How will the ophthalmologist of the future practice? What will be the effect of government policy? How will this impact the mix of health care providers responsible for the delivery of eye care to patients? What part will health record technology play in clinical practice? These topics were discussed at the Knapp Symposium of the 2011 Annual Meeting of the American Ophthalmological Society. The health care system within which ophthalmology will be practiced will be radically different, ruled by changes in collaboration, communication, and practice guidelines. Given the coming uncertainty of our professional lives, it is vital that we anticipate, contemplate, and plan for our futures.

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Making sense of the tumultuous changes in the delivery of eye care led the American Ophthalmological Society to sponsor a symposium focusing on the ophthalmic practice of the future. The ophthalmologist of the future will likely practice in a very different environment. This will include not only their personal values, work, and lifestyle but also their professional milieu. It is likely that government regulations, externally mandated practice guidelines, changes in patient expectations, and the electronic health record (EHR) will play a substantial role in the future practice of ophthalmology. Involvement by informed ophthalmologists in determining this future is essential for navigating these changes for the betterment of our patients and profession.

The US health care system is currently undergoing a dramatic restructuring. The Patient Protection and Affordable Care Act (PPACA) became law in 2010 to address the following deficiencies: 43 million uninsured Americans; escalating expenses; absence of comparative effectiveness research; suboptimal quality and safety; large disparities in outcomes; and only scattered adoption of health information technology. Although its exact effects will depend on regulatory action and court challenges, PPACA will certainly have a dramatic impact on ophthalmology as well as the rest of medicine. For example, there was bipartisan agreement that physician payment had to move from a system that rewards the volume of services provided, irrespective of utility and efficacy, to one that compensates physicians on the basis of outcomes and value. In response, medical specialty societies including the American Academy of Ophthalmology developed evidence-based quality metrics that ideally should contribute to the basis of Medicare’s value-based payment. Physicians initially will be paid more if they reach quality goals in an efficient manner. The Medicare Value-Based Modifier Program will be implemented in 2015 for health care professionals providing services for 20 high-cost diseases and will be applicable to all physicians by 2017.

See also pages 1190 and 1203

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who use fewer resources in the provision of services and attain quality goals will be paid more for all their billings in the coming years. Excess testing will be punished, not rewarded as is often the case now. In addition, penalties will be introduced by PPACA in 2015 for health care providers who do not meet reporting requirements. Provisions within PPACA will alter the traditional physician-patient relationship in many ways. The model of the “all-knowing physician” will be challenged by requirements to justify treatments with evidence-based decision making. The Patient-Centered Outcomes Research Institute established by PPACA will concentrate on the comparative effectiveness of differing treatments, including drugs, devices, procedures, and processes of care. This type of evaluation is not foreign to ophthalmology in that one of the highest-profile comparative-effectiveness research studies to date is the Comparative Age-Related Macular Degeneration Treatment Trial. Similarly, the Hoskins Center for Quality Eye Care provides a structure within ophthalmology to pursue this type of study. But in addition to formal requirements for justification-of-care decisions, patients, many of whom will be paying more out of pocket for their care, may demand more transparency and value from their health care providers. Physician quality scorecards, measures of efficiency, board certification, maintenance of certification participation, licensure, training, and outcomes data will be publicly reported to inform patient decisions. In addition, third parties may also play a mediating role between the physician and patient. With the explosion of new treatment modalities, patients are often asked to choose a course of therapy among many. Where the evidence is equivocal, insurers have begun contracting with informed-decision-making companies. These companies approach the patient and family with educational tools and direct counseling to assist their decision making. The involvement of these decision counselors will be a new and unfamiliar element in any ophthalmologist’s practice.

In the near future, PPACA will also lead to an increased workforce demand when currently uninsured individuals seek care. This diverse new population of patients will require ophthalmology to develop innovative models of care to address the issue of disparities in health outcomes. Despite remarkable progress in treating chronic conditions like glaucoma, macular degeneration, and diabetic retinopathy, there still exist large populations with poor outcomes, as PPACA indicates. Our profession has generally attributed such disparities in care to differential social, racial, and economic status, yet, despite recognition of these factors, large disparities in outcomes remain. It is apparent that issues of cultural competency and health literacy must be addressed in new delivery models to eliminate these glaring inequities.

In the near future, ophthalmologists will be rewarded for providing high-quality, efficient care and will have to accommodate and support the emerging integrated systems of care that will be in play by 2015.

**PRACTICE GUIDELINES AND THE DELIVERY OF CARE**

We face a number of serious challenges in delivering quality eye care to the American population. Increased longevity will result in an increased demand for eye care services, yet there will be a shortage of practicing ophthalmologists to provide care in its current delivery system. Also, quality of practice currently falls short of evidence-based recommendations. Finally, the costs of health care cannot be sustained by the US government, especially with the increase in innovative technology that is adding to the mounting costs. As a result, there is now a tremendous urgency to “bend the cost curve” in health care.

How will these challenges impact the ophthalmic practice? Consensus is quickly forming that incremental changes will not be sufficient and that what is needed instead is fundamental care redesign, which, of course, can mean different things to different people. Nevertheless, any fundamental change in care will have profound implications for how physicians practice as well as how their performance is assessed and compensated. As such, it is vital that physicians, particularly those most involved in the day-to-day care of patients, and their professional societies be active participants in guiding the structure, framework, and processes of any redesigned system of eye care.

What are some potential areas we might consider in care redesign? First, current assessment systems for measuring the quality of eye care are predicated on ophthalmologists making accurate diagnoses. However, there is substantial evidence of variance in diagnostic accuracy for many key conditions that can lead to vision loss, such as diabetic retinopathy or glaucoma. Thus, systems to improve the initial diagnostic accuracy of health care providers will become a new area of focus for individuals and organizations interested in improving care.

Second, as with many sectors of our economy, by reducing variation in what we do in more routine work we can improve quality and reduce costs. Research has shown that there is significant variation in the rates of conformance with ophthalmic guidelines. In this regard, evidence-based practice guidelines will become central by providing a basis for standardized processes that reduce variation. For example, adherence to evidence-based guidelines has been shown to improve mortality rates after heart attacks and reduce diabetic retinopathy among those with diabetesthe concurrent implementation of decision support services in routine care is another promising means to reducing care variation from evidence-based practice standards.

Third, efficiency can be increased by matching specific physician skills and training with tasks or treatments that demand a specific skill set. We need to define the basic tasks inherent in clinical care and match them with designated health care providers as part of an integrated system, using physicians specifically for those tasks that require their level of training, experience, and expertise: in other words, define what physicians do that requires the level of training and experience only they have and determine what can be delegated to others working under their supervision. Expanding the roles of technicians, optometrists, and even new classes of health care providers will likely be an important component of redesigned care in the future. Consequently, providing younger ophthalmologists with the skills to lead teams during their practice careers will be...
come a key goal for educational and professional organizations.

Fourth, lessons from a variety of services and industries demonstrate the value of nonhuman systems in achieving the highest levels of accuracy and reliability—the cornerstones of quality—when a specific task or function does not require human judgment. Repetitive tasks performed robotically have improved productivity in industry while increasing quality. This is an area with great promise within ophthalmology, as evidenced by work on automated analyses of retinopathy of prematurity in premature babies.16

How will health care providers and patients adapt to such a redesigned system? Such a system is not only highly consistent with our future workforce but also essential to the future practice of eye care. The implementation of an 80-hour work week in training, with discussions about 60 hours (maximum cumulative hours over a week, which were averaged over several weeks in some settings), means that physicians of the future will be accustomed to working shifts and that having handoffs and passing on care to colleagues will be an ingrained habit. These habits will set the pattern for future work for today’s young physicians, who will show a greater preference for joining larger and integrated group practices than in the past. In health care, there will always be opportunities for niche markets, and it is axiomatic that no single model will fit every situation or market. But, much as full-service gas stations and boutique stores with personal service have withered in major markets in the United States, the solo and even small-group health care practitioner in an era of greater regulatory burdens and cost pressures will find it harder to compete with integrated systems of care. For patients, more than 30 years of experience with midlevel health care practitioners such as nurse practitioners and physician’s assistants as well as team approaches (different doctors on different visits) in primary care mean that changes in how care is delivered will not be a foreign concept but rather one that is already accepted, however grudgingly.37

THE EHR AND BEYOND

The widespread adoption of the EHR has moved slowly for a variety of reasons. In 2008, the American Academy of Ophthalmology surveyed its membership regarding EHRs. Several issues surfaced, including concern about lack of capital resources to invest in the EHR, insufficient return on the investment, and loss of productivity.37 Recent government action toward moving all health care records to an electronic platform has only intensified these concerns for those still using paper records. Indeed, the financial concern is valid. According to the American Academy of Ophthalmology survey, the average cost of initial implementation for ophthalmologists was $49 712/physician, combined with an average monthly maintenance cost of $1066/physician. This is similar to other areas such as primary care outpatient clinics, which typically spend $44 000/provider for implementation and $701/provider per month for maintenance. In addition to software costs, computer hardware, and network infrastructure, information technology personnel and expertise are needed on an ongoing basis. Yet, despite these concerns, 76% of the survey respondents using an EHR would recommend it to another ophthalmologist and 79% would not go back to paper records. Clearly there are returns on investment in EHRs, both practical and financial. For example, national data show that it takes roughly 2.5 years to pay for EHR implementation; however, this is followed by an average net benefit of $23 000/provider per year going forward.18 One of the primary financial benefits is in billing, which can be done promptly and with accurate supporting documentation for the level of coding.

While the effect of EHRs on clinical practice may be less quantifiable, it is equally profound. The clinical advantages of the EHR range from the general—eg, the availability of clearly organized, readily accessible patient information—to the specific, such as a standardized examination template that encourages completion of all components of the examination. Certainly the advantages extend beyond the replacement of paper records and improved financial efficiencies. For example, having patient records available in electronic format opens a whole host of other possibilities. Telemedicine—the ability to link health care practitioners and patients in different locations—is greatly facilitated by the EHR, addressing an unmet clinical need. Research can also be facilitated: centralized and shared data can enable complex outcomes analysis for individual patients and even whole populations.

Despite the clear advantages, there are real shortcomings to the EHR. Most significantly, the EHR’s digital platform, which enables many of the described benefits, also introduces significant challenges. Because it is electronic, computer infrastructure is necessary, which requires personnel and equipment that are not typically present in most health care settings. The databases and user interfaces, while often helpful, can be restrictive in the type, form, and structure of data entered. Because there is no universal data standard, EHRs can have difficulty sharing information among different vendors and even between the same vendor in different locations. The interface also requires some computer skill, which many physicians lack. Information entry can be tedious, and it can detract from the doctor-patient interaction during visits. Certain types of data, such as illustrations, may not be easily entered into an EHR. And while remote-site accessibility to medical records is certainly enhanced, simultaneous access at a single site by the many individuals who participate in the care of a patient requires negotiating access to shared computer equipment, mobile electronic devices (which present another set of issues), or both.

Converting a clinical practice to an EHR is not without potential long-term cost. Survey data from the University of Pittsburgh Medical Center regarding the outpatient EHR EpicCare showed that while it was considered an effective tool, provided easy access to test results, was more accurate than a handwritten record, and made prescribing easier, 50% of respondents felt that its use added hours to the workday. Over time this perception has persisted.
and represents time taken away from patient care. However, while 28% of physicians using EpicCare for fewer than 3 months would have been willing to return to paper records, that number decreased rapidly with duration of use: 18% with 3 to 6 months of use, 15% with a year of use, and 5% with 2 or more years of use. Similar results have been reported by Lim et al at the University of California at Davis.19 Lastly, the EHR has the potential to empower patients to become more involved and engaged in their own care. In the future, they may be able to access their entire medical record, including medications, health history, and laboratory and test results; schedule, confirm, and cancel appointments; exchange secure messages with physicians and staff; make online payments; receive text message alerts and reminders; request prescription renewal; and have virtual, online visits with physicians. Having ready access to medical information that is easily transportable will enable patients to visit a physician of their choice anywhere and have their medical history immediately available. In an ideal world, EHRs and health information technology provide limitless access to information that is accessible, reliable, secure, and ubiquitous. It remains to be seen whether these and other benefits outweigh the drawbacks for both patients and health care providers.

CONCLUSIONS

The practice of ophthalmology faces many opportunities and challenges going forward. Fortune favors the prepared mind: ophthalmologists need to recognize the current government regulations and anticipate future developments. Ophthalmic practices of the future will be rewarded for providing high-quality and efficient care and must be ready to support emerging, integrated methods of care. High-quality, efficient care includes standardized care processes based on recommended practice guidelines and appropriately matching the level of care to the skills of the health care provider. Optimal implementation of the EHR should support these goals.

The 2011 Knapp Symposium of the American Ophthalmological Society attempted to address the issues facing ophthalmologists and their practices in the future. The presentations identified the broad outlines of future trends that are largely driven by demographics, economics, human factors, and informatics. The ophthalmologist will need to be informed and professional practices will need to adapt. How we deal with these forces will shape the system we have in the future. A new world of health care is upon us. Ophthalmology has been blessed over the years with leadership and vision that will enable us to adjust, prosper, and increase the eye care health of the population. These characteristics should serve us well in the future.

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