

THE FUTURE OF MEDICINE

Aging, consumerism, and technology are about to change fundamentally the way medicine is practiced.

Hang on to your stethoscope.

Maria Caltrez shuffles slowly up the ramp to her doctor's office. The 80-year-old determinedly pushes a walker in front of her as her 55 year-old daughter, Ellena, walks beside her.

It is Maria's first visit in more than two years. As she enters the office, Matthew Anderson greets them and ushers them to his office. Anderson, the nurse-director of one of several physician-led teams in the office, is ebullient.

"You look terrific!" he says to Maria. "And your heart rate was well within normal range as you walked up the ramp." Maria smiles broadly.

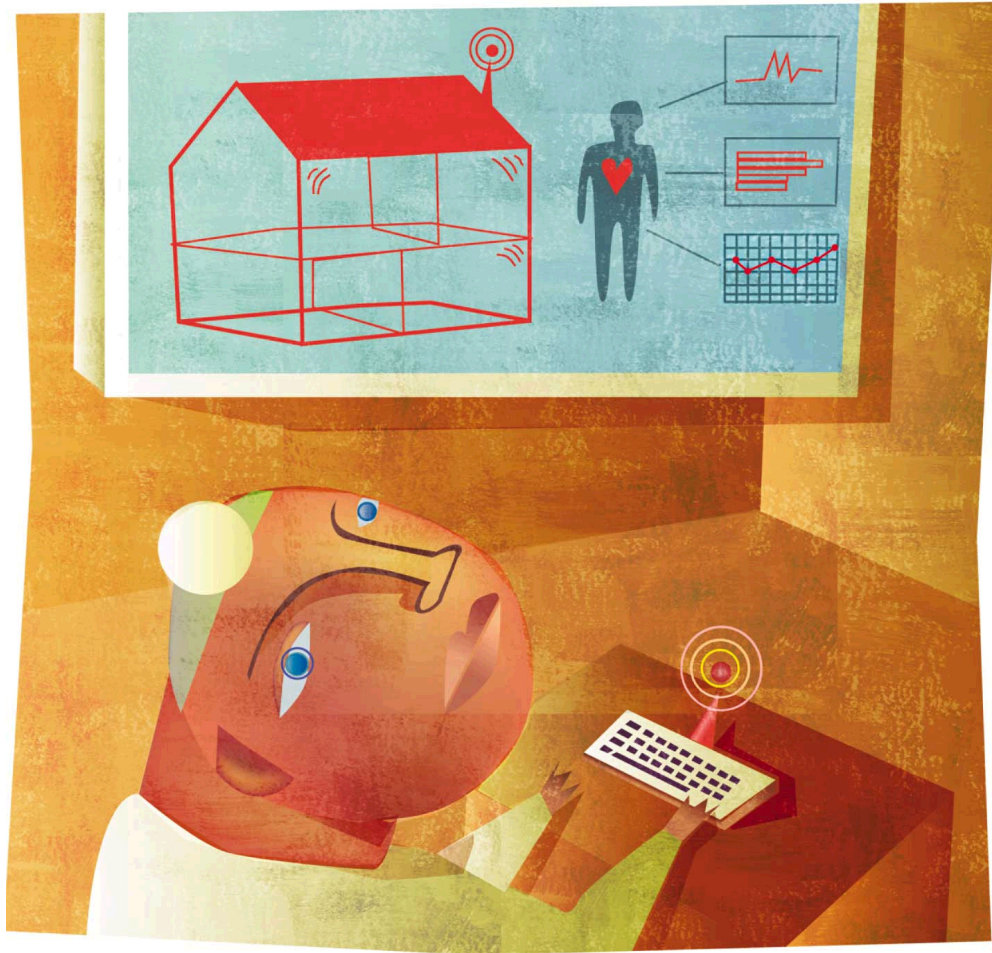
Maria is one of 50 patients that Anderson's team monitors 24/7. Maria's home is wired with motion sensors and diagnostic devices that provide real-time medical data piped directly into Anderson's computer. Aside from continuously monitoring Maria and his other patients throughout the day, he is alerted if Maria's vital signs stray

outside the pre-set parameters determined by the team.

During the visit, Maria and Ellena discuss Maria's Lifespan Management Plan with Anderson. He explains some late-breaking research findings and together the three decide to tweak the nutritional component of the plan by increasing certain foods and supplements. Ellena explains to Anderson her mother's lifelong aversion to one of the foods and together they come up with substitutes. Finally, Anderson reviews with the women Maria's daily activities schedule.

If Maria forgets to bathe by a certain time, Anderson's computer will send a video reminder to all television sets in Maria's condo, actually one of several pre-recorded messages from her daughter, Ellena. Each day, Maria plays a simple video game, which in reality is a sophisticated cognition test, the results of which are transmitted back to Anderson, who is then able to proactively remediate and prescribe social service interventions. The "wristwatch" that Maria wears is actually a diagnostic monitor with a Wi-Max transmitter.

Sound farfetched? Hang on, because the face of medicine is about to change in ways that few practitioners are able to comprehend. In 20 years, according to many experts, the practice of medicine promises to be radically



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different from how it is practiced today.

Like our larger society, the social mega-trends of the past few decades have had a significant impact on the practice of medicine. Increased consumerism, the evolution of powerful—some would say dictatorial—payer systems, and rapid advances in medicine itself have each affected medicine down to the practitioner level. But those trends pale in comparison to what is in store for younger physicians. The next 20 to 30 years will see the convergence of more radical social trends and technological changes that will leave no practice of medicine untouched.

Mega-Trends

They may disagree on the specifics, but nearly every medical futurist predicts that several potent social trends are now in-

tertwining, and together will eventually transform the tradition-bound practice of medicine in this country. Like the confluence of many small tributaries, this intertwining will strengthen and accelerate the individual changes each trend fosters. Here are three of the most significant social and technological mega-trends that will shape medicine in profound ways and revolutionize its practice.

• **Aging**

The fastest growing demographic group in the United States is the elderly. “For most people when they talk about aging demographics, they’re talking about numbers of people over 65 or 85,” says Mike Magee, MD, the author of *Health Politics: Power, Populism and Health* (Spencer Books, 2005) and the host of the weekly, Internet-based show “Health Politics with Dr. Mike Magee” (www.HealthPolitics.org). “But, the most important thing about aging is that we are rapidly moving from three-generational families to four-generational families. Nearly 50 percent of all 60-year-olds have a parent still alive. By 2050, it is anticipated that more than 1 million Americans will be over 100 years old. The five-generational

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family is right around the corner.”

Magee, the director of the Pfizer Medical Humanities Initiative and a senior fellow in the Humanities to the World Medical Association, has studied health-care systems in the United States, United Kingdom, Canada, Germany, South Africa, and Japan. Magee views the American medical system as broken and in need of revolutionary change. That change is around the corner, pushed forward by trends like our aging population.

“From the standpoint of a caregiver,” Magee says, “there is an exponential increase in complexity when moving from managing three-generation complexity to managing four- and five-generation complexity.” Nearly 25 percent of American families now have an informal caregiver in place and 85 percent of those are relatives. The vast majority of these are third-generation women, ages 45 to 65, attempting to manage parents and grandparents on the one hand, and children and grandchildren on the other. There is no financial, organizational, or psychological support for these efforts. Literally, each woman thinks she is doing it for the very first time.

Lacking support, approximately 17 percent of these women resign their jobs and 20 percent are on anti-anxiety or anti-depression medications. If they are charged with caring for patients with dementia at home, nearly 50 percent are clinically depressed. Many of them forego their own regular exams and needed medical care and, as a result, they suffer a higher disease burden than the general population.

“The concept of treating one disease is archaic, because older patients have an average of five plus diseases,” says Dr. Jonathan Weiner, a professor of health policy and management at The Johns Hopkins Bloomberg School of Public Health and an expert on medical trends. “The need for coordination, continuity, and chronic care focus (the “three Cs”) will be critical in the future. The concept of a geriatrician for every older patient is not going to work, but there should be a bit of geriatrician in every doctor. And, in general, medical schools do a pretty lousy job of preparing docs for older patients.”

Clearly, the current medical system does not serve older seniors and their caregivers well.

• Consumerism

It is hard to believe that the health consumer movement is less than 25 years old. But it is already morphing from

Trends or Myths?

As if the mega-trends of aging, consumerism, and technology are not enough for young doctors to worry about, medical experts offer a broad range of trends that might affect physician practices in the coming decades. Here is a sampling of others, along with some that may be more hype than fact.

PHYSICIAN SHORTAGES:

Predicted for years, physician shortages are a debatable issue. Because our country is a free-market system, there will always be shortages in specific areas or specialties, since some physicians don't want to go into certain practice environments. “There is a perception now that there is going to be a shortage of doctors. I believe that is only a perception,” says John Hopkins researcher Jonathan Weiner, MD, a professor of health policy and management. “This is largely promulgated by medical school deans and national search firms, and begrudgingly the Feds, who like the notion of a shortage rather than a surplus.”

BROKEN PAYER SYSTEM:

Few argue that the current private payer system is archaic. According to Jordan J. Cohen, MD, the immediate past-president of the Association of American Medical Colleges, health care is fast becoming unaffordable for patients. On the physician side, demands for increased accountability, lower fees, and more paperwork are choking the system in bureaucracy. The failing system is a trend that must be addressed within the next decade.

MEDICAL ETHICS:

In a consumer-driven society, pressures will increase for physicians to cater to the vanity whims of health consumers, especially those paying their own freight outside the traditional third-party payer system. Plastic surgery interventions currently lead the ethics debate, but close on its heels is biomedical intervention for fetuses,

neonates, and young children. Anti-aging regimes are already on the scene and will increase markedly in the decades to come, fertile ground for ethical conundrums.

PANDEMICS: The current health-care system in this country is already taxed to the breaking point, but some researchers see the increasing likelihood of global pandemics finally breaking the system. The demands on doctors and health-care systems will be far more than they can handle in the case of even a modest pandemic. The 1918-19 influenza pandemic killed as many as 100 million. Many epidemiologists believe that number will pale in comparison to a new pandemic hitting the overcrowded and impoverished third world. And, medically underserved areas of this country will not be immune to devastating health consequences, both to patients and the caregiver system.

SLEEPLESSNESS, DEPRESSION:

In our incredibly fast-paced nation, sleep is the first necessity to be sacrificed at the altar of productivity. Since the dawn of the 19th century, the average sleep for Americans has dropped to under seven hours from nine. For those not already suffering depression from genetic and environmental causes, sleeplessness markedly increases the chances of clinical depression. The human organism is simply not made for extended periods of sleeplessness, a fact that physicians will need to grapple with-and treat-for the foreseeable future. ■



Mike Magee, MD, the author of *Health Politics: Power, Populism and Health* (Spencer Books, 2005), says, “Just as General Electric revolutionized toasters and refrigerators, and literally did improve the quality of our lives,... the same can be done with home health technologies, especially if you leverage them with Wi-Max and other wireless technologies.”

the simpler notion of a more informed health consumer—primarily an educational function—to a model involving a thoroughly engaged consumer. Driven by those very same third-generation women caregivers, these consumers are demanding a much more responsive health-care system.

“I call this consumer engagement,” says Magee. “These most active consumers are saying educational empowerment is not enough. These systems are broken and do not serve us well. We need to reform them.” As Magee points out, the current system is centered around a loop that goes from hospitals to doctors’ offices and back again. The system needs to be re-centered on a primary loop that goes from the home to a physician-led, often nurse-directed care team, and back to the home again. The loop would also contain side loops to a world of resources designed to help with the medical problem the family faces.

“If I’m the patient, I need data flow to go automatically to the doctor, with my permission,” Magee says, “so the team can see

whether or not I’m doing well with my current health plan. And I need information 24/7 coming back to me through my team nurse who can instruct and reinforce me in real time to encourage me to stick to my plan.”

This aggressive engagement will be new for most physicians and will undoubtedly challenge them. But, the advent of the informed health consumer 25 years ago also demanded an adjustment period, and that education is now standard practice.

Part of the consumerism movement involves the critical interface known as doctor-patient communication. “In the last 25 years there has been a greater appreciation of the inclusion of the patient in the centrality of medicine,” says Debra Roter, a professor at The Johns Hopkins Schools of Medicine and Nursing and the author of the seminal book, *Doctors Talking With Patients/Patients Talking With Doctors*:

Improving Communication In Medical Visits, Second Edition (Praeger, 2006). “Now we hear lots of talk about patient-centeredness in the delivery of medical care, as a component of quality of care.”

Patient-centeredness works, especially with the elderly and in particular when paired with a friend or relative who attends office visits. Roter’s research shows that a better informed and engaged patient is more compliant and has better health outcomes when paired with a visit companion. That is one of the many reasons this trend will continue.

“I see this movement strengthening in the decades to come,” Roter says. “It is part of the movement toward personalized medicine. At a molecular, biochemical level, there is already a recognition that everyone is different and responds differently. All kinds of treatments will eventually be

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Dr. Jonathan Weiner, a professor of health policy and management at The Johns Hopkins Bloomberg School of Public Health and an expert on medical trends, says many illnesses requiring hospital stays today may be treated at home in the future. “The hospital-at-home concept is a wonderful idea. There is also a huge trend in biometrics. There are toilets that can do assays in the morning, there are scales that can call in data, and an array of monitoring devices.”



tailored to genetic receptors. But our social, psychological, behavioral profile is also quite different. There is increasing evidence that when treatment options are better lined up with an individual's own personality, the treatments are more effective."

In any case, Roter and Magee agree that the increasing percentage of women in medicine is helping, a trend that appears to enhance the patient-doctor communication. "Doctors have been generally lousy about communicating well with patients," Hopkins' Weiner says bluntly. "The best thing that docs have going for them now is that they are increasingly women, who by their very nature are better communicators." It is also helping that medical schools are including modules on better patient communication in their medical student education.

That is a contributing factor to why physician-led, nurse-directed teams will eventually become the norm. Under this concept, a doctor manages three to five nurses, each of whom monitors 50 to 100 patients. In the future, prevention-focused, personalized treatment will be made more effective with better listening skills. "Increasingly, patients like nurses better than docs," says Weiner, "in part because nurses tend to be women and they don't tend to cut off the communications as most docs do. There definitely has to be an increased sensitivity to this skill. The good news is that the younger men are more from both Mars and Venus, so the younger generation of docs seems to do better."

• Technology

The exponential increase in the use of technology in medicine over the past two decades is well documented. Technology tends to feed on itself. As computing power has increased, advances come at an ever-increasing, frenetic pace. But, paradoxically, so far that technology has not changed the traditional way medicine is

practiced. That is about to change.

The Internet will profoundly affect medical practice over the next 20 years. Magee says, "The most important thing about the Internet is that it goes well beyond the distribution of information. In ignoring geography, it breaks all the rules and eliminates all the boundaries that currently define and contain marketplace pricing, credentialing, and regulation. We have not even begun to deal with the implications of this."

Individual consumers can now create their own marketplace with pharmaceuticals, for example, cherry picking the Internet for pricing, then combining it with overnight delivery for immediate access to products. Powerful databases—even ones that inform physicians and nurses—are now available on line, along with Web sites that interpret the jargon for consumers. Diagnostic devices can be coupled with the Internet and data transmitted to physician offices in real time.

Then there is the hospital-at-home concept, made possible by technological advances, especially in biometrics. "The hospital-at-home concept is a wonderful idea," Weiner says. "There is also a huge trend in biometrics. There are toilets that can do assays in the morning, there are scales that can call in data, and an array of monitoring devices."

Most physicians are unaware of just how alluring the home health-technology trend has become to the sector most influential to its eventual success—big business. More than 400 of the largest technology firms have already formed a trade association, The Center for Aging Services Technology. With five years of development already behind them, in an industry that Forrester Research anticipates will be an explosive growth market by 2010, these businesses are developing a wide range of home health technology products that will revolutionize the way a

home is managed for health.

"These people understand that home may be where the heart is but it's not currently where the health is," says Magee. "Just as General Electric revolutionized toasters and refrigerators, and literally did improve the quality of our lives, GE and these other technology firms now realize that the same can be done with home health technologies, especially if you leverage them with Wi-Max and other wireless technologies and transmit information automatically to one's care team in support of that home-health team feedback loop."

We are on the verge of a revolutionary movement, a result of the intersecting mega-trends of aging, health consumerism, evolution of the patient-physician relationship, emergence of the Internet and Wi-Max technologies. This phenomenon is largely under-recognized by traditional health-care leaders, but is dead-center on the radar screens of visionary thinkers in the financial, technology, and entertainment sectors. Lines are being blurred as these players test the marketplace with innovative products. United Healthcare, for example, formed a bank a few years ago to process debit cards for their health savings accounts, a step toward integration of health and financial services.

The majority of content on the Internet is health-related, according to Google, which reports that 80 percent of adult Internet users have searched for health-related topics. Google and other search companies recognize that the major contribution they can make to a preventive health-care system is to allow the real-time infusion of exactly the right type of knowledge to support patients and caretakers in joint decision-making. The systems they are already developing are the systems that will eventually bring the people closer to those caring for them.

"The true promise of information technologies and new media," says Magee, "is

to strengthen the patient-physician relationship and to cement the commitment and confidence and trust that the people have with their health-care providers.”

Health care in 2030

Given these mega-trends, what will the practice of medicine look like in 20 or 30 years? Brace yourself.

The scenario described at the beginning of this article, that of Maria and her daughter Ellena, will be just the starting point for the radical transformation of medical practice, if Magee and his futurist colleagues are correct in their projections.

Front and center will be that traditional medicine will be turned on its head. The home will become “health central,” with its winning combination of 24/7 care, multi-generational connections and sophisticated technology that will allow robust, real-time data inputs transmitted to the physician-led, nurse-directed health team. That, in turn, will enable the team to prescribe daily, age-specific, micro-adjustments in the patient’s health plan that will markedly improve quality of life. Computer programs using embedded, research-based treatment protocols, best practices, and prevention strategies will aid the health-care teams.

Health insurance will be nearly universal, with insurance premiums decreasing in those homes where the family member responsible for home health care—the home health manager—demonstrates positive health outcomes for the family. Nursing homes will be a relic of the past. Homes will be outfitted to maximize caring for a senior with mild dementia or other chronic diseases. Basic diagnostic tools and therapeutic treatments will be supervised at home by the home health manager. Data will flow to the physician-led, nurse-directed team and feedback then provided to the home health manager. With this new paradigm, people like Maria will have services

layered on pro-actively, because doctors and nurses will be able to see her decline in real time. She has a good chance of living a high quality life and dying at home without ever having felt isolated.

Nor will the informal home health manager feel isolated. She will be directly supported not only by the nurse on her team, but by Internet communities devoted to providing detailed information and real-time support to those facing the challenges of specific chronic diseases. The care team will understand that the fears of the informal caregiver have to be managed at the same time as that of the patient. That sense of high-tech touch will be one measure of real progress.

By 2035, people younger than 20 will have had the benefit of a Lifespan Management Plan since well before conception, as their parents prepared themselves for the rigors and joys of childbirth and childrearing. By birth they will have been the beneficiaries of advanced lifecycle planning that will maximize nutrition, exercise, diagnostics, and medicine. Throughout their lives, they will benefit from research that will allow them to micro-adjust their lifespan management plans to maximize their quality of life.

How expensive will this new health-care system be? Right now, with our broken health-care system, approximately 16 percent of our gross domestic product (GDP) goes to health care and nearly every segment of our society is up in arms over its high cost. But, as Magee and others point out, no one knows how much the American consumer would spend for a health-care system that actually worked—that markedly improved one’s quality of life and even extended it. Some economists believe that 25 percent of GDP would be acceptable. And, a prevention-focused, home-based system financed by a combination of government and private industry might be cheaper than our existing system.

And, how will the physicians fare as they dispense medical care amidst this whirling dervish of change? Under this new vision, the typical physician will be able to grow office capacity, since most care will not involve a patient visit. Reimbursement will be reconfigured to reflect the physician’s evolved role in managing teams, spearheading education and prevention efforts, and dealing with the complex challenges of multigenerational health. A new brand of nurses, drawn to the field due to its redefinition as an integral member of the care team, will make the physician’s job easier.

And the outcomes of this futuristic vision? “Family nutrition is carefully planned and executed,” predicts Magee. “Activity levels of all five generations are up, weight is down, cognition is up, and mental and physical well-being are also up.”

Medical futurists believe that most physicians and patients, if given proper incentives, will thoroughly embrace the kind of joint decision-making that is supported by constant data inputs.

“I foresee a golden era of joint decision-making that is just around the corner,” says Magee. “But in order to get there, we have to very deliberately embrace a new vision and build out a system that is re-centered around an electronic loop that goes from home to care team and back to home. To do this we have to access both health-system and information-system expertise, with the involvement and resources of the financial, technology, entertainment, and health industries.”

Despite mind-boggling discoveries and rapid technological advances, the day-to-day practice of medicine has changed surprisingly little in more than 100 years. That, most assuredly, is about to change profoundly. ■

Les Picker is a regular contributor to *Unique Opportunities*.