Time-Capsule Thinking: The Health Care Workforce, Past And Future

As important as technology is, people are at the center of the health care workforce issues—both as providers and as patients.

by Fitzhugh Mullan

ABSTRACT: The size and shape of the U.S. health care workforce are in constant evolution. Using the metaphorical device of a time capsule, this essay examines the past and future of the workforce. It traces the growth, specialization, and diversification of health care workers during the twentieth century, emphasizing the particular expansion of the nonmedical aspects of the workforce. Looking ahead, the paper examines technology, informatics, nursing, provider distribution, and the global migration of health care workers as pivotal issues for the future of the workforce.

In the year 1900 Walter Wyman was halfway through a twenty-year term as surgeon general of the United States Marine Hospital Service in what today we would call an important health policy-making position. During his tenure he moved the one-room Hygienic Laboratory from Staten Island to Washington, D.C., where it became the precursor of the National Institutes of Health; oversaw the federalization of quarantine duties and the assignment of his medical officers to Ellis Island; and led a rapid expansion of federal disease surveillance activities. In 1912 his service was renamed the United States Public Health Service.1

If Dr. Wyman had been asked about his vision of the future of health care in the United States and, particularly, the roles to be played by physicians, nurses, and other health care workers, what might he have said? If he had been asked to bury items in a futurist time capsule that would be representative of his predictions, what might they have been? The federal government of the time had no mandate in regard to the education of health professionals, but the surgeon general was himself a physician and was actively involved in the medical and public health movements of the time. He was as well positioned as anyone to have a vision of the future. Let me suggest what he might have put in his time capsule: a stethoscope, a

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train ticket to Baltimore, a scalpel, an X-ray plate, a nurse's cap, a brick, a pill bottle, a syringe, and a milk bottle.

Dr. Wyman's stethoscope would suggest the predominance of physicians in the medical practice of the twentieth century, an accurate prediction but one that he might well have suspected would be tempered by developments at the Johns Hopkins University in Baltimore—hence the railway ticket. Hopkins opened its new medical school in 1876 based on the close integration of science and medical education, a model that was extolled in the 1910 landmark report of Abraham Flexner that resulted in the closure of dozens of proprietary medical schools and the formal embrace of scientific rigor by those that remained. Wyman's scalpel and X-ray plate would have been prescient symbols of trends in the physician workforce that resulted from the marriage of science and medicine. Advances in invasive (the scalpel) and noninvasive (the X-ray) technologies invited residency training, specialization, and subspecialization, converting a physician workforce that was almost entirely made up of general practitioners (GPs) in 1900 to one that today contains predominantly specialists.

With the first formal schools of nursing in the United States dating from 1873, professional nursing was a new enterprise at the dawn of the twentieth century. Although there were as yet no nurses in Dr. Wyman's Commissioned Corps, he would certainly have had a sense of the important role that nursing would come to play and would have put the nursing cap into his time capsule. The 2.2 million practicing registered nurses in the United States today outnumber physicians three to one and are the largest single health profession.

In 1900 the recent advent of sterile technique and anesthesia was converting hospitals from alms-houses and mortuaries to institutions in which physicians, surgeons, and nurses could actually heal people and extend life. Dr. Wyman's brick would presage the enormous growth in hospitals in America and the central role that they would come to play as the arena in which much of the health care workforce would practice.

Of the many nostrums dispensed in 1900, only a few (digitalis and morphine, in particular) actually provided therapeutic benefit. Wyman's pill bottle would suggest the coming pharmaceutical revolution that would produce medications to combat everything from meningitis to impotence and greatly strengthen the therapeutic hand of clinicians a century later. The syringe and the milk bottle would foretell a coming revolution in public health. Vaccines, in their infancy at the start of the twentieth century, became the paradigmatic example of preventive medicine and a staple of the emerging public health workforce. Hygienic innovations such as clean milk curtailed infant mortality and contributed to the rise of state and local public health systems populated by public health nurses, physicians, sanitarians, laboratory scientists, and statisticians. These were developments in which Dr. Wyman's Public Health Service was to play a leading role.
Old Century, New Century

Prescient as he might have been, what would a resurrected Surgeon General Wyman think about the health care workforce at the start of the twenty-first century? Like Rip Van Winkle, he would rub his eyes, surely amazed at the numbers, variety, and sophistication of today's health care workers. The workplace he would discover today is dramatically more diverse than anything he ever experienced. Forty-five percent of medical students are women; one-fourth of physicians are trained abroad; and African Americans, Latinos, and Native Americans are represented among medical practitioners. In 1900 doctors dominated the modest ranks of health care workers that included small numbers of nurses, dentists, pharmacists, and other paraprofessional health workers. By contrast, today's greatly expanded medical profession is dwarfed by the numbers and varieties of other health care workers. Despite his inklings about specialization and the role of hospitals, Dr. Wyman would undoubtedly be astounded by the degree of specialization and the prominence of the hospital in the work of the health professions.

The overlapping boundaries among the licensed domains of individual health professions would also be unfamiliar to Wyman. Although the nineteenth century was replete with battles between competing sects of physicians (osteopaths, homeopaths, and naturopaths competing for recognition with allopaths), the medical license established an arena of legally sanctioned practice activity that was reserved for physicians. Nurses, dentists, and others had clearly defined areas of activity separate from those of physicians. The growing zones of overlapping practice among physicians and advanced practice nurses, physician assistants, psychologists, social workers, optometrists, and podiatrists would be quite foreign to Dr. Wyman.

As Dr. Wyman was, we are poised at the beginning of a new century. If one were to ask us about the future of the health care workforce, what might we envision? What would we put in our futurist time capsule? Speculating about the future, I realize, can be a hazardous and potentially embarrassing drill, but, in the spirit of fun and provocation, I offer my candidate items. I do so acknowledging that like everyone not actually equipped with a crystal ball, my sense of the future is inevitably colored by my view of the present. So I offer my vision and my myopia and hope the former proves sturdier than the latter. My time capsule would contain a laparoscope, a rapid strep test, a pregnancy test kit, a personal digital assistant (PDA), a nurse's cap, a universal health insurance card, a National Health Service Corps bumper sticker, an English-Spanish medical dictionary, and a Green Card.

Rolling Innovation

Technological innovation is everywhere in health care and will certainly continue to be so. Three items for my time capsule suggest the varied impacts of innovation on the caregivers of tomorrow: an operative laparoscope as exemplar of the highly refined but increasingly invasive technologies that will continue to be the
domain of specialists; a rapid strep test that is the product of sophisticated molecular science but is available as a simple procedure used by generalist clinicians to obtain quick, accurate information; and a home pregnancy test kit, an important technology used by patients themselves.

Conventional wisdom often associates technology with highly specialized practitioners performing complex procedures such as cataract surgery or the placement of vascular stents. Many such technologies will augment and improve the practice of current specialists, while others will call forth new and as yet unenvisioned areas of subspecialization. Advances in imaging, miniaturized surgical techniques, and new transplant therapies might well be examples of these. Certain current and future technologies, however, will be improved, simplified, and made more available to generalist practitioners. Successful medical innovations are often simplifications of previous technologies that then move “downstream” to be used by individuals with less training or with training that is more broadly based. The twentieth century saw the polio vaccine replace the iron lung and the electrocardiogram and Pap smear move to the primary care office. Similarly, molecular and genetic diagnostics, new vaccines, and highly tailored drugs will be commonly used by the generalist practitioner. Patients already manage insulin pumps and will soon be able to do much more at home, such as screening for sexually transmitted diseases with kits purchased at the local pharmacy. The most-talked-about scientific development of our time, the decoding of the human genome, will certainly lead to a wealth of medical innovations, some of which will require the refined skill of specialty practitioners but many others of which will augment the diagnostic and treatment capabilities of generalists or enhance the ability of patients to care for themselves.

Technology may, in fact, create a paradoxical pressure on the workforce. Although the content of the technology will be increasingly arcane and reductionist in nature, its cumulative clinical presence will generate a need for clinical arbitration and patient management. At the same time that innovation creates a demand for specialists with extreme proficiency in specific areas, it will also spawn a need for generalists to provide practical interpretation and coordination for patients awash in the expanding universe of clinical possibilities. Not only will generalists have to practice in the familiar areas of primary care and health maintenance, but they will also be increasingly important in helping patients navigate a complex and information-rich system. No matter how advanced the technology, medical uncertainty will remain a common and challenging part of patient care. The generalist’s role will be to provide primary care and to help patients and families make complicated decisions in areas such as specialty care selection, quality of life ver-
sus intensity of treatment, and end-of-life care.

This will not be an easy role. Today’s primary care physicians are stretched thin, laboring at the center of an ever more complex system, often tasked as gatekeepers, and frequently reimbursed at levels well below those of their specialist colleagues. However, many existing developments will contribute to the building of the generalist of the future. These include advances in the management and availability of information, team and systems approaches to the management of care, the hospitalist movement, the presence of new professionals in the field (nurse practitioners and physician assistants), and the empowered patient.

Everybody Knows Everything

Information technology is a special domain of innovation that will bring sweeping changes to health care and the health care workforce. My candidate item to symbolize electronically managed and disseminated medical information is the PDA. PDAs are portable, powerful, and increasingly available. They will be a portal to limitless quantities of information, they are interactive, and they are available to health professionals and patients alike. But the PDA is an appendage of a much larger potential system. The patient record, arguably the hub of all medical information, is still predominantly paper, not easily moved, and frequently illegible. Despite the twin challenges of connectivity and privacy, paper records will certainly be replaced by electronic records, providing immediate benefits in the quality of patient care, physician feedback, and the standardization of medical practice. The medical literature (textbooks, articles, and databases) will be constantly available online, and clinical guidelines and quality measurement systems will be omnipresent and widely used by hospitals and health systems. The power of information will accentuate and facilitate systems of care, promote interdisciplinary teams bonded by information, and perpetuate the movement away from independent practice. Even those practitioners working in settings that are physically distant will be tied closely to larger systems by information networks.

Patients, similarly, will have far more information and are likely to play ever larger roles in clinical decision making. This new reality will be complicated by the fact that not all patients will have the same information access or propensity. But the ability of patients to become versed in the generalities and, if they choose, the specifics of their own health will fundamentally amend the doctor-patient equation that has existed for centuries. Clinical care will be more informed and more democratic in the future.

The ubiquity of medical information and the growth of technology are likely to contribute to the continued migration of professional boundaries, which began in earnest toward the end of the twentieth century. The current legislative contests over scope of practice between health professional groups such as physicians and nurse practitioners, psychologists and psychiatrists, nurse anesthetists and anesthesiologists are likely to become more contentious as medical information dimin-
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ishes the exclusivity of knowledge on which professional practice acts have been based in the past. The success of practitioners now labeled as “alternative” (such as chiropractors and acupuncturists) will depend on how they fare in these information wars. Widely available and increasingly precise performance data will subject all practitioners to greater scrutiny and more rigorous standards.

One could imagine the physicians’ world as being formally divided between specialists and generalists or between those who use the hospital and those who do not. If the convergence of the work of physicians and advanced practice nurses in areas such as primary care, anesthesia, and obstetrics continues, the concept of doctoral degrees for nurses will emerge, ultimately raising the question as to whether there are two professions or one. As psychologists gain the right to prescribe psychoactive drugs, they will emerge as mental health “doctors.” My guess is that several current professions including nursing, pharmacy, and psychology will build formal ladders into medical practice where experience, study, and challenge by exam will allow adult learners to be licensed as physicians using routes other than medical school. The alternative is hybrid practitioners who achieve the same levels of competence but cleave to the identity of their original profession while asserting independence within the domain of medical practice. In either case, these professions will be challenged to stay focused on their traditional areas of expertise even as some of their members seek roles as medical practitioners. At the same time, medicine itself could become segmented by training and licensure so that training in, say, pediatrics does not make one eligible to practice surgery—and vice versa. If so, nonphysician health professionals could conceivably train and challenge for practice in specific aspects of “medical practice” such as mental health, women’s health, or orthopedics. Whether or not events evolve in this manner, the combined effects of new technologies, the ubiquity of information, and the aspirations of various groups will likely contribute to realignment of professional boundaries in the not-too-distant future.

Nursing Again

Like Dr. Wyman, I include a nursing cap in my time capsule—recognizing that nurses no longer wear caps. I do this in the belief that nursing is launched on a journey away from the traditional profession that wore caps but has yet to settle on a new “uniform” for itself. Nursing is the largest, most central, and in many ways most uncertain part of the health care workforce. Its well-being affects almost all aspects of the health care system. Unlike most other health disciplines, whose pattern of training and sphere of work are fairly uniform, registered nurses (RNs) are educated in a variety of different ways (at the baccalaureate, associate,
and certificate levels) and span a range of professional activities from basic patient care to highly independent clinical work. In the past, perceptions of nursing adequacy or shortage have been cyclical. There are now widespread reports of shortages compounded by a pervasive sense of dissatisfaction in the ranks of practicing nurses. Multiple factors contribute to this unrest, including the increasingly “industrialized” hospital sector, the technical demands of care for today’s more-acute hospitalized patients, nurses’ relatively modest wages, and the absence of control that nurses feel in institutional settings.

These problems are made more complex by pressures at both ends of the nursing spectrum. At the high end, nurses have moved successfully into areas of advanced practice where they are able to achieve increasing professional independence and income. The nursing profession is properly proud of this achievement, but it does not address the core dissatisfaction of many of hospital-based nurses. Problems also exist at the other end of the nursing spectrum, where custodial care is the principal product and levels of training are more limited. There are estimated to be 700,000 licensed practical nurses and 1.4 million nurse aides in the United States who, despite the word “nurse” in their titles, are generally not regarded as part of the profession of nursing in education or policy discussions. Moreover, hospitals seeking to curtail labor costs have hired and trained non-nursing personnel to work as “patient associates” to carry out some duties usually undertaken by nurses. The continued aging of the U.S. population and the inevitable growth of nursing homes and home care are creating increasing demand and uncertainty in this huge area of the paraprofessional workforce.

In short, we use the label “nursing” to refer to a pivotal set of health care activities from the simplest patient companionship to the most complex and independent clinical services—a vocational stretch by any measure. At the high end, where nurses function in areas previously reserved to medicine, it seems entirely plausible that nursing will merge with medicine in the realm of clinical practice. The aging baby-boom population will put pressure on the current availability of in-home services and nursing facilities, which suggests the need for more training, creativity, and professionalization in these areas. The future of the hospital nurse will be determined by the evolving relationships between hospitals and nurses. If wages and working conditions for nurses are improved, one can imagine a future with a strong and highly motivated hospital nursing staff. If, however, the nurse remains caught as a highly stressed, modest-income laborer, nursing shortages and chronic problems with quality of care will result in the employment of many more non-nurse personnel in an attempt to fill gaps and carry out patient care activities.

Information technology as well as robotics may well relieve some of the redundancies and frustrations in clinical nursing. Better pay and more independence would certainly contribute to a more satisfied nursing workforce. Agreement on the standardization of nursing education programs at specified levels (perhaps basic, baccalaureate, and advanced practice) would help to clarify educational,
certification, and employment issues. Strategies to improve the recruitment, training, and remuneration of nurse aides and custodial workers would seem needed to upgrade this important part of the workforce toward the end of improving home care and nursing home quality.

**Where The Doctors Are Not**

In health professions training, no one teaches “Treating the Uninsured 101” or “Advanced Methods of Dealing with the Underserved.” Yet the reality that some forty million Americans lack health insurance confronts all students of the health sciences well before they leave school. Some deal with the problem by avoiding it, selecting practice settings that involve few—or refuse to see—uninsured patients. Others gamely treat some uninsured patients working within the economic realities of their practices, shouldering some responsibility for the system’s shortfalls. Still others practice in “safety-net” settings, making do with Medicaid and public grants, seeing large numbers of uninsured patients, and playing medical Robin Hood as well as they can. In all cases compromises get made in terms of who is seen, how they are treated, and, inevitably, their health outcomes.

Although sages have predicted (wrongly, as yet) the enactment of a U.S. system of national health insurance since the 1930s, I continue to believe that we will yet extend this civility to all of our citizens, so I have put a universal health insurance card in my time capsule. Universal coverage could take a variety of forms, but all would facilitate access to care for the 15 percent of the population that now lacks insurance, improve health outcomes, and be an enormous step forward in diminishing disparities in health. Universal coverage would make neighborhoods and populations that had previously lacked insurance more attractive to providers and would thus be a positive force for the improved distribution of clinicians.

Important as universal health insurance would be to health and equity in the United States, it would not solve all of the problems of distribution of health care workers. Even in systems with well-established universal coverage such as in Canada, the United Kingdom, and Australia, variations in geography and wealth make some areas more appealing than others to health professionals, leaving inequalities and gaps in coverage. Rural areas in general and some economically depressed urban areas tend to remain staffing challenges, as physicians and others locate preferentially in areas where professional and family life are deemed better. This is the case in the United States today and would surely remain so even with universal insurance coverage. So my time capsule contains a National Health Service Corps bumper sticker, an English-Spanish medical dictionary, and a Green Card, symbols of past policy that will very likely be part of future reality. Currently, publicly supported incentive programs such as the National Health Service Corps and community health centers as well as immigration strategies such as the J-1 visa waiver are used to provide help to some disadvantaged communities. Telehealth may provide some assistance to isolated rural areas but will be of lim-
ited use in substituting for trained professionals. Absent a strong governmental commitment, the workforce of the future will continue to be distributed along a gradient determined by economics and professional lifestyle preferences, resulting in permanent disparities in access.

Racial, ethnic, and linguistic diversity in the health care workforce has received increasing attention in recent years. Although underrepresented minorities are not present in the health professions in proportion to their numbers in the population, progress has been made in this regard in the latter part of the twentieth century. Additionally, new immigrant groups—particularly those from Asia—have moved quickly into the ranks of the health professions. Effectiveness of service and equality of opportunity both argue strongly in favor of building a workforce that “looks like” the population as a whole.

The affirmative-action strategies that have helped underrepresented minorities close the gap are under legal attack, and their future is uncertain. However, without programs based on strategies such as these, it will remain difficult for young people raised at economic disadvantage in communities with generally poor schools to successfully compete for health professions training. New immigrant groups are likely to generate health professionals in accordance with their economic success. The continuing mission for health policymakers and health professions educators will be to find ways to bring individuals from the most economically disadvantaged groups into health science education, given the poverty of education at the primary and secondary levels in poor communities.

One-quarter of the physicians in practice today in the United States are graduates of medical schools elsewhere in the world. This is a result of a complex of intersecting interests that include the extensive use of residents by teaching hospitals to meet their service needs, the reluctance of U.S. medical schools to expand their number of graduates, and a strong U.S. economy serving as a magnet to doctors from abroad. The number of foreign-trained physicians that the United States imports annually is roughly equivalent to the output of fifty foreign medical schools graduating a hundred students each. Almost all of the international medical graduates (IMGs) who receive residency training in the United States remain to practice here. The shortage of nurses in the United States has recently led to similar strategies of importing nurses from abroad.

The emigration of physicians from poorer countries to areas of better economic opportunity is a global phenomenon by no means limited to the United States. Canada, the United Kingdom, and Australia, for instance, have similar percentages of foreign-trained physicians in their practicing ranks. The medical degree, to some extent, has become a passport enabling individuals of intelligence in whom a sizable educational investment has been made to leave their countries in search of better practice opportunities in nations with better economies. Improvements in medical education, standardized testing, and English as the common language of science and medicine will only make the phenomenon of migratory physicians a
greater feature of the future than the past. Moreover, similar dynamics might well pertain to many other health professions. These realities raise both practical and ethical questions. A number of economically advanced nations including the United States are allowing other countries to bear the cost of educating their brightest young people as physicians and delivering them to our hospitals ready to work as residents in return for specialty training. There are those who argue that this is a good strategy in that it brings gifted people to the United States and puts them to work at no expense to the American taxpayer. The logical extension of this thinking is that the United States and other developed nations could derive all of their physicians from less-developed countries in much the way, say, that the garment industry has moved “offshore.”

The arguments against this “globalized” approach to the health professions workforce is that a physician is not a T-shirt and that the nature of education as well as the cultural competence of the physician are important to clinical practice. Opportunity is another argument in favor of retaining medical education within the country, because the population as a whole sees jobs in the health professions as desirable and wants the career opportunities. The ethical argument against the globalization of medical training is that developed countries should not, as a matter of policy, take the best and the brightest from less-developed nations at considerable expense to those “donor nations.” This not only subtracts valuable personnel from those nations but also creates a medical education environment where medical schools in poorer countries, geared toward the export of their physicians, train to a levels of sophistication inappropriate for their countries. In a period where the role of the United States as a global citizen is receiving considerable scrutiny, one would hope that, on balance, our workforce strategies would not depend on systematic human subsidies from other nations.

These issues will be made more complicated in the future by the emergence of free-trade zones. The European Union has already eliminated national licensure as a barrier to professional mobility within Europe. A similar possibility has been raised for the United States, Canada, and Mexico under the aegis of the North American Free Trade Agreement (NAFTA). Reliance on IMGs has been seen as a temporary strategy because of imbalances in training capacity. But the chronic maldistribution of health care workers in the developed world, economic globalization, and the ambitions of health professionals in poorer nations will make professional migration a central issue for the workforce of the future.

The Future

As important as technology is and will remain, people are at the center of the health care workforce issues—both as providers and as patients. Alternative medicine, patient-centered medicine, the empowered patient, and the patient as informed consumer are all variants on the theme of the activated patient, a certain feature of health care of the future. The nature of the provider is a little less clear in
my mind. Even the term “provider,” while efficiently inclusive and politically correct, feels awkward to people who consider themselves nurses or dentists or physicians. Generic treatment is uncomfortable for clinicians who, with reason, take pride in their respective professions, enjoy a sense of their history, and have benefited from the political representation afforded them by their professional organizations over the years. Moreover, the past decade was a turbulent one for health professionals, with managed care, nursing shortages, malpractice costs, pharmacy shortages, Medicare pay caps, and quality concerns buffeting their world. Legislative battles between professions over scope of practice and prescriptive authority have contributed to tensions as well. In the short run, morale is an issue for many physicians and nurses, who talk about retiring or quitting with a shrillness that is disconcerting to colleagues, students, and patients alike.

Yet we have always valued health professionals, and it is hard to imagine that, in the long run, the health care marketplace will not settle down and that careers in these important human pursuits will not be seen again as among society’s most desirable. When my time capsule gets dug up some years from now, there will be an ample and spirited representation of health professionals in attendance. The work of health care will likely have undergone redefinition and reallocation, and the professional labels may have morphed a bit, but the attendees will be healers interested the well-being of patients and in their professional pasts and futures. They surely will be entertained by my time capsule items. Perhaps, when they are done chuckling and reflecting, they will have the temerity to select a few items of their own for another time capsule for yet another future.

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