines and fields
- Democratization of knowledge accompanied by shifts in responsibility
- Greater capacity to manage ever-increasing volume and sophistication of data and knowledge

Each of these trends is evident in the following scenarios for the four domains of the health sector: clinical care, research, public health, and education. Within clinical care we must consider both patients and health care professionals; thus, the vision for the future begins with an examination of how ICT supports patients and the public.[1]

ICT-enabled Patients and the Public

The most significant health ICT application for patients and the public will be the web-enabled, integrated personal health record (integrated PHR), or patient-shared electronic health record (EHR). Depending on the patient's willingness to share information with clinicians and vice versa, PHRs provide tools that help people collect, organize, and store their health information (AMIA, 2007a). By linking patients to their health information and other resources, integrated PHRs strengthen patients' ability to actively participate in their own care, including its monitoring and outcome-tracking. Basic information available includes medical history, medications, medical and emergency contacts, outpatient and hospital visits, allergies, immunization tracking, insurance records, and health-related alerts and reminders. More advanced PHRs offer additional functions such as (Tang et al., unpublished):

- Access to medical records with capacity to offer amendments to add information, such as alternative treatments being pursued by the patient, or correct misinformation or incomplete information
- Appointment scheduling
- Patient-clinician secure email
- Decision-support tailored to both clinician's needs and patient's circumstances and needs
- Retrieval of laboratory and other tests
- Prescription refills
- Drug-interaction checking
- Interactive health-risk profiling and patient education resources
- Prevention and wellness reminders
- Home-monitoring with recording or tele-reporting of data to the record
- Claims and payment processing
- Insurance eligibility and benefit review
- Access to information by other approved individuals (i.e., informal caregivers)

[1] See appendix A for examples of ICT found in the literature that informed the clinical domain scenarios.

Integrated PHRs must at least be capable of electronic data exchange with the disparate sources of relevant health information and be fully integrated with their health care provider communications and records. Further, for integrated PHRs to have their full impact, patients/public will need to be associated with a primary care practice or care system that is committed to health promotion, chronic-care management, patient-centered care, and information technology. These practices demonstrate their commitment through routine electronic communication to patients and among the multiple health professionals involved in the patient's care. [2]

In some of these sites, prior to regularly scheduled appointments, the practice sends an electronic questionnaire targeted to the patient's existing conditions and health history. Based on patient responses and monitoring results (see below), the clinician can order lab or other tests prior to the scheduled visit. Routine lab services are offered in local pharmacies for patient convenience and lab results are sent directly to EHRs in physician offices. Results of tests ordered during a visit can be forwarded to the patient via e-mail after review by her primary care clinician with an alert if follow-up action is needed. When a treatment or intervention is under consideration, a patient can review relevant literature through links in the integrated PHR, access decision-support tools that allow the patient to assess alternative treatments based on personal preferences, and review all electronic information with a health coach.

Patients with chronic conditions that require routine monitoring may be able to take advantage of implanted (e.g., intelligent implantable devices such as pacemakers, defibrillators, and insulin pumps), worn (e.g., like a watch), or environmental monitors that send data to a patient's cell phone, which in turn sends the data to the patient's integrated PHR and the practice's EHR. Heart rate, temperature, respiration, blood pressure, blood oxygen, perspiration, physical location, physical orientation, and movement can all be tracked as needed. The integrated PHR presents the data in graphical form so that a patient can see if she is responding to treatment. Individuals can easily document symptoms over time (e.g., migraine headache occurrences) and can request prompts to remind them to do so. Primary care professionals communicate regularly (usually electronically) about monitoring results, medications, as well as diet, exercise, or other nonmedical factors that affect the patient's health. Patients can record any unusual but not urgent events immediately via email to the primary care office or their integrated PHRs.

Patients receive email reminders from their pharmacy if they have let a prescription lapse or missed a refill date. If patients do not order refills, the pharmacy notifies the primary care office. Primary care clinicians and pharmacists can help patients who have difficulty remembering to take their medicines by scheduling automatically generated reminders in the form of text messages, telephone calls, or emails.

ICT-enabled Clinicians, Including Allied Health Professionals

Clinicians have access to "a pre-computed intelligent integration of the individual's health information, together with the subset of biomedical evidence relevant to that individual" (Stead, 2007). Patient records are updated regularly from a range of sources–-the patient's integrated PHR, remote-monitoring, pharmacy, lab, other health care providers (e.g., physical therapists) so that a clinician has a comprehensive view of patient data. The system flags missing diagnostic test results. Monitoring data received by the primary care practice are processed by an algorithm that flags patients who need attention. Primary care

[2] Models of such care exist today, for example, at Harvard Partners (PatientSite) (Barnett, 2007).

staff follow up with the patient or designated family member via a patient's preferred method. If monitoring data do not arrive when expected, primary care professionals receive a message so that assessment can be made to determine if there is a battery outage or equipment failure, or if the patient is out of range or is at risk. As a result of the stronger connection between the patient and primary care practice, the workload of the practice is redistributed. There is a decrease in office visits and an increase in telephone calls and emails (Kilo, 2005).[3]

Decision support is available in a variety of formats: alerts triggered by patient data; prompts for preventive measures embedded in patient records linked to ordering medications, diagnostic tests, or therapeutic interventions; algorithms that rapidly sort molecular information about a patient's particular condition (e.g., tumor) and match the information to the treatment most likely to be effective; and clinician-initiated queries of scientific literature and databases that contain recent research findings. Since clinicians will often be coaching patients through the decision process, evidence is presented "in a way that lets the clinician and the patient—with very different learning styles—make the right decisions" (Stead, 2007).

The clinician's information system also provides the capacity for a clinician to query the database of all patients in a practice to proactively plan for population care (Langley and Beasley, 2007). For example, a clinician may seek to identify all diabetes patients in the practice who have not had an eye exam during the past 12 months. Once those patients are identified, the practice can follow up with the individual patients and determine why the eye exams were missed so that this service gap will be avoided in the future.

In other care settings, intensive care systems integrate voice, visual images, telemetry data, and summary patient history in digital form and enable intensivists to monitor dozens of patients (perhaps more than 100) in remote ICUs by coordinating the activities of on-site ICU nurses (Goldsmith, 2004a). These applications will also enable patient management in a wide range of inpatient units and allow large groups of patients, previously hospitalized for monitoring, to be monitored in real time in the home and community (Goldsmith, 2004a).

Telemedicine combined with robust patient records and decision support expands access to a range services including both diagnostic and long-term monitoring for patients in rural areas or patients with limited mobility (e.g., psychiatry, ophthalmology, management of chronic illnesses such as pain, diabetes, depression, and COPD). These advancements save travel time and expenses for rural residents and reduce missed work. Telemedicine presenters play a vital role in the effectiveness of this service. These highly skilled professionals (e.g., nurse practitioners) acquire the necessary elements of the medical history and clinical findings, present needed information to the telemedicine-consultation specialist, serve as the hands of the distant consultant, and act as a patient advocate. Radiologists read images from a central location in a region and easily obtain second opinions from colleagues across the country. Hospitals with heavy demand for image-reading take advantage of 24-hour services through global outsourcing.

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[3] "At GreenField Health, we have used both telephone and electronic contact extensively to explore how patient management might be more appropriately designed. Approximately 80 percent of our patient contacts occur via phone and e-mail, with only 20 percent occurring in visits. Since visits require more time, that translates into approximately half of a clinician's time being dedicated to visits and half to phone and e-mail contact." (Kilo, 2005).

ICT-enabled Public Health
Public health officials will be more closely linked to the clinical domain due to the smooth flow of relevant selective data from clinical records to regional, state, and national public health databases. Incoming data will be automatically screened and patterns of disease or symptoms of concern will be flagged (McMurray et al., 2007). As a result, public health professionals will be able to provide immediate information to health care providers and patients when appropriate. They will also be able to trace data back to original records when more information is needed on specific patients.

ICT-enabled Research
Researchers, clinicians, and patients will all benefit from a planned infrastructure and formal linkages that enable integrated research such as the National Cancer Center's cancer Biomedical Informatics Grid (caBIG™) (McKinney, 2007). With more interoperability standards, researchers can share data and research tools. Comprehensive directories of research, currently underway, as well as recent findings will foster collaboration among researchers and speed diffusion of verified knowledge into practice. These developments will not only support more efficient research in the United States, but will also enable more international collaboration, and will support international health-services research.

The clinical research paradigm will shift away from a predominant focus on randomized clinical trials toward methodologies that take better advantage of data generated in the course of health care delivery to speed the development of new knowledge.[4] Research findings can be verified more quickly by comparing the results from smaller populations to the results obtained through analysis of larger populations. Further, once research results have been verified or vetted, they can be disseminated to clinicians and patients via decision-support mechanisms.

ICT-enabled Health Professional Education
Health professional schools take advantage of ICT to offer a variety of learning opportunities that meet a range of learning styles and optimize available resources (e.g., tele-education and self-directed learning). Where curricula of health professional schools overlap, universities offer inter-professional courses, thereby saving resources and fostering inter-professional habits among future professionals. Schools share effective online modules through a consortium rather than each school reinventing the wheel; feedback on the modules is gathered by the consortium to inform future versions. A common multimodular informatics course is available for all entering health professional students and in many universities the course is taught in such a way that discussion sessions with faculty create a team-learning and team-working opportunity.

Students demonstrate competency in both basic and advanced skills via simulations that assess mastery (Cooke et al., 2007). Agreed-on educational standards that assure better learning materials have improved the value of offerings. (MedBiquitous, 2007). If students show proficiency, they progress to the next level; if their knowledge or skills are lacking,

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[4] As the CEO of Kaiser Permanent described in 2004 (Goldsmith, 2004b):

> Part of what we are doing is to take all this information and then use it to track the results of different approaches. So if we are doing outreach for a given population, we're able to track the difference between patients who received the intervention or advice and those who didn't. As we complete the system, we're going to be the equivalent of a data-rich, eight million member perpetual clinical trial. We're going to be identifying how well different drugs work, identifying the short- and long-term consequences of various surgical procedures. And our ability to do medical research will be immense. … We can do our version of the RAND study every Friday. Our access to medical information is a research scientist's dream.

they are redirected to educational modules for further study and practice (Stead, 2007). Licensed professionals and students who are providing supervised care receive ongoing educational support from EHRs that embed evidence into the practice workflow and can flag a practitioner-ordered intervention that deviates from the standard practice of care. Clinicians can analyze their own performance through study of patient records.

In essence, learning is continuous and augmented with "just-in-time" access to information in clinical workflow. Further, assessment is part of the system. For example, performance based on a review of patient outcomes is shared with the clinician. If she needs additional knowledge, she can access targeted online curriculum modules and then use simulations to test her understanding and technical skill. Traditional continuing-education conferences are replaced by a knowledge-translation model in which CME move to where care is delivered, all participants in care delivery are targeted, and the content is focused on using evidence-based, clinical knowledge and changing health outcomes (Davis et al., 2003; Williams, 2007). Since the focus is not on memory but on the capacity to find information and evaluate its relevance, critiques of knowledge sources are fed back to their sources so the offerings become better tailored to users' needs and styles of learning.

Impact on Health Workforce Efficiency and Capacity

As these views of the future illustrate, well-designed, widely diffused, robust ICT offers multiple ways of improving workforce efficiency and expanding workforce capacity across all domains of the health sector. Notably, ICT will enable health professionals to:

- Minimize redundancy in data capture by allowing data that have been captured and stored in one application (e.g., integrated PHR or clinician EHR) to be shared with other care providers, analyzed within a practice for quality improvements, and forwarded to authorized public health and research databases so the public health professionals and researchers do not need to use time-consuming data-collection methods to build essential databases.
- Eliminate duplication in services by making comprehensive patient records available to clinicians. Comprehensive patient records also enable improved effectiveness by highlighting gaps in service.
- Improve timeliness and thoroughness of communication with patients and fellow health care providers by eliminating telephone tag and lost messages, and referring to a written note (i.e., e-mail message) that can be linked to the patient record and referenced at a later date by patients.
- Strengthen and at times shorten decision-making process through enhanced decision support; timely access to patient data; faster availability of test results accompanied by potential to identify most appropriate intervention sooner, rather than reliance on trial and error in difficult or uncommon cases; and the capacity to identify and evaluate mistakes which in turn enables reduction of such errors in the future.
- Share responsibility and shift tasks
    - To patients and their family members as they become more informed about and involved in maintaining health, managing chronic illness, and in some instances returning home sooner during recuperation of acute conditions with support of remote monitoring;
    - Among health care providers as algorithms flag issues for attention for health care professionals in both individual records and across populations of their patients and for public health professionals;
    - To students (more self-learning less reliance on traditional lectures and CME conferences).

- Expand capacity of specialists
    - Telemedicine will improve access to specialty services in rural areas and for special populations (e.g., prisoners, patients with limited mobility);
    - Remote monitoring will increase efficiency for intensivists.
- Shorten the cycle for generation, dissemination, and application of new knowledge.
- Reduce time required to identify and respond to public health issues/problems.

These opportunities to improve workforce efficiency and capacity are likely to yield significant results. Evaluations of the small set of health care organizations that have extensive experience in developing and implementing health information technology have demonstrated "the efficacy of health information technology for improving quality and efficiency" (Chaudry et al., 2006). A 2003 study concluded that "nationwide adoption of advanced ACPOE (advanced computerized-provider order-entry) will save the U.S. health system approximately $44 billion per year in reduced medication, radiology, laboratory, and ADE-related (adverse drug events) expenditures" (Johnston et al., 2003). To date, however, such evaluations and projections have not attempted to measure the specific impact on labor costs. And given the complexity of achieving these efficiencies, it is not clear that such estimates could be made with any degree of certainty. Further, there are numerous offsets to the anticipated efficiencies in the form of increased workload that arises from ICT applications designed to improve quality or achieve other desired ends.

For example, preliminary experience indicates that computerized-provider order-entry (CPOE) adds to physician workload. A 2007 study found that CPOE adds to physician workload by forcing them to enter required information, respond to alerts, deal with multiple passwords, expend extra time on documentation, and perform tasks previously completed by other professionals (Ash et al., 2007). Another study found that use of bedside terminals and central station desktops saved nurses 24.5 percent and 23.5 percent of overall time spent documenting during a shift. In contrast use of bedside or point-of-care systems increased documentation time for physicians by 17.5 percent and use of central station desktops for CPOE increased the work time for physicians from 98.1 percent to 328.6 percent (Poissant et al., 2005).

There is increased expectation for documentation as part of the care process, not only for the care of an individual patient, but also for evaluations of the effectiveness of a practice and subsequent uses in public health and research. There will be increased volume and sophistication of data to be managed for each patient and increased demands to analyze available data to address specific questions that were not part of routine health care in the past (e.g., personalized medicine, analyze subgroups within a practice population). The evolution of genomic medicine will likely add complexity to the methodologies that clinicians must understand and be able to apply effectively, at least until sophisticated decision-support algorithms emerge. The increase in electronic communications will result in fewer direct (face to face) interactions among patients and health care professionals and among health care professionals, perhaps resulting in longer time needed to establish trusting relationships.

A more subtle, but clearly powerful, force affecting the efficiency of the health workforce will be the significant cultural changes that must accompany the introduction of next-generation health information technology for the health sector to take full advantage of the technology. These cultural shifts include, but are not limited to the following factors:

- The destabilizing upheaval created by the explosive growth of scientific publication and growing public access to what had previously been a relatively private reserve (Masys, 2002).

- A shift in medical thinking "that de-emphasizes personal expertise and intuition in favor of the ability to draw upon the best available evidence for the situation, in an environment in which knowledge is very dynamic" (IOM, 2007).
- The blurring of disciplines within health care. With the exception of professionals who must be licensed to perform medical procedures, all health professionals can expect that "virtually all aspects of traditional roles are potentially in question in a networked global society with a profusion of health-related data, information, and knowledge" (Masys, 2002).
- The expectation for multidisciplinary approaches, greater collaboration, and sharing of data by researchers in contrast to traditional approaches to research.
- The changing power structure within organizations due to the presence of a system that enforces specific clinical practices through mandatory data entry fields (Ash et al., 2007). Often the autonomy of physicians is reduced, while the leverage of the nursing staff, information technology specialists, and administration appears to increase. Pharmacy staff may feel threatened as physicians gain immediate access to information on all medications being taken by a patient.

The challenges faced by individuals and professionals when confronting large-scale change (e.g., introduction of a new research paradigm) should not be underestimated. We can reasonably expect that the next two decades will be a period of dramatic changes and turbulence in health care as the diffusion of higher-end ICT offers more unimagined opportunities and challenges to the health workforce at a time when nurses are both aging as a profession and when new nurses often leave the field soon after training and physician supply is short, particularly in primary care specialties.

The description of the introduction of a full-featured electronic health-record in a four-internist medical practice hints at the magnitude of transition issues to be faced throughout the sector and reinforces the ultimate benefits of enduring them.

> Its financial impact is not clearly positive; workflows were substantially disrupted; and the quality of the office environment initially deteriorated greatly for staff, physicians, and patients. That said, none of us would go back to paper health records, and all of us find that the technology helps us to better meet patient expectations, expedites many tedious processes (such as prescription writing and creation of chart notes), and creates new ways in which we can improve the health of our patients (Baron et al., 2005).

Much More than Technology is Needed

How do we achieve the desired state outlined in the ICT-enabled scenarios of the future? Given the recent, rapid advancement of information technology, it is reasonably safe to assume that technology will not be the limiting factor in reaching the envisioned future. Six significant challenges must be confronted to reach our goal. Three of these challenges relate directly to the preparation and composition of the future health workforce. Two of the challenges relate to pivotal policies and ongoing federal leadership for building the non-technological infrastructure necessary to optimize ICT. The final challenge relates to enabling patients to be active participants in managing their care and health through ICT.

The magnitude of the task at hand requires that all organizations with expertise and resources share work collaboratively toward a common goal. AMIA is committed to helping address the educational issues that arise from the need to strengthen the informatics capabilities of the health workforce. Other organizations that can and do offer relevant

knowledge and skills include the Health Information Management Systems Society (HIMSS) for ICT systems and their management (largely the organization of ICT vendors); the American Health Information Management Association (AHIMA) for record-keeping, accurate coding, etc.; the Electronic Health Initiative (EHI) that supports the creation of sound policy and networks across the nation; the National Association for Health Information Technology (NAHIT); the College of Health Information Management Executives; MedBiquitous for computer-based educational standards; and the Markle Foundation program, *Connecting for Health,* that seeks to create consensus on health ICT policy issues. Relevant federal initiatives include establishment of the Office of the National Coordinator for Health Information Technology (ONCHIT or ONC); the American Health Information Community (AHIC) that serves as an advisory body to the Department of Health and Human Services; and government agencies such as the National Library of Medicine and the National Center for Research Resources in the National Institutes of Health, the Agency for Healthcare Research and Quality, and the Center for Public Health Informatics at the Centers for Disease Control and Prevention.

Expand Understanding of Informatics and Its Role in the Health Sector
Compared to other medical or research disciplines, informatics is a relatively young field that began to take hold in the late 1970s with the arrival of personal computers and their spread throughout society (Shortliffe and Cimino, 2006). Informatics is an interdisciplinary field that grapples with rapidly changing technology. Distinctions between its major domains as well as its appropriate name continue to evolve along with the field. In contrast to the development of informatics in Europe as a theoretical discipline, in the United States both practice and theory progressed in step with each other. For this reason, the U.S. has led the world in the production of highly qualified informaticians.[5]

The discipline of *biomedical and health informatics* has to do with all aspects of understanding and promoting the effective organization, analysis, management, and use of information in health care. While the field of biomedical and health informatics shares the general scope of these interests with some other health care specialties and disciplines, biomedical and health informatics has developed its own areas of emphasis and approaches that have set it apart from other disciplines and specialties.

At present, AMIA uses a four-domain taxonomy to structure its education, member service, research programs, and policy initiatives:

- Applied clinical informatics (including health care and personal health management)
- Clinical research informatics (including clinical trials, clinical research and those methods used in translational bioinformatics)
- Public health/population informatics
- Translational bioinformatics (the research itself)

The domains are not exclusive. They overlap in various ways and, importantly, informatics done properly is intrinsically multidisciplinary in nature, flexible and integrative.

Applied clinical informatics focuses on the application of informatics and information technology to deliver health care services. This includes analysis of organizational needs, implementation of IT systems (including EHRs and decision support), as well as

[5] Informaticians are distinct from IT specialists. An IT specialist focuses on the hardware, software and its implementation with far less focus upon how well it actually impacts on professional work, either through work processes or knowledge management.

visualization, imaging, and simulation of organs and systems. Despite some variations, informatics when used for health care delivery is essentially the same regardless of the health professional group involved, whether dentist, pharmacist, physician, nurse, or other health professional although there will be some applications unique to various disciplines and specialties. Knowledge management is sometimes included as part of this domain.

Clinical research informatics relates to the use of informatics in the discovery and management of new knowledge relating to health and disease. This includes the management of the relevant knowledge base. It also includes the development of storage, analytic, and interpretive methods needed to optimize the transformation of increasingly voluminous biomedical data, and genomic data in particular, into proactive, predictive, preventive, and participatory health. Research informatics includes the development of novel techniques for the integration of biological and clinical data and the evolution of clinical informatics methodology to encompass biological observations.

Public health informatics, and its corollary, population informatics, are concerned with informatics focused on groups rather than individuals. AMIA's focus within this domain parallels the field of public health particularly those aspects of public health that are considered to be in the purview of the Centers for Disease Control and Prevention including security with respect to biosurveillance and bioterrorism.

The end product of *translational bioinformatics* is the newly found knowledge from these integrative efforts that is disseminated to a variety of stakeholders, including biomedical scientists, clinicians, and patients. Issues relating to database management, administration, or policy are coordinated through the clinical research informatics domain.

These definitions provide a sense of the scope and complexity of the field of informatics, but may not adequately convey the growing importance of informatics to the health sector. Beginning in 1991 with *The Computer-based Patient Record: An Essential Technology for Health Care,* a series of Institute of Medicine (IOM) and National Research Council (NRC) reports, workshops, and summits has outlined the growing importance of biomedical and health informatics and reflects how the domain has broadened (IOM 1991, 1999, 2001, 2003a, 2003b, 2004, 2005; IOM/NAE 2005; NRC 2000). The 2007 IOM Roundtable on Evidence-based Medicine Workshop Summary, titled *The Learning Healthcare System,* presents the culmination of 15 years of thinking about how the health sector must use ICT to reach its goals for quality (IOM, 2007). Specifically, the Roundtable on Evidence-based Medicine seeks:

- the development of a learning healthcare system that is designed to generate and apply the best evidence for the collaborative health care choices of each patient and provider;
- to drive the process of discovery as a natural outgrowth of patient care; and
- to ensure innovation, quality, safety, and value in health care.

The Roundtable is working towards the goal of having 90 percent of clinical decisions being supported by accurate, timely, and up-to-date clinical information by the year 2010. While focused on the clinical domain, this goal has clear implications for the research, public health, and education domains, particularly in terms of contributing to the development of best-evidence and preparing health care professionals to work with patients in using evidence in decisions. It also establishes clear expectations for the field of informatics as all

of the needs for the learning healthcare system identified by the Roundtable will depend on informatics tools, knowledge, skills, and professionals (See Box 1).

Box 1: Needs for the Learning Healthcare System

- Adaptation to the pace of change
- Stronger synchrony of efforts
- Culture of shared responsibility
- New clinical research paradigm
- Clinical decision-support systems
- Universal electronic health records
- Tools for database linkage, mining, and use
- Notion of clinical data as a public good
- Incentives aligned for practice-based evidence
- Public engagement
- Trusted scientific broker
- Leadership

Thus, it is essential that the health community strengthen its understanding of informatics and that health leaders begin to understand the role of informatics in taking advantage of ICT in all health sector processes. In particular, as the institutions that already possess the largest concentration of informaticians and organizations that are expected to become innovators and thought-leaders, academic health centers (AHCs) need to organize for informatics and ICT in all of their major product lines (i.e., clinical care, research, and education).

AMIA established the Academic Strategic Leadership Council (ASLC) to enable academic health science institutions, in conjunction with the Academic Forum (see below), to lead the way to improvement in health care through biomedical and health informatics. The ASLC comprises AHC leaders who seek to strengthen the leadership base for biomedical/health informatics within the academic health sciences. AMIA also seeks to strengthen partnerships among relevant organizations, such as the Association of Academic Health Centers (AAHC), the Association of American Medical Colleges (AAMC), the American Association of Colleges of Nursing (AACN), the American Association of Colleges of Pharmacy (AACP), and specialty societies that have a role to play in expanding informatics capabilities within the health workforce. In November 2006, the Council of Medical Specialty Societies elected the American Medical Informatics Association into full membership and early in 2007, AMIA became a member of AAMC's Council of Academic Societies. Efforts on this front should not, however, be limited to academic medicine. All healthcare delivery organizations need to broaden their ICT strategies to encompass informatics principles. Further, third-party payers need to understand the role of informatics in the delivery of health care services and the need to recognize the costs of using ICT in optimal ways as part of future health delivery.

Strengthen the Informatics Knowledge-base and Skill Set across the Health Workforce

Well-designed ICT applications and systems will not have a positive effect on health quality unless they are being used by professionals who understand the relationship of the systems to the larger goal of improving health, are proficient in the use of ICT, and are able to analyze the data and apply the knowledge made available through ICT systems. Health professional education needs to provide students with sufficient opportunities to develop needed informatics knowledge and skills. As noted in the 2003 IOM report on health profession education, "While clinicians are trained to use an array of cutting-edge

technologies related to care delivery, they often are not provided a basic foundation in informatics" (IOM, 2003a). This report recommended that all programs and institutions engaged in the clinical education of health professionals embrace an overarching vision:

> All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatic*s.*

Thus, a pivotal challenge for all health professional schools is to provide a curriculum that prepares health professionals--including all disciplines and all levels of student (including those already in the work force who participate in continuing education)--to operate in a "learning health care system" and specifically addresses foundational informatics skills that foster communication, manage knowledge, mitigate error, and support decision-making using ICT.

All health professionals need the following general informatics competencies, regardless of their discipline (IOM, 2003a):

- Employ word processing, presentation, and data analysis software
- Search, retrieve, manage, and make decisions using electronic data from internal information databases, external databases, and the Internet.
- Communicate using e-mail, instant messaging, listservs, and file transfers.
- Understand security protections such as access control, data security, and data encryption and directly address ethical and legal issues related to the use of information technology in practice.
- Enhance education and access to reliable health information for patients.

The knowledge required extends beyond basic computer literacy. Effective health professionals will be proficient in acquiring, appraising, and synthesizing the information necessary to perform their jobs efficiently and effectively and understand that knowledge-management is integral to health care decision-making. They will understand cycle of data capture/analysis/knowledge generation/application and be able to contribute to generating new knowledge. These technical skills must be accompanied by education in the ethics of using ICT. We need to make certain that bad habits are not permitted to develop and flourish (e.g., cutting and pasting old clinical-progress notes not only is plagiarism but also affects the reliability and validity of data).

As decision-support becomes routinely available across health care settings and more sophisticated, the role of clinicians will shift away from factual recall toward coaching patients through decisions (Stead, 2007). Thus, health professional schools must confront the fundamental question of what is the appropriate balance between memorizing core knowledge versus mastering the ability to frame questions, search knowledge-sources, assess validity and appropriateness of knowledge, and adding to the knowledge base (Detmer, 1997).

Some changes consistent with this vision are already afoot. For example, the Columbia School of Nursing has adopted translational research as a guiding principle leading to a continuous cycle in which students and faculty are engaged in research, implementation, dissemination, and inquiry (Mundinger, 2007). Topics emphasized include: developing the skills needed to become sophisticated readers of the literature; understanding the relationship between design methods and conclusions and recommendations; understanding the science; knowing how care protocols evolve; and knowing when to deviate from protocols because of patient responses. The University of Arizona is developing a new

medical school in Phoenix in partnership with Arizona State University and it will have informatics at the core of its curriculum. AMIA's 10x10 program provides one model of how to train current health-care professionals in needed informatics skills. (See Box 2, below.) A substantial number of older learners who take the initial three-credit 10x10 introductory course offered by Oregon Health & Science University, are deciding to enroll in its master's program, which offers a much more comprehensive approach for health professional students.

In sum, three strategies will enable progress on this front:

1. Develop and implement a common informatics curriculum across all health professional schools that provides opportunities for interdisciplinary learning and shared learning resources
2. Increase attention to new learning opportunities created by ICT for use in undergraduate, graduate and continuing health professional education (e.g., simulations, competency self-assessment)
3. Realign curricula to shift away from memorization toward skills in using decision support tools effectively, coaching patients through the decision process and in ongoing self-care, creating and managing evidence-based knowledge stores, and developing meaningful professional relationships with patients using a variety of ICT interfaces.

Box 2: AMIA's 10x10 Program

The goal of the AMIA 10x10 Program is to train clinicians and other health care professionals in informatics to become knowledgeable participants in IT implementation in their local settings. The 10x10 program alone will not make one a full-time professional in informatics (any more than a semester of medicine or nursing will make one a doctor or nurse). The program is structured to allow those who complete the course to carry the credits forward into other graduate programs in informatics.

The AMIA 10x10 program training is conducted in a wide range of settings across the United States by AMIA through its collaboration with key strategic partners in the informatics education community. AMIA's current 10x10 program aims to provide rigorous introductory training to build the workforce that will enable information technology to improve the quality, safety, and cost-effectiveness of health care. Since the program was launched, more than 500 individuals have completed the course, with many going on to advanced study in the field.

The content provides a framework with relevant details, especially in areas such as electronic and personal health records, health information exchange, standards and terminology, and health care quality and error prevention. AMIA's 10x10 programs involve participants developing solutions to problems in real-world settings, ideally their own, guided by established informatics principles. Participants are exposed to a set of competencies that, upon completion, will enable them to serve as champions in their local hospitals, outpatient offices and clinics, and other health-care settings to provide relevant informatics input into health information technology projects. Descriptions of AMIA's current 10x10 offerings are described on the AMIA web site (www.amia.org/10x10/).

Increase the Number of Qualified Informaticians
The U.S. health system needs a cadre of health professionals who possess the knowledge and skills to develop next-generation health information systems, lead implementation of these systems, and evaluate the effectiveness of the systems in each of the major health domains. We need individuals who can pursue the major informatics research challenges (Lobach and Detmer, 2007; Starren et al., unpublished). We need people who can serve as a bridge between health care and information technology professionals and who can serve as a bridge across the various domains within the health sector given the need for data and knowledge to flow among the domains. We need individuals who can redesign work processes, lead changes in practice, and, in so doing, maximize the skills of the health work force so that the health sector achieves the improved efficiency and effectiveness that is possible through ICT. In short, the U.S. health system needs more informaticians.

AMIA sees the greatest need for health professionals trained in applied clinical informatics. These individuals are needed to help people and organizations make the transition to ICT and to assure that advanced systems with decision support become the norm and yield the anticipated gains in quality and efficiency. Applied clinical informatics should be basically generic across all practicing health professionals, with some variation based upon one's parent discipline (e.g., pediatrician, nurse, pharmacist, surgeon, dentist, or internist). Today, there are disproportionately more nurse and internal medicine informaticians than surgical informaticians, much like specialty maldistribution that exists across medical specialties. What is problematic is the reality that each discipline and subspecialty can benefit from both generalists as well as those with sub-discipline expertise in informatics. This makes the educational challenge rather acute despite the growing awareness across all heath professions that informatics is crucial to the future. Obviously, with the rise of genomics, there is a growing need for MD/PhD training in translational bioinformatics as well as more research and public health informaticians with master's and doctoral training.

Four strategies should enable us to make progress towards the goal of increasing the number of qualified informaticians in the United States.

1. Define what constitutes a "qualified informatician" and provide recognition for these professionals.

As the demand for informaticians has grown, informatics leaders have recognized the need to increase production (i.e., training) of skilled individuals. One way to ensure the production of highly qualified professionals is to establish a structure for systematic evolution of training within the field through accreditation of training programs and certification of individuals. The multidisciplinary nature of the field makes this goal particularly challenging. For example, while sharing a common base of knowledge, the knowledge and skills used by an applied clinical informatician on a daily basis differ from the knowledge and skills employed by a translational bioinformatician. Nonetheless, there is increasing attention to the issues of defining core competencies, accrediting training programs, and certifying informatics professionals.

Nursing has taken the lead on this front by establishing informatics certification in 1995. Since that time, more than 500 nurses have successfully passed the certification exam which is administered by the American Nurses Credentialing Center (American Nurses Credentialing Center, 2007). In 2001, AMIA initiated discussions on this issue for other disciplines within informatics. These discussions provided the foundation for a recent grant from the Robert Wood Johnson Foundation to AMIA for systematically exploring the potential to create an applied clinical informatics subspecialty for physicians. The first task for this project is to develop a document that outlines the core content of applied clinical

informatics and this is well underway. The second task is to develop a training-requirements document that will outline standards for training applied clinical informaticians. As these two foundational documents are developed, project participants will explore how training program accreditation and physician certification might be implemented.

2. Strengthen existing training programs and their role within academic health science centers.

AMIA has established the Academic Forum to promote the development of biomedical and health informatics as an academic discipline. The Academic Forum is a membership unit dedicated to serving the needs of post-baccalaureate biomedical and health informatics training programs. It provides a professional home for leaders of biomedical/health informatics training programs and a mechanism for sharing knowledge of best practices related to education, scholarship, faculty development, and faculty retention. As described in the introduction to the Academic Forum (AMIA, 2007b):

> As biomedical and health informatics becomes an entrenched component of the educational mission of academic medical centers and universities, and as informatics becomes a core component of new federal initiatives in biomedical research, it will become increasingly important for academic units in biomedical and health informatics to articulate standards and policies for education and scholarship. At the same time, the larger organizations in which these units are embedded will need to develop an enhanced understanding of academic work in informatics, and of the support that these units and their associate faculty members require to be successful.

Further, if we are to make step-threshold improvements in efficiency, there is a need for more "hybrid" professionals who can bridge disciplines (e.g., industrial or systems engineering and applied clinical informatics programs), like the recently established doctoral training program at the University of Virginia that brings together the engineering and medical schools.

3. Survey future employers of informaticians to enable projections of the number of informaticians that will be needed as the century progresses and compare projections to existing capacity to train informaticians.

It is clear that we do not have enough practicing informaticians to fill anticipated demand and that we need to increase our production capacity. It is not yet clear how many informaticians are needed to meet the needs of the health system. Recent testimony given to the American Health Information Community (AHIC) Workgroup on Electronic Health Records provides a preliminary, although indirect, indication of the magnitude of the issue. A study on the number of personnel needed to install the national health information network found that 7600 IT workers would be needed to implement physician office EHRs, 28,600 workers would be needed to achieve hospital implementation, and over 400 personnel would be needed to complete the community health information infrastructures (Yasnoff, 2007). These numbers focused on implementation of the information networks and did not distinguish between IT personnel, certified informaticians, or clinicians with informatics skills. Citing data from the Bureau of Labor Statistics, Linda Kloss, CEO of AHIMA, reported that over 200,000 medical records and health information technicians will be needed in 2010 compared to 136,000 in 2000 (Kloss, 2007).

On the supply side, there are 50 programs offering health information management at the master's and baccalaureate level and 180 programs offering an associate degree for health information technician (Kloss, 2007). There are over 37 formal informatics programs with 50 to 80 physicians in the master's or doctoral degree pipeline, 30 to 60 nurses in similar nursing informatics programs, but very scarce educational efforts for allied health and other health professionals (Detmer, 2007). A preliminary analysis suggests that, if sufficient funding were available, and, given interest among young professionals, the potential exists to triple output of trained informaticians.

Additional data are needed to support decisions on how many informatics training slots and programs are needed to meet future demands for informaticians. As a first step, a sample of public and private sector organizations in all health domains could be surveyed to identify the numbers of kinds of informaticians they anticipate needing in 5, 10, and 20 years. Subsequent analysis should examine the potential for existing informatics training programs to increase capacity without adversely affecting the quality of the education they offer.

4. Ensure adequate funding for informatics training including potential increase in training slots.

The federal government supports informatics training through National Library of Medicine (NLM) funded informatics programs, the CDC Public Health Informatics Fellowship Program, and the NIH Roadmap for Medical Research, specifically the National Centers for Biomedical Computing (CDC, 2006; NIH, 2007; US DHHS, 2006). The Robert Wood Johnson Foundation supports public health informatics tracks in four of the NLM-funded programs. Additional funding would be made possible through H.R. 1467 (10,000 trained by 2010 Act) and through S. 1693 (Wired for Health Care Quality Act) (Library of Congress, 2007). H.R. 1467, introduced by Representative Wu of Oregon, would require the director of the National Science Foundation to award competitive grants to institutions of higher learning to establish or improve undergraduate and master's degree health care information programs. S. 1693, introduced by Senator Kennedy (D-MA), would authorize the Secretary of Health and Human Services to award grants for the development of academic curricula integrating qualified health-information technology systems in the clinical education of health professionals. As of late September 2007, H.R. 1467 had passed the House and S.1693 had been voted out of the Health, Education, Labor, and Pensions Committee.

As more precise projections on the number of informaticians needed become available, a comprehensive review of all federal informatics-related training funding would be appropriate to ensure that training programs are adequately funded to meet projected needs and that funding is balanced to meet anticipated needs for various kinds of informaticians. Further, health professional schools should seek support from the private sector (both industry and philanthropic organizations) in developing the infrastructure needed to produce ICT capable workforce. For example, the pharmaceutical industry is likely to be a major beneficiary of trained informatics professionals and may be interested in establishing fellowships for informatics training that specifically meets their needs.

Pivotal Issues beyond Health Workforce Education

Continue Progress towards a Robust Knowledge Generation and Management Infrastructure

Achieving improved efficiency and effectiveness of clinical care depends on the best available information being available in a readily accessible format when needed by health professionals and patients for making decisions. Underlying this objective is a series of complex processes related to basic, translational, and clinical research; collecting patient

data and making it available to researchers as well as clinicians; organizing information needed for clinical decisions; creating mechanisms for effective dissemination of the information; and capturing the results of decisions made using the information for future analysis. The NIH Roadmap for Medical Research is tackling the knowledge-generation and management from the research perspective (NIH, 2006). The Office of the National Coordinator for Health Information Technology (ONC) sponsored the development of *A Roadmap for National Action on Clinical Decision Support*. An AMIA working group completed this roadmap in June 2006 (Osheroff et al., 2006). ONC through its American Health Information Community Workgroups and the Agency for Healthcare Research and Quality are using this roadmap to guide their efforts to advance the health sector's ability to bring the knowledge generated by researchers to patients and clinicians.

Address Long-standing ICT Issues that Threaten Full Maturation and Diffusion
Three nontechnical issues threaten to impede progress towards a fully functioning ICT–enabled health sector. These issues are sufficiently complex to have been under discussion for over a decade. During that time, progress has been made in other key areas, such as setting data standards and building consensus that the health sector must adopt electronic health records as a foundational technology to support all of its domains. The remaining issues require continued attention, strong leadership, good data to guide decisions, and innovative approaches to make needed progress and avoid short-circuiting the overall goal of transforming the health sector.

First, the reimbursement framework should reward health professionals for providing services to patients even when they are not in the same room as the patient. The nature of chronic care management requires ongoing support from health professionals but often in a less resource-intensive way. Thus, insurers should reimburse health care providers for "electronic" care (e.g., regular communication with patients, review of data that is submitted via remote monitors). Second, health care licensing should be structured to enable telemedicine across state (and perhaps national) lines so that the expertise of specialists can be extended to fill patient needs. Third, a privacy/security framework is needed that will protect the flow of patient data to authorized users with appropriate safeguards and sanctions and in so doing build trust among health professionals and the public. This framework must include consensus on an approach that will enable all patient data from multiple sources (e.g., remote monitors, lab, pharmacy, primary care office) to be integrated and create a master record for patients.

Anticipate and Meet the Needs of Patients and the Public
The vision of patients and the public using ICT to manage their care and maintain their health depends on them having access to ICT, being proficient in ICT use, and being able to understand the information presented via ICT or their health professionals. *Healthy People 2010* addresses these two conditions: access to the Internet at home and health literacy--and is tracking their progress (US DHHS, 2007).[6] Of note, in 2001, 59 percent of the adult population without disabilities had access to the Internet in their homes while 42 percent of the adult population with disabilities had access. Thus, specific strategies are needed to

[6] With respect to ICT access, the 2007 progress review on Healthy People 2010 Health Communication Objective reported that the percentage of total U.S. population aged 18 and older with access to the Internet in their home has increased from 57 percent in 2001 to 64 percent in 2003. The target is 80 percent. In 2003, 12 percent of the total population aged 16 years and older were at a proficient level of health literacy, 53 percent were at an intermediate level, 22 percent were at a basic level, and 14 percent were below the basic level.

address the Internet needs of the disabled population. In particular, rigorous research on the benefits of regular integrated PHR-use accompanied by a supportive primary-care practice is needed to help determine whether it would be effective for insurers to provide coverage or subsidies for ICT for patients with chronic conditions and limited financial means so that these patients can use integrated PHRs to manage their health. For example, a 2005 study on the use of an eHealth system by low-income women with breast cancer found that low-income subjects logged on and spent more time on the system than more affluent women and the system had a positive impact on the health of the low-income women (Gustafson et al., 2005).

And yet, the health system will also need to develop approaches for patients who may never use integrated PHRs. A 2007 Pew study found that 71 percent of the U.S. adult population had Internet access at home, work, or unspecified location; 27 percent do not use a computer at home or at work; and 2 percent have access to a computer but do not use internet or email (Horrigan, 2007). The Pew study found that non-Internet users as a group are disproportionately poor and old and many of them do not have positive attitudes about information technology. As one observer noted:

> Notwithstanding the publicity given to empowered consumers, there is a substantial fraction of the population who either do not want to or cannot shoulder the burden of understanding the intricacies of their health problems and "just want the doctor to take care of me." This difference in approach has been called a "digital divide," but it is far more a question of literacy, motivation, and educational level than of access to information technology (Masys, 2002).

The issue of the general public's computer proficiency is not being addressed systematically in the United States. This issue clearly extends beyond health care and involves high schools, community colleges, colleges and universities, local communities, and special interest groups such as AARP, as potential places where computer proficiency can be improved and assessed. The health community should play an active role in ensuring that Americans are prepared to use ICT to manage their health. Organizations like the International Computer Driver's License–US can be critical to achieving greater computer skills in the general population (ICDL, 2005).

Conclusion

The good news is that there is a shared sense of what we need to do to make substantial progress toward implementing robust ICT systems that will enable major transformations in the health sector. Some progress has been made at the national policy level as well as in a number of states, localities, and organizations.

The bad news is that our disjointed non-health system makes it very hard to address key issues relating to data access (specifically, privacy and personal health-identification regulations remains a quagmire with no clear resolution in sight), and creation of a sustainable infrastructure. Other struggles relate to standards maintenance and a national strategy for integrating U.S. and global standards.

The other part of the bad news is that vendors are focused on selling products that are weak in terms of work-process improvements, and interoperability remains a significant problem. Far too many in health-care leadership roles do not understand the difference between IT and informatics, and our education remains too focused on human memory

rather than facility with knowledge-management even while the knowledge base continues to explode.

Looking to the bright side, patients can be brought into the center of their care with the right systems of care, professionals can enjoy more of their work again, and care can be dramatically improved in terms of safety, equity via telemedicine, and timeliness. We will make real gains on the IOM's STEEEP criteria (i.e., safety, timeliness, effectiveness, efficiency, equity, and patient-centeredness) for quality, but efficiency will remain a challenge unless and until we make in investments in new knowledge and skills for the entire current and future workforce.

A "learning" health system is the correct model for the U.S. to pursue. ICT enriched by informatics offers the opportunity to be able to make sense out of all the health activities and data involved so that over time far better systems and processes can result. But this model will only be possible if the workforce has a solid base of informatics knowledge and there are sufficient numbers of informaticians working in all domains of health care. Organizations involved in shaping and supporting the health workforce must aggressively confront the challenges of creating an informatics-capable workforce. Meanwhile, we can get ready for more disruption and change.

Appendix A
Examples of ICT that Have Informed the Clinical Domain Scenarios

- Telepsychiatry through videoconference versus face-to-face treatments (De La Curevas et al., 2006). Significant improvement found in both groups. Shown to be an effective means of delivering mental health services to psychiatric patients in remote areas with limited resources.

- Telemedicine for home care of patients with COPD (De Toledo et al., 2006). Patients could contact HCP via call center at any time. HCP shared an electronic chronic patient record. Integrated home telemedicine services supported HCP and improved patient health. Fewer patients were readmitted.

- Analysis of use of tele-homecare for treatment of elderly people with chronic conditions (Lamothe et al., 2006). Major changes in work processes results in new models of home care delivery.

- Evaluation of patients' cost savings from telehealth found that without telemedicine, 94 percent of patients in rural setting would travel more than 70 miles for care; 84 percent would miss a day of work; and 74 percent would spend $75-$150 for additional family expenses (Bynum et al., 2003).

- Telehealth used to provide interdisciplinary mental health training and support to health professionals in a rural region of Atlantic Canada (Cornish et al., 2003).

- Passive health-status monitoring installed in assisted living units to track physiological parameters (heart rate and breathing rate), the activities of daily living, and key alert conditions (Alwan et al., 2007). Health care professionals were provided with access to the wellness status of the residents they serve. Over a 3-month period, monitored residents showed reduction in billable interventions, hospital days, and estimated cost of care. Positive impact on professional caregivers' efficiency.

- Impact of telehealth on health workforce evaluated in Canada (Jennett et al., 2000). Positive impact of telehealth applications were reported for expertise distribution, skills base, recruitment/retention, and health care use. Wider range of responses received in area of staffing. Need for training and informal support networks identified.

- Home health monitors administered standardized measures for depression and pain in a very small sample of the VA patient population (Dobscha et al., 2006). Patients transmitted depression and pain-severity scores on a weekly basis for 24 weeks. Information received and reviewed by a nurse care-manager who recommended treatment changes as appropriate and followed up changes in symptom severity with phone calls; called one patient to inquire why not submitting data. Patient satisfaction was high; 3 of 5 preferred monitors to phone or mail for completing questionnaires. Expressed no concerns about privacy.

- A web-based intervention was not effective in improving blood sugar readings among adults with 6 or more co-morbidities (Bond et al., 2006).

- Mixed results from home-monitoring (Pare et al., 2007). Clinical effectiveness is more evident in pulmonary and cardiac studies than in diabetes and hypertension.

- Telemedicine case management improved glycemic control, blood pressure levels, and total and LDL cholesterol levels at one year of follow-up (Shea et al., 2007). Randomized, controlled trial comparing telemedicine case management to usual care for Medicare recipients living in federally designated underserved areas of New York state.

- E-health approach to managing patients presenting with vascular-type symptoms (Hands et al., 2006). Findings: common vascular-type symptoms can be satisfactorily evaluated across a telelink with the aid of a practice nurse and baseline patient data transferred electronically.

- 1600 patients using in-home kidney dialysis from NxStage Medical with numbers expected to grow (Garloch, 2007).

- Researchers have developed a "coexpression extrapolation (COXEN) system" that can accurately predict drug sensitivity for bladder cancer cell lines and can predict clinical responses of breast cancer patients to two common chemotherapies (Lee et al., 2007). Researchers also used COXEN to screen for 45,000 compounds to identify an agent with activity against human bladder cancer.

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Pulling Regulatory Levers to Improve Health Care

Catherine Dower*

The ongoing discussions and debates in the U.S. on health care continue to revolve around the familiar triad of access, cost, and quality. From presidential candidates' speeches to governors' proposals to the popular documentaries, opinions abound on the plight of the uninsured, the staggering costs, and the questionable relationship between expensive care and good health. Less rarely discussed is just how deeply embedded health-care workforce regulation is within the triad. Laws and regulations directly and indirectly affect who in the health care world can do what to whom and where. Health professions regulation is inextricably linked to supply of professionals, to the quality of their training, and to safety oversight throughout their careers. These in turn underlie access, cost, and quality. In particular, several questions provide a starting point for a new look at health professions regulation.

- If we figure out a way to "insure," or cover the financial costs for, individuals currently not accessing the health care system, would we have enough health professionals--doctors, nurses, physical therapists, pharmacists, etc.--to provide the increased amount of care to those who need it? If not, do we have the infrastructure and capacity to expand our educational programs or redeploy the workforce to meet demand?

- Are we appropriately and efficiently steering patients to the right providers? Are we even close to ensuring that people are seeing the most suitable type of health professional for their condition or disease?

- Are we making the best use of one of our nation's most valuable resources: its health care workforce? Are we managing this resource in a fiscally and ethically responsible manner?

As we face increased awareness of shortages in many professions, as well as the nation's changing demographics and shifting disease burden, it may be time to reevaluate whether regulatory changes might make a change for the better. Several key regulatory areas could be explored for their potential contribution to improving health care in the U.S.

- Overtraining relative to practice authority
- Improving the decision-making process regarding regulation
- Establishing national scopes of practice
- Collecting data

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Overtraining Relative to Practice Authority

Some professions have educational standards that are higher than their legal scope of practice. In other words, professionals are being trained and tested to competently perform tasks that they are not allowed to do once licensed and caring for patients. This may be particularly true for professions that have moved to or are moving toward national standards for education but are still stuck in the variable-by-state legal and regulatory scopes of practice. For example, many would-be health care practitioners are trained in professional programs that are accredited by national organizations using a common set of standards.[1] However, once licensed and practicing, the legal scope of practice for these professionals may vary tremendously by state.

> Physical therapists – 42 states permit consumers direct access to physical therapists but 8 states require a referral (usually from a physician) to initiate treatment by a physical therapist.[2]
>
> Dental hygienists – The scopes of practice for dental hygienists vary tremendously from state to state regarding restorative duties, direct access, independent practice, and administration of anesthesia and nitrous oxide.[3]
>
> Naturopathic doctors (or naturopathic physicians) – 14 states license naturopathic doctors (NDs). Generally, in these states, NDs practice independently as primary care providers and can diagnose and treat medical conditions, perform physical examinations and order laboratory tests.[4] Some states allow NDs with special training to prescribe drugs, perform minor surgery, practice acupuncture, and/or assist in childbirth.[5]
>
> Nurse practitioners – NPs are authorized to practice in all states plus the District of Columbia. They have prescriptive privileges of varying degrees in 49 states;[6] the variables can include how many NPs an MD can supervise for prescriptive purposes and/or the schedule of drugs NPs may prescribe.[7] Washington, D.C. and 23 states permit NPs to practice independently from physicians; 28 states require documented physician involvement (including collaboration, supervision and/or authorization).[8]

The list goes on and on relative to the 200+ recognized health professions in this country. Some of the differences are minor, and others are significant. The numbers involved and the amount of effort that go into determining who may do what are staggering. Hundreds, if not thousands, of state bills are considered annually that would recognize a new profession or expand the scope of practice of an existing profession. At any given time during legislative sessions in every state legislature across the country, the health professional associations are arguing with each other in front of the legislators. Each profession's agenda is clear and predictable. If proposing to expand their own scope of practice, members of a profession will offer various types of evidence demonstrating their competence to do more than what is currently permitted. At the same time, they will challenge other professions' attempts to expand their scopes of practice if the result could in any way be considered to be an overlap of practice authority.

Each state has witnessed its own variations on the theme. A few recent examples from California include:[9]

- The psychologists' efforts to secure legal authority to prescribe psychotropic drugs (SB 993) were successfully opposed by the psychiatrists.

- Dental hygienists, who now work under the supervision of dentists, are supporting SB 534, which would create a separate state licensing board for the hygienists.
- AB 1436 would give physicians assistants the authority to prescribe drugs [later amended to delete reference to physicians assistants and to clarify and expand nurse practitioners authority; opposed by the medical association].
- AB 1444 would grant authority to physical therapists to practice without direct referral from physicians. This is opposed by chiropractors and orthopedists (MDs). When massage therapists sought licensure through SB 731, chiropractors and physical therapists joined forces in opposition.
- SB 136 would authorize acupuncturists to perform "tui na," a form of bodily manipulation. AB 636 would allow acupuncturists to use light as a therapeutic technique.
- AB 1367 and AB 1486 would elevate "drug and alcohol counselors" and "professional counselors" to state-licensed professions. Psychologists, who want to expand their practices relative to psychiatrists, oppose these bills.

Regulation of the health professionals is limited to the states. However, it is not uncommon for national actors to get involved. Some examples include:

- The American Medical Association's efforts, through its Scope of Practice Partnership, include "developing a clearinghouse of information about nonphysician providers' educational preparation, licensure requirements and state legislation and regulation regarding scope-of-practice. Local chapters (of the AMA) and medical societies will have access to the information as they work to address scope-of-practice issues that may arise in their states."[10] Because it is perceived as a concerted effort on the part of medicine to restrict scope-of-practice expansion for any other profession, the "Partnership" has been formally opposed by dozens of national associations of other health care professions.[11]
- The American Dental Association has filed a lawsuit against the Alaska Native Tribal Health Consortium asking the court to declare the Consortium and its dental health aide therapists in violation of state dental licensing laws.[12] The dental aides are providing care in underserved rural areas of Alaska.

What might be the implications of overtraining health professionals relative to their practice authority? The primary concern for policymakers is the under-use of the health workforce in meeting the needs of the county. The U.S. currently faces confirmed, serious shortages in several health professions, and more shortages are looming on the horizon. Where we do not have whole-profession shortages, we often see significant maldistribution of the workforce, with practitioners congregating in urban and suburban areas in higher proportions than the general public, resulting in "undersupply," or shortages, in rural and underserved communities. While educators and professional leaders scramble to expand training programs to produce more graduates and recruit more individuals into a profession, an untapped resource--health care workers who are already trained to provide the care that is needed--is often overlooked.

At a time when our educational programs are often strained to near-breaking, it may be imprudent to spend precious time and money on programs, faculty and curricula designed to teach students how to do things they will not be permitted to do upon graduation. For example, nurse practitioner and physical therapist programs devote both didactic and clinical time to training students how to practice independently (i.e., without supervision or without referral, respectively). However, some students graduating from these programs will choose to live and practice in states that do not permit independent practice, effectively defining those hours as a waste.

As educational programs necessarily ramp up their programs to increase the number of seats and expand their recruitment efforts, they might also need to be wary of selling a bill of goods to potential students and health professionals regarding what they really will be doing with their degrees. Particularly vulnerable might be those populations traditionally under-represented in the health workforce but that are currently being targeted by programs to increase overall total numbers in each profession while simultaneously increasing racial and ethnic diversity in the health workforce. The future may well bring a backlash in the form of newly minted professionals leaving a health care practice world that looks dramatically different from what they were led to expect.

Finally, one might also hypothesize that interprofessional scope-of-practice turf battles of the sort that are waged in state legislatures exacerbate the challenges of encouraging members of different professions to work collaboratively for the sake of a patient. Professional associations at the national and state levels have clear agendas to oppose efforts by other professions to expand practice authority into their turf and the efforts start early. The California Medical Association's Medical Student Section website has a Get Involved page that links to the CMA Hot List, which is a list of legislation sponsored and opposed by the CMA. Every scope-of-practice bill on the Hot List (including those that would expand scopes of practice for acupuncturists (AB 636), nurse practitioners (AB 1436, AB 1643), physical therapists (AB 1444), and psychologists (SB 993)) is opposed by the CMA.[13] Such an approach--targeted to include individuals still in training--to create divisions between the professions when debating in state capitals can only make the goal of true interdisciplinary teamwork when providing care to patients more illusory than ever.

What would it mean if scopes of practice for select professions were expanded to meet the level of training?

The possible benefits of expanded scopes of practice are many; practice acts that are more closely aligned with competence might:

- *Help meet demand where shortages exist*

The perceived and real health professions shortages whether they be due to overall decreases in new entrants to the field, geographic maldistribution, or disproportionate increases in demand from an aging and chronically ill population, can and must be addressed with efforts to restructure and expand educational programs, reach out to pools of potential new workers, and improve working conditions to limit both high turnover and early retirement. The integration of promising technological developments into health care delivery will also, by necessity, be pursued. However, demographic realities will ensure that these efforts will go only so far. To meet the increased demand for health workers, innovative approaches to deploying workers must also be explored. The proverbial low-hanging fruit on this tree will be workers who are already trained to provide health care services but who are currently, due to state licensing laws, not making full use of their competence. A first step might be to look at states with more permissive practice acts for similarly trained workers. These states might be able to provide model practice acts, best practices for regulating these professionals to ensure safe care, and lessons learned from any adverse events.

Recent calls for related changes include Pennsylvania Governor Rendell's proposal to reduce health care costs and expand access to coverage. The proposal points to the possibility of expanding the role of nurses and physician assistants in treating patients.[14] Similarly, in a comprehensive look at hospital staffing issues, PricewaterhouseCoopers noted the need for hospital executives to "consider what kinds of nurses and doctors are needed, what tasks these clinicians are best educated to deliver, and how technology and lower-skilled workers

can be used to supplement or replace them."[15] In proposing new attention to scope of practice issues in Canada generally (which resulted in governmental funds flowing to multidisciplinary primary care teams), Commissioner Romanow was quite blunt: the health "professions tend to protect their scopes-of-practice. Each profession appears willing to take on more responsibilities, but is unwilling to relinquish some duties to other professions."[16]

- *Expand training capacity*

Another piece of the shortage puzzle is the limited number of faculty available to teach current and prospective students, particularly as plans are implemented to expand class sizes. With several years of attention focused on the national nursing shortage, it is not surprising that faculty shortages have been well documented in nursing.[17] [18] With safe expansions of practice authority for specific professions, more individuals could be qualified as competent and available to train future health workers on particular tasks and responsibilities.

- *Help steer people to the right providers*

In virtually every state today, medical doctors have an all-inclusive scope-of-practice for physical and mental health. However, not all health care is provided by medical doctors. All other health professions have scopes of practice that are subsets of the medical practice acts, either by body part or system (e.g., the foot for podiatrists, the eye for optometrists, mental health for psychologists) or modality (e.g., acupuncture for acupuncturists; physical therapy for physical therapists; and prenatal, labor, and delivery for nurse-midwives). Professions other than physicians do not enjoy exclusive subsets, however, and physicians continue to maintain their broad practice authority while the other professions focus on their domain or philosophy of care. Patients may choose (sometimes steered by reimbursement mechanisms) to see either a podiatrist or a physician for conditions of the foot, to see either an optometrist or an ophthalmologist for conditions of the eye. Overlapping scopes of practice provide for flexibility on the part of health personnel policymakers and choice on the part of consumers and patients. By and large, the choices are appropriate. Expanding the range of safe choices for consumers could improve the chance that people are seeing the right type of practitioner for the care they need.

Other potential impacts of matching scope-of-practice to training-competence would need to be explored. It is possible that such a correlation could improve employment satisfaction and retention rates where practitioners no longer perceive a gap between their training and their practice authority. Researchers and policy makers might also look to the possible impacts quality, safety, and costs. For example, it is unclear whether expanded scope-of - practice authority would lead to increased costs based on higher fees charged by practitioners seeing themselves as worth more than before, or lower costs based on increased availability of services and accompanying competition. In addition, changing reimbursement policies and rates, which are often tied by third party insurers to scope of practice, should be studied for their effect on costs to and access by consumers.

New Ways of Determining Scopes of Practice

At times, an element of society's infrastructure, such as regulation, is so familiar to us that it is difficult to see the possibility of change. We become so proficient at continuing patterns, as they have been done for decades, that we do not dare upset the routine. Two decades ago, however, leaders in Ontario, Canada, undertook a novel approach to regulating their health professionals. This was a comprehensive and inclusive attempt at reform quite separate from the country's health care financing systems that covered everything from

setting standards for entry into the professions and continuing competence to filing complaints and disciplining errant practitioners. Years in the making, the efforts culminated in 1991 in the Regulated Health Professions Act (RHPA).

Prior to 1991, Ontario had determined whether and how to regulate health professionals much like any state in the U.S. The aim of the RHPA, called a "decisive departure from the past pattern of regulation" by an early commentator, was to protect the public without unduly burdening the professions. Embedded in the policy rationale was the goal of "making more efficient use of all health professionals". [19] One key element of the RHPA is the focus on a list of thirteen "controlled acts." Each regulated profession is granted authority for a subset list of these controlled acts, and this subset essentially forms the legal scope of practice for each profession. Several of the professions have several of the controlled acts in common in their practice authority. Just because one profession has demonstrated competence to perform one of these acts does not prohibit any other profession from demonstrating its competence. Acts that are not on the list are not regulated and can be performed by any regulated or non-regulated individuals. The controlled acts are as follows:

1. Communicating to the individual or his or her personal representative a diagnosis identifying a disease or disorder as the cause of symptoms in the individual in circumstances in which it is reasonably foreseeable that the individual or his or her personal representative will rely on the diagnosis.
2. Performing a procedure on tissue below the dermis, below the surface of a mucus membrane, in or below the surface of the cornea, or in or below the surfaces of the teeth, including the scaling of teeth.
3. Setting or casting a fracture of a bone or a dislocation of a joint.
4. Moving the joints of the spine beyond the individual's usual physiological range of motion using a fast, low amplitude thrust.
5. Administering a substance by injection or inhalation.
6. Putting an instrument, hand, or finger, (beyond openings into the body).
7. Applying or ordering the application of a form of energy prescribed by the regulations under this Act.
8. Prescribing, dispensing, selling, or compounding a drug as defined in subsection 117(1) of the Drug and Pharmacies Regulation Act (reference omitted) or supervising the part of a pharmacy where such drugs are kept.
9. Prescribing or dispensing, for vision or eye problems, subnormal vision devices, contact lenses, or eye glasses other than simple magnifiers.
10. Prescribing a hearing aid for a hearing-impaired person.
11. Fitting or dispensing a dental prosthesis, orthodontic, or periodontal appliance, or a device used inside the mouth to protect teeth from abnormal functioning.
12. Managing labor or conducting the delivery of a baby.
13. Allergy challenge-testing of a kind in which a positive result of the test is a significant allergic response.

Another key element of the RHPA is the method for determining whether a profession shall have practice authority for any or all of the controlled acts. The Health Professions Regulatory Advisory Council (HPRAC) reviews proposals to establish new or expand existing regulations for the professions. The HRPAC receives requests to review proposals from the minister of health or from any of the professions. The HRPAC, which may not include any public employees or any current or past members of the health profession, reviews the proposal and all comments from interested parties and makes recommendations to the minister.

The RHPA has been subjected to several formal evaluations since it was implemented. Most recently, the Health Professions Regulatory Advisory Council (HPRAC) submitted its report, *Regulation of Health Professions in Ontario: New Directions*, to the minister of health and long-term care fifteen years after the RHPA was enacted. Although several recommendations are included in this report as areas worthy of attention for improving the system due to changes that have occurred in health care delivery since the RHPA went into effect, the report affirms the "current health professions regulation system as the most appropriate vehicle for the self-governance of our health professions." While the regulations should continue to evolve, the HPRAC notes that the RHPA was "far-sighted when introduced, and it remains a model that other jurisdictions seek to emulate."

A substantial section of the 2006 evaluation of the RHPA was devoted to the links between scopes of practice and human resources planning. For example, the evaluation notes:

> …it would be useful to examine whether professionals are in fact practicing to the maximum scope of their practice and, if not, what barriers restrict them from doing so. Another aspect of this review would be to shed light on what new roles might be appropriate within a profession and how best practices in cross-professional scopes can be promoted.[20]

Based on this analysis and awareness of the impact scopes-of-practice have on supply and demand of health care workers, the following undertaking was proposed: "HPRAC proposes to develop a consultation program that will enable each profession to assess the validity and currency of its scope and authorized acts…"[21]

The evaluation of the RHPA continued to look specifically at unreasonable wait-times, shortages in select health professions, and evolving health care needs to consider the possibilities for meeting those needs through different practice authorizations and new professions. To address anesthesiologist shortages in Ontario, the proposals included training nurses and respiratory therapists to work as anesthesia assistants and exploring the development of nurse anesthetists (currently not a recognized profession in Ontario). To address the province's critical shortage of orthopedic surgeons, HPRAC proposes exploring health professions regulatory options for extending the role of physical-therapy orthopedic specialists. To address pressures in diagnostic and technological services, including pathology, medical laboratory technology and medical radiation technology, the "HPRAC proposes to conduct a review of whether scopes-of-practice are current in the health professions' diagnostic and technological sectors and whether new classes within these professions are appropriate to meet current and future needs."[22]

By changing the way decisions are made about the legal authority of health professionals, Ontario appears to be able now to avoid much of the wasted time and money that accompanies the ongoing scope-of-practice battles among the professions in the U.S. However, Ontario is not alone in moving toward new ways of determining scope-of-practice authorities for health care professionals. British Columbia has developed a similar list of controlled acts and favors the establishment of overlapping scopes of practice among various professions.

The way scope-of-practice decisions are usually made in the United States are problematic in several ways,[23] including the fact that legislators are often called upon to decide technical health-care matters without prior knowledge in the area. In addition, many of the states do not have clear guidelines or procedures on how to evaluate the information submitted by the professions in support of or in opposition to a change in practice authority. Rarely are

documents provided to the legislators equivalent to what rules of evidence provide lawyers and judges. Without such guidance, it is not clear to the individual legislator or committee which data are reliable, the weight other states' experience might be given, whether anecdotal evidence should ever be considered, and how much credibility should be given to various witnesses, organizations, and research studies.

In the United States, several jurisdictions have addressed the issue of how to decide a scope-of-practice in one of two ways. Some states have set up review committees that are somewhat independent from the legislative process while others have crafted high-quality guidelines for reviewing proposals for scope-of-practice expansions.

- *Examples of independent review committees for scope-of-practice matters*

The Minnesota Council of Health Boards, which consists of representatives from existing health licensing boards, administers the Minnesota Health Occupation Review Program. Under this program, the Council provides information, upon request of the legislature, on proposals relating to the regulation of health occupations. The Council's reports to the legislature offer impartial, objective, and nonpartisan analyses of the proposed changes to existing law based on information provided to the Council by both supporters of and opponents to scope-of-practice proposals.[24]

Virginia's Board of Health Professions consists of 18 members, one from each of the health professions regulatory boards and five public consumers. The legislature directs the Board of Health Professions to review proposals to establish or change scope-of-practice regulations and issue a report to the legislature for final determination.[25]

In Iowa, a scope-of-practice review committee limited to five members (one representing the profession seeking a change in scope of practice, one from the health profession directly affected by the proposed change, one impartial health professional who is not affected by the proposed change, and two impartial public members) studies the proposed change and reports to the Department of Health, which in turn makes recommendations to the general assembly based on the committee's findings.[26]

Pending legislation in Texas would create a Health Professions Scope of Practice Review Commission (which would include two public members and a representative of the Health, Law and Policy Institute at the University of Houston) and establish a formal method for objectively evaluating proposed changes to scopes of practice.[27]

In New Mexico, House Joint Memorial 71 requests the Interim Legislative Health and Human Services Committee to establish an unbiased and fair review process for scope-of-practice matters.[28]

- *Examples of guidelines for scope- of-practice matters in the United States*

Arizona's guiding principles regarding scope-of-practice issues can be found in statute:

> Regulation shall not be imposed on any unregulated health profession except for the exclusive purpose of protecting the public interest…. A health profession shall be regulated by this state only if: 1) unregulated practice can clearly harm or endanger the public health, safety or welfare and the potential for harm is easily recognizable and not remote or dependent on tenuous argument; 2) The public needs and can reasonably be expected to benefit from an assurance or initial

> and continuing professional ability; 3) The public cannot be effectively protected by other means in a more cost beneficial manner…. After evaluating the criteria [above] and considering governmental and societal costs and benefits, if the legislature finds that it is necessary to regulate a health profession not previously regulated by law, the least restrictive alternative method of regulation shall be implemented….[29]

Arizona's statute also lists several factors that should be considered when a scope-of-practice expansion is sought: a definition of the problem, why a change is necessary, the extent to which consumers need and will benefit from the change, and evidence that the profession's regulatory board "has functioned adequately in protecting the public."[30]

Another example of guidance for state legislative bodies in deciding scope-of-practice issues can be found in *Changes in Healthcare Professions' Scope of Practice: Legislative Considerations (Changes)*.[31] This landmark document was produced in 2006 through the collaborative efforts of representatives from six regulatory associations: the Association of Social Work Boards; the Federation of State Boards of Physical Therapy; the Federation of State Medical Boards; the National Board for Certification in Occupational Therapy; the National Council of State Boards of Nursing, Inc.; and the National Association of Boards of Pharmacy. It lays out five assumptions related to scope of practice:

1. The purpose of regulation – public protection – should have top priority in scope-of-practice decisions, rather than professional self-interest.
2. Changes in scope of practice are inherent in our current healthcare system.
3. Collaboration between healthcare providers should be the professional norm.
4. Overlap of professions is necessary.
5. Practice acts should require licensees to demonstrate that they have the requisite training and competence to provide a service.

Changes proposes: When defining a profession's scope of practice, the goal of public protection can be realized when legislative and/or regulatory bodies include the following critical factors in their decision-making process:

- Historical basis for the profession, especially the evolution of the profession advocating a scope-of-practice change,
- Relationship of education and training of practitioners to scope of practice,
- Evidence related to how the new or revised scope of practice benefits the public, and
- The capacity of the regulatory agency involved to effectively manage modifications to scope-of-practice changes.

What would be the impact of changing the way scopes of practice are decided?
The state legislative process for deciding health professions' scopes of practice is a time-honored tradition with significant value. In addition, because scopes-of-practice authority is tied not only to professional identity but also to valuable reimbursement rates, any changes to the way the practice acts are decided are likely to be opposed by many professional organizations. However, the process is imperfect and needs to be updated. The imperfections could be limited with the adoption of relatively minor changes to the

mechanism in which decisions are considered. Should the processes be modified, promising impacts include:

- *Help for legislators to make informed decisions about scopes of practice*

The adoption of new models for deciding scopes of practice--whether they be in the form of guidelines regarding how to evaluate evidence and other information submitted, or committees charged with reviewing the information submitted and making an objective recommendation to the legislative body--could go far in assisting legislatures make informed decisions. Scope-of-practice decisions could be made more on an objective analysis of whether a profession "can provide [the] proposed service in a safe and effective manner"[32] and less on how many lobbyists a profession can hire or how many supporters can be bused to a hearing. The transparency of improved types of decision-making could foster more trust in the system and in the validity of the practice acts themselves.

- *Improved relationships between members of different professions*

A less tangible but potentially very valuable benefit of efforts to revise the way scope-of-practice decisions are made would be the lowering of animosity between the professions. Shifting the process away from the current win-lose framework might permit health professionals to spend more time developing collegial relationships and less on seeing each other as the opposition. It is possible to train professionals to see overlapping scopes of practice authority not as threatening to their careers, their professional integrity, their income or their patients' safety. Rather, overlapping scopes of practice, implemented and regulated appropriately, could improve interdisciplinary care and make for true team work with the patients' interest being the focus.

National Standards

As noted, determination of the health professions' legal scopes of practice is an authority enjoyed by the states. As a result, state-by-state (and in Canada, province-by-province) differences exist in the legal scopes of practice for health care professions. With few exceptions, licensed health professionals in one jurisdiction cannot practice in another jurisdiction without obtaining licensure in that second jurisdiction. Despite state legislatures' efforts to protect their residents and to balance the interests of the professions, no correlation is apparent between scope-of-practice laws and health status. That is, no studies have found that states with restrictive scopes-of-practice laws enjoy higher health status rates than states with expansive scopes of practice laws. However, the state-by-state variability can be problematic.

This arrangement can be burdensome to health professionals, who:

- Must secure new licensure to move to a new state, cross over the state line to see patients in a nearby community, or attempt to provide health care assistance in a different state when a natural or other disaster strikes;
- Face licensing protocols when seeking a second license that may range from minor bureaucratic forms and fees to substantive new educational or training requirements; and
- Have different scope-of-practice authority in the various jurisdictions in which they hold licenses even with the same education, training and competence.

This arrangement also can be burdensome to patients:

- Who may have choices limited by state laws, resulting in the need to travel out of state for particular services or forgoing those professional services;
- Who may not fully understand who can provide which services because of state-based differences; and
- Whose likelihood of receiving high-quality care from a team of professionals might be compromised by interprofessional fighting over legislative proposals.

Without a clear public-protection basis for maintaining state-based differences in scopes of practice, the U.S. could move toward national standards for education, training, and legal scopes of practice for health professionals. And, while it might be prudent to keep state-based regulatory agencies in place to handle licensing mechanisms and complaint and disciplinary processes regarding health professionals, national scope-of-practice standards would reduce or remove the burdens to the public and profession listed above.

Moreover, such a move to national standards would likely have a positive impact on the capacity to scale up training programs and graduates in shortage areas. For various reasons that include geography, economics, demographics and history, some states can be strong net producers of health professionals while others must rely on external sources. Having national scope-of-practice standards in place would permit more flexibility when one state or region identifies a shortage trend and needs additional professionals but had limited in-state capacity to produce them.

For possible models, the U.S. can look to almost any other country, where scope-of-practice laws usually are standardized at the national level. Some regional areas go even further. For example, member countries of the European Union recognize the legal credentials to practice for health professionals from other member countries.

Collecting Data Through Regulatory Processes

Before closing, a brief look at the role that data play is appropriate. In the U.S., concerns continue to rise about looming shortages in many health professions, whether individuals are receiving care from appropriate professionals, and what is to be done about safety and quality issues, including ensuring that patients are receiving culturally competent and linguistically appropriate care. Many legislators and other policymakers are attempting to address these questions but critical information is often lacking at the state level. All states have a board or agency that tracks the number of licensees in the various professions. However, not all of them track the active-practice status of licensees in meaningful ways. Several aspects of practice would be informative in the debates over supply and demand, shortages and oversupply, and whether or not patients can actually get appointments with the health professionals they need. Some of these elements of health professions practice include:

- Active versus retired status
- Percent of time or number of hours working
- Geographic location(s) of practice (and percent of each if multiple)
- Specialty area or type of practice
- Race/ethnicity and foreign language fluency
- Case loads: numbers and profiles of patients being served
- Patients being seen: Are new patients being accepted? Are Medicaid and Medicare patients accepted? Are patients on HMO and/or private insurance plans excluded (either globally or by specific plan or company)?

Regulatory agencies are well positioned to collect these data at licensing--and at re-licensing throughout careers--and they could be made available to various entities for analysis. With this information in hand, policymakers would be much better prepared to consider whether trends indicate problems and how best to address problems before they grow out of control. If data are not collected through regulatory agencies and based on common templates, the information often is not standardized, and comparisons over time (i.e., trends) or between the professions cannot be made with validity or reliability.

Putting the Pieces Together

The questions posed at the beginning of this article were not meant to be rhetorical. Various pressures and actors are converging with a likely outcome of more, if not most, individuals in this country enjoying improved access to health care based on expanded health insurance through public, private, or combination coverage systems. Significant expansions in coverage will strain the workforce supply and demand models currently being used to estimate how many providers of what sort will be needed in which geographic areas.

Despite the challenge of getting the details, demand for more and new workers will likely go up and add to the health professions shortages now or on the horizon. Having tried with limited success to deal with the very real nursing shortages over the past decade, it is unlikely that states have the capacity to quickly expand educational programs or shift health workers from one sector to another efficiently.

In addition, the U.S. health system continues to be very inefficient at directing individuals to appropriate practitioners. Our experience so far with managed care has left both practitioners and patients dissatisfied with the way gateways and pathways are established and controlled. The development and evolution of new professions will challenge the current system. It is not hard to imagine the need for new professions to care for the country's aging and increasingly chronically ill populations. A cross between a community health worker and an emergency medical technician, for example, might be perfectly suited to help patients who choose to stay home rather than enter institutional care. Alternatively, a professional who has education and training in both nursing and information technology might be the answer for many rural patients. However, finding space to nurture such new professions will be next to impossible given the current opposition from established professions toward anything novel. The professions often see each other as opponents rather than as colleagues with different but equally respectable scopes of practice intent on working together in the patients' best interest.

Finally, the U.S. health workforce is propping up the nation's labor economy. It alone has been the one labor sector area that has seen a net gain in positions over the past several years. However, policy makers have not given due respect to this reality. We continue to train people for positions that are stymied by aging regulations; we do not have functioning career ladders between and among the professions; and we do not have the infrastructure to meet even the demand of potential students much less the demands of the population for health care.

Several other countries, of course, offer models, including regulatory approaches, for addressing these challenges. We do not need to look to foreign shores, however, for promising ideas. The U.S. military provides a recent example of addressing a workforce need by informed changes in training and duties for a particular group of health workers. In 2001, an analysis of the Army's health workforce identified the benefits of and need for combining earlier incarnations of combat medics with aspects of emergency medical

technicians and licensed practical nurses into a new occupation known as *health care specialists* (still known colloquially as *medics*). The training was modified to be longer (16 weeks) and to focus on trauma, sustaining injuries and the use of digital diagnostic equipment. The Army implemented the necessary courses and a six-year transition period for then-active duty personnel and an eight-year transition period for reservists. [33] The ability of the Army to identify the need (based on data) and implement regulatory changes to training and scopes of practice in such a short period of time stands in stark contrast to any U.S. state or regional capacity to make effective changes to health workforce development and allocation. It is but one example of how we might more responsibly demonstrate the value and trust we have in our health care practitioners.

Conclusion

A silver lining to the complexity and challenges of the health care system in the US today is the wide range of opportunities to make improvements. One large area that has not yet been mined for its wealth of possible benefits has been health professions regulation. Policy makers could view regulation, generally, and scope-of-practice authorities, specifically, as ways of addressing workforce shortages and other challenges. Rather than being a reactionary response to requests and counter-requests from the professions, with the occasional overreaction to a health care incident in the news, wise decisions regarding scopes of practice could be some of the most innovative and productive steps to take.

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Establishing a Regional Academic Health Campus

Peter O. Kohler and Jon Parham

The Need for More Health Professionals and Possible Solutions

The United States is experiencing growing shortages of health workers. Compounding this problem is an aging population requiring more health care services than ever before.

The oldest of the Baby Boomer generation--those born between 1946 and 1964--turned 60 in 2006, beginning a generational shift in population in the U.S. By 2030, the country will have 72 million people age 65 or older--twice as many as there were in 2000 (U.S. Census Bureau). Those Americans born in 2001 are expected to have an average life expectancy of 77 years, much greater than the average of 47 years for those born in 1900 (Centers for Disease Control and Prevention).

The federal Centers for Disease Control and Prevention (CDC) reported in 2004 that the average 75-year-old has three chronic health problems and takes five prescription medications. Approximately 80 percent of those currently 65 or older have at least one chronic condition (e.g., cancer, heart disease, or diabetes) which requires extensive and long-term care. Older Americans also use more health care services, the CDC said in its 2004 report, noting that while representing about 13 percent of the population, persons 65 or older account for almost half of physician visits and hospital stays.

Against this backdrop of rising demand for care, patients are often finding the country's health care system to be understaffed. Workforce shortages force hospitals to make staffing and operational decisions that adversely impact patient care, causing overcrowded emergency departments, longer waits for treatment, or reduced hours of operation. Patients often must travel farther for care and wait longer to see a physician. From physicians and nurses to pharmacists and the many allied health professions, workforce shortages have been reported and are expected to worsen as boomer health-care practitioners retire and population growth outpaces the production of new professionals.

The Council on Graduate Medical Education (COGME), the national advisory body that tracks the supply and distribution of physicians, predicted in 2004 that the demand for medical care will significantly outweigh the supply of physicians by 2020. (COGME, January 2005) The Health Resources and Services Administration (HRSA), Bureau of Health Professions, projects that the nation will have a shortage of at least 55,000 physicians by 2020.

By 2000, the U.S. Department of Health and Human Services was reporting the demand for RNs was already outpacing the supply by about 6 percent. HRSA projected that by 2020 there will be more than 1 million unfilled nursing jobs.

The demand for pharmacists has been driven by rapid growth in prescription medicines. Despite the addition of new pharmacy schools, the supply of pharmacy graduates is not projected to meet demand through at least 2010. A 2002 report by

the Pharmacy Manpower Project predicted that by 2020 there will be 157,000 vacant pharmacist jobs in the U.S.

A variety of allied health professions, from clinical laboratory workers and respiratory therapists to emergency medical responders and genetic counselors, also are experiencing shortages attributable to many of the same factors--population shifts and increased demand for services.

In July 2005, HRSA reported that clinical managers and educators were concerned about a growing shortage of laboratory workers, including medical technologists and cytotechnologists. The aging population, improvements in health-care technology, and increases in the number of available clinical laboratory tests were seen as factors in the rising demand for workers. The shortfall was due, in part, to a decrease in the number of education programs, mainly in hospitals, as a result of limited budgets.

As these demographic changes have taken place, academic entities have been urged to increase enrollment to address the current and expected shortages. With shortages projected to worsen in the coming years, academic health sciences campuses and training programs across the United States are working to develop strategies to increase the supply of health care workers through increased enrollment and expanded educational programs.

The Association of American Medical Colleges (AAMC) has endorsed a 30 percent enrollment increase in our medical schools by 2015--about 4,900 new students annually--to help meet the rising health care demand. Merely increasing the number of medical graduates alone will not solve the problem if the students do not have the opportunity to complete their clinical education by serving a medical residency. So other proposals suggest increasing the number of medical residency slots to further increase the supply of practicing physicians.

In considering the best route toward increased enrollment, universities must consider classroom, laboratory, library, and study space, in addition to available faculty and clinical education sites. If one or more of those factors is not adequate for expansion on the main campus, then a regional or satellite campus remote from the main campus is a possible alternative. Many of the regional or satellite health sciences campuses across the country are more than just an extension of a medical school. They also are home to programs of the other health professional schools.

In the 2003 monograph, *Regional Medical Campuses: Bridging Communities, Enhancing Mission, Expanding Medical Education*, 23 of 39 regional campuses responding to a survey hosted health professions programs in addition to the medical school. Nursing and pharmacy programs were the most common, followed by physician assistant and other allied health programs (Mallon et al.).

The report defined a clinical campus for a medical school as meeting three criteria:

1. The campus is geographically separate and does not serve as the medical school's primary clinical site for medical student education.

2. The campus has an administrative tie to the office of the dean (not only departmental-level ties).

3. The campus offers four of the required third-year clerkships (internal medicine, surgery, pediatrics and obstetrics/gynecology). (Mallon et al.).

Using that definition, the researchers identified 41 regional campuses at 25 medical schools. Several other regional campuses were in various states of development at that time, with the total number reaching approximately 50 regional campuses by 2007. (*AAMC Reporter*, February 2007)

Establishing a satellite campus can be an effective way to reduce the facility and faculty costs along with some of the regulatory and political challenges associated with starting a new school. In addition, a regional campus should be located in sites with adequate clinical capacity.

According to a February 2007 report by the AAMC Center for Workforce Studies, nearly 60 percent of the nation's medical schools reported plans for expanding enrollment between the 2005-2006 and 2011-2012 school years. Of those planning enrollment increases, more than 20 percent of respondents (18 schools) said they had "definite" or "probable" plans to establish a regional or branch campus.

Recognizing the appeal of regional campuses, the AAMC Executive Council in 2002 established a professional development group, the Group on Regional Medical Campuses, specifically for the executive leadership of regional medical campuses. "Creating new stand-alone medical schools from scratch is difficult due to the high start-up costs, accreditation challenges, and state and local politics," Bill Mallon, lead author of the 2003 regional campus study, later noted. (*AAMC Reporter,* February 2007).

The educational programs for medical students at a satellite campus can be either a "preceptor model", depending extensively on clinical faculty physicians in practice, or a "residency model" in which residents-in-training participate in the education of the students (Friedland, 2007). The preceptor model is easier to initiate, particularly with smaller programs. However, the addition of resident training programs provides an additional source of educational support, particularly in larger programs. This also provides for the needed expansion of post-graduate education that will be necessary to accommodate the larger number of graduating medical students.

Teaching hospital administrators might be reluctant to take on the increased cost associated with increasing medical-school enrollment enough to meet the enrollment goals called for by the AAMC. Hospitals that agree to increase undergraduate medical school enrollment must be willing to cover the cost-out of existing patient care revenue and may also provide subsequent postgraduate training (Whitcomb, 2007).

In spite of these concerns, academic health centers can provide leadership in the effort to increase medical school enrollments through the creation of regional clinical campuses.

Mallon has suggested that an established school looking for clinical sites to accommodate expanding enrollment must consider sending students to hospitals and clinics outside its campus area. At the same time, he noted, fast-growing areas where hospitals with clinical capacity are located make a regional campus a "win-win" for the school and the community:

Many large cities are very interested in having a medical school and are lobbying their state politicians. For many of them, partnering with an established medical school outside their immediate area can be a faster and less cost- and labor-intensive way to accomplish that goal (*AAMC Reporter*, February 2007).

Arkansas as a Case Study[1]

A. Building support for a satellite campus

Faced with the prospect of rising health workforce shortages and the call for medical schools across the country to increase enrollment, the University of Arkansas for Medical Sciences (UAMS) determined that creation of a branch or satellite campus would be the optimal method for producing more health care professionals.

With the facility, faculty, and funding needs that a new campus requires, broad support is needed across many different constituencies. A university must reach out to doctors and hospital officials to pave the way for potential clinical sites. Community support is needed to show the new campus is wanted and needed. Legislative efforts at the state and federal level are focused on funding issues for start-up and operations.

There also is an educational period required for those at all levels who might not understand what a satellite campus would be.

For a rural state such as Arkansas with thousands of health care vacancies, increasing the production of doctors, nurses, pharmacists, and allied health professionals can help reduce those workforce shortages. In a 2003 assessment of Arkansas' health workforce needs, researchers at the University of Arkansas for Medical Sciences (UAMS) canvassed health care facilities across the state and found thousands of immediate vacancies. Of the 341 responding facilities, 3,387 vacancies were reported in 79 health professions and the number of vacancies was expected to more than double by 2007. When those figures were extrapolated to include all 774 of the Arkansas facilities surveyed, the estimated number of vacancies by 2007 jumped to more than 14,000. (UAMS Rural Hospital Program)

Increasing production of health professionals will improve access to health care. Physicians often start their careers in the area where they completed medical school or their residency. In 2005, Arkansas ranked third in the nation, behind only California and Texas, in the percentage of active physicians who graduated from medical school in the state. Arkansas also ranked fifth in the nation in percentage of medical residents and fellows who remained in the state after completing their residency. (AAMC)

The education effort required includes illustrating the benefits of a satellite campus to the different constituencies, improving health care access at the local level, and

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[1] Author's Note: Author Peter O. Kohler, M.D., was involved in the planning of a satellite campus for the Oregon Health and Science University when he served as that institution's president. Upon retirement, he agreed to be directly involved in the development of a remote campus in Arkansas. The Arkansas experience, it is hoped, will be useful to other institutions that are contemplating a satellite campus.

meeting the health care work force needs of the entire state. The depth and level of coordination required for this effort is in many ways like a political campaign.

In 2005, UAMS administrators began studying a potential satellite campus in earnest. The existing campus in Little Rock and UAMS programs around the state that hosted clinical education for students and medical residents were at capacity or not able to accommodate enough new students. The location of a new campus was among the first concerns. Since the branch campus would be a clinical campus for more advanced students and residents, the location needed to be where there were enough clinical hosts. Clinical sites include hospitals, clinics, and pharmacies where students can attain experience developing their skills with the latest medical technology or treating real patients in supervised settings.

Outside of central Arkansas (where the UAMS campus is located), the next highest concentration of health care providers is in the northwest region of the state. The concentration of hospital and clinics in that area could ensure enough patients to provide a diverse range of medical conditions for students and residents to observe and treat. The region's population growth also pointed to a growing need for more health professionals. Accordingly, northwest Arkansas best fit the needs for a satellite campus.

UAMS officials began meeting with area physicians and representatives of local hospitals in 2005 to discuss the idea of a branch campus and the clinical sites that would be needed to support it. Next were meetings with business and community leaders, from mayors to state legislators to congressional representatives. Discussions centered on the funds that would be needed to support the campus—and whether new facilities were to be built or existing buildings renovated. There were also discussions about the benefits of having the satellite campus, including improved health care access and new health care professionals starting their careers in the region.

The University of Arkansas (UA), also part of the University of Arkansas System of which UAMS is a member, is located in Fayetteville. The UA has been supportive of the UAMS effort and continued discussions have focused on potential academic collaborations.

At the federal level, there were consultations with Arkansas' U.S. Senators and Congresspersons about issues, such as the Centers for Medicare & Medicaid Services' funding cap on hospital medical residency positions, which would require Congressional attention.

Contact was made with the Accreditation Council for Graduate Medical Education and professional organizations seeking information on accreditation requirements and issues related to establishing a regional campus. These collaborations could identify methods for overcoming obstacles that others had already faced.

Some misconceptions that emerged during the various meetings included a concern that the satellite campus meant UAMS was planning to build a new hospital that would compete with the four hospitals already in the area. There was no intention, however, to build a new hospital. Existing hospitals and clinics were being considered as potential hosts for students and medical residents.

There also was a belief by some that the plans meant a new and separate medical school, which the state could not afford. A satellite campus is not a separate institution.

Another misperception that arose was that the satellite campus would only benefit the region of the state in which it was located. As UAMS is the state's only medical school and academic health sciences campus, one of its missions is to meet the health workforce needs for all of the state, not just the region in which the main campus is located. Expanding the number of medical students should benefit the entire state.

In June 2006, a delegation of legislative and business representatives from northwest Arkansas accompanied UAMS officials on a two-day visit to a satellite medical school campus at the University of Kansas School of Medicine-Wichita in Kansas. The University of Kansas School of Medicine affiliate has served as a clinical campus since it was established in 1975. Its 2006-2007 academic year enrollment was 118 students, and its faculty consists mostly of 1,000+ area physicians and clinicians who volunteer their time. (KU School of Medicine-Wichita) The site visit, which included meetings with school administrators, faculty members, legislators and community leaders, offered the Arkansas representatives an opportunity to ask questions and see first-hand what a branch health sciences campus could mean to the region.

As the planning and development of the satellite campus continues, UAMS administrators will meet with different target audiences, from local service clubs and business groups to professional organizations and area news media. The goal is to explain and provide as much detail as possible about the need and benefits of a satellite campus.

Close contact also will be maintained with the governor and state legislators to ensure that the project will be seen as a funding priority. Continued contact also will be needed with physicians, pharmacists, and other health care practitioners to build support and keep the project in the public's eye.

Building support for a satellite campus is a continuing effort from the time of conception through the planning and opening. The key is to identify the target audiences and make sure they have the information needed to make informed decisions.

B. Facility and faculty needs for a satellite campus

Facilities

Facility needs for a regional or satellite campus will vary, mainly depending on the size and specific needs of the programs to be located there. Depending on available resources, a university can build a new facility or renovate an existing structure. The University of Arkansas for Medical Sciences is currently examining its options for a facility to house a satellite campus in northwest Arkansas.

One of the more economical strategies is to obtain an existing building, then seek a partnership of public, private and corporate funds to pay for renovating it to meet the needs of the satellite campus. Hospitals are often looked to as sources of funding, but their resources may not be sufficient.

The programs intended for the UAMS satellite campus anticipate between 250 and 300 students, including pharmacy, allied health, and medical residents when full enrollment is reached. It will likely take up to several years to reach this level.

Classrooms as well as small conference rooms would be needed for several programs, along with lecture halls and laboratories. An auditorium would be desirable for hosting larger lectures and events such as Grand Rounds, at which health care experts and specialists speak. The facility would also be well positioned to host health education presentations and health screenings for the public as well as continuing education sessions for community health care providers.

Distance learning accommodations and video connections would be needed. UAMS currently uses these tools to broadcast lectures or special events from its main campus to classes or programs at its Area Health Education Centers (AHECs) around the state. The interactive and real-time nature of distance learning extends the educational resources.

Office space will be needed for the administrative functions of the satellite campus and the faculty members based there. The satellite will not require as many administrators and office staff as the main campus, since it functions like a branch office of the colleges and programs based on the main campus. Some programs do require full-time administrators on the geographically separate campus, though.

Space for student services, including an adequate library and computers, will be required. Across the various accreditation agencies governing health professions education, the overriding view toward satellite campuses is that the student experience there cannot put these students at any disadvantage compared to those on the main campus.

Faculty
Volunteer and part-time faculty members will almost certainly outnumber the full-time faculty on the satellite campus. This is the case at most existing satellite campuses, at which local clinicians volunteer their time and expertise to enhance the education experience for students.

The part-time and volunteer faculty members serve as preceptors in clinical settings. Here, they serve as supervisors and mentors for students gaining hands-on experience with real patients.

The residency programs on the satellite campus will require part- or full-time directors. The staffing requirements are specified by the review committees of the Accrediting Council for Graduate Medical Education that oversee those disciplines.

C. Funding needs for a satellite campus
Creation of a regional campus will require start-up funds to cover facility acquisition and administrative costs, as well as continuing operational funding. For many institutions, funding can be a delicate balance involving a combination of sources including the clinical sites, local, state and federal governments, and philanthropy.

One of the most important current funding issues for either a satellite campus or an academic health center is the limit on federal funding for medical residencies. Teaching hospitals and clinical sites that host residents receive money through the federal Medicare program to pay for residency positions since those hospitals provide

health care services to Medicare beneficiaries. The Balanced Budget Act of 1997 limited the number of residency positions that could be counted for Medicare reimbursement. The intention was to control costs to help balance the federal budget. Another reason was that previously, experts had predicted a physician surplus (Brezenoff testimony).

Now the pendulum has swung in the other direction with the anticipated shortage in physicians. Even without new funding for residency positions, teaching hospitals have increased the number of residents since the residency cap was put in place. Based on reports from 975 teaching hospitals across the country, nearly half have already exceeded their resident count by a total of some 4,900 positions. The teaching hospitals have funded the additional positions from their own budgets, or with support of state governments. They have not received additional Medicare funding for these positions. Despite some refinements to the program that added some monies for rural teaching hospitals and a one-time redistribution to hospitals below the limit, the limit has remained in place.

The need to fund residents is one reason that hospital administrators may not be enthusiastic about increasing the number of residents in training.

With the expected impact of the increase in the number of elderly and workforce shortages, proposals to increase the resident limit are being debated in Congress and elsewhere. Faced with the call to increase medical school enrollment by 30 percent, it would seem logical that an increase in the resident cap also would be necessary. Congressional delegations from some states have expressed concern that the number of residency slots could not be increased without any additional funding to pay for those new positions. This would further stretch the existing funds, potentially causing funding to be shifted from one state to another. The implications could cause some states to resist a change to the residency numbers.

Another problem has been the concern by some in Congress that the federal government should not have to be the main supporter of graduate medical education. However, it is clear that with the increased demand for care and the increased number of older Americans in the next 10 to 20 years, there will have to be more residency slots along with some mechanism for funding to pay for them.

Other funding needs for a satellite campus could be provided at the state and local level. Contributions from local hospitals and clinical sites, in addition to paying for residency positions, could include equipment, facilities, and staffing to accommodate the residents and students in other programs. State government support could range from ongoing funds for operations to assistance with residency costs.

The amount needed from the state could be reduced by increases made to the federal residency cap or from the support of area hospitals participating as clinical affiliates for the satellite campus. Another potential contributing factor in budget projections is philanthropy.

Some of the costs, perhaps for facilities, could be offset by private or corporate gifts. Another possibility is that private gifts could provide teaching endowments, paying the costs to allow local physicians to participate by mentoring and teaching students and resident physicians.

D. Establishing medical residency programs

The driving force behind establishing a satellite campus is the need to produce more health professionals to meet workforce shortages. For a medical school, the issue is often not only graduating more medical students but creating more medical-residency training positions for those graduates. A medical residency follows graduation from medical school and includes more specialized education in a hospital or health clinic. Its length varies across the different disciplines and gives a new physician the opportunity to see a range of patients and procedures while practicing in a closely supervised environment.

Physicians often stay in the region in which they complete their residency. For a state like Arkansas, which is largely rural and experiencing a shortage of doctors, increasing the number of medical residencies would inevitably increase the number of young doctors entering the profession in the region and state.

In 2006, UAMS had 714 residents and fellows. UAMS has been approved for more residency slots but currently there are not funds or enough clinical education sites to support those additional students. Establishing a satellite campus is therefore critical for UAMS in its ability to increase the number of medical residents. Its current clinical affiliates, the hospitals and clinics that host residents, are at or near capacity based on their ability to pay and accommodate these residents.

It is possible to have medical students in clinical rotations without a resident physician present. However, we believe it is preferable to have a residency program in place to help with student education. Then, when medical students examine patients or accompany physicians on patient rounds, residents also are present to further assist students with questions about diagnosis or clinical management.

Residency programs are governed by the Accreditation Council for Graduate Medical Education (ACGME), the nonprofit organization that accredits approximately 8,000 residency programs in the United States. Most medical and surgical specialty boards require physicians to complete an ACGME-accredited residency education program to be eligible for specialty certification. In addition, programs must be ACGME-accredited in order to receive federal graduate medical education funds (ACGME).

For its satellite campus, UAMS has planned to establish residency programs in five core areas: internal medicine, obstetrics/gynecology, pediatrics, psychiatry and surgery, in addition to a family medicine program that already exists in the UAMS AHEC program. ACGME approval would be necessary for each program before new residents could be accepted. It is anticipated that the residency programs for a UAMS satellite campus will be phased in--with some starting before others due to the varied timelines required for assembling the program and completing the accreditation process.

Each medical or surgical specialty discipline has an ACGME Residency Review Committee (RRC), composed of physicians nominated by supporting organizations (e.g., AMA, medical specialty boards, professional organizations) as well as one or more resident representatives. The RRCs establish program requirements and make accreditation decisions for programs in that specialty and related subspecialties (ACGME).

Length of Medical Residency in Years		Min. # Residents/Year
Internal Medicine	3	4/yr average
Obstetrics /Gynecology	4	4/yr average
Pediatrics	3	4 per year
Psychiatry	4	3 per year *
Surgery	5	Varies

* Except for the fourth year, which can have fewer than three residents

A potential alternative to establishing separate residency programs would be to expand the central training program to clinical rotations at new sites that could accommodate new residents. UAMS must still apply for the additional residency positions to the ACGME.

The mechanics of a residency program might prove to be an obstacle to the satellite alternative. One requirement of a residency is that the resident must have a continuity clinic experience, i.e., the opportunity to follow medical patients from intake through follow-up visits. This experience includes the diagnosis, treatment, and record-keeping involved through the course of care. If a resident is sent to another part of the state for two to three months for a clinical rotation, it can dilute his or her clinical experience at the home location. Also, clinical sites receive funding for hosting residents and paying their salaries. It also would seem unlikely a hospital would be satisfied paying for a resident to work elsewhere.

An early step in creating a residency program would be to select a program director. Program directors, as well as most faculty, must be board-certified physicians in their specialty. The program director also must be based at the teaching site.

The program director and a program coordinator will select clinical sites for hosting residents and gather lecturers who will augment a resident's clinical experience along with clinical supervisors. Each element of the program must conform to specific program requirements for each discipline, which can range from faculty-to-student ratios to duty hours and board examination passing rates.

For internal medicine, for example, the ACGME requires a residency program to have four "key clinical faculty" members plus a program director working at least 15 hours a week. For pediatrics, a program director must be at least a 75 percent full-time faculty member, and the residency program must include five pediatric subspecialties such as pediatric oncology and pediatric cardiology.

The program director will craft the Program Information Form (PIF) for submission to its particular RRC. This form will detail how the program will be established and operated. The PIF will cover financing, facility plans, faculty credentials, curriculum, and clinical site information.

Each RRC meets at least once a year, at which time submitted PIFs are reviewed. If the PIF does not meet the deadline for submission, a program may have to wait a full year before making another application, depending upon the RRC's meeting schedule. An ACGME representative may make a site visit ahead of the RRC meeting and submit a report that also will be considered by the committee making the accreditation decision. If the committee approves, the program will be accredited and additional residency slots approved based on the program's ability to support

them. If the committee does not approve, it will ask for additional information on meeting program requirements. This would require a new application, the timing of which would depend upon when that RRC was scheduled to meet next.

From initial writing of the PIF to the first day a resident could start training is estimated to take 15 months to two years if all requirements are met. If a program has to resubmit the initial PIF, it could add another year or two to the process. The program is accredited for up to five years, based on the program's strengths.

Upon accreditation, the residency program must make arrangements to enter the National Resident Matching Program (NRMP). The NRMP is the organization responsible for placing medical school students in residency programs across the country. A nationwide computerized selection process matches the fourth-year students with residency openings based on student preference and availability. The match results are released simultaneously to students across the country on "Match Day" every March. The new residency programs would need to be in place and able to communicate their availability to potential residents who will be submitting applications to the Match Program.

Yet another consideration for establishing a residency program will be addressing the anxiety that such programs can cause within the medical staffs of host hospitals. Members of the medical staffs could be concerned about how the residency programs will affect patient care in their facility. This is critical "since the medical staff alone have the authority to determine whether residents may be involved in patient care. Other issues he felt must be addressed will be how the staff will participate in the training of residents and whether they will be compensated for the time involved (Whitcomb, 2007).

E. Medical program accreditation and curriculum

Regional campuses for medical schools in the United States have followed different structural models, whether they offer only basic science instruction or serve as a clinical campus for third- and fourth-year medical students. Most regional campuses include or are affiliated with medical residency programs.

In the planning stages for a satellite campus, UAMS chose to pursue the option of a clinical campus for third- and fourth-year medical students, as well as residency programs. The satellite campus also will serve as a location to expand programs in its colleges of pharmacy and health related professions. In each case, the educational programs included in the regional expansion are governed by accreditation organizations. (appendix A)

Expansion of a medical school in the United States must be accomplished under the oversight of the Liaison Committee for Medical Education (LCME), the accrediting authority for medical education programs leading to an M.D. degree in the U.S. and Canada. The LCME is sponsored by the AAMC and the American Medical Association.

Based on the LCME's 2005 statement on the scope of accreditation, UAMS would not need a separate accreditation for its satellite medical education program (what LCME terms a "geographically separate" campus). The LCME only accredits "complete" programs that offer all courses, electives and clinical rotations necessary for a student to earn an M.D. degree (LCME).

A school must notify the organization if it plans a substantial change in its curriculum or educational program. Notification also is required for any enrollment change. Upon receiving such notification, the LCME could choose to reevaluate a program prior to its accreditation renewal or accept the changes.

The LCME limits how fast a medical school can grow, so it will not exceed its resources. Current LCME guidelines prohibit medical school enrollment to expand by more than 10 percent or 15 students in any given year or by a cumulative increase of 20 percent over three years without prior notification. (LCME)

The LCME expects the educational experience on the geographically separate campus to be essentially the same as for students on the main campus. This ranges from primary issues, such as curriculum, faculty and clinical requirements, to support services such as access to a library, student health, career advising and personal counseling services. The curriculum on geographically separate campuses does not necessarily need to be identical to that on the main campus, but it must provide essentially the same information. Some lectures and courses could be taken by teleconference, with the presenter remaining on the main campus, for example, or a student could travel to the main campus on a temporary basis.

During the third year of medical school, UAMS students complete eight clinical rotations. They are exposed to different specialties in both outpatient and inpatient settings. The third-year rotations at UAMS include:

- 8 weeks of internal medicine
- 8 weeks of pediatrics
- 8 weeks of surgery
- 6 weeks of obstetrics/gynecology
- 6 weeks of psychiatry
- 4 weeks of geriatrics
- 4 weeks of family medicine
- 4 week specialty rotation

During the specialty rotation, students will either have a combination of neurology and neurosurgery or a combination of orthopedics, otolaryngology, urology, anesthesiology and ophthalmology. In the fourth year, students will complete the specialty rotation they did not have during their third year.

In addition to the specialty rotation, fourth-year students complete a four-week acting internship. During this time, students are given increased responsibility in an inpatient clinical setting, not unlike new residents but more closely supervised. Several students will accompany an attending physician and some residents on daily patient rounds and will follow cases from beginning to end. For the clinical rotations, a site will be needed that has all of the necessary services as well as staff to supervise students.

Another necessity for the medical education program is a clinical skills education center. This center, also used by pharmacy students, allows face-to-face interaction between students and “patients” --actually people hired or volunteering to simulate illnesses for students to diagnose. Students learn how to take patient histories and perform examinations in a controlled and supervised setting. The centers also are used for testing clinical skills. A location would be needed that would mimic a clinic

or hospital with exam rooms. An administrative staff is needed, along with someone to recruit and train the simulated patients.

F. Pharmacy, nursing, and allied health professions programs on a satellite campus

UAMS plans for the satellite campus in northwest Arkansas include expanding its College of Pharmacy and at least five programs in its College of Health Related Professions (CHRP). The colleges' decision to participate was driven by existing workforce shortages in these professions, which are expected to grow. Responding to those anticipated shortages requires more graduates in the health professions. The education of these additional graduates requires, among other resources, an increased number of clinical rotation sites for them when they are students. Northwest Arkansas offers a number of large and excellent health-care institutions as well as smaller settings that can provide many of those needed rotation sites that are currently saturated in central Arkansas surrounding UAMS.

Moreover, placing additional programs on the satellite campus increases efficiency because the programs could share services that would be needed by all. The costs of some student and administrative services could be shared.

Nursing

Because the University of Arkansas in Fayetteville (UAF) already has a nursing program, UAMS does not plan to start a duplicate program. However, the UAMS College of Nursing is examining the addition of graduate-level programs on the satellite campus that the UAF program does not have. The master's and doctoral programs on a satellite campus would focus on preparing future nursing faculty.

Arkansas, like the rest of the country, is facing a significant nursing shortage. One factor holding back enrollment in many nursing schools is the lack of faculty. Nurses often are able to make more money providing clinical care than teaching nursing. A 2007 workforce survey of executives at academic health centers by the Association of Academic Health Centers showed faculty shortages to be considered a major problem; the most serious faculty shortages were seen in nursing schools (AAHC). In Arkansas, for example, the average age of doctorally prepared faculty is 59 and for other RN program faculty, is 54.

Changes in the nursing programs would require notification and approval as necessary at the state level by the Arkansas State Board of Nursing; and at the national level by the Commission of Collegiate Nursing Education.

Another possible avenue for expanding a nursing program might come in the form of programs to accelerate nursing education. Such a program was introduced in 2001 by the Oregon Health & Science School of Nursing when it joined with Oregon Community Colleges to create the Oregon Consortium of Nursing Education (OCNE) in response to the critical nursing shortage. OCNE enables Oregon nursing programs to expand the ability of students to earn a nursing degree through shared curriculum across several campuses and institutions; agreements to facilitate students completing needed courses on different campuses through dual enrollment and other services; and shared graduation standards among partner schools. (OCNE)
Such a program could be replicated, including an "educating the educators" format that would encourage setting up advanced nursing programs for students who could then go on to become nursing faculty.

Pharmacy
The UAMS College of Pharmacy hopes to have 30 fourth-year students complete their entire senior year in northwest Arkansas through the opening of a satellite campus. In addition, the college is considering having 30 third-year students take classes on the satellite campus.

UAMS will notify the Accreditation Council for Pharmacy Education (ACPE), which accredits colleges of pharmacy, and seek any necessary approvals for the planned changes in its pharmacy program, including the details on how it will accommodate the additional students and provide clinical experiences and student services.

A formal satellite campus with pharmacy students would require a site visit by the ACPE. ACPE regulations also point to the need for an administrator for the college to be based in a satellite campus. (ACPE)

Facility needs would be similar to the other colleges, including classroom space, small group meeting sites, technology equipment for distance learning and a laboratory. Clinical sites, in this case institutional and retail pharmacies that would host students, will be needed.

A major need would be a center for clinical skills education. This center, used by pharmacy, nursing, allied health and medical students, would allow face-to-face interaction between students and "patients"--actually people hired or who volunteer to portray patients by simulating illnesses for students to diagnose. These "standardized patients" also test pharmacy students by simulating a health professional or patient requesting a drug therapy consultation.

A mix of full-time, part-time, and volunteer faculty is anticipated. A small administrative staff for the college would be based on the satellite campus.

The UAMS College of Pharmacy already has a presence in the region, as approximately 30 fourth-year pharmacy students are intermittently spending time in clinical practice experiences in northwest Arkansas. A satellite campus should provide excellent educational opportunities to the college as it expands.

Allied Health
The College of Health Related Professions also already has a presence in Fayetteville, with approximately 30 students in the radiologic imaging sciences and diagnostic medical sonography programs offered through the UAMS Area Health Education Center (AHEC). CHRP also plans to add new programs to the area in health information management, medical technology and respiratory care.

The CHRP predicts that once it fully phases in its programs at the satellite campus, enrollment in the region over three years would at least double. The CHRP now offers programs in 17 different allied health professions in response to health workforce needs. The college will conduct needs assessments through contacts with health care practitioners and their employers in the region to determine the precise size and scope of its expansion plans. In each program, the college will need to notify the appropriate accrediting body, whether the Commission on Accreditation of Allied Health Programs (CAAHEP) or a professional organization such as the Committee on Accreditation for Respiratory Care (CoARC), of a program change. Each evaluation becomes part of the next re-accreditation cycle. [appendix A]

Facility needs include office, classroom, and laboratory space. Equipment, such as ventilators and X-ray equipment, and technology for video classes and conferences and hands-on teaching will be needed as well.

Five to seven full-time faculty members would likely be needed across all five CHRP programs to reach the planned enrollment. Volunteer faculty will be used as well, many from the health care providers hosting students for clinical experiences. Approximately three administrative employees would handle operations for all of the programs.

Benefits of a Regional Campus

Establishing a geographically separate or regional campus offers a university another avenue for expanding its enrollment. This solution is being examined by academic health centers across the country as a response to the growing shortages of physicians, nurses, pharmacists and other health professionals.

As the baby boomer generation reaches age 65 over the next few years, workforce shortages will increase as will the demand for care. That is driving the sense of urgency to increase enrollments as quickly as possible. Nearly saturated clinical sites and overcrowded classrooms on main campuses that lack space for additional growth make the establishment of a regional campus more attractive.

The benefits of a satellite campus include: (1)increasing the number of health professionals entering the workforce in the region; (2)allowing improved access to care for patients with the addition of medical residents seeing patients in area clinics and hospitals; and (3)allowing educational institutions to deliver on the mission of education and community outreach.

UAMS has traditionally produced many of the health professionals working in Arkansas. Increasing the flow of students in its education programs by adding a satellite campus will increase the number of graduates entering the workforce in the state.

Similarly, a 2003 survey of regional campuses found that 50 percent of medical residents in the program at the Fresno satellite campus of the University of California, San Francisco School of Medicine remained in the Fresno area to practice medicine. (Mallon) Mallon learned in community interviews that a satellite medical education program boosted the community's ability to attract specialty physicians who otherwise would have gone elsewhere. The impact can be economic as well as the improved level of care can attract employers to the region. Hospital administrators indicated that hosting medical residency programs enhanced the hospital's reputation as an academic medical center, with one hospital noting that the relationship between the hospital and the residency program enhanced the hospital's academic image, offering strategic benefits such as improved ability to capture state funds for research (Mallon).

Teaching hospitals often see more patients from underserved populations. The additional staff provided by the presence of medical residents means improved health care access for patients from economically disadvantaged backgrounds.

The addition of medical residents to the physician staff is believed to improve patient care. With residents shadowing staff physicians and participating in cases, the outcome is a team format for care, with multiple evaluations and opinions about the best course of care. The presence of residents also may challenge and stimulate attending physicians to be as up-to-date and engaged as possible because of their role as mentor. (Journal of General Internal Medicine)

Hosting medical residents or pharmacy or allied health students also places the clinical site in a prime position to recruit program graduates. Hiring recent graduates is generally less expensive that recruiting more established professionals or trying to attract recent graduates from other states.

John Molidor, Ph.D., community assistant dean at Michigan State University College of Human Medicine-Flint, summed it up:

> If a medical school approaches a hospital and says, "We are looking for sites where we can place students for the last two years of their education, and we'd like to partner with you," that can be an extremely attractive position.
>
> The benefits can be considerable. They can hire their choice of new doctors with minimal recruitment costs. They get the cutting-edge cachet of being an affiliated teaching hospital. And it's true that doctors can learn as much from students as the reverse, so bringing in students tends to rejuvenate and enhance the skills of the entire staff (*AAMC Reporter*, February 2007).

Lessons Learned

Pressured by the rising demand for health care and increasing shortages of health professionals, academic health centers across the country are wrestling with how to respond to calls to raise student enrollment. For institutions constrained by facility limitations, faculty shortages or a lack of clinical education sites, one potential solution is the establishment of a regional or satellite campus apart from the main campus as a way to obtain new resources and increase capacity for producing more health professionals. Establishing a new campus is often an economically sound and efficient alternative to starting a new school. However, there are often substantial academic, regulatory, political and financial hurdles that must be overcome.

The Arkansas experience is replete with lessons for others. Among the issues being addressed:

- Location - Institutions must find a location for a potential campus that includes access to clinical education sites. An adequate patient volume and mix is needed for students to complete clinical education by seeing actual patients in supervised settings.

- Local support – Local government and business leaders must understand what a satellite campus would mean for their communities. Statistics show that doctors often start their career in the area where they completed their residency. The same goes for other health professionals, meaning that the area around the regional campus will have access to new health workers, likely improving access to health care. However, this very advantage may be threatening to health professionals already practicing in the area.

Misconceptions about satellite campuses must also be addressed. A regional campus is not a new and separate school. While some professionals in the optimal location may not be sure they want the new campus, other regions of a state may need to be reassured they will not be left out of access to new health professionals by not having the campus located in their area.

- Funding – State and federal government, corporate and philanthropic sources will be needed to provide sufficient funding to establish and operate a satellite campus. However, there are issues that could raise or lower each element of the financial support stream, such as an increase in the number of federally funded residency positions or philanthropic support for facility costs or teaching endowments. In a time of tight state budgets, explaining the scope and benefits of a satellite campus becomes more critical in securing state funding.

- Accreditation – Review and approval by the respective accrediting agencies will be necessary for all programs on the satellite campus. Each accrediting entity has its own requirements when it comes to staffing, resources, and clinical experiences, but the underlying theme is that the educational experience on the satellite campus should be essentially the same as that on the main campus.

  This sentiment extends to campus resources as well; thus, a satellite campus needs to provide adequate access to e.g., a library, technology, student health services, etc.

- Medical residency programs – Specialization through a medical residency follows graduation from medical school and establishing residency programs will likely be the most complicated part of in creating a satellite medical school campus. For its satellite residency programs to become accredited by the Accreditation Council for Graduate Medical Education (ACGME), an institution must meet a series of requirements ranging from faculty credentials to facility resources and clinical education opportunities for each medical specialty.

  It is the residency programs that often prove most attractive to prospective clinical education partners. Resident physicians improve patient access to care at that hospital or clinic. Since many residents usually remain in the region to practice medicine following their residency, the residency programs and by extension the satellite campus, become even more valuable to local communities.

- Clinical sites – Facility needs include classroom space and lecture halls, but the major need of a satellite campus that will host third- and fourth-year medical and pharmacy students will be access to clinical education sites. As with the residency locations, these are in hospitals, clinics, or offices where students receive hands-on experience with real patients under close supervision. Many hospitals do not have adequate small conference rooms for teaching small groups, so some provision must be made for these.

  In many cases, it is the lack of clinical education locations or the inability to expand existing clinical capacity that is driving academic health centers to consider creating a separate campus.

- Volunteer and part-time faculty needs – Volunteer and part-time faculty will usually outnumber the full-time faculty on a satellite campus. With the focus in the latter years of medical and pharmacy education on clinical experiences, the main staffing needs will be for preceptors--health professionals in the community who can supervise and mentor the students and residents.

Ultimately, the benefits of a regional campus as a means for increasing enrollment will include improving access to health care in the region and an anticipated influx of new medical residents and other health professionals in a time of practitioner shortage.

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APPENDIX A

Listed below are the accrediting organizations for those health care programs that will need approval before the start-up of the satellite campus planned by the University of Arkansas for Medical Sciences.

Accrediting Agencies

Diagnostic Medical Sonography	Commission on Accreditation of Allied Health Programs (CAAHEP) Joint Review Committee on Education in Diagnostic Medical Sonography (JRCEDMS)
Health Information Management	Commission on Accreditation for Health Informatics and Information Management Education (CAHIIME)
Medicine	Liaison Committee for Medical Education (LCME) Accreditation Council for Graduate Medical Education (ACGME) Residency Review Committee (RRC) for each specialty
Medical Technology	National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)
Nursing	Arkansas State Board of Nursing Commission of Collegiate Nursing Foundation
Pharmacy	Accreditation Council for Pharmacy Education (ACPE)
Radiologic Imaging Sciences	Joint Review Committee on Education in Radiologic Technology (JRCERT)
Respiratory Care	CAAHEP Committee on Accreditation for Respiratory Care (CoARC)

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Health Workforce Research: What Are the Issues?

Jean Moore

Introduction

Lack of relevant and timely data on the health workforce is a significant barrier to the development of effective health workforce programs and policies that could support improvements in the health care delivery system. An in-depth understanding of the forces that influence health workforce supply and demand is crucial for shaping future direction in health workforce policy.

For the past ten years, the National Center for Health Workforce Analysis, based in the Bureau of Health Professions at the Health Resources and Services Administration of the U.S. Department of Health and Human Services, played a key role in setting a national agenda for health workforce research. The mission of the National Center was to collect, analyze, and disseminate health workforce information and facilitate national, state, and local workforce planning efforts. The National Center provided funding to support the work of six regional workforce research centers based in California, Illinois, New York, North Carolina, Washington, and Texas. Federal legislation that passed in 2006 resulted in substantial cuts to Title VII programs and eliminated the National Center as well as the federal funding for the regional centers.

This paper describes health workforce research; what it is, why it's important, and how the agenda for health workforce research is being re-focused as a result of a diminished federal presence in the health workforce area. The regional workforce centers, however, continue to conduct health workforce research, primarily at state and local levels.

Background

The health of our country's population depends on the availability of a health workforce that is both well-trained and adequate in number. A health care system is only as good as its workforce and its workforce directly affects quality, cost, and access to health care. Furthermore, health care employment is an important economic engine in the United States. More than one in ten Americans either works in health care or is a health professional, and health care spending accounts for more than 15 percent of the nation's economy.

Health policies designed to expand access, improve quality, and control costs must take into account the supply, distribution, education, and utilization of the health workforce needed for these policies to succeed.

Lack of relevant and timely data on the health workforce is a significant barrier to the development of effective health workforce programs and policies that could support improvements in the health care delivery system. An in-depth understanding of forces that influence health workforce supply and demand is crucial for shaping future direction in health workforce policy.

An excerpt from a *Wall Street Journal* article about physician shortage in Massachusetts:

"The dearth of primary care providers threatens to undermine the Massachusetts health care initiative, which passed amid much fanfare last year. Newly insured patients are expected to avail themselves of primary care because the insurance covers it. And with the primary care system already straining, some providers say they have no idea how they will accommodate an additional half-million patients seeking checkups and other routine care." (July 25, 2007)

Three Key Questions About Workforce Imbalances

What are health workforce supply and demand imbalances?

Fluctuations in health workforce labor markets can lead to widespread workforce imbalances, referred to as **shortages** or **surpluses**. These imbalances can take many forms as follows:

- Profession imbalances, (e.g., shortages of RNs) or specialty imbalances within professions, (e.g., shortages of primary care physicians or general surgeons);
- Geographic imbalances (i.e., differences in the supply of health workers between rural and urban areas or between economically disadvantaged and affluent communities);
- Institutional and service imbalances (differences in the supply of health workers in different health care settings, e.g., acute care compared to long-term care);
- Public and private imbalances (associated with differences in the supply of health workers between publicly- and privately-sponsored health care providers); and
- Gender or racial and ethnic imbalances in a health profession (i.e., differences in the representation of women and various racial and ethnic groups in a health profession as compared to their presence in community).

What contributes to imbalances between supply of and demand for health workers?

Many factors contribute to these imbalances and the specific reasons vary by occupation. Short-term factors contributing to shortages include the competition for health workers in a strong economy, growing demand for health care services, an increased intensity and complexity of services, and educational system cycles and response lags. When the economy is strong, shortages in health care traditionally worsen because other opportunities may be more attractive or lucrative or less stressful at similar levels of education. At the same time, demand for health care (unlike demand for most consumer services) is not greatly affected by economic fluctuations. Instead, demand for health care is steadily growing. Additionally, services provided are more complex in all settings due to the rising rates of chronic disease and co-morbidities, the trend towards ambulatory and community-based care, and increasing technological sophistication at all levels of care. This growing complexity and intensity escalate the demand for more highly skilled workers.

Furthermore, the educational system is slow to respond to the demands of the health care system. For example, it can take two to four years for nursing education

programs to produce more graduates in response to shortages of RNs. These educational response lags can lead to overproduction, resulting in short-term surpluses followed by a reactionary constriction of pipeline production that historically prefaces a new cycle of shortage.

Key Short-Term Factors Contributing to Health Workforce Shortages

- Competition for workers
- Growing demand
- Increasing intensity and complexity of health services
- Educational system cycles and response lags

Workplace factors can discourage recruitment into health professions; however workplace factors typically exert a stronger effect upon the retention of existing workers. Many health care jobs are physically and emotionally demanding. Some of these jobs may not provide competitive wages and benefits. This is especially true of entry-level, direct-care workers such as nursing aides or home health aides. Furthermore, many jobs are designed in such a way that patient contact is minimized. An excessive amount of paperwork and poorly implemented health information technology also contribute to burnout. Many supervisory and managerial staff are experienced and trained in clinical care, but not necessarily in managing other workers effectively, potentially leading to strain in their own jobs and conflict with those working under them.

Attrition of existing workers is an issue at all levels of nursing care. Turnover in other settings, such as long-term care facilities, is generally even higher. The loss of nursing staff by one employer to another does not reduce the net supply of such workers, but high rates of turnover, or "churn," within an institution can negatively affect patient care. Furthermore, many nurses and nursing staff (e.g., nursing aides) leave the field completely for less demanding jobs, or move to jobs within the field that do not involve direct patient care (e.g., insurance claims reviewer). In 2004, just over 16 percent of the nation's RNs were not working as nurses[2].

Key Workplace Factors Contributing to Health Workforce Shortages

- Physically and emotionally demanding work
- Noncompetitive wages and benefits
- Lack of patient contact
- Paperwork and lack of efficient information systems
- Poorly trained managers

[2] National Sample Survey of Registered Nurses, 2004.

Short-term and workplace factors explain why workforce shortages in health care have been so persistent despite decades of efforts to eliminate them. In addition, a number of long-term factors point to a worsening of these shortages in the future. These factors include the growing diversity of the country's population, retirements from an aging health workforce, and growing demand for health services by an aging population.

Racial and ethnic imbalances persist in many health professions and occupations. According to the 2000 U.S. Census, 30 percent of the country's population comprise racial and ethnic minorities, but many health professions are predominantly non-Hispanic White. Minority recruitment will become critical to maintaining an adequate supply of health professionals in the future as the population becomes increasingly diverse, and non-Hispanic Whites become a smaller percentage of the country's population.

In addition, current research suggests that a lack of cultural competence is one reason for the well-documented racial and ethnic disparities in health outcomes. Increasing the number of underrepresented minorities in health professions, such as nursing and medicine, has the potential to improve the cultural competence of these professions.

Many health professionals in medicine and registered nursing are older than the average U.S. worker. Consequently, an increasing number of retirements in these health professions in the coming years is likely. Other health professionals that may be in short supply are also older than average, compared to the civilian labor force.

The baby boom generation (born 1946-1964) will turn age 65 between 2011 and 2029, resulting in rapid growth of the older adult population over the next 25 years. Older adults suffer more chronic disease and consume more health services than younger age groups, including more hospital, nursing home, and home health services, as well as more ambulatory care and more prescription drugs. The aging of the population will also affect the nature of the skills and services the health care workforce must be equipped to provide and the settings in which this care is provided.

Long-Term Factors Contributing to Health Workforce Shortages

- Changing racial and ethnic mix in the U.S.
- The aging of America: increase in demand for services
- The aging of America: decrease in supply of workers

How can health workforce supply and demand imbalances be addressed?

The options for responding to health worker shortages include the following:

- Increase the pipeline (e.g., add or expand educational programs, support health and education sector partnerships, training initiatives, career ladders, marketing careers, etc.).
- Improve retention (e.g., increase wages, benefits, improve working conditions, increase education and training opportunities for incumbent workers, etc.).
- Reduce demand (e.g., increase efficiency, implement new technology, shift delivery site).
- Government interventions (e.g., establish commissions or task forces, review professional regulations on scope of practice or immigration policies).
- Conduct health workforce research to inform program and policy decisions (e.g., conduct studies that focus on the supply, demand, use, and distribution of health workers).

Key Concepts in Health Workforce Research

Systematic health-workforce research increases the likelihood that people will receive needed services in the most cost-effective manner. It is important to understand the basic terminology used in health workforce research such as supply, demand, need, and requirements for personnel (Moore, et al, 2005).

Supply represents the number of health personnel either working or available to work in health care. The economic interpretation of supply includes the concept of willingness to work at current wages and salaries.

North Carolina Health Professions Data System

The Center for Health Workforce Studies at the University of North Carolina at Chapel Hill houses the North Carolina Health Professions Data System (HPDS) *http://www.shepscenter.unc.edu/hp*. The HPDS operates with funding from the North Carolina Area Health Educations Center (AHEC) Program and the UNC Office of the Provost (Health Affairs). The HPDS maintains annual licensure files for 19 health professions and has continuous data for most of these professions dating back to 1979. Annual licensure data include demographic (e.g., name, data and place of birth, race/ethnicity, and gender), educational (e.g., professional degree and graduation year) and professional characteristics (e.g., employment address, specialty, type of position, employment setting, and activity status). The HPDS produces both annual and special topic reports that serve three functions:

- Monitor trends in health professional supply and distribution.
- Provide state policy makers with objective, timely data to inform health workforce policy debates.
- Identify emerging issues in the supply of unlicensed health professionals that are important to health care delivery as well as the health of the state's economy.

Demand is an economic concept based on the willingness of employers to purchase the services of health care personnel at a particular compensation level.

New York State Resident Exit Survey

Since 2000, the New York Center for Health Workforce Studies, with support from the New York State Department of Health, has conducted an annual census survey of residents and fellows completing training in New York in order to learn more about the new physician job market. The Center issues an annual report on the outcomes of residency and fellowship training in the state and produces periodic reports that describe trends in the demand for new physicians.

Need represents a normative judgment about the ideal number of health personnel that should be available to "deliver safe, effective or high quality care" (Prescott, 2000) in a particular area or population, regardless of ability to pay. Typically, need for health personnel almost always exceeds demand.

Requirements are the estimates of health personnel needed to achieve desired levels of health care for specific population groups or geographic regions. The estimates generally involve adjustments to actual or hypothetical evaluations of demand.

Michigan Physician Workforce Requirements Assessment
In 2005, the New York Center for Health Workforce Studies, with support from a consortium of stakeholders in Michigan, conducted an assessment of the future supply of and demand for physicians in Michigan through 2020. Using physician-forecasting models developed by HRSA and adapted to incorporate data specific to Michigan, the Center was able to apply a number of different supply and demand scenarios to estimate physician workforce requirements in Michigan by sub-state region and by specialty. The Center concluded that between 2005 and 2020, growth in demand for physicians will likely outpace growth in physician supply, and that by 2020, Michigan will experience a shortage of more than 4,400 physicians.

Health Workforce Research Questions of Interest

- Is the current and future supply of health workers in a given state, community, or facility adequate to meet the demand for health services and the needs of the population served?

- Is the health workforce racially and ethnically representative of the population it serves?

The **Center for California Health Workforce Studies** has completed a number of recent research projects on health workforce diversity. The findings follow:

-- Minority dentists are more likely to work in minority communities. However, there are very few minority dentists to serve these communities. New recruitment and retention programs are being developed across the state of California to increase the diversity of the workforce, and the California Center will track the success and impact of these programs.

-- Minority RNs in California are more satisfied than their non-Hispanic white counterparts, but also report high rates of being passed over for promotions for reasons other than experience and qualification.

-- Postbaccalaureate pre-medical programs are effective in the goal of increasing the number of disadvantaged and underrepresented groups in medical schools, with minority and disadvantaged postbaccalaureate participants having 2.4-3.3 the odds of gaining admission into medical school than similar students who did not participate in a postbaccalaureate program.

- Do we have the appropriate health workers with the right set of skills and training to provide high-quality health care?

- Given that chronic health workforce shortages are likely to worsen in the future, are there new and innovative ways to deploy health workers to assure access and improve quality and efficiency in the delivery of health services?

What Organizations Conduct Health Workforce Research?

The National Center for Health Workforce Analysis, established in the late 1990s, was based in the Bureau of Health Professions at the Health Resources and Services Administration of the Department of Health and Human Services. The mission of the National Center was to collect, analyze, and disseminate health workforce information and facilitate national, state, and local workforce planning efforts. The National Center performed the following tasks:

- Sponsored and conducted research on important issues that affected the health workforce. Provided technical assistance to states, educational institutions, professional associations, and other federal agencies regarding health personnel information and analysis.
- Provided data in support of health workforce research.
- Conducted evaluations of health professions' training programs.
- Developed tools to support research on the health workforce.

A Data Tool of the National Center

The Area Resource File (ARF) is a collection of data from more than 50 sources, including the following institutions:

- American Medical Association
- American Hospital Association
- U.S. Census Bureau
- Centers for Medicare and Medicaid Services
- Bureau of Labor Statistics
- National Center for Health Statistics

The basic county-specific ARF is the nucleus of the overall ARF System. ARF contains information on health facilities, health professions, and measures of resource scarcity, health status, economic activity, health training programs, and socioeconomic and environmental characteristics. In addition, the basic file contains geographic codes and descriptors that enable it to be linked to many other files and to aggregate counties into various geographic groupings.

The ARF is designed to be used by planners, policymakers, researchers, and others interested in the nation's health care delivery system as well as factors that may impact health status and health care in the U.S.

A Forecasting Model Developed by the National Center

The Bureau of Health Professions' Physician Supply Model (PSM) produces national projections of physician supply for 36 medical specialties through 2020, which are aggregated into 18 specialties for comparison to the Physician Requirements Model projections. The PSM is an inventory model that tracks the supply of physicians by age, sex, country of medical education (whether U.S. medical graduate [USMG] or international medical graduate [IMG]), type of degree (i.e., medical doctor [MD] or doctor of osteopathy [DO]), medical specialty, and primary activity (e.g., patient care or non-patient care).

The PSM projects the future supply of physicians based on:

- Number of physicians in the preceding year (starting with the base year 2000);
- Number of new USMGs and IMGs; and
- Attrition due to retirement, death, and disability.

The PSM produces two measures of physician supply: 1) the number of active physicians, and 2) the number of full-time equivalent (FTE) physicians. One FTE is defined as the average annual hours worked in patient care per physician in 2000, and these estimates vary by specialty. Women and older physicians historically have worked fewer patient care hours, on average, compared to male and younger physicians, and because a growing proportion of the physician workforce is female and older, the FTE supply of physicians is growing slightly slower than the number of active physicians.

The federal government also has recognized the value of research on the health workforce, and in 1997 began funding regional centers for health workforce studies under the National Center for Health Workforce Analysis.

Regional center goals are as follows:

- Advancing access to quality health care by measuring the supply, demand, education, training, distribution, and use of health care personnel;
- Improving understanding of how market forces and other factors affect current and future supply, demand, and use of health care personnel; and
- Evaluating the impact of policy decisions on the workforce in terms of access to care, health care costs, and health outcomes.

The six regional centers have completed a wide variety of studies examining issues affecting the health-care professions and have provided their findings and expertise to health care policy audiences across the nation.

An example of a HRSA-funded health workforce study conducted by a regional center

The United States Health Workforce Profile was prepared by the New York Center under its cooperative agreement with the National Center for Health Workforce Analysis. The report details the supply, distribution, and education of 30 separate health workforces in all 50 states and the District of Columbia using 2004 data. As a whole, the report provides a description of the country's health workforce at state, regional, and national levels. Estimated numbers of each occupation's workers are presented to indicate the size of the nation's health workforce and per capita ratios are included for comparisons between states, regions, and with the nation overall. The profile also has information on health status indicators and health care employment by setting.

Federal legislation enacted in 2006 resulted in substantial cuts to many of the programs in Title VII of the Public Health Service Act and eliminated both the National Center for Health Workforce Analysis and federal funding for the regional centers. The most significant impacts of these cuts were:

- Loss of an explicit federal agenda for health workforce research and analysis at the national level;
- Dissolution of a formal organized network of regional health workforce research centers overseen by a national center; and
- Diminished overall capacity to provide technical assistance to states related to the health care workforce, including projected supply and demand.

Despite the loss of federal funding, the six regional centers continue to conduct health workforce research that supports and promotes health workforce planning and policy making. These centers continue to be a valuable resource for tracking, evaluating, and improving health policy throughout the nation.

Where are the Regional Centers and What Do They Do?

New York Center for Health Workforce Studies
University at Albany, SUNY
School of Public Health
(518) 402-0250, fax: (518) 402-0252
Jean Moore, MSN, Director
http://chws.albany.edu/

The New York Center, based at the University at Albany, School of Public Health, was established in 1996. The mission of the Center is to provide timely, accurate data, and conduct policy-relevant research about the health workforce at national, state and local levels. The Center has extensive experience in conducting primary survey research as well as profession-specific studies, and produces numerous reports about their work that help inform health policy makers' decisions. Since losing federal funding for its work, the Center's research has become much more state-focused, especially New York.

Center for California Health Workforce Studies
University of California at San Francisco
Kevin Grumbach, MD, Director
(415) 476-8181, fax: (415) 476-4113
http://futurehealth.ucsf.edu/cchws.html

The Center for California Health Workforce Studies (CCHWS) was created in 1997. CCHWS brings together a multidisciplinary team of investigators to examine critical issues in the distribution, diversity, supply, and competence of health professionals in California and other western states. The work of the CCHWS has focused on minorities in the health professions and health disparities, the nursing shortage, the maldistribution of dentists and other oral health providers, and related issues. This work has been widely heralded for its value to national and state policymakers. Since the loss of federal funding, CCHWS has substantially reduced the technical and research assistance it provides to California government agencies.

Center for Health Workforce Studies
University of North Carolina at Chapel Hill
(919) 966-7112, fax (919) 966-5764
Erin Fraher, MPP, Director
http://www.healthworkforce.unc.edu/

The Center for Health Workforce Studies at the University of North Carolina at Chapel Hill is located within the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill. Despite losing federal funding two years after it began, the Center has conducted a number of important analyses and has continued to provide technical assistance to many states wanting to set up their own health workforce analysis systems (e.g. North Dakota, Florida, Hawaii, Oregon, Colorado, South Carolina, Massachusetts, Rhode Island, Alaska, California, Mississippi and Tennessee). Since losing federal funding, the work of the Center has mainly occurred through the North Carolina Health Professions Data System and has focused on state workforce issues.

University of Washington Center for Health Workforce Studies
Department of Family Medicine
School of Medicine, University of Washington
(206) 685-6679, fax: (206) 616-4768
Mark Doescher, MD, MSPH, Director
http://depts.washington.edu/uwchws/

The UW CHWS was established in 1998 with funding from the Bureau of Health Profession's National Center for Health Workforce Analysis. The WWAMI Center for Health Workforce Studies conducts relevant health-workforce research and policy analysis in collaboration with federal and state agencies; provides consultation to local, state, regional and national policymakers on health workforce issues; develops and refines analytical methods for measuring state health-workforce supply and requirements; contributes to the understanding of health workforce issues and findings; and disseminates study results to a wide audience. The UW CHWS continues to carry out health workforce research as individual studies are funded by local, state and national organizations.

The Midwest Center for Health Workforce Studies
Institute for Health Research and Policy
University of Illinois at Chicago
(312)-996-0703, fax (312) 996-0065
Surrey M. Walton, PhD, Director
http://www.uic.edu/sph/ichws/

The Midwest Center for Health Workforce Studies was established in 1998 through a cooperative agreement between HRSA's Bureau of Health Professions and the University of Illinois at Chicago. The center conducts state, regional, and national analyses on the supply, demand, and training of the health workforce. The center addresses workforce issues critical to a broad health care audience--policymakers, providers, educators, and researchers. In addition, the center has collaborated with national, Midwest regional, and Illinois agencies, and offered technical assistance to organizations seeking health workforce information. Since losing funding, the center's capacity to conduct research and provide technical assistance has been greatly diminished.

Regional Center for Health Workforce Studies at CHEP
Center for Health Economics and Policy
University of Texas Health Science Center at San Antonio
(210) 567-3168, fax (210) 567-6804
Antonio Furino, PhD, Director
http://www.uthscsa.edu/rchws/index.asp

Selected Examples of Recent Study Findings from the Six Workforce Research Centers

- Physicians graduating from medical education programs that receive Title VII funds are more likely to work in community health centers (California CHWS).

- Recent analyses demonstrate the impact of the hurricanes of 2005 on physician distribution in the Southeast (North Carolina CHWS).

- Nearly a fourth of U.S. physicians are International Medical Graduates (IMGs), and their service is essential in underserved areas (Washington CHWS).

- The aging of the U.S. population will result in an increase in demand for health services at the same time that large numbers of health workers are retiring (New York CHWS).

- Access to dental care for low-income populations in urban and rural areas is problematic. Few rural dentists see Medicaid patients, and those who do tend to serve a larger number of Medicaid patients than their urban counterparts (Midwest CHWS).

- Allied health professions experience cyclical shortages and surpluses due a lack of communication between the training institutions, employers, and policy makers who control payment decisions (North Carolina CHWS).

- A national Community Health Worker study provides a comprehensive, national picture of the workforce of community health workers, who have been described as cost-effective complements to medical teams to reach underserved populations (Texas CHWS).

- Registered nurses in rural areas are less likely than urban RNs to have baccalaureate or higher nursing degrees. The more rural an RN lives, the lower the salary he/she receives and the more likely he/she is to commute to a more urban area for work (Washington CHWS).

What is the Future of Health Workforce Research and Analysis?

Lack of a federal presence
The elimination of the National Center for Health Workforce Analysis has resulted in a limited federal focus in the area of health workforce research and analysis. HRSA's Strategic Plan for 2005-2010 acknowledges the issues that the country faces in health workforce recruitment and retention:

> There are a number of challenges posed by the current status of the Nation's health care workforce on the health-care delivery system overall and the health care safety net in particular. These challenges include a nationwide shortage of health care professionals, especially nurses, but also pharmacists, allied and public health workforce, dentists, and physicians who are pediatric sub-specialists. The shortage of physicians in certain areas is exacerbated by increasing rates of malpractice insurance that is limiting scopes of practice for

many physicians (e.g., obstetric services). There is particularly a problem with the recruitment and retention of health care professionals to underserved areas, including rural and border areas. Recruitment and retention issues create additional financial burdens on health care safety net providers in their attempt to retain qualified personnel.

HRSA will continue to make available some data, such as the Area Resource File, and continue to administer the National Sample Survey of Registered Nurses, but these resources and activities are described within the context of an "evaluation infrastructure." There is little evidence of HRSA program or policy focus on health workforce research in the near term at the National Center level.

Lack of data
In addition to a lack of federal initiatives on health workforce research, there are also limited data about the country's supply of and demand for health workers. While such data are available from a variety of public and private resources at the national level (New York CHWS, 2000), there are limits to their value, depending on the research question to be answered.

For example, while data on the number of licensed RNs in the U.S. are available through the NSSRN, the sampling methodology precludes using these data for sub-state analyses. Consequently, while these data have been used to estimate state-level shortages of RNs (HRSA, 2002), they would not be appropriate for analyzing geographic variation in the supply and distribution of RNs within a state. Another important national data-set is the American Medical Association Masterfile of physicians in the U.S. This is one of the most comprehensive sources of data on the country's medical workforce, but there are concerns about timeliness as well as uneven quality of the data.

Another source of data on health professions is the Occupational Employment Statistics available from the Bureau of Labor Statistics, which furnishes job counts of standard occupational classifications. However, counts based on jobs, rather than individuals, can be misleading, because an occupation with many part-time workers (and jobs) could overestimate actual workforce capacity.

In addition to national-level data sets on health professions and occupations, some states collect their own data on the health workers in their state. However, lack of consistency in state-level health workforce data collection activities tends to limit the value of these data sets to in-state studies.

Increasing state involvement
States play a key role in developing and regulating their health workforce, including:

- Licensing health professionals;
- Regulating the scope of practice for health professions and occupations;
- Educating and training health professionals at state-sponsored colleges and universities; and
- Reimbursing or setting reimbursement policy for the delivery of health services (Salsberg, 2003).

Many of the health workforce shortages that face the country are national in scope, but the effects are local as individual health care providers compete for a small pool of candidates to fill their vacancies (Ricketts, 2007). These local effects often result

in public expectations for state involvement and leadership in addressing the state's health workforce shortages. As a result, an increasing number of states are either actively planning or engaged in monitoring specific health professions and occupations in their state. Such monitoring can better inform state-level programs and policies designed to assure an adequate health workforce to meet the demand for health services.

Citing concern about shortages of health-care professionals in Colorado the Colorado Health Institute (CHI) as part of its Health Professions Initiative, is compiling health professions datasets to inform health workforce policy in Colorado. From these datasets, CHI will develop a set of health professions workforce indicators for Colorado to document changes in the supply and demand of Colorado's primary health care workforce over time.

In addition, some states have Nursing Workforce Centers, many of which were initially supported by Robert Wood Johnson Foundation Colleagues in Caring grants. The majority of these centers are actively engaged in collecting and analyzing state-level data on the nursing workforce.

Other stakeholders
In addition to state-level health-workforce research activities, there are other stakeholders who recognize the value of health workforce research in order to better understand and respond to health workforce shortages. These stakeholders include health care providers and their associations, educators, individual health professions, health worker unions, and health care consumers (Salsberg, 2002). Typically these stakeholders may seek answers to singularly-focused research questions. For example:

- A study conducted by the Association of American Medical Colleges Center for Workforce Studies and commissioned by the American Society of Clinical Oncology projected a significant shortage of medical and gynecologic oncologists in the U.S. by 2020.
- The American Health Information Management Association (AHIMA) supported a study conducted by the New York Center for Health Workforce Studies on the HIM workforce, and the results predicted significant future growth in the size and scope of the profession. Based on the survey findings, AHIMA developed a series of action initiatives to enhance the development of HIM professionals.

Conclusion

The lack of a strong federal presence in health workforce research signals potential shifts in the direction of future studies. More research will likely be state-focused in an effort to better understand specific state-level issues that affect the supply of and demand for health workers. Such research will prove valuable in developing the appropriate state policies and programs to assure an adequately sized and appropriately trained health workforce to serve the residents of the state. National-level health-workforce research will more likely focus on singular professions or specialties. Clearly, these studies will reveal important insights and guide future profession-specific directions.

While state-level and profession-specific studies are needed and valuable, other important health workforce research is less likely to receive significant support in the near term, for example:

- Research to develop new or update existing forecasting models, which is used in estimating future gaps between health worker supply and demand;
- Research that compares variation in supply, demand, and use of health workers across states or across geographies;
- Research that assesses the impact of increasing diffusion of health information technology on health care professionals and paraprofessionals;
- Research that assesses impacts of testing new models of health service delivery on cost, quality, and access to care; and
- Research that evaluates the effectiveness of new approaches to foster effective interdisciplinary education and collaborative practice.

Pervasive health workforce shortages may require substantive changes to the health-care delivery system. It may be appropriate to shift the focus of future research away from questions like "Do we need more doctors, nurses, dentists, etc" and begin to consider questions like "What new models of health service delivery, using health workers in new and innovative ways, can affect cost, quality, and access to care?"

Innovative Model: Alaskan Dental Therapist Initiative

Concerned about a chronic lack of access to oral health providers and its impact on the health of Alaska Natives living in remote areas of the state, the Alaska Native Tribal Health Council adopted a different model for the delivery of basic oral health services, using dental therapists.

Dental therapists complete a two-year training program and are able to perform procedures such as fillings, extractions, and preventive care, such as cleanings, sealants, and fluoride treatments. New Zealand has successfully used dental therapists for nearly 90 years and the model is being replicated in an increasing number of countries, including Canada and Australia.
http://www.anthc.org/cs/chs/dhs/index.cfm

In fact, since there were no dental therapist education programs in the U.S., the first Alaskan dental therapists were trained in New Zealand. Since then, foundation funding has supported the development of a dental therapist education program at the University of Washington.

This new approach to the delivery of oral health services is not without controversy. It has encountered resistance from dental professional associations, which cite concerns about the quality of care provided by dental therapists. However, an initial evaluation of the clinical performance of the dental therapists in Alaska, conducted in late 2005, found their work to be safe and of very high quality (Fiset, 2005).

Future health workforce research may likely involve collaborations among diverse stakeholders, representing providers, educators, health professionals, government and researchers who come together in response to concerns about insufficient workforce capacity and who recognize the value of identifying new and better approaches to meeting the nation's health care needs. These collaborations hold the key to setting a new and important direction for health workforce research.

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Trends and Issues Related to the Work Environment Impacting the Health Workforce

Bonnie Rogers

Introduction

Over the years, the health workforce has experienced varying degrees of shortages across various disciplines. The many reasons for these shortages include salary, workload, workplace hierarchical structures, a culture that is non-supportive or devalues the health worker, demanding schedules, and deficiencies in infrastructure. Only relatively recently has serious attention been paid to significant work environment hazards that have resulted in injury and illness and negatively impacted recruitment and retention of health workers.

This paper addresses the hazardous health work environment and its impact on the health workforce discussing the improvements in policy and practice needed to support and sustain a work environment in which health workers can safely provide care to patients.

Work Environment Hazards

Health workers are exposed to a wide range of agents in the work environment that present significant health threats resulting in injury, illness, long-term disability, and even death. However, only in the last two decades has there been significant research conducted on work-related hazards faced by health workers. Occupational hazards are classified in five categories as follows:

1. *Biological/Infectious Hazards:* Infectious and biological agents, such as bacteria, viruses, fungi, or parasites, that can be transmitted through contact with infected patients or contaminated body secretions or fluids.

2. *Chemical Hazards:* Various forms of chemicals that are potentially toxic or irritating to the body system, including medications, solutions, and gases.

3. *Enviromechanical Hazards:* Factors encountered in the work environment that cause or potentiate accidents, injuries, strain, or discomfort (e.g., poor equipment or lifting devices, slippery floors).

4. *Physical Hazards:* Agents within the work environment, such as radiation, electricity, extreme temperatures, and noise that can cause tissue trauma.

5. *Psychosocial Hazards:* Factors and situations encountered or associated with one's job or work environment that create or potentiate stress, emotional strain, and/or interpersonal problems (Rogers, 2003).

Illness and Injury Trends

In 2004, the U.S. Bureau of Labor Statistics (BLS) reported that 14 industries had more than 100,000 nonfatal injuries and illnesses. Three of these were in the health sector: hospitals with 284,600 cases, nursing and residential facilities with 215,200

cases, and ambulatory health care services with 124,600 cases (BLS, 2005). For the past two years, hospitals have been among those industries reporting at least 100,000 injuries and illnesses, and the illness rate of hospital workers was 72.9 cases per 10,000 full-time workers compared to an illness case rate of 27.9 for private industry as a whole. Data regarding occupational risk-hazard assessment in community health care settings (e.g., home health agencies, private practice offices) are virtually absent.

In 2005, nursing and residential care facilities experienced the highest incident rates in the sector for musculoskeletal disorders, with a rate of 131.4 cases per 10,000 workers followed by other ambulatory services (89.0), and hospitals (82.7) (BLS, 2006). Nursing aides, orderlies, and attendants had the third-highest number of days-away-from-work injuries and illnesses in 2005 (52,150) among all occupational groups, with nearly 90 percent involving women. Registered nurses posted the eleventh-highest number of days-away-from-work for injuries and illnesses in 2005 (20,100) among all occupational groups, and second highest among health occupations, with six days away as the median number.

Older workers miss more days from work due to injury than do younger workers. In 2001, the median number of days away from work due to injury or illness was five for workers aged 25-34; seven for workers aged 35-44; eight for workers aged 45-54; and ten for workers aged 55-64 (DHHS-NIOSH, 2004). It is predicted that by 2010 more than 40 percent of registered nurses will be over 50 years old (Buerhaus, 2000).

Health workers have expressed legitimate concern about these actual and potential hazards, and the need to prevent and control them. Some health workers have left their jobs due to the number of threats posed by the work they perform. The risk of occupational illness and injury in this group is likely to rise, as demands for health care increase with concomitant increases in length of working hours, shift rotation, and workload, as more patients require highly complex technological care and services.

Potential Hazards in the Workplace

In an American Nurses Association Health and Safety Study (2001), 88 percent of nurses reported that health and safety concerns influence their decision to remain in nursing, as well as the kind of nursing work that they choose to perform. More than 70 percent said the acute and chronic effects of stress and overwork were among their top three health concerns, with more than two-thirds reporting they work some type of mandatory overtime every month. Nurses also cited disabling back injury (60 percent) and potential contraction of HIV or hepatitis from a needlestick injury (45 percent) among their top three health and safety concerns. The survey further revealed that fewer than 20 percent of respondents felt safe in their current work environment. 17 percent had been physically assaulted in the past year, and more than half were threatened or experienced verbal abuse. (www.nursingworld.org/surveys/hssurvey.htm).

Biological/Infectious Hazards

Health workers are occupationally exposed to biological agents through contact with bloodborne pathogens from needlestick and sharps injuries. While exposure to more than 20 pathogens may occur from percutaneous exposure through needlestick/sharps transmission, hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV) are those most commonly transmitted

(Bell, 1997; Collins, 1987; Pike, 1976; Shapiro, 1995; Wagner, 2004). Definitive data on the annual number of needlestick and other percutaneous injuries sustained by health workers are not available; however, it is estimated that hospital workers have approximately 385,000 percutaneous injury exposures each year (Panlilio, 2004). Non-hospital settings such as private physician and dental offices, home care settings, long-term care facilities or correctional institutions are not included in this estimate.

The average risk of HIV transmission after a percutaneous exposure is estimated to be approximately 0.3 percent. There is a 6 to 30 percent risk that an exposed, non-vaccinated health worker will become infected with HBV. The average risk of HCV transmission following percutaneous exposure to an HCV-positive source is 1.8 percent (range: 0 percent -7 percent) (Centers for Disease Control and Prevention, 2001; Ippolito, 1999). While the risk of acquiring infection is relatively low, there have been 57 documented cases of occupational HIV transmission among health workers as reported by the U.S. Centers for Disease Control and Prevention (CDC) through December 2001, with a possible 138 additional cases (Centers for Disease Control and Prevention, 2007). Occupational HBV infections among health workers have declined more than 95 percent since introduction of the HBV vaccine; however, the CDC (2001) estimates approximately 800 health workers annually contract work-related HBV infection. It is unknown how many health workers have been infected with hepatitis C from an occupational exposure.

In 2000, the Needlestick Safety and Prevention Act directed the U.S. Occupational Safety and Health Administration (OSHA) to amend the Bloodborne Pathogens Standard to increase the requirement for using engineering controls to prevent needlestick injuries. The act also required employers to obtain input from frontline healthcare workers in the identification, evaluation, and selection of engineering and work practice controls (National Institute for Occupational Safety and Health, 2007). Yet to date, only 21 states have enacted sharps injury prevention laws that reflect the amended standard, and sharps injuries continue to occur. Workers' concerns about potential bloodborne pathogen exposures and transmission have received little attention.

Health workers also face new and emerging infectious hazards, including multi-drug resistant and re-emerging pathogens. As a result of over-prescription and misuse of antibiotics, Methicillin-resistent staphylococcus and Vancomycin-resistant enterococcus have emerged as dangerous bacterial infections. These infections are passed to others, like health workers, through direct contact with stool, urine, or blood. (Orford, 2002). Understaffing may contribute to the exposure situation where health workers may not adhere to precautionary measures, like hand washing, due to time constraints.

The resurgence of tuberculosis (TB) in the mid-1980s has resulted in serious nosocomial outbreaks faced by health workers. While the prevalence of TB in the United States is low, nearly three percent of TB infection occurs in healthcare workers (Centers for Disease Control and Prevention, 2003), and one-third of the world's population is infected with the TB bacterium. In the past decade there has been a surge in multidrug resistant TB that is increasing worldwide, reaching 14 percent of new cases in Estonia (Dye, 2002). Those at greatest risk include health workers with direct patient care responsibilities, house staff, medical residents, medical and nursing students, and workers involved in procedures that aerosolize

respiratory secretions (Bangsberg, 1997; Collins, 1999; Louther, 1997; Menzies, 2000).

There are other emerging viral pathogens. Severe Acute Respiratory Syndrome (SARS), a coronavirus, was responsible for outbreaks and mortality among exposed health workers. Perhaps the most ominous threat is H5N1 avian influenza, which has a high mortality rate and is of significant concern for pandemic outbreak. Concern exists about how health workers should be protected from these transmittable biological agents, particularly when there is uncertainty about the mechanism of transmission. Health workers are not always compliant with using protective equipment (Gershon, 1999).

Chemical Hazards

The health care setting presents many of the same types of chemical exposures that are found in industrial plant settings. In the United States, an estimated 5.5 million health workers are potentially exposed to hazardous drugs or drug waste at their worksites. These workers include pharmacists and pharmacy technicians, nursing personnel, physicians, operating room personnel, shipping and receiving personnel, waste handlers, maintenance workers, and workers in veterinary practices. Workers may be exposed to hazardous drugs when they create aerosols, generate dust, clean up spills, or touch contaminated surfaces when preparing, administering, or disposing of hazardous drugs (National Institute for Occupational Safety and Health, 2004). Many hazardous drugs are used to treat illnesses such as cancer or HIV infection. For the patient, the potential benefits of hazardous drugs outweigh the possible negative side- effects, but health workers risk the same side-effects with no positive benefit. Some of the more common hazards used in the health care environment include exposures to disinfecting or sterilizing agents such as glutaraldehyde and ethylene oxide, waste anesthetic gases, latex, and chemotherapeutic agents.

Chemical disinfectants and cold sterilants, such as two percent alkaline glutaraldehyde, which is used to disinfect instruments, can provoke reactive airway symptoms and skin problems, and mercury exposure can result in numerous organ system reactions. Ethylene oxide is a chemical agent with mutagenic, carcinogenic, and explosive properties that is used to sterilize heat-sensitive equipment. Nearly 100,000 hospital personnel are estimated to have direct or indirect contact with ethylene oxide each year (Rogers, 1997), and cancer and reproductive toxic effects have been reported in animal studies. Waste anesthetic gases have been studied in numerous epidemiologic surveys, and results suggest that these gases generate various adverse health effects, including hepatic and renal diseases, and central nervous system and immune system dysfunctions. Several studies indicate that individuals exposed to waste anesthetic gases have a higher risk of spontaneous abortions and their children a higher risk of congenital malformations (Rogers, 1997). Latex allergy, which is associated with the use of medical gloves, is a continuous problem among health workers, with prevalence rates of 10 percent reported in frequent glove users, such as operating room personnel. Exposure can occur through direct skin contact or inhalation of the allergen. Reactions can range from local contact dermatitis to systemic reactions, asthma, and anaphylaxis (Rogers, 1997).

Antineoplastic chemotherapy agents present significant risk to exposed health workers who handle these drugs during preparation, administration, or waste disposal. More than 10 of the commonly used anticancer drugs or combinations of

these drugs have been found by the International Agency for Research on Cancer (IARC) to be known human carcinogens (Group 1) and another dozen are thought to be "probable" human carcinogens (Group 2A). An additional 11 agents are listed as "likely" to be human carcinogens (Group 2B) (International Agency for Research on Cancer, 2004). Given the mode of action of many of these agents, with their ability to bind with DNA, RNA, and proteins, many are both mutagenic and carcinogenic.

Enviromechanical Hazards

Enviromechanical agents are associated with injuries and accidents in the work setting. Poorly designed or inadequate work stations and equipment can cause discomfort and set the stage for potential injuries. Cluttered and slippery floors (in some cases from spilled fluids) contribute to falls and other accidents. Excessive exposure to risk factors such as force, task repetition, and awkward postures can result in a variety of disorders in affected workers. These conditions, collectively referred to as musculoskeletal disorders, include conditions such as low back pain, sciatica, rotator cuff injuries, epicondylitis, and carpal tunnel syndrome (Occupational Safety and Health Administration, 2003). Musculoskeletal disorders may also be linked to certain psychosocial factors such as job dissatisfaction, monotonous work, and limited job control.

According to the BLS, musculoskeletal disorders resulted in an estimated 10,815 work-related injuries with days-away-from-work among registered nurses employed by private industry in 2002 (BLS, 2004a), which represents nearly half of all reported days away from work among this group (BLS, 2004b). However, these data likely undercount by 50-70 percent (Leigh, Markowitz, Fahs, Shin, & Landrigan, 1997). In spite of the difficulties associated with use of prevalence data, studies have estimated that approximately 17 percent of nurses experience low back-pain at any point in time, and 40-50 percent of nurses experience low back pain during any 12-month period (Hignett, 1996). A study of nurses in New York and Illinois found that nurses working for at least one year reported neck problems (45.8 percent), shoulder problems (35.1 percent), and back problems (47 percent) (Trinkoff, Lipscomb, Geiger-Brown, & Brady, 2002). In addition, even though mechanical lifting devices may be available, lift equipment cannot help to reduce injuries unless it is accepted and used by nurses. Nurses working in nursing homes (29 percent) and home health agencies (31 percent) were reported to be more likely to prefer mechanical lifts, while the two-person lift team was preferred by hospital nurses (49 percent).

Compounding the problem of high injury rates in hospitals is the aging of the nursing workforce (Buerhaus, Staiger, & Auerbach, 2000). Given the fact that muscle strength decreases with age, and back pain and injury prevalence rates increase with age, the aging nursing workforce will not be physically equipped to continue to manually transfer patients (Fragala & Bailey, 2003).

Moreover, as the patient population becomes heavier, the handling of obese or bariatric patients becomes more common, presenting a greater risk to health workers. Only one study was found that specifically addressed bariatric patient handling where two nursing assistants suffered disabling back injuries while transferring a patient weighing over 540 pounds (Muir and Gerland, 2003). The hospital (in Canada) decided to look more closely at managing obese patients. A review of patient admission data revealed that in a five-year period, at least 20 patients weighing over 350 pounds had been admitted, and that the rate of these admissions was increasing.

In a Robert Wood Johnson Foundation study (Rogers, 2006) of ergonomics and nursing in hospitals, focus-group study participants recommended several solutions to deal with specific work activities that contribute to musculoskeletal injury including: (1)re-designing and re-organizing the environment; (2)providing new or additional equipment or devices; (3)increasing staff (especially males); (4)reducing the nurse-patient ratio; and (5)limiting patient visitation.

Providing care to nursing home residents is physically demanding work. Nursing home residents often require assistance to walk, bathe, or perform other normal daily activities, and they may be totally dependent upon caregivers for mobility. Manual lifting and other tasks involving the repositioning of residents are associated with an increased risk of back pain and injury to caregivers. These tasks can entail high physical demands due to the large amount of body weight involved, awkward postures that may result from leaning over a bed or working in a confined area, the shifting of weight that may occur if a resident loses balance or strength while moving, and task repetition.

Physical Hazards

Physical agents in the health work environment, such as radiation or laser, can also create health hazards. Radiation is a common physical agent widely used in medicine for various diagnostic and therapeutic procedures and protocols. Health workers may be at risk for radiation exposure during diagnostic radiography, treatment of patients with radioactive implants, and exposure to body fluids of patients receiving metabolized therapeutic nuclear radiation (Godwin, 1985). Radiation exposure has been linked to cancer and reproductive toxic effects. Lasers emit non-ionizing radiation in the ultraviolet, infrared, or visible spectrum, and are effective by pointing a very bright narrow beam of light at the point of impact. Health workers may be at risk of eye or skin injury or viral-particle exposure through the laser smoke emission.

Psychosocial Hazards

Stress in the work environment is pervasive and insidious, and may be characterized by physical, psychological, and behavioral manifestations. NIOSH (1999) defines occupational stress as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health, injury, reduced satisfaction and work productivity, and intention to leave the job. This is not meant to imply that highly challenging jobs are bad--quite the contrary. Challenge energizes workers both psychologically and physically. It also motivates workers to learn and acquire new skills. However, when challenge turns into job demands that cannot be met, exhaustion, fatigue, feelings of being overwhelmed, and stress can set in (NIOSH, 1999).

Studies on the scope of job stress in the American workplace indicate that three-fourths of employees believe the worker has more on-the-job stress than a generation ago (Princeton Survey Research Associates, 1997), and that problems at work are more strongly associated with health complaints than are any other life stressor. Absenteeism, staff conflict, staff turnover, decreased morale, and decreased practice effectiveness are associated with stress. Some sources of stress identified in the work environment include poor working conditions, work overload, role ambiguity, organizational politics, physical danger, poor communications, and shift work. In healthcare work environments, stress continues to escalate, and job dissatisfaction and burnout ensue. In addition, questions arise as to whether stress and injury are interrelated.

Six factors in the work environment influence the stress state (Rogers, 2003):

- Organizational factors
- Situational factors
- Personal factors
- Technological factors
- Environmental factors
- Economic factors

Organizational factors: policy and operational controls, such as a lack of shared decision-making when job demands exceed worker control, heavy workload, mandatory overtime, role ambiguity, poor communication, ineffective organizational and managerial leadership, inadequate resources, job depersonalization, and lack of opportunity provided for professional growth. In the health-care environment, workers may be faced with too many demands and vigilant tasks without enough help or adequate, state-of-the-art equipment and supplies. The politics of the institution in terms of corporate culture and level of productivity expected may also result in varying degrees of stress.

Shiftwork as a stress producer deserves special mention. Studies of shiftworkers have shown that shiftwork, especially night and rotating shiftwork, has a negative impact on the worker's general well-being and performance (Moore-Ede and Richardson, 1985). It is estimated that 11.5 million Americans (27 percent men and 16 percent women) work some type of shift pattern. The demands of shiftwork cause desynchronization of the internal rhythms, which can lead to a variety of psychological and physical problems, including gastrointestinal disturbances, exhaustion, depression, anxiety, interpersonal relationship difficulties, and higher rates of accidents. Shiftworkers have reported a lower sense of well-being, with lower participation rates in social organizations, engagement in more solitary activities, higher incidences of family and sexual problems, higher rates of divorce, and decreased work performance compared with day workers. Factors that affect adjustments to shiftwork include the type of shiftwork schedule, the frequency of the schedule changes, the degree to which workers adjust to their social, dietary, and sleeping habits to coincide with their shiftwork schedule, and the age of the worker (LaDou, 2004). Rotating shifts and working night shifts also affect the worker's interactions with family and friends.

Situational factors: events or conditions of the job such as care for agitated or dying patients; quality of social support systems; conflicts with managers, peers, or colleagues; and lack of respect. Social support systems at work influence psychological well-being, job satisfaction, health status, and employee absenteeism or departure.

Personal factor: individual characteristics or conditions that affect personal motivation. These include health status, personality, performance ability, coping and communication skills, value systems, and conflict between demands of the job and home life. More widely recognized than ever before as sources of stress are the multiple roles women find themselves in today, such as mother, worker, and student.

Technological factors: new or advanced systems for delivery of services, such as handling sophisticated equipment, involvement in task design, interaction with

computers and communication networks, and complex advances in high technology fields (e.g., engineering, medicine).

Environmental factors: the quality of and hazards faced in the work setting. This category includes work-related exposure to toxins, the physical design of the work station, ergonomic controls, stimuli such as lights, noise, and odors, dangerous environmental location, air pollution, crowding, and the general tension level in the environment.

Economic factors can cause considerable stress, particularly if the worker's economic security is in jeopardy, such as in the case of single-parents. Linked to the type of position one has in the healthcare industry, are work-force salaries, and the salary range is very dramatic. Many health workers may find themselves working two jobs to make ends meet, creating much uncertainty. In 2004, seven percent held more than one job (BLS 2006).

Burnout

In the health professions, stress can lead to burnout. According to Maslach, burnout is a syndrome characterized by emotional exhaustion, depersonalization, and a low level of personal accomplishments; it primarily affects people who are dealing with other people in their work. Burnout develops as a response to the chronic emotional strain, which is the result of dealing with other people, and especially those coping with serious problems. Burnout is considered a type of professional stress which results from the social interaction between the person who provides help and the person who receives that help. Nurses are particularly susceptible to the development of burnout, mainly because of the nature and the emotional demands of their profession.

In a study of 10,000 nurses and 230,000 patients from 168 Pennsylvania hospitals from 1998 to 1999 on hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction, Aiken and colleagues (2002) found that each additional patient assigned to a nurse resulted in:

- 30-day patient mortality increases of seven percent,
- failure-to-rescue rate increase of seven percent,
- odds of nursing job dissatisfaction increasing by 15 percent, and
- odds of nurse burnout increasing by 23 percent.

When nurses had eight patients instead of four, their patients had a 31 percent higher chance of dying within 30 days of admission. In addition, of the nurses surveyed, 43 percent were burnt out and emotionally exhausted, and those who were burnt out were four times as likely to report that they were leaving their jobs in the next year. A Canadian study (Laschinger, 2006) further documented that a "high proportion of nursing graduates are reporting severe burnout less than two years into their jobs--primarily because of crushing workloads". The author surveyed 225 junior hospital nurses working across Ontario and found that 66 percent were experiencing "symptoms of burnout, including emotional exhaustion and depression," up from 58 percent from earlier studies.

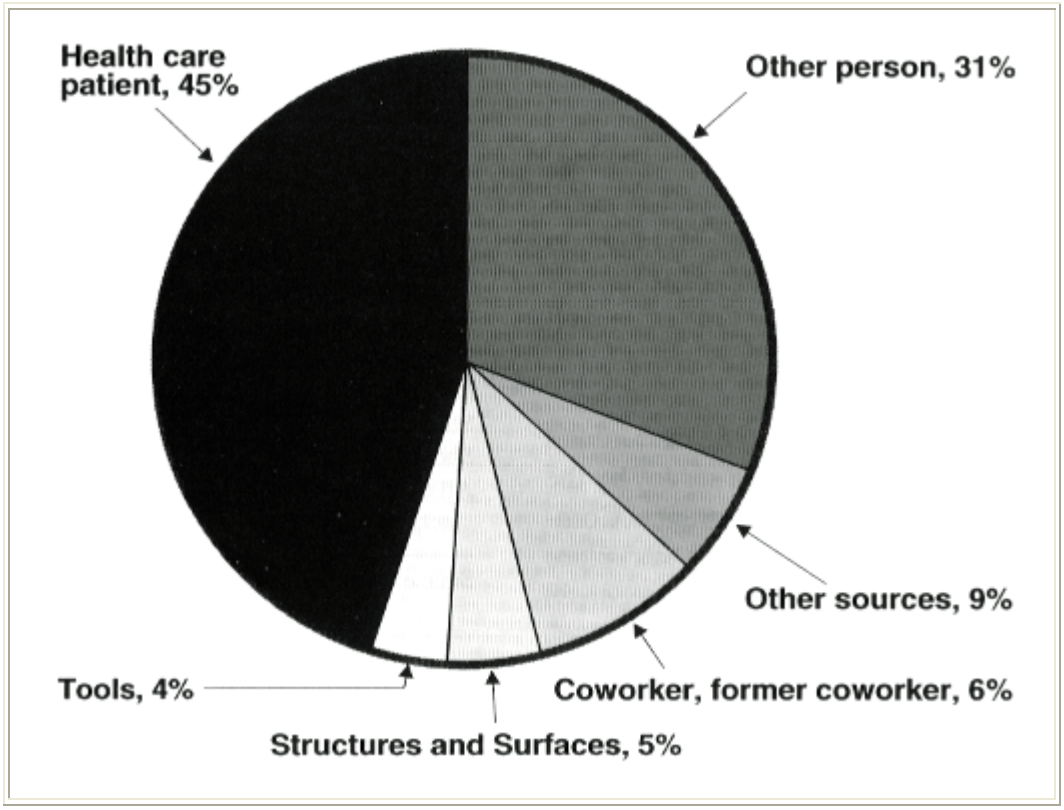
A 2002 study by Adali and Priami compared levels of burnout among 233 nurses in three nursing specialties in five Greek hospitals, as well as contributing environmental factors. The results indicated that nurses in emergency departments showed significantly higher levels of emotional exhaustion and burnout than nurses

working in intensive care and internal medicine units. Depersonalization in the work environment was a notably significant factor in burnout. For the intensive care nurses, significant predictors included peer cohesion, control, involvement, and task orientation, while, for the internal medicine nurses, significant predictors were involvement, workload, physical comfort, task orientation and autonomy. Finally, for the emergency department nurses, significant predictors included involvement, workload, innovation, supervisor support, age, and task orientation.

Violence

Entwined with work environment issues is workplace violence. NIOSH defines workplace violence as violent acts (including physical assaults and threats of assaults) directed toward persons at work or on duty (CDC/NIOSH 2006). Workplace violence ranges from offensive and threatening language to homicide. The majority of the nonfatal assaults reported in the Annual Survey of Occupational Injuries and Illnesses occurred in the service (64 percent) and retail trade (21 percent) industries. Of those in services, 27 percent occurred in nursing homes, 13 percent in social services, and 11 percent in hospitals. The source of injury in 45 percent of the cases was a patient (Figure 1) (Bureau of Labor Statistics, 1994). Workplace violence can be perpetrated by patients, families, friends, visitors, coworkers, and managers (Rogers, 2007).

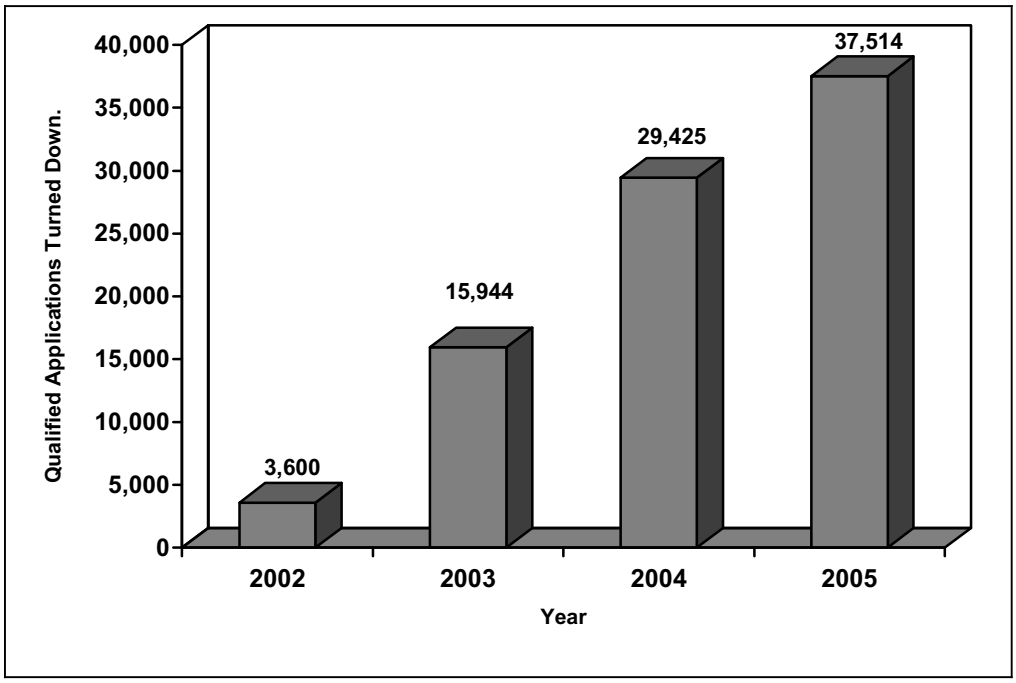
Figure 1:
Violent acts resulting in days away from work, by Source of Injury--United States, 1992. (Source: BLS, 1994)



Violence against employees has been a serious problem for many years in such work environments as psychiatric facilities, community mental health clinics, corrections department infirmaries, and community care facilities. The health sector leads all industrial sectors in the incidence of nonfatal workplace assaults (Figure 2). Violent acts against health workers frequently go unreported as exposure to violence is considered "part of the job" (Gates, 2004; U.S. Department of Justice, 2001).

Figure 2:

Incidence Rates for Nonfatal Assaults and Violent Acts by Industry, 2000



Data reported include the following:

- Between 1992 and 1996, nonfatal assaults on nurses and other health care professionals in health care and mental health settings were similar in frequency to those in law enforcement--well over 200,000 annually (Bureau of Justice Statistics, 1998).

- In 2000, 48 percent of all nonfatal injuries from occupational assaults and violent acts occurred in health care and social services. Most occurred in hospitals, residential care services, and nursing and personal care facilities. Nurses, aides, orderlies, and attendants suffered the most nonfatal assaults resulting in injury.

- The Department of Justice's National Crime Victimization Survey for 1993 to 1999 lists average annual rates of nonfatal violent crime by occupation. The average annual rate for nonfatal violent crime for all occupations is 12.6 per 1,000 workers. Nurses, however, have an annual rate of 21.9; physicians, 16.2; and mental health professionals, 68.2.

As the US population ages, the number of elderly patients in nursing homes and long-term care facilities, often with dementia, will continue to rise dramatically, thereby increasing the potential for violence in these settings.

Buerhaus and colleagues (2005) found that more than 75 percent of registered nurses believe the nursing shortage presents a major problem for the quality of their work life, the quality of patient care, and the amount of time nurses can spend with patients. Looking forward, almost all surveyed nurses see the future shortage as a catalyst for increasing stress on nurses (98 percent), and decreasing quality of patient care (93 percent)—both major factors in nurses' decision to leave the profession (93 percent). In a recent survey by the Bernard Hodes Group (2006), 55 percent of nurses reported their intention to retire between 2011 and 2020.

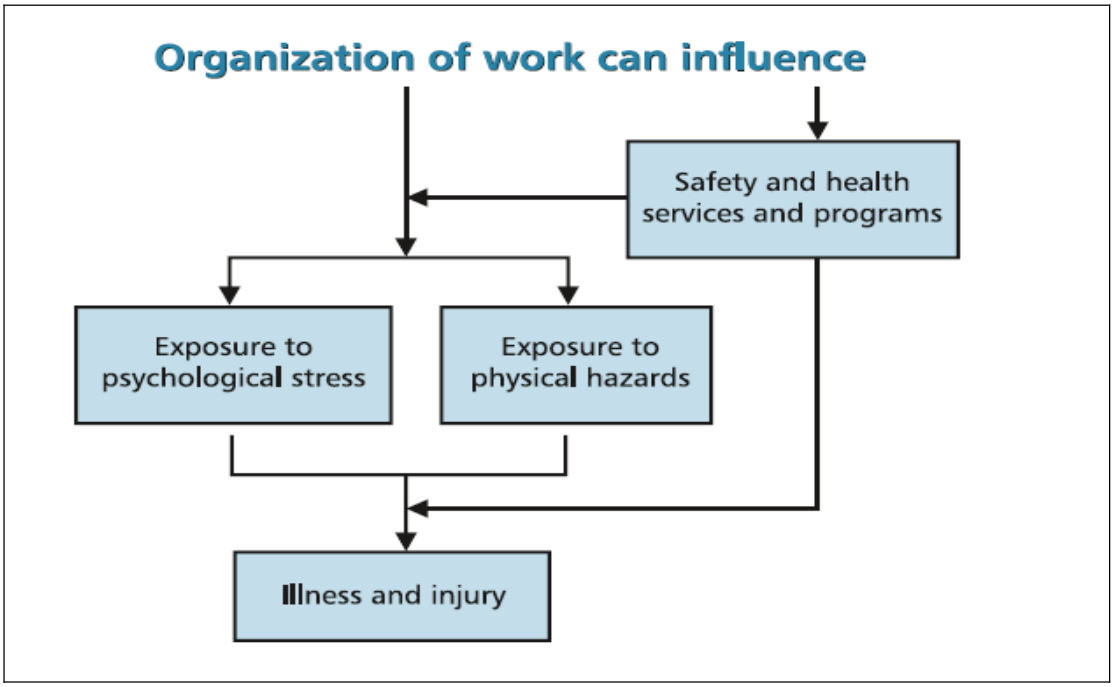
Work Organization

Much of what has been discussed regarding the risks and hazards of the health work environment relates to work organization. Work organization refers to the work process (the ways jobs are designed and performed) and to the organizational practices that influence job design. However, how this interacts with workers' health and safety must be considered a component of the work process. Organizational practices have changed dramatically.

Many organizations, including those in health care, have resurrected themselves by downsizing their workforce and adding contract personnel. For many workers, these trends have resulted in a variety of potentially stressful or hazardous circumstances, such as reduced job stability and increased workload. Data suggest, for example, that the average work year for prime-age working couples has increased by nearly 700 hours in the last two decades (CDC, 2002) and that high levels of emotional exhaustion at the end of the workday are the norm for 25 to 30 percent of the workforce (Bond et al., 1997). These revolutionary changes in the organization of work have far outpaced our understanding of their implications for work life quality and safety and health on the job.

Organization of work is a particular focus of interest especially as it affects job stress, work fatigue, and ergonomics. For example, extensive literature links job characteristics (e.g., low levels of control and work overload) to job stress and stress-mediated health outcomes such as cardiovascular disease and psychological disorders (Sauter et al. 1998; Schnall et al. 2000). In addition, the changing organization of work may also directly influence the level of exposure to hazards in the work environment. For example, workers with extended work shifts might be at risk of greater exposure to chemicals such as disinfectants, gases, or latex because they are working longer. Long work hours and staff reductions may increase the risk of overexertion injury. Increased public contact and alternative work schedules (e.g., shift work), which are common in the growing health sector, may expose workers to heightened risk of fatigue, stress, and even violence in their jobs.

Figure 3: Pathways between organization of work and illness and injury.



Clearly, work organization brings several concerns. Lower job satisfaction, which can result in turnover or intention to leave the job, is an important result. In a study by Castle et al. (2007), nurses' aides indicated that low overall job satisfaction was associated with burnout, intention to leave the job, and turnover. Intent to leave is influenced by personal characteristics, role-related characteristics, facility characteristics, turnover opportunities, and job characteristics. As the U.S. population ages, we will need more caregivers but an inadequate number of caregivers are entering the healthcare workforce (American Nurses Association, 2001), and a significant number of nurses' aides are leaving nursing homes (Seavey, 2004). It is recognized that "fundamental flaws in the environment, design, and culture of long-term-care work contribute to vacancies and high turnover" (Davis & Dawson, 2003, p.4) and staff job satisfaction likely reflects these flaws. Castle et al. (2007) suggest that nurses' aides are especially dissatisfied with staffing levels, workload, and the amount of time they have to do their jobs. Nurses' aides with high workloads may not be able to follow care regimens in the way that they were taught. This may cause further discontent with both the high workload and prior training.

Eriksen (2006) examined fatigue among nurses' aides, and reported that high demands and lack of rewards at work may cause persistent fatigue in nurses' aides. Reduction of demands, adequate feedback, and mental stimulation in the form of support and positive challenges may facilitate recovery in those who have persistent fatigue. The author strongly suggested that leaders in the health services give rewards for excellent work, as well as provide adequate support and feedback, and

that more emphasis should be placed on creating a positive, challenging work situation.

Several initiatives are underway to improve the job satisfaction and retention of nurses' aides. For example, the Better Jobs Better Care demonstrations (Better Jobs Better Care, 2006) involve five state-based coalitions of providers who use peer mentoring (Iowa), higher wages and benefits (North Carolina), career advancement (Oregon), uniform training requirements (Pennsylvania), and improvements to organizational culture (Vermont) to improve workers' jobs.

The health workforce continues to face enormous and life-threatening hazards in the course of daily work. The work is demanding, it requires extraordinary vigilance, and it poses significant risks for workers. Because of these factors, potential applicants to health professions schools may choose other occupations, and those engaged in this work often think about leaving the profession. The work environment needs to be made safer for caregivers.

A Culture of Safety

The best approach to managing a work environment that is safe for all health workers is to develop, support, and sustain a culture of safety. A culture of safety emphasizes safety as the organization's highest priority, and creates an organization-wide effort to develop and sustain safety practices. Yet hospitals and other health care organizations are still in the beginning stages of developing their individual safety cultures (ECRI, 2005). Employees who perceive a strong organization-wide commitment to safety are two-and-one-half times more likely to adhere to safety protocols than those who have no such perceptions (DeJoy, 1999), and the result is consistently fewer workplace injuries among employees (Gershon, 2000). Developing a culture of safety is not easy; it involves changing processes within an organization in order to cultivate the culture, and fostering an atmosphere that encourages attitudinal and behavioral change. Management and employees must not only pledge commitment to a culture of safety; they must also *live* the culture. Of course, accomplishing this is never easy, but it may be easier in hospital organizations than in office-related settings.

Singer (2003) points out that the most essential element in establishing a culture of safety in a hospital or other health care environment is to have open communication across all levels of the organization. Singer's study of safety issues in 15 California hospitals found that senior-level managers and non-clinicians believed there were fewer safety concerns than did lower-level managers and clinicians.

To foster a culture of safety, several actions must be taken: hazard recognition must be acknowledged by all parties; reporting of safety incidents, accidents, and "close calls" must be encouraged without fear of reprisal; and management must be committed to take action to remedy the problem. Employees must take an active role in the process of creating, implementing, and evaluating a culture of safety, such as becoming actively involved with safety committees, councils, and initiatives (Gershon, 2000; Zalewshi, 2004). This investment will foster ownership of and conscientious engagement in the safety effort.

Leading by example through the management structure is one of the best ways to establish a culture of safety. This is not always the case in hospitals and health care environments (Gershon, 1995). Studies have shown that supervisors and managers in private industry and heath care settings often do not always practice what they

preach in regard to safety practices. For example, health workers may observe physicians or nurses who do not use gloves or other protective equipment necessary when exposure to blood and/or body fluids could be reasonably anticipated. This might lead one to assume that the risk is nonexistent, or that management does not care if safety procedures are properly followed. Management should demonstrate an active commitment to safety. Practices such as walk-throughs can be used to identify hazards. Results of such practices should be communicated regularly to all workers.

Education practices and the engineering controls that the organization has in place are strongly correlated with a culture of safety. The frequency of exposure incidents has been shown to be significantly lower when safety feedback and training is available in the hospital due to both increased knowledge of safety practices, as well as a stronger culture of safety (Gershon, 2000). For a culture of safety to work effectively, safety responsibility must be everyone's job. Much of the responsibility for creating and monitoring a safety program falls upon the management, but employees must also be held accountable for applying the safety practices to their work environment.

While health care is often viewed as safer than traditional private industry, this is not the case. New practices and technologies often create the potential for hazardous health issues to present themselves. For example, radiation doses associated with the computed tomography are much greater than for conventional radiographs, creating the potential for healthcare workers to have greater exposure to radiation. Consequently, workplace safety must be a top priority, and new approaches must be adopted to minimize hazardous processes, such as finding substitutes for irritant disinfectants, developing best practices in how materials are handled, or using ergonomic approaches for lifting (e.g., employing mechanical devices).

All jobs have some degree of risk, but the hazard risk should be eliminated or minimized as much as possible. Management and workers must understand the risks, and they must be encouraged to acknowledge the hazards in order to mitigate the risk. Risk perception is important, because when risk is not perceived, it is considered to be absent, and protective measures are less likely to be used. Education and training on risk, risk perception, risk acceptance, and the need to adhere to safety practices is needed to change this environment. Safety expectations should be incorporated into job requirements and responsibilities.

The most effective approach to prevent and control work-related illnesses and injuries is to "design out" the hazard, typically through hazard elimination or engineering controls. Patient safety––the utmost concern to healthcare workers––does not need to be at odds with worker safety. Frequently, health workers modify equipment or processes in the work environment because the device is not suitable to use in its current form, or it may present a safety hazard. A better approach is for manufacturers to obtain input from health workers before devices are developed. Quinn and colleagues (2006) have identified several issues related to design development:

- Workers and administrators did not see themselves as having a role in product or equipment design, but rather as having some role in the re-design of work practices after the product was developed. There was no systematic way for the workers to have design input.

- Designers and manufacturers of medical devices and materials had no regular communication with the health workers.

- Information about alternative designs was not available to health workers and few alternative designs for products, materials, and equipment were available.

- Occupational safety and health professionals have been viewed as peripheral to design development and the primary production process, even though they have hazard knowledge that could be helpful.

Much of the existing research deals with the creation of environments and equipment for managing patients. Relatively fewer studies focus on the potential of design to favorably impact the health and safety of health workers. More work needs to be done to further understand the design potential to reduce employee risk of exposure to infectious diseases such as SARS (Jiang et al., 2003) or tuberculosis (Menzies, Fanning, Yuan, and Fitzgerald, 2000), and other environmental exposures, such as poor ergonomic design of patient areas. In the Canadian SARS study, workers often felt infection control policies developed elsewhere had little relevance to their workplace, especially if the institution had not experienced SARS (Yassi et al., 2004). One of the remedies to this problem would be to involve frontline workers in setting infection control guidelines and procedures, which can be viewed as a safety climate fostering factor.

Nickell (2004) conducted a study in a Toronto hospital during the SARS outbreak of 2003 and found that wearing a mask was cited as the most bothersome precaution for doctors and nurses. Physical discomfort (92.9 percent), difficulty communicating (47.0 percent), difficulty recognizing people (23.9 percent), and sense of isolation (13 percent) were the reasons given for respondents who had concerns about wearing the masks. New equipment should be designed and developed for transferring a patient to or from a stretcher or bed during a procedure to avoid injury to a staff person either during a fall or during a lift associated with the transfer (Ulrich, 2006). This will have significant impact for an aging health workforce who may be unable to continue handling heavy patient loads. All health care facilities should involve workers in the architectural design of patient care units, such as positioning electrical outlets at waist-level instead of at floor level, which requires bending down to reach the outlet.

There must be a continuum of safety controls that includes environmental controls and administrative/work practice controls. However, organizational factors that include policies and procedures, compliance directives, training and education programs, and involvement of health workers in decision-making are key to sustaining a better work environment.

Conclusion

As the U.S. population ages, the work environment will remain an important influence in both the recruitment and retention of health workers. The work that they do is often hard, demanding, and risky, with multiple hazardous exposures. Musculoskeletal disorders resulting in long-term disabling injuries are a major concern, with back injuries the most prevalent. Stress and burnout have been cited by many disciplines as reasons for leaving their jobs early, and by potential new entrants as reasons for not joining a health profession. Work organization issues of

increased workloads, mandatory overtime, interpersonal conflicts, and lack of resources and infrastructure continue to plague the health work environment. Health professions schools must also add a strong element to their curricula that addresses issues of health and safety at work, ensuring that students learn the best approaches to safeguarding their health.

Building a culture of safety will take time and leadership. Institutional policies need to be developed to seriously support a culture of safety, which means there must be employer and employee commitment to make the work environment suitable, and to reduce the risks health workers now face. All work has some associated risk; nevertheless, steps must be taken to mitigate the risk as much as possible, so that workers do not endure unnecessary illness or injury.

Health workers must be involved in the design of equipment and infrastructure that can better meet the needs in providing patient care. Without this input, new problems will emerge to make the work more difficult and less efficient. Engaging the health workforce in conversations about the workplace, and seeking their input in solution-development, will help create and sustain a place where people want to go to work, and continue to work. We cannot and should not expect our health workforce to function in an environment fraught with hazards that may result in injury, illness, and even death. A commitment to a healthful and safe work environment by the organization is essential. Developing a culture of safety is everyone's business, and it will make the work environment better for all health workers.

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Cultural Competence for the Health Workforce

Jeannette E. South-Paul and Robert C. Like

A key strategy for reducing health and health care disparities is providing culturally responsive and effective care to our diverse populations. Evidence of cultural (racial, ethnic, and religious, among other determinants) discordance between health care providers and the populations they serve suggests that every member of the health workforce must understand and implement culturally competent care as the foundation for improving the quality of services delivered.

Cultural competence has been defined as "a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or professional to work effectively in cross-cultural situations."[1] Betancourt et al.[2] have described a practical framework in health care that entails understanding the importance of social and cultural influences on a patient's health beliefs and behaviors, considering how these factors interact at multiple levels of the health care delivery system (e.g., at the level of structural processes of care or clinical decision-making), and devising interventions that take these issues into account to assure quality health care delivery to diverse patient populations. This framework for cultural competence includes organizational, structural, and clinical interventions.

Current migration patterns are driving globalization and consequently influence population health. The diversity that results from globalization not only determines the mix of patients served, but also drives the diversity of the health workforce. House staff, nurses, pharmacists, technicians, and other clinicians all hail from countries across the globe, yet still require training in cultural competence. Koehn[3-4] has coined the term "transnational competence education" as preparation for ethnically and socially discordant encounters. Transnational competence is described as involving analytic, emotional, creative, communicative, and functional core skill domains in order to communicate effectively.

Cultural competence education is an important element of health professions training and should be made available early and often. However, in a July 2004 a group of leaders in medical education released the State of Medical Education: Report of the Ad Hoc Committee of Deans, *Educating Doctors to Provide High Quality Medical Care: A Vision for Medical Education in the United States* http://www.bumc.bu.edu/www/busm/mec/pdf/AAMCeddocshighqualitycare.pdf), noting that "clinical education had not kept pace with, nor been responsive enough to, shifting patient demographics and desires, changing health system expectations, evolving practice requirements and staffing arrangements, new information, a focus on improving quality, or new technologies (p. 3)." Health professions educational institutions, however, have recognized the need for cultural competence education, as have hospitals and managed care organizations (e.g., American Medical Association,[5] Joint Commission/California Endowment,[6-7] National Committee for Quality Assurance[8]).

The American Hospital Association's Health Research and Education Trust (HRET) has developed an approach to cultural-competence training that employs a web-based tool that provides hospitals, health systems, clinics, and health plans with

information and resources for systematically collecting race, ethnicity, and primary-language data from patients. The HRET Disparities Toolkit[9] is useful for educating and informing staff about the importance of data collection, how to implement a framework to collect race, ethnicity, and primary-language data within organizations, and ultimately how to use these data to improve quality of care for all populations.

California Speaks: Language Diversity and English Proficiency by Legislative District, a report funded by The California Endowment and the Chung Ying Tang Foundation, examines numerous languages (other than English) spoken at home by nearly 40 percent of Californians. The research and analysis presented in the report can raise awareness and inform policymakers and long-term planners on issues related to meeting the needs of the changing population.[10]

Patient-provider communication must be effective in order to deliver quality care. Good patient-provider communication is associated with better patient satisfaction, greater adherence to treatment recommendations, and improved health outcomes.[11-12] Effective patient-provider communication within the context of the diversity of the United States today is culturally competent if there is (1) recognition of potential healthcare disparities, (2) understanding that socio-cultural factors influence health beliefs and behaviors, and (3) involvement of clinicians with the skills to manage these factors appropriately.[13] The significance is evident in the recommendation for cross-cultural training to reduce healthcare disparities in the seminal 2002 Institute of Medicine report, *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*.[14]

The role played by various forms of racism, bias, and prejudice in creating disparities in health and health care is also becoming increasingly being recognized. Educational interventions to address these issues are being integrated into health professions curricula and training programs.[15-18]

> It is assumed, but not proven, that the components of communication that acknowledge and take into account differences between providers and patients, particularly with regard to culture, ethnicity, and beliefs play an important role in efforts to reduce racial and ethnic disparities in the quality of care. Research is currently ongoing to determine whether different cultural competency interventions are effective in closing the health disparities gap.[19-20]

Emergence of Cultural Competence Training and Breadth Today

During the mid- to late-1990s, there was a national push to increase diversity in the health professions, led largely by the Association of American Medical Colleges' (AAMC) *Project 3000 by 2000*, the vision of Herbert Nickens, Robert Petersdorf, and Tim Ready. In addition to setting a clear numerical target (enroll at least 3,000 underrepresented minority first-year medical students by the year 2000), this campaign energized academic health centers, established national conferences, and generated monographs and reports outlining important data and analyses to assist academicians in developing their programs.

The AAMC also partnered with the Commonwealth Fund to develop a Tool for Assessing Culturally Competent Curricula (TACCT) in medical schools (see http://www.aamc.org/meded/tacct/culturalcomped.pdf and

http://www.aamc.org/meded/tacct/start.htm). Model curricula for medical students and residents have been developed by the American Medical Student Association's Achieving Diversity in Dentistry and Medicine initiative (see http://www.ask.hrsa.gov/downloads/CulturalCompBHP00208.pdf), and in clinical specialties such as family medicine[21] and internal medicine.[22]

Educators in other health professions, including nursing, pharmacy, dentistry, social work, and psychology, have recognized the importance of cultural competence in delivery of services for some time as is evident in their professional literature (see appendix). The California Endowment monograph, *Principles and Recommended Standards for Cultural Competence Education of Health Care Professionals,*[23] presents an excellent summary of these educational initiatives and the important lessons learned. As a result, many faculty committed to changing the face of health-professions education began to assess their programs and curricula to determine whether they were making progress toward increased diversity and to publish their findings.

Cultural competence has been described as being integral to holistic nursing practice for some time, especially under the leadership of Madeleine Leininger and the Transcultural Nursing Society (http://www.tcns.org).
Campinha-Bacote,[24] for example, has described a practice model of cultural competence as a volcano at the base of which must be a true desire to be culturally competent. Cultural competence must be seen as a process, not an event; a journey, not a destination. This process consists of five interrelated constructs: cultural desire, cultural awareness, cultural knowledge, cultural skill, and cultural encounters. She summarizes these concepts by affirming that all encounters are cultural encounters. Srivastava[25] in Canada has also published an excellent text, *The Healthcare Professional's Guide to Clinical Cultural Competence,* that "presents an integrated approach to cultural competence, highlighting some of the critiques, as well as the strengths, of the diverse approaches to learning about culture and cultural competence in health care (p. ix)."

The Health Resources and Services Administration's (HRSA) Centers of Excellence program has played a significant role in developing cultural and linguistic competency in health care. Its curriculum guide, *Transforming the Face of Health Professions Through Cultural and Linguistic Competence Education: The Role of the HRSA Centers of Excellence* (available at the website of HRSA, a part of the U.S. Department of Health and Human Services (DHHS) http://www.hrsa.gov/culturalcompetence/curriculumguide) provides a template for education in order to expand the training of those skills defined as being patient-centered. Examples of curricular content and teaching strategies being used in different institutions, as well as approaches to evaluating the effectiveness of this training, are described. The development of appropriate attitudes, knowledge, and skills, however, does not guarantee organizational cultural competence, nor does it serve as a substitute for leadership or commitment to cross-cultural education. Fortunately, with the appropriate institutional leadership and resource support, the health professions workforce can be trained in cultural competence.

Many excellent, free, on-line cultural competence courses are now available for and should be of significant interest to physicians, nurses, interpreters, physician assistants, pharmacists, and other health professionals (see Tables 1 and 2, below). These include continuing education programs sponsored by the DHHS Office of Minority Health (OMH) (http://www.thinkculturalhealth.org), HRSA (Unified Health

Communication 101: Addressing Health Literacy, Cultural Competency, and Limited English Proficiency (http://www.hrsa.gov/healthliteracy/training.htm), and the University Health System Consortium (see Cultural Competence in Health Care http://uhclearningexchange.uhc.edu/Presentations/pres-out67.html).

Additional public and private sector cultural competence courses are also available as well as a host of useful websites and resources (e.g., The Provider's Guide to Quality and Culture - http://erc.msh.org/mainpage.cfm?file=1.0.htm&module=provider&language=English ; Ethnomed http://www.ethnomed.org; Curriculum in Ethnogeriatrics - http://www.stanford.edu/group/ethnoger; DiversityRx - http://www.diversityrx.org; Georgetown National Center for Cultural Competence - http://www11.georgetown.edu/research/gucchd/nccc; Cross-Cultural Health Program - http://www.xculture.org)

Table 1
Cultural Competence Curricula

Cultural Competence Curricula	**Web Link**	**Target Audience**
Model Diversity Curriculum	http://www.amsa.org/addm/#cult	Medical students
Transforming the Face of the Health Professions Through Cultural and Linguistic Competence Education (HRSA Centers of Excellence)	http://www.hrsa.gov/culturalcompetence/curriculumguide	Health Professionals
Cultural Competency in Medical Education Guidebook (HRSA,BHPr-funded)	http://www.ask.hrsa.gov/downloads/CulturalCompBHP00208.pdf	Medical faculty and students
Core Curriculum Guidelines on Culturally Sensitive and Competent Health Care	http://www.stfm.org/corep.html	Family physicians and trainees
Recommendations for teaching about racial and ethnic disparities in health care	Smith WR, Betancourt JR, Wynia MK et al. Recommendations for teaching about racial and ethnic disparities in health and health care. Ann Int Med 2007;147(9):654-665	Internists and trainees
National Consortium for Multicultural Education (NHLBI-funded)	http://culturalmeded.stanford.edu/about/collaborative.html	Health professionals
Ethnomed	http://www.ethnomed.org	Health professionals
Curriculum in Ethnogeriatrics	http://www.stanford.edu/group/ethnoger	Geriatricians and others who care for the elderly

Table 2

On-Line Cultural Competence Courses

Title	Web Link
US Office of Minority Health	http://thinkculturalhealth.org
HRSA Unified Health Communication 101:Addressing Health Literacy, Cultural Competency, and Limited English Proficiency	http://www.hrsa.gov/healthliteracy/training.htm
University Health System Consortium	http://uhclearningexchange.uhc.edu/Presentations/pres-out67.html
The Provider Guide to Quality and Culture	http://erc.msh.org/mainpage.cfm?file=1.0htm&module=provider&language=English
Unified Health Communication 101: Addressing Health Literacy, Cultural Competency, and Limited English Proficiency	http://www.hrsa.gov/healthliteracy/training.htm

Current Status of Assessment and Evaluation

A series of systematic reviews of the literature have found that cultural competency training can improve communication with patients from other cultures, and that it is associated with greater health-care provider knowledge of patients' different cultures, improved provider attitudes and skills, and increased patient satisfaction with physicians. Direct links, however, have not yet been found between training and improved patient health outcomes.[26-28]

The majority of studies on cultural competence education and training in the 1990s were essentially descriptive, but some studies examined the impact on trainees and on care that was delivered. Descriptive studies primarily examined cultural competence training in different educational settings, including family medicine, medicine, pediatrics, nursing, social work, and mental health programs[29-37] The literature focused on educational techniques and course development, duration of training, content, and cross-cultural skill modules. Common elements of training covered a range of topics, such as recognition of issues pertinent to specific multicultural populations, cultural awareness and sensitivity, cross-cultural communication, use of language assistance services, culturally specific patient assessment and management, epidemiological assessment, and multicultural resource identification and utilization.

In general, studies that used self-assessment measurements of change in cultural knowledge with no comparison groups reported that participants felt their level of competency had increased significantly.[38-43] Some studies reported that change occurred in some areas of awareness and sensitivity, but not in others.[44-45] One study that compared a group of trainees to a group that did not receive training showed an impact in some aspects of cross-cultural adaptability,[46] Another study that compared "culture schooled" students with those who received alternative training found no difference in knowledge gains between the two groups.[47]

A number of studies have described a variety of cultural competence training methods, including lectures, clinical contacts, videotaped consultations, student log-books, community medicine projects, and affective methods. One study found that the affective approach led to higher scores in the areas of awareness and cultural competency than a more knowledge-based approach to teaching.[40] Kurtz[42] described a structured, psycho-educational group format, using supportive self-help components. Salcido and Garcia[36] found a greater impact on trainees who used a video training model over a helping skills or culture-specific model. Not all studies found differences in the impact of interventions examined. Naphotz[41] found both innovative and traditional cultural sensitivity improved nursing students' skill assessment scores. Pruegger and Rogers[48] found no differences demonstrated in pre- and post-tests between the experiential approach and the lecture approach, although qualitative data from personal documents indicated significantly greater effects of the experiential treatment.

Earlier studies tended to assess clinician knowledge, provide training, and then complete post-training evaluation. These studies rarely went beyond examining the impact of training on trainees to see what effect trained clinicians have on patients. Again, more attention to patients appeared in the counseling literature. Clients assigned to experienced counselors who had received cultural sensitivity training rated their counselor higher on credibility and relationship measures, returned for more follow-up sessions, and expressed greater satisfaction with counseling than did clients assigned to experienced counselors who had not received the additional training.[49]

Although same-race counseling dyads resulted in less client attrition, this factor did not influence client perceptions of counselors and the counseling process. Norman[50] reported that patients of experienced counselors who had received cross-cultural psycho-educational intervention on counseling graduate students reduced two of five measured symptoms of borderline personality disorder diagnosis, compared to patients of experienced counselors who did not receive the training. Lefley[51] found that cross-cultural training of mental health clinicians and administrators led to a significant increase in minority use of services and reduction of drop-out rates.

More recent studies assess perceptions of patients and their families about the behaviors of members of the health care team. Language barriers play a major role in racial/ethnic disparities in care, which emphasizes the importance of providing linguistically appropriate health care services.[52] Even when language is not a consideration, African American patients surveyed through focus groups expressed concern about time pressures in doctor-patient encounters, a lack of culturally appropriate informational materials, unhelpful staff (especially when making appointments), and dirty physical facilities.[53]

Thom and Tirado[54] examined the impact of a cultural-competence training intervention on measures of cultural competency, patient trust and satisfaction, adherence to treatment, and control of diabetes and hypertension. In surveying 53 primary care physicians and more than 200 of their patients, they found no measurable impact of physician training on patient-reported and disease-specific outcomes.

Thus, there is a need to define the most desirable outcomes from the patient-provider relationship, and to determine the most reliable indicators of positive improvements that result from training. Measuring satisfaction may have more to do with a response to someone's personality than the effect of training. Across all of the studies are fundamental problems with the myriad definitions of training: in the absence of a universal standard for training or a standard definition of cultural competence, there is limited comparability from one study to another of the "cultural competence" of subjects participating in different training programs.

This suggests that we must first study what behaviors and attitudes have an impact on the delivery of care, and then study what teaching methods work best to improve them. The content of training described in these studies varied widely, and was not always thoroughly described. It is difficult to discern whether different approaches to content resulted in better post-training scores, and it was impossible to make a link to improved behavior. The vast majority of studies relied on pre- and post-self-assessments, did not utilize control groups appropriately or at all, and did not measure impact on trainees' behavior or on patients.

The training interventions studied were mostly aimed at students and trainees, not providers, making it impossible to assess changes in behavior or service delivery. Furthermore, initial training strategies centered around exposing the learner to much detail regarding cultural preferences of specific groups. A more recent evaluation by Betancourt and colleagues[55-56] of preparedness of resident physicians to provide cross-cultural care in their final year of training revealed that they felt unprepared to care for patients with specific cultural characteristics, including those who mistrust the U.S. health care system or who have health beliefs or practices at odds with western medicine.

Recognizing the need for more comprehensive training for residents, a family medicine program in Minnesota launched a diversity curriculum based on the concept of "cultural humility;"[57-58] and found that residents who participated in didactics and structured learning activities were able to increase patient involvement during office visits.

More recent studies have also begun to include the patient in the assessment of the cultural competence of physicians and other clinicians through monitoring clinician behavior.[53,59-60] Others are responding to the national focus on quality and are measuring quality indicators and correlating outcomes with patient-clinician interaction measures.

Although the foundation that patient-provider communication provides to culturally competent care is being accepted in the field, there has been little research on assessing actual behaviors in the practice setting. Thom and Tirado[61] recognized that having no valid measure of provider cultural-competency limits the ability to link culturally competent provider behaviors and the outcomes of care. As a result, they

developed a patient-reported measure of physicians' culturally competent communication behavior, which they validated in a group of more than 400 adult patients with diabetes and/or hypertension. They also noted a discrepancy between patient report and physician self-report of culturally competent behaviors. Several provider behaviors identified as important to cultural competency are actually similar to those important for general interpersonal competency.

How Can Health Care Organizations and States Focus on Cultural Competence and Health Disparities?

In the 21st century, cultural competence is a business imperative because customers are more aware of and are demanding sensitivity to their personal and cultural needs. Cultural competency--or the lack thereof--is easily recognized by patients and staff, and an organization that is skilled in meeting the needs of a multicultural population distinguishes itself from the competition.[64-65]

Like other public health goals, this can be achieved through legislative direction, through attending to market forces, through community activism, and/or in response to the direction of strong organizational leaders. Federal agencies such as the DHHS Office of Minority Health took the lead in establishing what has become known as the National Standards on Culturally and Linguistically Appropriate Services (CLAS) in Health Care; these guidelines include, but are not limited to, directions for developing organizational cultural competence and improving language access,[62] (see Table 3, and http://www.omhrc.gov/templates/browse.aspx?lvl=2&lvlID=15).

The Joint Commission on Accreditation of Healthcare Organizations has published a cross-walk between the CLAS Standards and their 2007 Standards for Hospitals, Ambulatory, Behavioral Health, Long Term Care, and Home Care (http://www.jointcommission.org/NR/rdonlyres/5EABBEC8-F5E2-4810-A16F-E2F148AB5170/0/hlc_omh_xwalk.pdf). McDonough et al.[63] offered directions that could be followed at the state level to address health disparities based on research that informed each recommendation. In addition to translation and interpreter services (which have also been included in state legislation in California), McDonough notes that state infrastructure can be modified to address collection of data, establishing programs for minority elderly, providing better services for the medically uninsured, expanding primary care capacity, and fostering the development of a diverse workforce, among other actions.[63]

In addition to DHHS (2001), many organizations, including the Lewin Group (2002), the American Psychological Association (2005), and the American Medical Association (2006), have adopted a focused approach to multicultural capacity in order to support effective services for a diverse population. What the organizational culture values drives strategic and process improvement. Multicultural capacity and equitable practices are interconnected as part of a systems approach. (www.calendow.org/collection_Publications.aspx?coll_id=46&ItemID=322)

Table 3

U.S. Department of Health and Human Services
Office of Minority Health
National Standards for Culturally and Linguistically Appropriate Services (CLAS) in Health Care: Final Report

1. Health care organizations should ensure that patients/consumers receive from all staff members effective, understandable, and respectful care that is provided in a manner compatible with their cultural health beliefs and practices and preferred language.

2. Health care organizations should implement strategies to recruit, retain, and promote at all levels of the organization a diverse staff and leadership that are representative of the demographic characteristics of the service area.

3. Health care organizations should ensure that staff at all levels and across all disciplines receive ongoing education and training in culturally and linguistically appropriate service delivery.

4. Health care organizations must offer and provide language assistance services, including bilingual staff and interpreter services, at no cost to each patient/consumer with limited English proficiency at all points of contact, in a timely manner during all hours of operation.

5. Health care organizations must provide to patients/consumers in their preferred language both verbal offers and written notices informing them of their right to receive language assistance services.

6. Health care organizations must assure the competence of language assistance provided to limited English proficient patients/consumers by interpreters and bilingual staff. Family and friends should not be used to provide interpretation services (except on request by the patient/consumer).

7. Health care organizations must make available easily understood patient-related materials and post signage in the languages of the commonly encountered groups and/or groups represented in the service area.

8. Health care organizations should develop, implement, and promote a written strategic plan that outlines clear goals, policies, operational plans, and management accountability/oversight mechanisms to provide culturally and linguistically appropriate services.

9. Health care organizations should conduct initial and ongoing organizational self-assessments of CLAS-related activities and are encouraged to integrate cultural and linguistic competence-related measures into their internal audits, performance improvement programs, patient satisfaction assessments, and outcomes-based evaluations.

10. Health care organizations should ensure that data on the individual patient's/consumer's race, ethnicity, and spoken and written language are collected in health records, integrated into the organization's management information systems, and periodically updated.

11. Health care organizations should maintain a current demographic, cultural, and epidemiological profile of the community as well as a needs assessment to accurately plan for and implement services that respond to the cultural and linguistic characteristics of the service area.

12. Health care organizations should develop participatory, collaborative partnerships with communities and utilize a variety of formal and informal mechanisms to facilitate community and patient/consumer involvement in designing and implementing CLAS-related activities.

13. Health care organizations should ensure that conflict and grievance resolution processes are culturally and linguistically sensitive and capable of identifying, preventing, and resolving cross-cultural conflicts or complaints by patients/consumers.

14. Health care organizations are encouraged to regularly make available to the public information about their progress and successful innovations in implementing the CLAS standards and to provide public notice in their communities about the availability of this information.

Published in the Federal Register: December 22, 2000 (Volume 65, Number 246, pages 80865-80879). Additional information is available at: www.omhrc.gov/CLAS/.

Where Does Training in Cultural Competence Need to Be?

Cultural competency training should be aligned with and integrated into the competencies of existing and emerging health professions.

In medicine, for example, the Accreditation Council for Graduate Medical Education (ACGME) outcomes-based competencies of patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice would be particularly appropriate. Additional competencies relevant to different health professions should also be included.

There is a need for training early and often in undergraduate health professions education.

Cultural competence training is a necessary element of the training of all health professionals from the beginning of their studies. Patient interviewing and physical diagnosis are introduced at the beginning of the first year of training and are often challenging for students because they know very little about health care. These skills are reinforced with each rotation, however, as students expand their clinical knowledge.

There is a need for formal and focused training during graduate health professions education.

The ACGME competencies have driven elements of graduate medical training, and a similar commitment will be necessary to energize the cultural competency training of all members of the health workforce. The Liaison Committee on Medical Education in May 1999 adopted specific language requiring diversity in medical education:

> Given the expanding diversity in society, students must understand and be able to deal with various belief systems, cultural biases, and other culturally determined factors that influence the manner in which different people experience illness and respond to treatment. (www.lcme.org).

Subsequently, multiple entities began to design curricula to achieve these standards. Similarly, the establishment of a requirement for cultural competency training within the curricula of each health profession will drive the development of training and evaluation for all clinicians.

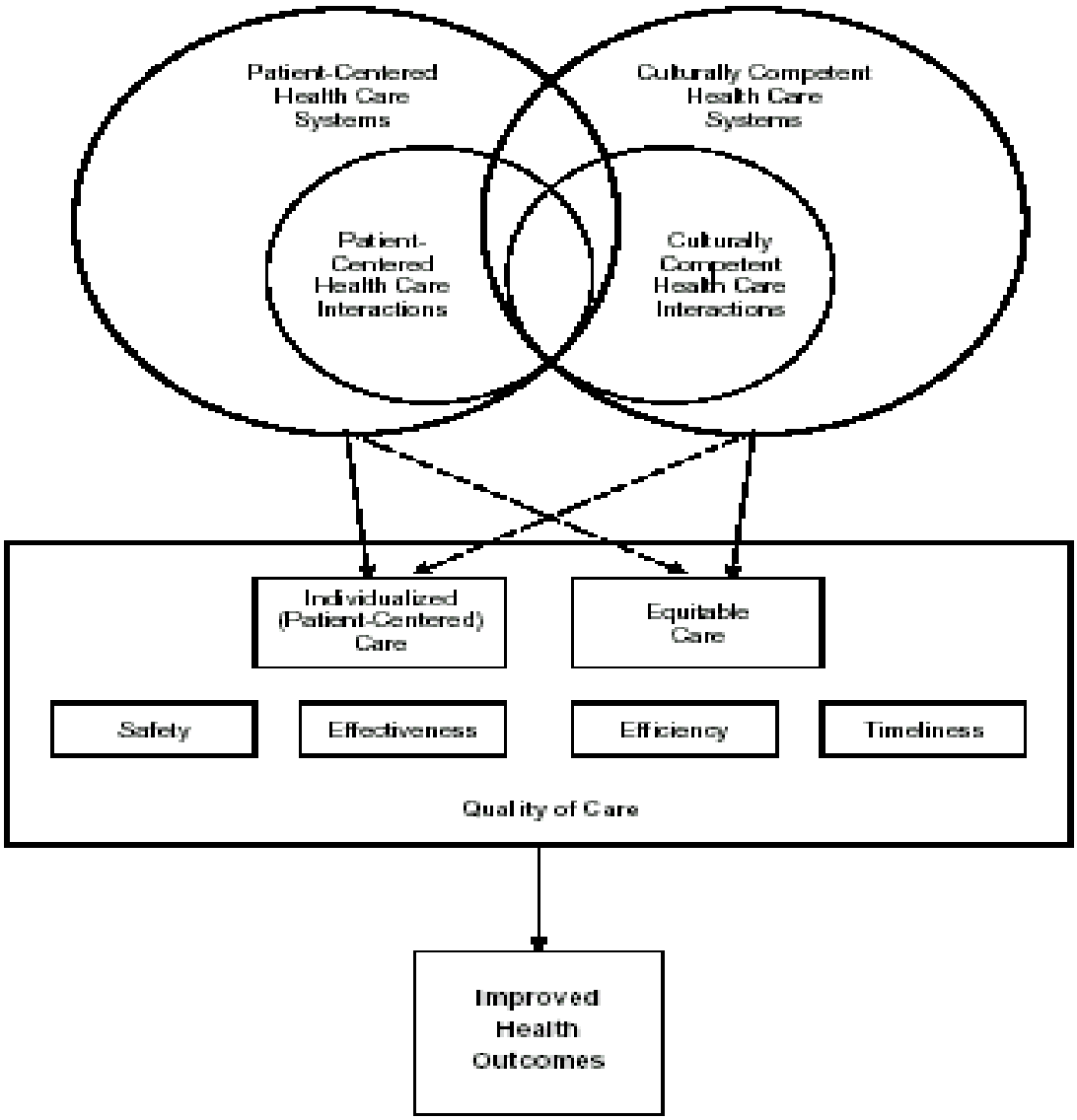
There is a need for training in the context of teams.

Recognizing that clinical care is now often delivered by an interprofessional group that may include representatives from nursing, medicine, pharmacy, psychology, dentistry and/or social work, cultural competence training will be more effective if provided in an interdisciplinary format. The HRET has created team-based seminars to train multidisciplinary teams from academic health centers to deliver culturally competent services jointly upon returning home. (http://www.hret.org/hret/programs/cclpsa.html). HRET's Cultural Competence Leadership Fellowship is designed to stimulate health care organizations to consider the challenges of serving patients from diverse communities and engage teams to learn strategies to meet these challenges. It has spotlighted promising initiatives from various health care settings, including major health systems, pharmaceutical companies, universities, and community based organizations nationwide.

There is a need for connecting cultural competency training to collaborative patient- and family-centered care and medical home initiatives.

Patient-centeredness (focusing on patients' needs and concerns and coordination of care) emerged earlier than did cultural competence in health care, with the latter appearing more in the literature in the early 1990s. As Beach et al[66] noted, both proponents of "the patient-centeredness movement and pioneers of cultural competence recognize that disparities in health care quality may result not only from cultural and other barriers between patients and health care providers, but also between entire communities and health care systems." Both principles seek to improve health care, but by emphasizing different aspects of quality. Beach graphically depicts the interrelationship of patient-centeredness and cultural competence (see Figure 1).

Figure 1. Patient-Centeredness and Cultural Competence Integral to Health Care Quality



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Patient-centeredness focuses on better individualized care through improving relationships while the aim of cultural competence is to increase health equity and reduce disparities by focusing on people of color or people otherwise disadvantaged. The coming together of these movements will also help to support the current push for developing "patient-centered medical homes"[67-68] and providing "interprofessional education for collaborative patient-centered practice."[69]

There is a need for faculty development in cultural competence.

Health professions students and trainees have traditionally been nurtured in an apprenticeship model. If their mentors are not practicing culturally competent care, the experience of not seeing this practiced or valued will extinguish the trainees' newly learned behaviors. As faculty undergo continuing education to remain current in new or developing content areas (such as health economics, genetics, quality improvement, and patient safety), they must also receive training in cultural competence to effectively train the next generation of the health workforce.

There is a need for training in the context of families and communities and among diverse groups.

Its community is the biggest and most important customer or beneficiary of the academic health center. Therefore, academic health centers should strive to assess community needs and wants and aim to do more than satisfy them. In certain Japanese hospitals, the motto is not 'we aim to please or satisfy the patient' but rather 'we aim to delight them!'[70]

There is a need to link the training with an understanding of the current and future directions of basic science, clinical, health services, and public health research.

Recognizing that the academic health center has multiple missions (clinical practice, education, generation of new knowledge) that are shaped by the changing priorities of health care, so too must the research mission reflect the changes brought by globalization and diversity. The increasingly important focus on the clinical translation of science is shaping the way research is applied to practice and how practice informs research. This strategic initiative requires not only applying new knowledge to the bedside, but also extending it to the community. If a lack of understanding of the culture of the community leads to use of an uninformed approach, community-based practice and research are significantly compromised.

Rust and Cooper[71] have emphasized the need to implement a new model of practice-based research that tests dynamic, multidimensional interventions that triangulate patients, providers, and communities rather than the traditional experimental model focusing on a single intervention. Developing such a model would involve studies relating to acute and chronic illness, health promotion and disease prevention, behavioral and psychosocial issues, supportive care, rehabilitation, palliative care, and end-of-life care. This research should make use of participatory action inquiry and multiple quantitative methods. When such a model is used, the impact of socioeconomic deprivation and disenfranchisement on determinants of health and the need to focus on the most appropriate targets for intervention become apparent.[72]

How Do We Get There? What Needs to be Done?

Achieving a culturally competent academic health center is an evolving process that will require participation from all members of the health care team. Health professionals need to become knowledgeable about and implement programs that address the Office of Minority Health's National Standards on Culturally and Linguistically Appropriate Services (CLAS) in Health Care. Some key steps toward this end include:

1. Establishing formal, regional focus groups to understand the journey and attitudes of those in training in the health sciences, given the evidence of bias (unintentional or intentional) in diagnosis and treatment of diverse groups and the disconnect between physicians' perceptions of their own behaviors and that of their patients.

2. Incorporating cultural-competence training into the required undergraduate and graduate health-science curricula and striving for instruction by interdisciplinary teams. It is essential to measure the outcomes since what is not measured is not valued.

3. Building an assessment of clinician performance by colleagues and the patients receiving care and provide incentives for good performance through enhanced reimbursement by insurers.

4. Reimbursing clinicians for providing culturally competent environments (e.g., making available multilingual patient education and information materials and providing for interpreters). Current requirements of the DHHS Office for Civil Rights (http://www.hhs.gov/ocr/lep) regarding interpreters, without provision for the cost of these services, operate as disincentive to identifying those in need of the service.

5. Promoting cultural competence education and training conferences and continuing education and incorporating this material into general clinical and research conferences.

6. Encouraging and supporting cultural competence training as a component of licensure through a balance of appropriate requirements and incentives. New Jersey, California, Washington, and New Mexico currently have legislation in place, and at least seven other states have bills pending.[73]

7. Re-energizing a campaign to increase the diversity of the clinician workforce to mirror the population it serves. This would include incorporating activities that mentor children early in the pipeline, mentoring health sciences students in training, and supporting minority faculty who have already entered academic careers.[74-75]

8. Developing and implementing "inter-cultural competence" training to improve communication and relations between and among health professionals from different backgrounds and disciplines.

9. Developing strategies for relieving the overwhelming and immobilizing cost of health science education; debt will drive clinicians away from practicing in the neediest communities. Consider service contracts for disadvantaged communities that relieve debt in exchange for practicing in areas of need. These could be state-funded or result from expanding current U.S. Public Health Service programs.

10. Encouraging support from federal, state, and private funders for more primary care practice-based research, as well as participatory models of action research and collaborative education via partnering with communities.

Summary

Interest in cultural competence, multicultural medicine, and health inequalities has reached the "tipping point," and efforts are underway throughout the United States and around the world to improve access and the quality of care for our increasingly diverse populations and communities.

Successfully meeting the needs of all customers served by academic health centers requires identifying the breadth of diversity they represent, prioritizing cultural competence as a skill set that must be acquired by every member of the workforce, and encouraging corporate (both academic and business) leaders to adopt this as a priority focus. By adopting this approach, patient-centeredness and patient satisfaction will be achieved within an environment that respects all members and stimulates the highest productivity by everyone.

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Compiled by:
Robert C. Like, MD, MS
Professor and Director
Center for Healthy Families and Cultural Diversity
Department of Family Medicine
UMDNJ-Robert Wood Johnson Medical School
New Brunswick, New Jersey
Email: Like@umdnj.edu
Website: http://www2.umdnj.edu/fmedweb/chfcd/index.htm
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The Long-Term Care Workforce: Current and Future Trends, Challenges, and Potential Solutions

Robyn I. Stone

Introduction

Long-term care has been the subject of much analysis and debate by policymakers, providers, consumers and researchers over the last three decades. The challenge of meeting the long-term-care needs of America's chronically disabled older population will become even more salient over the next 30 to 40 years as the Baby Boom generation ages. Until recently, most of the attention has been focused on how to finance these services and how service systems should be designed. Much less attention has been paid to the third part of the "triple knot" of long-term care—the workforce that delivers the care (Stone, 2006).

For the last five years, however, the importance of the workforce has been acknowledged and has, in fact, become a much-scrutinized phenomenon. From the Institute of Medicine (IOM) and the U.S. Departments of Health and Human Services (DHHS) and Labor (DOL), to the National Commission on the Nursing Workforce for Long-Term Care, the Citizens for Long-Term Care, the National Alliance for Caregiving (the Alliance) and more than 35 state commissions and task forces, stakeholders and healthcare experts have been brought together to examine workforce issues and lay out potential solutions.[1] Most recently, the National Commission for Quality Long-Term Care (the Commission) released a report, *Out of Isolation: A Vision for Long-Term Care in America*, laying out the case for long-term care reform, including confronting workforce problems (National Commission for Quality Long-Term Care, 2006).

These organizations and groups have largely agreed on four issues:

1. There is a well-documented shortage of professional and paraprofessional personnel to manage, supervise, and provide long-term care services in nursing homes, assisted living, and other facility-based and home care settings—the result of high turnover, large numbers of vacancies and difficulty attracting new employees.
2. The problem goes beyond a shortage of "warm bodies." There is a serious dearth of qualified, competent, and appropriately trained and educated professionals and paraprofessional caregivers to deliver long-term care across the range of settings.
3. The instability and lack of competencies of today's long-term care workforce has contributed to:
    - Service-access problems for consumers that, in many cases, has seriously compromised their safety, quality of care, and quality of life;

[1] See, for example the following reports: National Commission on Nursing Workforce for Long-Term Care, 2005; HHS/DOL, 2003; Citizens for Long Term Care, 2002; National Alliance for Caregiving and AARP, 2004; Wunderlich and Kohler, 2001

- Excessive provider costs due to the need to continuously recruit and train new personnel and use temporary, higher-cost contract staff; and
- Extreme workloads for both nurses and paraprofessional staff, inadequate supervision, less time for new staff to learn their jobs, and high accident and injury rates exceeding those in the construction and mining industries.

4. As a result of growing demand from aging baby boomers and a shrinking of the traditional caregiver labor-pool, the future will be immeasurably worse without decisive action by both the public and private sectors.

Unfortunately, there is no silver bullet that can solve today's shortages and meet future demand. Actions are required at many levels, on many different fronts. Many will be costly—and not all will agree about how or where to start. Perhaps most importantly, confronting workforce shortages is inextricably related to all other aspects of long-term care reform—from defining what the long-term-care system is expected to do and how it should be financed to how to promote quality, employ technology and develop and implement new models of organization and service delivery. How the United States chooses to meet a growing demand for long-term care in the future will have a significant impact on the number and types of personnel that will be needed, ranging from where they will be recruited, and how they should be compensated and trained, to the nature of their work, and the settings in which they will work.

This paper addresses long-term-care workforce problems affecting frail and disabled older adults who receive care in nursing homes, assisted living and other residential facilities, and home and community-based settings—principally their own homes and apartments. In the first section, the composition of the long-term-care workforce is described. This is followed by a review of the factors that are driving today's long-term-care workforce challenges and the trends that are likely to drive it in the future. The paper concludes with the identification of a range of policy, practice, and research options that could be pursued to ensure an adequate supply of competent long-term care professionals and paraprofessionals.

The Make-up of the Long-Term Care Workforce

According to Bureau of Labor Statistics (BLS) 2000 data, there are an estimated 1.85 million employees working in facility-based and home care settings, not including caregivers employed directly by consumers and their families. This paper focuses on two categories of the long-term care workforce. The first group includes the key **licensed professionals** in long-term care: physicians, nurse practitioners, nursing home and assisted living administrators, other home health and community services agency directors and chief executive officers, registered nurses (RNs), and licensed practical and vocational nurses (LPNs/LVNs). The second group includes a wide range of **direct care workers**: home health aides, nursing aides and assistants, personal care attendants and home care aides, as well as independent providers employed directly by consumers and their families.

There are also an estimated 1.65 million support personnel, including therapists, management, and administrative staff, cleaning and maintenance staff, food preparers and servers, and social services personnel. While important to the delivery of good care, issues related to these personnel are not addressed in this paper.

Licensed professionals

Physicians—Physicians are formally involved in long-term care as nursing-home and home-health agency medical-directors and as those who are required to sign off on nursing home and home health-care plans. Some physicians also continue to treat their elderly patients after they enter a nursing home or assisted living facility. Since 1990, nursing homes reimbursed by Medicare or Medicaid are required to have a physician medical director who is responsible for implementing medical care policies and coordinating medical care. The practical meaning of these responsibilities, however, is not well defined. Home health agencies are not required to have a medical-director, although many do. Few physicians within or outside the long-term-care system are geriatricians or have training in geriatrics to prepare them to carry out these roles effectively.

Most observers agree that little medical care is found in nursing homes (Wunderlich and Kohler, 2001). A review of the literature suggests that most medical directors have limited authority over nursing home staff or internal nursing home practices (Levy, Epstein, Landry, et al., 2005). About 84 percent are working part-time and 87 percent also are attending physicians of residents for whom they are responsible. A 2003 study of medical directors conducted by researchers at the U.S. Department of Health and Human Services (DHHS) found that 86 percent spent eight hours or less per week in a facility and 62 percent reported visiting the facility one time per week or less. Seven out of ten reported that from one to ten percent of their overall medical practice was devoted to their medical-director role (U.S. Department of Health and Human Services, Office of the Inspector General, 2003). Despite the federal mandate requiring medical director oversight in nursing homes, the federal government has paid little attention to the lack of physician involvement. In a recent effort to elevate the medical director's role, the Centers for Medicare and Medicaid Services (CMS) instructed nursing home surveyors to examine the adequacy of their performance and link deficiencies in their performance to resident outcomes (Levine, Savino, and Siegel, 2006).

Physician involvement with the elderly homebound clients of home health agencies is also quite limited and often problematic. Coordination and communication between home health agencies and physicians has long been regarded as inadequate.

Nurse practitioner (NP)—NPs, registered nurses with additional education in health assessment, diagnosis and management of illness and disease, have been reimbursed by Medicare since 1998. Studies of NPs in nursing homes suggest they enhance the medical services available to residents and prevent unnecessary hospital admissions (McAiney, 2005). A survey of nursing-home medical directors found that they perceived NPs to be particularly effective in maintaining physician, resident and family satisfaction (Rosenfeld, Kobayashi, Barber et al., 2004). In their evaluation of the Wellspring nursing home quality-improvement model implemented by a collaborative of eight facilities in Wisconsin, Stone and colleagues (2002) found that the nurse practitioner shared by all the nursing homes in the program was the key to the success of this effort.

These findings underscore the significant role that NPs, particularly those trained specifically in geriatrics, can play in bridging the worlds of medical care and long-term care. Although the number of NPs now employed by long-term-care providers is not known, anecdotal evidence (including the difficulties in recruiting NPs among facilities interested in replicating the Wellspring program) suggests that the

availability of these professionals is quite variable across the country. Furthermore, despite increasing evidence of the success of NP involvement, many nursing home administrators have not been convinced to invest their often limited resources in hiring NPs.

Nursing home/other long-term-care administrators—The federal government requires states to license nursing home administrators, although there are no national standards. Consequently, wide variations in licensing requirements exist across states (Langelier and Wing, 2004). States determine whether and how administrators in assisted living facilities, home health agencies, and other home and community-based services agencies are credentialed.

The National Association of Boards of Examiners of Long Term Care Administrators (NABE) estimates there are between 22,000 and 25,000 licensed nursing home administrators, of whom 16,000 to 17,000 are currently employed in skilled nursing facilities. These individuals are responsible for all facets of facility life, including the supervision and management of staff and compliance with federal and state regulations. Most states require prospective nursing-home administrators to serve an unpaid apprenticeship prior to obtaining a license.

Over the past several years, there have been sharp declines in the number of individuals entering nursing home administration and high rates of turnover among current job holders (National Association of Boards of Examiners of Long Term Care Administrators, 2001). One study of more than 400 nursing homes found an annual turnover rate of 43 percent. Administrator turnover has been linked to poor quality outcomes in nursing home residents (Castle, 2001). Recent data suggest that the decline in new applications for licenses may have leveled off; however, the causes of past declines, or the reasons why the decline may have reversed, are not known (Stoil, 2005). There are few studies of administrators in other long-term-care settings and no information at the national level on their numbers, turnover or vacancy rates.

Nurses—An estimated 500,000 registered nurses (RNs) and licensed practical/vocational nurses (LPNs/LVNs) make up the vast majority of long-term-care professionals (American Health Care Association, 2004). RNs in long-term-care settings represent only a small percentage of the total RN workforce, most of them are employed in hospitals. They are, however, the dominating force in long-term care, playing a major role in care assessment, and planning and delivery as well as quality assurance. This contrasts with the acute care sector where physicians play the dominant role.

RNs are relatively evenly distributed between home health agencies and nursing homes. About 90 percent of RNs are white women, although increasing numbers are immigrants from racially diverse backgrounds. About four percent are both foreign-born and foreign-trained (Health Resources and Services Administration, 2004). RNs in nursing homes tend to be older than RNs in other health care settings—36 percent are aged 50 or over and 10 percent are over age 60 (Spratley, Johnson, Sochalski et al., 2001). Most RNs in nursing homes hold administrative and supervisory positions, including director, or assistant director, of nursing or head nurse. Their primary role is to assess residents' health, develop treatment plans, and supervise LPNs and paraprofessional direct care staff.). Home health RNs assess patients' home environment, care for and instruct patients and their families, and supervise home health aides.

A number of researchers have investigated the link between the presence of RNs and nursing home quality and have found a strong positive relationship between adequate numbers of RNs and better quality outcomes for residents (Bostick, Rantz, Flesner et al., 2006; Harrington, Carrillo, and Wellin, 2001). To date there has been no similar research activity regarding links between RN presence and the quality of home health care. The job satisfaction of RNs in all health care settings is low in comparison to the job satisfaction of other professionals and is lowest of all in nursing homes and other facility-based settings (Spratley, Johson, Sochalski et al., 2001).

LPNs account for 46 percent of licensed long-term care nurses and are employed primarily by nursing homes. The LPN workforce is somewhat younger than the RN workforce, and the racial diversity of the workforce is greater. About 26 percent of LPNs are black and almost all are U.S. born (Seago, Spetz, Chapman et al., 2001).

Although LPN scopes of practice are more limited than that of RNs, they play an extremely important role in nursing homes. They provide direct patient care including taking vital signs and administering medications. According to surveys conducted by the National Council of State Boards of Nursing, more than 60 percent act as charge nurses or team leaders with responsibility for supervising and directing the care provided by paraprofessional direct-care staff. A study of nursing hours in nursing homes found that LPNs provided more hours of nursing care per day than did RNs (Harrington et al, 2003).

Both RNs and LPNs are licensed at the state level. RNs typically take two to four years to complete their nursing education, while LPNs usually can obtain a license after 12 to 18 months. According to the BLS, the median annual wage in 2005 for RNs employed by home health agencies was $54,550, and $51,510 for RNs employed in nursing homes (RNs employed in hospitals earned $57,820 per year). The median annual wage for LPNs in nursing homes was $37,520 in 2005, and $37,810 in home health agencies.

High turnover and vacancy rates and difficulty recruiting and retaining RNs and LPNs are reported across the spectrum of long-term-care providers. Analysis of a 2002 survey of nursing homes conducted by the American Health Care Association (AHCA, 2003) found annual turnover among RNs averaged almost 49 percent, and LPN turnover averaged more than 50 percent. Facility respondents reported that 18.4 percent of RN positions were vacant, as were 14.4 percent of LPN positions. They also reported that recruitment problems were getting worse.

These trends are consistent with results of similar state-specific studies. The final report of the National Commission on Nursing Workforce for Long-Term Care (2003) estimated that 96,000 new nurses are needed just to fill current nursing-home vacancies. While anecdotes from the field suggest that nurse turnover in home health care is less of a problem, findings from one study cited in a U.S. General Accounting Office (GAO) report indicate a 21 percent annual turnover rate among RNs employed by home health agencies (U.S. Government Accounting Office, 2001).

Direct care workers

Direct care workers are considered the "hands, voice and face" of long-term care, responsible for helping frail and disabled older adults carry out the most basic

activities of daily life. The majority work in nursing homes and assisted living facilities; however, increasing numbers provide in-home supportive and health-related services. Estimating the size of the home care workforce is particularly difficult—many are missed in surveys because they are directly employed by consumers and/or their families. A recent study suggested their numbers are significantly undercounted (Montgomery, Holley, Deichert et al., 2006). According to 2006 BLS data, the total paraprofessional direct care workforce in both the health and long-term care sectors (the majority employed in the latter sector) consists of:

- 1,391,430 nurse aides, orderlies and attendants, largely employed in nursing homes;
- 663,280 home health aides, a slight majority of whom work in home-based care settings; and
- 566,860 personal care and home care aides, two-thirds of whom work in home-based services.[2]

Women make up about 90 percent of the paraprofessional workforce. Almost half of these workers are racial or ethnic minorities, including 33 percent who are African American and 15 percent who are either Hispanic or other persons of color. In their analysis of data from the 2000 Census, Montgomery and colleagues (2006) found that the characteristics of paraprofessional nursing-home and home-care workers diverge in some important ways. For example, Hispanics are somewhat more likely to work in home care settings while African Americans are more likely to work in nursing homes. Direct care staff employed in home care agencies are also more likely than nursing home staff to be foreign born and less likely to be U.S. citizens, perhaps indicating that home care is an entry-level job for new immigrants. Home care workers are also older than nursing home direct-care workers, with a mean age of 46 (compared to age 36 for nursing home workers). The percentage of home care workers over age 65 is three times that of direct care workers in nursing homes. Home care personnel are also less likely to be married. Importantly, 50 percent of nursing home workers are employed full-time, but only about a third of home care workers are employed full-time. These differences have implications for developing recruitment and retention strategies targeted to the specific subsectors within the long-term care industry.

Certification requirements for direct care workers across all long-term-care settings are usually low or nonexistent. Federal law requires nursing assistants and home health aides to have less than two weeks of training, although most states add on to these requirements. Federal law does not require training for home care workers, and state requirements for these workers vary widely. Although 20 percent of nursing assistants and home health aides have not graduated from high school, more than 30 percent have some college education (Health Resources and Services Administration, 2004). The median annual wage in 2005 for personal and home care aides was $17,710; for home health aides, $18,850; and for nurse's aides and orderlies, $21,480 (Bureau of Labor Statistics, 2006). One in four direct care workers employed in nursing homes and two in five employed in home care agencies lack health insurance. Nursing home workers are also twice as likely to be uninsured as hospital personnel. High injury rates may make them especially vulnerable but without adequate insurance coverage (Paraprofessional Health Care Institute, 2006).

[2] Montgomery, based on an analysis of the 2000 Census, estimated there are almost 800,000 home care aides, including personnel employed privately by families and those employed in home care agencies who have been missed in other estimates.

While the number of direct care workers grew 40 percent between 1988 and 1998, vacancies and turnover has become a serious problem (U.S Government Accounting Office, 2001). The AHCA survey of nursing homes found annual turnover rates among nurse aides of more than 76 percent and vacancy rates of almost 12 percent (American Health Care Association, 2003). A national survey of 44 states conducted in 2003 found that 80 percent of state respondents (33 states) indicated direct care worker shortages were a serious problem (Paraprofessional Health Care Institute, 2006). A 2005 AARP report cites numerous studies of high vacancy and turnover rates among paraprofessional direct care staff (Wright, 2005). One national study of assisted living reported annual turnover rates of about 40 percent among personal care workers and nurse aides. A 2002 Wisconsin study found turnover rates among direct care paraprofessionals of 77 percent to 164 percent in assisted living, from 99 percent to 127 percent in nursing homes and 25 percent to 50 percent in home health agencies. A 2002 North Carolina study found turnover rates for aides of 95 percent in nursing homes and 37 percent for home care agencies.

Research confirms that the most important reason direct-care paraprofessional workers stay in their jobs is the relationships they have with older adults in their care. Turnover and job dissatisfaction is clearly linked to poor pay and benefits (Harris-Kojetin, Lipson, Fielding et al., 2004). However, compensation issues alone do not explain overall satisfaction or turnover. Direct care staff whose work is valued and appreciated by their supervisors, and who are listened to and encouraged to participate in care-planning decisions, have higher levels of job satisfaction and are more likely to stay in their jobs (Bowers, Esmond and Jacobson, 2003; Harris-Kojetin, Lipson, Fielding et al.,2004).

Factors Influencing Workforce Recruitment and Retention

A variety of factors influence the recruitment and retention of the long-term care workforce. The impact of some of these factors is immediately apparent—the impact of other factors is much more uncertain.

Short-term factors

A variety of short-term-care factors influence the recruitment and retention of both professionals and paraprofessionals regardless of the setting in which they work. They are described below.

The Economy—When the economy is strong, as it was in the late 1990s, and unemployment is low, the pool of personnel—particularly women who may have in the past chosen long-term care—have more options. The tighter the labor market, the more difficult it may be to attract personnel to long-term care jobs.

Industry Stereotyping—The very image of the long-term-care industry makes workforce recruitment more difficult. Ageism in the larger culture, the tendency to equate long-term care with nursing home (a setting older people want to avoid) and sensational stories in the media about nursing home fires, abuse, and scandal combine to bias the public's view. According to a Kaiser Commission Survey, nursing homes are ranked below drug companies and just above health insurance companies in the share of adults who think they do a good job. Of the respondents, 4 in 10 respondents said they do not believe nursing homes provide a high quality of service, 6 in 10 said nursing homes make people worse off, and only 2 in 10 said they make people better (Kaiser Family Foundation, 2006). It is, therefore, difficult to attract professionals and potential direct care workers into these settings.

Pay and Benefits—Salary is a critical issue for all categories of the long-term care workforce. The level at which salaries would attract sufficient numbers of physicians, nurses, and paraprofessionals to long-term care is not known. Wages and benefits of the paraprofessional workforce are particularly problematic given the level of responsibility these workers are expected to assume, the heavy workloads they must endure, and the high injury rates. Almost 30 percent live at or below the poverty line. They are less likely to have health insurance than the average worker in the United States, and 75 percent have no employer-sponsored pension. Compounding the problem of low wages is the high proportion of paraprofessional workers who work part-time (Salsberg, 2003). Wage increases have been shown to have a substantial impact on their recruitment and retention. An evaluation of a San Francisco County initiative that doubled the wages of In-Home Supportive Services (IHSS) personnel found that the wage hike resulted in a 54 percent increase in the number of IHSS personnel employed over the period of the study.[3] Annual turnover also fell 30 percent (Howes, 2002).

Poor Working Conditions—As is often true in the larger health-care sector, the long-term care industry tends to follow an almost military, hierarchal approach to workplace organization and management. Mentoring, coaching, the use of teams, and collective involvement of staff in decision making is the exception rather than the rule. Both nurses and aides complain about managers who lack respect for the knowledge and skills they bring to the job and refuse to share information, poor supervision, and a feeling that they are powerless to change their work environment (Bowers, Esmond and Jacobson, 2003; Kimball and O'Neil, 2002). Problems with turnover of administrators, directors of nursing, and frontline caregivers further exacerbate a negative situation when the remaining staff is faced with assuming the responsibilities that should have been addressed by staff filling the vacant positions. The retention of long-term care personnel will not be accomplished without significant changes in human resource practices and systems.

Inadequate/Misplaced Investments in Long-Term Care Workforce Education and Training—The professional long-term-care workforce is not trained to address the special health and medical care needs of elderly consumers. Nationwide, there are few geriatricians or physicians trained in geriatrics. In many states, nursing home administrators—the chief executive officer in nursing homes— are only required to have a high school diploma and pass an exam. Training requirements governing administrators in other settings, such as assisted living or home health care, range from rigorous to minimal.

Less than one percent of RNs are certified in geriatrics (Miller and Mor, 2006). Nursing schools, community colleges and technical schools, furthermore, typically do not cover long-term care nursing in more than a cursory way in their curriculum. Anecdotal evidence suggests they may discourage nursing students from even considering long-term-care careers. Nursing schools largely fail to prepare RNs to carry out administrative roles, although it is a primary responsibility in long-term care nursing. They do not adequately prepare RNs or LPNs in effective supervisory approaches, although one of their principal responsibilities is to supervise

[3] The wage increase resulted from (1)the county enacting of a living-wage ordinance and (2)union bargaining with the county public authority, the employer of record for IHHS personnel who are employed directly by consumers.

paraprofessional staff. Nurses also are poorly trained to understand the workforce implications of a culturally diverse paraprofessional workforce or the growing ethnic and racial diversity of older adults who are the consumers of long-term care.

To become certified as nursing assistants or home health aides, individuals are required to have less than two weeks of training. Home care aides are not subject to any federal requirements, and few states require training. Most direct care workers appear to learn what is expected of them and how to do their jobs after they have been hired. As a result, large numbers are unprepared for the demands placed upon them and leave their jobs within the first few months. Continuing education requirements for both professional and paraprofessional personnel are minimal. They are primarily didactic in nature and fail to apply adult-learning techniques that focus more on experiential training efforts that link the instruction to the reality of the tasks they must perform daily. There are few rewards for keeping up with the latest information on evidence- based practices or the availability of new technologies. Raising education requirements also could have an undesirable effect if it discourages or delays prospective personnel from entering long-term care jobs; however, improving training may be the only path to creating higher-quality jobs that are more competitive in the labor market.

Limited Data on Long-Term Care Workforce Supply and Demand Imbalances—There are large geographical differences within and across states with respect to workforce shortages in the long-term care delivery system. The ability of public and private agencies to track supply, demand, and labor shortages is weak. Consistent definitions of the various categories of long-term care employees, as well as measures of supply and demand, are lacking. Workforce planning, policy development, quality improvement, evaluation of what works and information for consumers all require better data on the various components of the long-term care workforce (Moore, 2003).

Limited Dollars to Add New Personnel—Seventy percent of long-term care costs are paid from public funds (Georgetown University Long-Term Care Financing Project, 2007). Public reimbursement rates are critical factors, therefore, in determining both the supply of and demand for long-term care. Because government financing policies largely have been driven by cost-containment motives, they limit the number of new employees that providers are willing or able to add to the labor pool. Although the relationship between raising reimbursement rates to providers and increased staffing levels is not well understood, assumptions that the private market will take care of workforce shortages without additional public dollars are questionable. A number of recruitment and retention issues also affect professionals and paraprofessionals in the long-term-care workforce somewhat differently. For example:

- Most physicians have office-based practices. Most nursing home residents (as well as many other older adults with chronic illness and disability) cannot get to a doctor's office without extreme difficulty, if at all. Until Medicare and Medicaid provide sufficient monetary incentives to compensate physicians for time spent traveling to and working in a nursing home, assisted living facility, or in the individuals' own home if they are homebound, inadequate oversight of and coordination of medical care and long-term-care services will continue to be a problem.

- The National Association of Boards of Examiners of Long Term Care Administrators has identified several special barriers to the recruitment and

retention of qualified nursing-home administrators, including (1) the lack of a national registry of licensed administrators to inform recruitment and retention, education and training preparation, and standards development and licensing practices; (2) state licensure requirements that demand months of necessary but unpaid apprenticeship before licensure is completed; and (3) uneven training and licensure standards that limit workplace mobility and may contribute to poor performance and the inability to quickly place qualified administrators where they are needed most.

- While RN shortages are influenced by inadequate wages and poor working conditions, recruitment efforts also are exacerbated by the lack of faculty to teach nursing students. Surveys conducted by the American Association of Colleges of Nursing (2006) found that U.S. nursing schools turned away 41,683 qualified applicants from baccalaureate and graduate nursing programs in 2005 because of a shortage of faculty, a lack of clinical sites, and space and budget constraints. Almost three-quarters of nursing schools responding to the survey reported that faculty shortages prevent them from accepting all qualified students (American Association of Colleges of Nursing, 2006).

- Paperwork burdens, the result of federal and state regulatory requirements, also have become particularly burdensome for nurses in nursing home and home health settings—detracting from their ability to supervise and mentor staff, oversee quality, and introduce innovation to the workplace. LPNs, the dominant nursing presence in nursing homes, may be hampered by the restrictive scope of practice. State regulation of nursing practice does not necessarily reinforce the role that the LPN must play in assessing residents, planning care, delegating tasks and supervising direct care personnel.

- The challenges peculiar to the recruitment and retention of direct care workers are perhaps the most complex and difficult to resolve. Wages are not adequate to support young families with children. The job is often not well-designed, creating inefficiencies, unnecessary job burdens, and subjecting occupants to high rates of injury. There are few opportunities for career advancement. Supervision is poor or nonexistent. In addition, low unemployment rates for all entry-level personnel, coupled with increasing levels of education among minority populations, provide this labor pool with far more choices than low-income women have had in the past.

Long-Term trends

The 'Emerging Care Gap'—Demographers point out that between now and 2015, the population aged 85 and older (those most likely to require long-term care) will increase by 40 percent. At the same time, the native-born population age 25 to 54—the pool of individuals from which both paid and informal caregivers have largely come—will not increase at all. After 2015, the older adult population really will begin to accelerate and will continue to do so until 2050. When the baby boomers turn 85, they will not have the number of children to help take care of their long-term-care needs as do today's 85-year-olds. The BLS predicts a 45 percent increase in demand for long-term care by 2010—equivalent to about 800,000 new jobs for nurse aides, home care personnel, and personal care. The increase in demand will be greatest in home care settings, followed by assisted living and other forms of residential care. The demand for nursing home personnel is expected to grow more modestly. One study has calculated that to maintain the current ratio of paid long-term care

personnel to the oldest old (those over 85) would require the long-term-care workforce to grow by two percent a year from now until 2050, and to add more than four million new long-term care personnel (Friedland, 2004). Government estimates are even higher (Levy, Landry, Kramer et al, 2005).

Shift from Institutional Care to In-Home and Community-Based Care Settings—The proportion of older adults in nursing homes declined from 4.2 percent to 3.6 percent between 1985 and 2004. One recent study found that declines in nursing home use were steepest among older adults aged 85 and older—the population most likely to be disabled and in need of long-term care (Alecxih, 2006). During this time period, alternatives to nursing homes have rapidly emerged, particularly assisted-living and home- and community-based services. The shift to home- and community-based services will influence the number and types of caregivers needed in the future, as well as regulatory requirements regarding credentialing and ongoing training.

Decline in Disability Rates—Disability rates among older adults declined between 1984 and 1999. If these patterns persist, the demand for long-term-care services could be substantially less than would be predicted based solely on the growth of the elderly population. To date, there is little if any consensus regarding future disability trends. However regardless of whether they decline at the same rate as in the past, level off, or go up, the number of older people with disabilities is expected to dramatically increase (Center for California Health Workforce Studies, 2006).

More Ethnically and Racially Diverse, Better Educated and Wealthier Older Adults—Baby boomers will look different than past elderly cohorts. They will be more racially and ethnically diverse—36 percent Hispanic in 2050 versus 16.5 percent in 2000; more likely to be high school and college graduates; and more likely to have higher incomes (Center for California Health Workforce Studies, 2006). These demographic changes will influence both the ability of older consumers to purchase services and the preferences for types of services and support.

Movement to New Models of Care—The organization of the long-term-care system of the future will be different. The traditional nursing home may not even exist. It is possible that these entities will become primarily or exclusively sub-acute facilities with the more traditional long-term care services provided in other types of residential settings. Home- and community-based services will dominate long-term care service delivery.

A larger proportion of tomorrow's older adults will no doubt manage far more of their care than they do today. While wealthier people always have been able to manage their own services by purchasing them in the private market, the consumer-directed care movement is bringing this type of autonomy and control to the public market as well. Consumer-directed care enables older adults with disabilities, rather than professionals, to make decisions about the services they want, who they want to deliver them, and how and when they are delivered. A 2002 survey conducted for AARP found that more than 85 percent of people aged 50 and over wanted to manage their own long-term care services rather than have an agency manage them on their behalf. Studies of consumer-directed services have concluded that participants were more satisfied than they had been under traditional agency-directed models, reported a higher quality of life, had fewer unmet needs, and said they got more care for their money (Kassner, 2006).

The proliferation of consumer-directed models will require considerable reorientation of the direct care workforce. The workforce must adapt to consumers who have the right to hire and fire them and to make care decisions. They also must deal with issues of potential exploitation around scheduling, wages and benefits. Already, public models of consumer direction raise several policy issues, such as whether there should be requirements for quality-oversight, training, and worker protection; how much workers should be paid; how federal and state tax withholding requirements can be assured; and whether consumers need training to supervise workers. California, Washington, and Oregon have begun to address such concerns by establishing public authority models that act as the employer of record for workers hired directly by consumers.

Introduction of New Technology—The future impact of new technology on the supply of and demand for personnel is promising but uncertain. The introduction of labor-saving technology may reduce paperwork burdens and rates of injury and improve worker efficiency, allowing fewer personnel to do more with less. The role of telehealth, including integrated electronic records that allow physicians and nurses to monitor health and functional status and to manage patient transitions from setting to setting may revolutionize these professions and facilitate their participation in the long-term care system.

Immigration Policy—Labor growth between 2000 and 2020 will rely on immigrants and people aged 55 and over. Immigrants are a particularly important source of labor in the home care sector. They are a growing force in the nursing profession. They may be more willing than U.S.-born natives to work in care-giving occupations with lower wages. Changes in immigration laws, therefore, can have a big impact on their supply.

Responses to short-term issues and longer-term trends affecting the workforce are not likely to be the same, yet both need to be addressed. The remainder of this paper is organized around six broad goals for addressing present and future shortages of competent personnel in the long-term care system.

Goals and Strategies

To have an impact, these goals must fit within a broader vision of long-term-care organization, financing and service delivery. Addressing any one goal in isolation from others is not likely to have much success. Concrete benchmarks to measure progress toward selected goals need to be established. History has also shown that effective implementation of workforce improvements is dependent upon the collaboration of multiple stakeholders—employers, consumer advocates, professional associations, unions and other worker groups, educational institutions, and government entities. If these disparate stakeholders cannot unite to achieve common goals, the most elegant strategies are likely to fail.

Goal 1 Expand the Supply of Personnel Coming into the Long-Term Care Field

The long-term care workforce is dominated by women. Its professional ranks lack ethnic and racial diversity. The nursing workforce is aging, and many are nearing retirement. The labor pool that has historically supplied both paid and informal caregivers is shrinking and will continue to do so for many decades to come.

Throwing warm bodies at the long-term care problem will not solve the vexing financing and quality problems that are at the heart of the need to reform long-term care. However, most stakeholders would agree that new sources of caregivers must be attracted to meet future demand regardless of the vision that will drive long-term care in the future.

Potential initiatives include:

- *Track Long-Term Care Labor Shortages*: At the federal level, the DHHS and DOL could work with the Regional Centers for Health Workforce Studies (funded by the Health Resources and Services Administration) to track supply, demand, and workforce shortages across regions and states. This would entail the development of common definitions of professional and direct-care worker categories; common measures of vacancies, turnover and projected need; and the development and implementation of new data systems. DOL also could be asked to join with the regional centers to provide technical assistance to states to promote long-term-care workforce planning.

- *Create State-Level Long-Term-Care Workforce Development Blue Prints:* DOL and DHHS could jointly request each state to prepare a detailed plan for addressing long-term-care workforce shortages in the state. Based on the collaboration of all stakeholders, the plan would identify current shortages at the state and sub-state level, project future needs and set goals for meeting needs, identify concrete benchmarks for measuring progress, identify policy and practice barriers to reaching agreed-upon goals, and lay out a staged five-year action plan. The requirement could be tied to the state Medicaid plan or, alternatively, states could be provided special grant funding.

- *Modernize the Image of the Long-Term Care Industry:* Large employers could be encouraged to band together to develop and launch marketing and recruiting campaigns aimed at modernizing the image of long-term-care as a career choice. Such campaigns could highlight the growing demand for long-term care jobs, particularly in caring for older adults with chronic illness and disability in their own homes; the leadership, managerial, clinical, and care-giving skills needed; the transferability of these skills across the health care sector; and career advancement opportunities.

- *Target Information on Long-Term Care Careers to Post-Secondary Education and Professional Schools:* Recruiters for large employers could target deans and faculty in institutions of higher education, including medical and nursing schools and other graduate schools and programs, to develop joint initiatives that expose students to long-term-care career options and opportunities.

- *Target Labor Sources Underrepresented in the Long-Term-Care Field*: Recruitment campaigns and incentives could be targeted at sources of labor that have been poorly tapped, e.g., Hispanics and African Americans who are underrepresented in nursing careers, unemployed immigrants who were trained in health care in their native countries, young people coming out of high school who might never have considered a career in long-term care, people with disabilities, unemployed males, and mothers with young children or retirees who may only want to work part-time. Such campaigns should involve planning and financial support from coalitions of employers, unions and other worker groups, professional associations, and educational

institutions. They could be implemented in areas where workforce shortages are acute.

- *Provide Candidates for Long-Term Care Jobs with More Financial Incentives to Complete Education and Credentialing Requirements*: Candidates for long-term care careers may need financial assistance to complete training and credentialing/certification. Federal funders and employers need to understand the extent to which a lack of resources to pay for training is a barrier to recruitment and to assist where financial help is needed. Additional financial incentives could include expanding scholarships and loan-forgiveness programs, and developing new work-study programs and apprenticeship opportunities. Such efforts can be tied to commitments to work in long-term-care or in specific long-term-care settings and/or to particular workforce shortage areas.

- *Channel Existing Workforce Development Funding to Long-Term Care*: The connection between government-supported workforce-investment activities and the needs of long-term-care employers for qualified personnel should be strengthened. Federal workforce development funds are directed at promoting sustainable economic growth in communities across the country, such as activities supported under the Workforce Investment Act, Temporary Assistance for Needy Families (TANF) and the Perkins Act. Funding for such programs totaled $5.3 billion in 2005. National, state, and municipal efforts need to be launched to channel more of these resources to the recruitment and training of the long-term-care workforce.

Goal 2 Create More Competitive Long-Term-Care Jobs through Wage and Benefit Increases

Almost all stakeholders agree that low wages for professional staff and direct care workers and limited employer-based health insurance coverage for the latter makes recruiting and retaining personnel in the long-term-care industry more difficult. Wages and benefits in acute- and primary-care settings are consistently higher for physicians, nurses, and direct care paraprofessionals. The lack of health insurance for direct care workers is widely seen to be a significant barrier to permanent employment. Employers argue that they cannot afford to raise wages or offer health insurance because they are dependent on public reimbursement. In the long term, improving wages and benefits for long-term-care personnel is tied to fundamental reforms in the way long-term-care is financed and reimbursed. In the shorter term, states and providers, in partnership with federal funders, could attempt a number of strategies.

Potential initiatives include:

- *Achieve Wage Parity Between Long-Term-Care and Acute Care*: A federal/state working group could be established to examine wage and benefit parity between acute- and long-term-care settings and to recommend financing and reimbursement options for achieving wage parity where it does not exist. Such an effort might be carried out in conjunction with the National Governors Association (NGA).

- *Leverage Current Federal Financing for Long-Term-Care to Raise Wages and Benefits*: A working group of the American Association of Homes and Services for the Aging (AAHSA), AHCA, the Alliance, NGA, and the National Conference of State Legislators could be established to identify, propose, and disseminate state and provider strategies for raising wages and providing health insurance to direct care personnel. Among the issues the working group could examine are: (1) implementing "pay for performance" schemes that provide higher reimbursement to providers demonstrating high-quality care and excellent working conditions; and (2) improving the impact of "Medicaid wage pass-throughs," a policy that increases Medicaid reimbursement to providers under the expectation that such an increase will be directly passed through to personnel in the form of higher wages or benefits. Results of research evaluating the impact of wage pass-throughs have been mixed. Some experts suggest that states need to implement better accountability mechanisms for tracking how earmarked funds are actually used to insure higher wages and benefits. The federal government could be required to evaluate the cost and impact of these strategies.

- *Reinvest Savings from Reducing Temporary Personnel to Enhance Wages and Benefits*: The national provider associations also could investigate the extent to which temporary and contract personnel are being utilized by their members and the added costs of these temporary staff. Based on the investigation, technical assistance could be offered to members to help them: (1) calculate savings that could be achieved by reducing the use of temporary personnel; (2) implement workforce improvements to reduce turnover; and (3) track the cost-effectiveness of reinvesting the savings in salary and benefit enhancements.

Goal 3 Improve Working Conditions and the Quality of Long-Term-Care Jobs

Higher wages and better benefits will not be sufficient alone to attract a high-quality workforce. High turnover is a sign of unhappy employees. Most experts agree that working conditions and the quality of the job must be improved. While many providers have gotten the message and made changes in the way staff are valued, developed, and treated, too many others have not. Without significant changes in working conditions, workforce shortages are likely to continue.

Potential initiatives include:

- *Develop Effective Long-Term-Care Leaders and Managers*: Such an effort must involve individual providers, professional associations and educational institutions willing to collaborate to identify strong candidates for leadership positions in provider agencies and facilities, create effective development programs, and support prospective leaders to obtain training and receive ongoing support.

- *Increase Participation of Racial and Ethnic Minorities in Long-Term-Care Management:* Ethnic and racial minorities are underrepresented in the professional ranks, particularly in administrator and RN positions. This lack of diversity may contribute to worker shortages and poorer quality care when administrators and supervisors are not familiar with cultural differences

between personnel and consumers. Initiatives could be developed to identify and provide career paths for promising LPNs, nursing assistants and aides from within facilities and agencies, as well as to recruit new candidates. One possible target could be nurses who have come to the United States from other countries.

- *Reward Long-Term-Care Employers and States that Improve Working Conditions*: Financial incentives and regulatory relief could be granted to states and long-term-care employers that have achieved real progress in improving working conditions while maintaining high standards of quality. The federal government, state agencies, and accrediting organizations could develop indicators of workforce performance such as reductions in turnover and vacancy rates and the use of temporary employees, and acknowledge and reward employers that achieve certain standards.

- *Invest in Information Technology to Reduce Paperwork Burdens in Long-Term Care Settings*: Federal and employer investments should be encouraged in the development, testing, and evaluation of information technologies to reduce paperwork burdens on administrators and nurses. A major complaint of administrators and directors of nursing, particularly in the nursing home and home health-care settings, is the amount of paperwork required to comply with federal regulation of long-term-care settings. Such paperwork restricts the amount of time they are able to spend on leading, motivating, and mentoring staff and overseeing and providing clinical care.

- *Improve Federal Fair Labor Standards/Other Mandated Worker-Protection for Long-Term-Care Personnel*: DOL is responsible for administering and enforcing fair labor standards and other mandated worker protection. The agency could be asked to study working conditions for direct care personnel in both home care and institutional settings. The agency could be asked to: (1) work with unions and other worker groups to identify the major cause of workforce stress and injury; (2) fund and evaluate the impact of new standards and protections such as eliminating mandatory overtime and implementing injury-prevention interventions on worker safety, turnover and quality of care; and (3) develop appropriate legislation and regulations based on demonstration findings.

- *Develop Pathways to Career Advancement in Facility-Based and Home- and Community-Care Settings*: Employers could be encouraged to develop, implement and evaluate the impact of career advancement opportunities such as career ladders and career lattice approaches. Partnerships of professional associations, unions, educational institutions, and provider groups could pool resources to invest in the development and dissemination of programs to: (1) provide financial assistance to home health aides, home care aides and nursing assistants who want to become LPNs and RNs, or LPNs who want to become RNs; (2) create more flexible training opportunities that combine work and study so that career advancement opportunities can be pursued; and (3) develop lateral career pathways so nursing assistants and home health aides can move into similar positions in other parts of the health care sector or can move to more specialized positions in long-term-care, such as dementia care and medication aides. There could be a similar effort for staff who are interested in becoming managers and administrators.

- *Establish Centers on Long-Term Care Leadership, Management and Supervisory Innovation*: One or more centers could be established to develop, identify, and disseminate effective educational and training programs and best practices for improving leadership, management, and supervisory skills for long-term-care administrators, directors of nursing, charge nurses, and team leaders. The center could offer internships to groom physicians, nurses, and aides for leadership positions and improve their leadership, management, and supervisory skills. It also could compile lists of experts at the state and sub-state level from the business community, universities, colleges, and consulting firms who could help providers assess working conditions in their facility or agency and provide technical assistance on supervision and management improvements.

Goal 4 Make Larger and Smarter Investments in the Development and Continuing Education of the Long-Term-Care Workforce

The preparation, credentialing and ongoing training of administrators, medical directors, nurses, and direct care paraprofessionals need to be rethought and redesigned in light of what has been learned about the composition of the workforce and the settings in which workers choose to work, the causes of job dissatisfaction, high turnover and vacancies and the realities of a changing workplace and future needs. Investment in more relevant and productive education and training should be increased.

Potential initiatives include:

- *Encourage Government to Match Long-Term-Care Provider Investments in Workforce Development*: Federal and state financial incentives could be offered to long-term-care employers that are willing to make significant investments in workforce development. Employers who invest in workforce development do it largely with their own resources and through private-grant funding. Encouraging this type of entrepreneurial behavior could pay dividends for improved staff training.

- *Request IOM to Review Federal Regulations Governing the Preparation and Credentialing of the Professional and Paraprofessional Long-Term-Care Workforce*: The Institute of Medicine could be asked to conduct an evaluation of federal regulations that influence the preparation, credentialing, and ongoing training of professional and paraprofessional long-term-care personnel, including federal requirements for credentialing administrators, medical directors, certified nursing assistants, and home health aides. The study should examine the extent to which these regulations are evidence-based; how they affect recruitment, job retention and job performance including quality of care; and whether and how they should be modified. Study results should be reported to Congress with recommendations for improvements.

- *Encourage State Reform of Education and Training Requirements*: The present education/training system is not serving the workforce or the public. States should be encouraged and supported to lead a comprehensive reexamination of how medical directors, administrators, nursing students, nursing assistants, and home health aides are prepared and credentialed for

administrative and direct-care careers in long-term-care, as well as the relevance and effectiveness of their continuing education experiences. Such an examination could address: (1) how prospective professional and paraprofessional personnel learn about long-term-care careers as part of their training; (2) the adequacy of their training in administration, management, clinical methods, geriatrics and the cultural diversity of the long-term-care workforce and its consumer base; (3) the effectiveness of teaching methods to which they are exposed; (4) their level of exposure to long-term-care practice settings; (5) the content of continuing education offerings and its responsiveness to staff-identified needs; and (6) the relationship between continuing education requirements and improved competencies and performance in the work setting. The examination should involve collaboration with medical and nursing schools, community colleges, professional associations, and unions and other worker groups.

- *Make Education and Training Opportunities More Accessible, Particularly in Rural Areas*: Incentives could be provided to medical and nursing schools, community colleges, and other educational vendors to broaden participation in formal courses of instruction for nurses and aides. Techniques such as satellite broadcasts, web-based courses, flexible scheduling of courses, easily accessible locations, and on-the-job training opportunities such as DOL's apprenticeship models should be pursued.

- *Improve Medical Directors' Performance*: The preparation of physicians to assume the position of medical director should be enhanced, and the medical director should be provided with the incentives and authority needed to do the job. Nursing-home and home health-agency providers should collaborate with the American Medical Directors Association and CMS to develop policies to improve the preparation of physicians to be medical directors, obtain training in geriatrics, develop guidelines for providing them with the authority they need to do their jobs, and develop reimbursement options that compensate them for the time and commitment they are expected to make.

- *Improve Competencies of Nursing Home Administrators*: AHCA and AAHSA should work with NABE to develop model standards for licensing nursing home administrators. States and/or facilities should pay nursing home administrators for time spent in apprenticeship programs prior to licensing.

- *Strengthen Long-Term-Care Nurse Competencies in Geriatrics, Administration, Management, and Supervision*: Directors of nursing and other nurses employed as administrators and supervisors in long-term-care settings need incentives to develop competencies in geriatrics, administration, management, and supervision. Long-term-care providers could join together to identify nurses and paraprofessional staff with strong leadership potential and to help them develop this potential. Schools of nursing should significantly increase the level of training and education in geriatrics for all nursing students, increase the availability of clinical preceptorships in long-term-care settings and offer preparation for frontline leadership and supervision essential to the effectiveness of the long-term-care nurse.

- *Provide dedicated funds for long-term-care to the Nursing Workforce Development Programs under Title VIII of the Public Health Service Act*: There is a need for increased nursing faculty who are trained in geriatric nursing specifically focused on long-term-care settings and who will encourage their students to pursue a long-term-care career path. The allocation for the Nursing Workforce Development programs needs to be increased and a significant portion of new dollars should be used to substantially increase the number of federal traineeships offered through the Advanced Nursing Education program. These traineeships should be targeted to individuals preparing for advanced degrees in geriatric nursing and, in particular, those who are interested in long-term care. Additional funds should be allocated to increase the number of grants awarded to schools of nursing that will commit to developing careers in geriatric/long-term care nursing education, with a substantial part dedicated to preparing geriatric nursing faculty with a focus on long-term care. Funding for the Nursing Loan Repayments and Scholarship programs should be tripled, with at least one-third of these dollars dedicated to nurses who choose to practice in long-term care settings.

- *Reassess Scopes of Practice of RNs and LPNs Working in Long-Term-Care Settings*: Scopes of practice for nurses in long-term-care settings may need to be modified in light of the tasks, activities, and responsibilities placed on them. This should involve state regulators, professional associations, and accrediting agencies working with employers and educational institutions to examine what regulatory changes may be needed and their impact on resident/client safety and quality.

Goal 5 Moderate the Demand for Long-Term Care Personnel

It is unlikely that the need for new long-term-care personnel can ever be completely reconciled with the growth in demand for long-term-care services, the result of an aging population, particularly given the shrinking numbers of potential family and formal caregivers. While as-yet unrealized medical breakthroughs, such as the prevention of Alzheimer's disease, could have a major impact on the demand for long-term-care personnel, discussion of investing in the prevention and cure of chronic illnesses are beyond the scope of this paper. There are, however, other strategies that might improve the efficiency of the workforce or lessen the need for hands-on care. These strategies may require changes to licensure, accreditation, and reimbursement policy.

Potential initiatives include:

- *Identify and Disseminate Labor-Saving Service Delivery Strategies*: Home-health and other long-term-care provider associations and innovative employers should be encouraged to work with CMS to identify more efficient, less labor-intensive strategies for delivering in-home services. This should involve identifying the regulatory and practice barriers that impede the development and wide-scale implementation of more efficient delivery strategies, as well as designating resources to pilot test and evaluate these strategies in actual practice settings and how they affect staffing, cost, and quality.

- *Support Government Investment in Promising Technologies to Reduce the Demand for Direct Care Personnel in Nursing Homes and Home Health Care*: Such investments would be similar to what the government has been willing to make in advancing the biomedical and space industries. Since Medicaid is the leading public payer of long-term-care services, federal and state governments should have ample incentives to fund the development of new labor-saving technologies.

- *Facilitate Self-Managed Care among Frail and Disabled Older Adults*: New systems and technologies are needed to help older adults with disabilities manage more of their own care. Collaborations among consumer advocates, long-term-care provider groups, physician practices with expertise in house call type programs, experts in chronic disease management, geriatricians, nurse practitioners, university schools of engineering, and technology centers should help develop and test such innovations.

- *Facilitate Lateral Transfers Across Health- and Long-Term-Care Settings*: Health and long-term-care employers and unions should join together with regulators and educational institutions to determine if easier movement between the health and long-term-care sectors and between positions within various long-term-care settings would help alleviate demand for new personnel. The regulatory and practice barriers to transfers across settings should be identified and the impact of removing them evaluated.

Goal 6 Encourage and Support Applied, Evidence-based Research to Inform Long-Term-Care Workforce Policy and Practice

There are a number of policy-related and practice issues that, if systematically explored through new research and demonstration programs, would significantly improve the capacity of the public and private sector to respond to existing and projected shortages of competent long-term-care personnel. The options highlighted below are divided into research and demonstration/evaluation initiatives.

Research Initiatives

1. *Develop Measures of Supply, Demand, and Workforce Shortages:* Research is needed to develop a consistent set of workforce measures to provide data to track supply, demand, and shortages among professional and paraprofessional personnel at the regional and state level.

2. *Identify Characteristics of the Professional Long-Term-Care Workforce:* Although several surveys have been conducted or are in the design stage to examine the characteristics of the direct care workforce, much less information is available on the professional long-term-care workforce. Surveys and other studies of physicians, nurses, and administrators should be conducted to learn why they choose long-term-care careers and the particular setting they choose, why so many physicians and nurses avoid long-term-care careers, what factors account for retention and turnover, where they go when they leave long-term care jobs, their perspectives on the adequacy of their training, wages and benefits, and the quality of the job.

3. *Project the Impact of Baby Boomers on Long-Term-Care Demand*: Baby boomers will be different from today's elderly cohort. Information is needed

on how the demand for formal and informal long-term-care is likely to be affected by the interaction of the growing population of aging baby boomers, their improved economic status and better health, and new treatments and technologies for diagnosing and treating chronic illnesses.

4. *Investigate the Role of Immigration in Long-Term-Care Service Delivery:* Immigrants are already a critical part of the direct care workforce and could play a key role in reducing shortages in the ranks of professionals. Research needs to investigate in more detail the role that immigrants currently play in helping to fill the demand for professional and paraprofessional long-term-care jobs and how and where the impact of immigration on this workforce has expanded/changed over the past 10 years. There is also a need to understand the relative benefits and disadvantages of employing an immigrant workforce for the employers, staff, and the federal and state governments. It is important, furthermore, to understand the implications of recruiting immigrants for education and training. Finally, it is essential that we understand the implications of changes in immigration policy for the recruitment and retention of a quality long-term-care workforce over the next 40 years.

5. *Examine the Impact of Wages and Benefits on Recruitment and Retention of the Long-Term-Care Workforce*: Although wages and benefits are important factors in recruitment and retention, it is not clear how the level of wages and benefits should be structured to attract personnel to the long-term-care industry and keep them. There is considerable natural variation in the level of wages and availability of benefits. Research should take advantage of these variations to address the impact of different wage and benefit structures on recruitment and retention of professional and paraprofessional employees; how wages versus other factors influence whether personnel choose to enter and stay in long-term-care jobs; and if these factors are the same or different in other comparable labor markets.

Potential Demonstration/Evaluation Initiatives

Over the next several decades, the government and private sector should increase the level of investment in comprehensive demonstration and evaluation of new ways of financing, reimbursing, organizing, staffing, and delivering services, and assuring the quality of long-term care. Of particular relevance to workforce improvements are the following types of interventions:

1. *Demonstration of Comprehensive Long-Term-Care Workforce Development/Improvement Innovations:* Such demonstrations need to address multiple factors related to the organization and staffing of the workplace, such as wages and benefits, working conditions, education and training, and how comprehensive workforce reforms influence recruitment, retention, job satisfaction, and quality of care.

2. *Demonstration of Wage and Benefit Enhancements:* Large-scale demonstration and evaluation are needed of the costs of raising wages and increasing health benefits and their impact on the recruitment and retention of paraprofessional direct care personnel.

3. *Demonstration of Comprehensive Education and Training Reforms:* These demonstrations would experiment with comprehensive changes to the education, credentialing/certification, and continuing education of physicians, nurses, and direct-care paraprofessionals, and evaluate the impact of changes on cost, recruitment, retention, job satisfaction, and quality of care.

4. *Demonstrations of Organizational and Staffing Innovations:* Demonstrations should be aimed at developing and testing more innovative and flexible ways of organizing work tasks and activities such as selecting, assigning, managing, and supervising staff.

5. *Demonstrations of Strategies to Bridge Long-Term Care and Medical Care:* People in need of long-term-care are also likely to suffer from serious chronic illnesses. Demonstrations could be designed to test the impact of greater physician and nurse practitioner involvement in the coordination and delivery of medical care in nursing homes, assisted living facilities, and in-home and community-based care settings.

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Appendix

Workforce Credentialing

The following chart sets forth an overview of the education and credentialing requirements for those health professions typically educated at the nation's academic health centers and other higher education settings. This chart illustrates some of the challenges and complexities associated with securing and retaining a robust health workforce. It also reveals several key themes in health professions credentialing, including rising degree standards (e.g., emergence of the professional doctorate) and the jigsaw puzzle of accreditation by multiple, profession-specific players.

Profession[1]	Entry-level degree	Minimum years of education [2]	Number of accredited programs in U.S.	Accrediting body	
Audiology	AuD[4]	Bachelor's + 3-5 years	71 audiology overall, 69 doctoral level	Council on Academic Accreditation in Audiology and Speech-Language Pathology under the American Speech-Language-Hearing Association (ASHA); Accreditation Commission for Audiology Education	
Chiropractic	DC	Bachelor's + 4-5 years	18	Council on Chiropractic Education (CCE)	
Clinical laboratory science/ Medical technology	CLS/MT[5]	Bachelor's	226	National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)	
Dental hygiene	AS or BS[6]	Associate's or Bachelor's	362	Commission on Dental Education under the American Dental Association	
Dentistry	DDS, DMD	Bachelor's + 4 years	56	Commission on Dental Education under the American Dental Association	
Medicine (allopathic)	MD	Bachelor's + 4 years	129	Liaison Committee for Medical Education (medical schools), Accreditation Council for Graduate Medical Education (residencies)	

[1] Includes selected allied health professions

[2] This includes the minimum number of years needed to obtain the degree. In some professions such as medicine, where a post-graduate residency is required to practice, the total number of years of training is higher.

[3] Typically, practitioners must meet continuing education requirements in order to maintain their licensure. Portability of licenses between states varies by profession and by state.

- Clinical laboratory science: Most states give reciprocity for another state license as stringent or more stringent than that state, per the American Society for Clinical Laboratory Science.
- Dental hygiene: 46 states grant licensure by credential/endorsement, often with special requirements such as a personal interview, letters of recommendation, or minimum hours of continuing education. An additional two states grant limited licensure by credential/endorsement.
- Dentistry: 47 states grant license by credentials to dentists who hold a current license and have already practiced for a specific amount of time in another jurisdiction. The American Dental Association also advocates the creation of a national licensing examination.
- Nursing: In 2000, the National Council of State Boards of Nursing implemented the Nurse Licensure Compact, whereby nurses may practice in any of the participating states if licensed in another participating state. Currently 20 states have implemented adopted the compact.

	Licensure requirements [3]	Requirements for specialty certification	Post-graduate residencies	Professional practice association
	1) Graduate from an accredited program (7 states require doctoral degree). 2) Pass the Praxis national examination. 3) Some states require additional certification from ASHA or the American Board of Audiology.	For certification in one specialty area: 1) Graduate from an accredited doctoral program. 2) Complete two-years post-graduate experience.3) Complete 450 direct cochlear implant patient contact hours and 50 hours of case management. 4) Obtain board certification in audiology. 5) Complete an examination. Certification is overseen by the American Board of Audiology (ABA).	Certification by ABA requires 2,000 hours of mentored professional practice in 2 years.	American Speech-Language-Hearing Association, American Academy of Audiology
	1) Graduate from an accredited program, 2) Pass the national written and practical examination.	For certification in seven specialty areas: 1) Graduate from an accredited program. 2) Complete a number of post-graduate training hours (~100-300). 3) Complete a written and/or oral examination. Certification is overseen by the American Chiropractic Academy of Neurology, American Chiropractic Neurology Board, American Chiropractic Board of Radiology, and various councils of the American Chiropractic Association.		American Chiropractic Association
	12 states grant licensure for clinical laboratory scientists. 1) Graduate from an accredited program. 2) Pass national certification exam (except in CA, which requires state exam).	1) Complete one of four possible combinations of education/experience credentials. 2) Pass an examination. Certification is overseen by the American Society for Clinical Pathology Board of Registry.		American Society for Clinical Laboratory Science
	1) Graduate from an accredited program. 2) Pass the National Board Dental Hygiene Exam. 3) Pass state examination.			American Dental Hygienists' Association
	1) Graduate from accredited program. 2) Pass National Board Dental Examination. 3) Pass state or regional examination. 4) Some states require completion of a residency.	For certification in nine specialty areas: 1) Graduate from an accredited program. 2) Complete 2-4 years of advanced education after graduation (e.g. a two-year postdoctoral general dentistry residency). 3) Complete 2-5 years of specialty training. 4) Complete a written and/or oral examination.	Residencies are required to practice in any of the nine specialties, but not in general dentistry. Only a few states require dentists to have completed a residency. Approximately 40% of graduates complete residencies.	American Dental Association, Academy of General Dentistry
	1) Graduate from accredited school. 2) Complete an accredited residency. 3) Pass the United States Medical Licensing Examination.	For certification in 24 specialty areas: 1) Graduate from an accredited medical school. 2) Complete an accredited residency program. 3) Hold an unrestricted license to practice medicine. 4) Pass a written and/or oral examination. 5) Many specialty boards require documentation of performance from the residency training director or from the chief of service in the hospital where the specialist has practiced. Certification is overseen by 24 boards under the American Board of Medical Specialties.	Completion of a 3-7 year residency is required.	American Medical Association

- Occupational therapy: Many states have "licensure by endorsement," but it generally does not product much of an impact as applicants are still required to produce paperwork, complete the applications, and pay fees.
- Optometry: 13 states grant licensure by endorsement.
- Pharmacy: All States except California currently grant a license without extensive reexamination to qualified pharmacists who already are licensed by another State. Many pharmacists are licensed to practice in more than one State.
- Psychology: 12 states offer a standard agreement of reciprocity, facilitated by the Association of State and Provincial Psychology Boards (ASPPB). In participating states, applicants must pay fees and might have to pass a jurisprudence exam, but are exempted from examinations of competence or proof of educational and professional credentials. The ASPPB offers three additional programs to facilitate mobility for licensed psychologists.
- Veterinary medicine: 12 states grant reciprocity and 17 states grant licensure by endorsement. However, the terms of reciprocity or endorsement vary by state.

[4] In audiology, the masters is currently the entry level accepted in most states, but the profession is transitioning to a doctorate.

[5] NAACLS approved proposed standards for clinical doctorate at September 2006 meeting. This would be a terminal, not entry-level degree.

[6] Master's degrees are available for those interested in education, research, or administration. ADHA is also developing a curriculum for an Advanced Dental Hygiene Practitioner (ADHP).

Profession[1]	Entry-level degree	Minimum years of education [2]	Number of accredited programs in U.S.	Accrediting body	
Medicine (osteopathic)	DO	Bachelor's + 4 years	25	Commission on Osteopathic College Accreditation under the American Osteopathic Association (schools), American Osteopathic Association (residencies)	
Nursing— Clinical nurse specialist	MSN [7]	Bachelor's + 2 years	230	National League for Nursing Accrediting Commission; Commission on Collegiate Nursing Education under the American Association of Colleges of Nursing	
Nursing — Nurse practitioner	MSN	Bachelor's + 2 years	342	National League for Nursing Accrediting Commission; Commission on Collegiate Nursing Education under the American Association of Colleges of Nursing	
Nursing — Nurse anesthetist	CRNA	Bachelor's + 2-3 years	106	Council on Accreditation of Nurse Anesthesia Educational Programs	
Nursing — Nurse midwife	CNM	Bachelor's	39	American College of Nurse Midwives	
Nursing — RN	ADN, BSN	Associate's or Bachelor's	~850 ADN, 907 BSN	National League for Nursing Accrediting Commission; Commission on Collegiate Nursing Education	

[7] The Doctor of Nursing Practice (DNP) degree is under development.

	Licensure requirements [3]	Requirements for specialty certification	Post-graduate residencies	Professional practice association
	1) Graduate from accredited school. 2) Complete an accredited residency. 3) Pass the Comprehensive Osteopathic Medical Licensing Examination.	For certification in 18 specialty areas: 1) Graduate from an accredited osteopathic medical school. 2) Complete an accredited osteopathic internship and residency program. 3) Hold an unrestricted license to practice medicine. 4) Pass a written and/or oral examination. 5) Be a member in good standing of the American Osteopathic Association or Canadian Osteopathic Association. Certification is overseen by 18 boards under the Bureau of Osteopathic Specialists.	Completion of a 3-5 year residency is required.	American Osteopathic Association
	1) Graduate from an accredited program. 2) Pass the national nursing exam, NCLEX-RN. 3) Obtain national certification from a nursing organization (varies by state).	For certification in seven specialty areas: 1) Hold a current, unrestricted RN license. 2) Hold a masters' or higher degree from an accredited nursing program. 3) Have completed education and training requirements in the specialty area. 4) Have completed >500 hours of supervised clinical practice in the specialty area. 5) Pass an examination. Certification is overseen by the American Nurses Credentialing Center.		National Association of Clinical Nurse Specialists
	1) Graduate from an accredited program. 2) Pass the national nursing exam, NCLEX-RN. 3) Obtain national certification from a nursing organization (varies by state).	For certification in eight specialty areas, requirements may include: 1) Hold a current, active RN license. 2) Complete a minimum number of hours or months in specialty practice (e.g. 500 hours, 24 months). 3) Complete a written examination. Requirements differ by specialty. Certification is overseen by the American Nurses Credentialing Center, the Pediatric Nursing Certification Board, and other bodies.		American Academy of Nurse Practitioners
	1) Graduate from an accredited program. 2) Pass the national nursing exam, NCLEX-RN. 3) Obtain certification from the Council on Certification of Nurse Anesthetists or another organization (varies by state).	1) Graduate from an accredited program. 2) Hold an unrestricted license. 3) Complete 20 hours of continuing education within last calendar year if graduation date was >2 years prior to examination. 4) Pass an examination. Certification is overseen by the Council on Certification of Nurse Anesthetists of the American Association of Nurse Anesthetists.		American Association of Nurse Anesthetists
	1) Graduate from an accredited program. 2) Pass the national nursing exam, NCLEX-RN. 3) Obtain national certification from a nursing organization (varies by state).	1) Graduate from an accredited program less than 2 years before taking exam. 2) Hold a license. 3) Pass an examination. Certification is overseen by the American Midwifery Certification Board.		American College of Nurse Midwives
	1) Graduate from accredited program. 2) Pass the National Council Licensure Examination for Registered Nurses.	For certification in one of 12 specialty areas: 1) Graduate from an accredited program. 2) Hold a current, unrestricted license. 3) Have practiced for at least two years full time. 4) Have a minimum of 2,000 hours of clinical practice in the specialty area in the last three years. 5) Have completed 30 contact hours within the last three years. Certification overseen by the American Nurses Credentialing Center.		National League of Nurses; American Association of Colleges of Nursing

Profession[1]	Entry-level degree	Minimum years of education [2]	Number of accredited programs in U.S.	Accrediting body
Occupational therapy	MA/MOT/ MS [8]	Bachelor's + 1-3 years	151 (146 master's level + 5 doctoral)	Accreditation Council for Occupational Therapy Education under the American Occupational Therapy Association
Optometry	OD	Bachelor's + 4 years	19	Accreditation Council on Optometric Education under the American Optometric Association; accredits both schools and residencies
Pharmacy	PharmD [9]	At least 2 years of college + 4 years	92	Accreditation Council for Pharmacy Education (schools); American Society of Health-System Pharmacists (residencies)
Physical therapist	MPT [10]	Bachelor's + 2-3 years	209	Commission on Accreditation in Physical Therapy Education
Physician assistant	BS, MS [11]	Bachelor's or Bachelor's + 2 years	141	Accreditation Review Commission on Education for the Physician Assistants (schools); Association of Post Graduate Physician Assistant Programs (residencies are members, but not formally accredited). The APPAP and ARC-PA are jointly developing standards for accreditation of residencies.

[8] The Doctorate of Occupational Therapy (DOT) degree is also available. A master's degree became the entry-level degree in 2007.

[9] Schools were required to implement the PharmD by 2000. The first cohort of students graduated in 2004.

[10] Bachelor's programs stopped being accredited in 2001. The APTA adopted a vision statement in 2000 advocating that all practitioners would have a Doctor of Physical Therapy (DPT) degree by 2020. Currently, more than 80% of programs offer the DPT. The association expects that by 2010, 99.5% of physical therapist programs will be accredited to award the DPT degree.

[11] The vast majority of programs (110 out of 141) offer master's degrees, but a few programs still offer bachelor's degrees.

	Licensure requirements [3]	Requirements for specialty certification	Post-graduate residencies	Professional practice association
	1) Graduate from an accredited program. 2) Pass the national certification examination. 3) Complete a period of supervised fieldwork.	For advanced board certification in one of four areas: 1) Graduate from a program. 2) Hold a recognized certificate or license. 3) Complete 5 years of professional practice. 4) Complete 5,000 hours in the certification area in the last seven calendar years. 5) Complete 500 hours delivering OT services in the certification area in the last 5 years. For specialty certification in one of another four areas: 1) Graduate from a program. 2) Hold a recognized certificate or license. 3) Complete 2000 hours of professional practice. 4) Complete 600 hours delivering OT services in the last three calendar years. Certification is overween by the American Occupational Therapy Association.		American Occupational Therapy Association
	1) Graduate from an accredited program. 2) Pass the national examination. 3) Many states require an additional examination on state law.		1-year residencies are available in 10 specialty areas.	American Optometry Association, American Academy of Optometry, Association of Schools and Colleges of Optometry
	1) Graduate from accredited college of pharmacy. 2) Pass the North American Pharmacist Licensure Exam (NAPLEX). 3) Pass an examination on pharmacy law. 43 states require the Multistate Pharmacy Jurisprudence Exam (MPJE). The remaining states require a state-specific exam similar to the MJPE.	For certification in one of five specialty areas: 1) Graduate from an accredited program. 2) Hold a current license. 3) Complete additional training requirements (e.g. specialty residency and/or 3-4 years of practice). 4) Pass examination. Certification overseen by the Board of Pharmaceutical Specialties.	Optional 1-year or 2-year residency programs or fellowships are available.	American Pharmacists Association, National Community Pharmacists Association, American Society of Health-System Pharmacists (ASHP)
	1) Graduate from accredited program. 2) Pass the National Physical Therapy Examination. 3) Continuing education required in some states.	For certification in one of seven specialty areas: 1) Hold a current license. 2) Complete at least 2,000 hours of clinical practice in the specialty area, 25% of which must have occurred within the last 3 years. 3) May need to complete additional training requirements. 4) Pass examination. Certification overseen by the American Board of Physical Therapy Specialties.	9-36 month residencies are available in five specialty areas and 6-36 month fellowships are available in four areas. Approximately 180 people pursue residencies and fellowship each year.	American Physical Therapy Association
	1) Graduate from accredited program. 2) Pass the Physician Assistant National Certifying Exam (PANCE) and/or hold current certification by the National Commission on Certification of Physician Assistants.	While specialized training is available, there is no specialty certification.	12-14 month residencies are available in 15 specialty areas.	American Academy of Physician Assistants

Profession[1]	Entry-level degree	Minimum years of education [2]	Number of accredited programs in U.S.	Accrediting body	
Podiatry	DPM	Bachelor's + 4 years	8	Council on Podiatric Medical Education (both schools and residencies)	
Psychology	PsyD, PhD	Bachelor's + 5-7 years	69 counseling, 219 clinical	Committee on Accreditation of the American Psychological Association (both schools and residencies)	
Radiologic technology	AS, BS [12]	Associate's or Bachelor's	600+	Joint Review Committee on Education in Radiologic Technology; regional accrediting bodies recognized by the American Registry of Radiologic Technologists (ARRT)	
Veterinary medicine	DVM, VMD	At least 2 years of college + 4 years	28	Council on Education of the American Veterinary Medical Association	

[12] Some states just require radiologic technologists to complete a one-year certificate program and do not require them to hold a degree.

	Licensure requirements [3]	Requirements for specialty certification	Post-graduate residencies	Professional practice association
	1) Graduate from an accredited program. 2) 2 year residency (in most states). 3) Pass an examination. Most states accept the National Board of Podiatric Medical Examiners exam.	For certification in one of three areas: 1) Graduate from an accredited program. 2) Hold a current license. 3) Complete a required number of years in residency. 4) Some require a minimum number of years in clinical practice. 5) Some require a minimum number of case reports. 6) Complete an oral and/or written examination. Certification overseen by American Board of Multiple Specialties in Podiatry; American Board of Podiatric Orthopedics and Primary Podiatric Medicine; American Board of Podiatric Surgery.	Most graduates complete a 1-4 year residency.	American Podiatric Medical Association, American Association of Colleges of Podiatric Medicine
	1) Graduate from an accredited program. 2) Complete a one year internship. 3) Complete 1 to 2 years of supervised professional experience (most states). 4) Pass the Examination for Professional Practice in Psychology. 5) Some states require a jurisprudence examination.	For certification in one of 13 specialty areas: 1) Graduate from an accredited program. 2) Hold a current license. 3) Complete additional specialty training, which may include an approved internship, a residency training program, and/or additional work experience. Certification overseen by American Board of Professional Psychology.	Residencies are available in 13 specialties.	American Psychological Association
	41 states license and/or certify radiologic technologists, depending on the imaging or therapy discipline. 1) Graduate from an accredited program. 2) Pass the ARRT exam (in 35 states).	For certification in one of five primary areas: 1) Graduate from an accredited program. 2) Pass an examination. For certification in one of 12 post-primary areas: 1) Hold registration in the necessary primary certification area(s). 2) Complete clinical experience requirements. 3) Pass an examination. Certification overseen by American Registry of Radiologic Technologists.		American Society of Radiologic Technologists
	1) Graduate from an accredited program. 2) Pass the North American Veterinary Licensing Exam. 3) Most states require a state jurisprudence exam. 4) Some states test for clinical competency.	For certification in one of 37 specialty areas: 1) Graduate from an accredited program or hold a current license. 2) Complete a residency and/or a certain number of years of work experience. 3) Some require submission of a number of case reports. 4) Some require a publication. 5) Pass a specialty examination administered by the specific specialty organization. Certification overseen by 20 boards under the American Board of Veterinary Specialties.	Residencies are available in most of the 37 specialty areas. Approximately 33% of students pursued residencies in 2006.	American Veterinary Medical Association

1400 16th Street, NW, Suite 720
Washington, DC 20036
P 202.265.9600 F 202.265.7514
www.aahcdc.org