This Issue's Contributors

Gina Cuyler, MD, FACP is board certified in Internal Medicine. She is an Assistant Professor of Clinical Medicine at the University of Rochester. She received her undergraduate training from New York University and completed her medical school and Internal Medicine residency at the University of Rochester. Dr. Cuyler is President and Co-Founder of the Black Physicians Network of Greater Rochester, Inc.

Joseph DiPoala, Jr., MD is a board-certified internist and partner at Ridgeview Internal Medicine Group in Irondequoit. He began his medical indoctrination on the lap of his father, Dr. Joseph DiPoala, Sr. at the age of 5. He is a graduate of Colgate University and received his medical degree from the Pennsylvania State College of Medicine in Hershey, Pennsylvania. He completed residency training in the Primary Care Program for Internal Medicine at the University of Rochester in 1992. Dr. DiPoala is a pioneer in the use of electronic health records, having used them since his first day of practice. He is Immediate Past President of Monroe County Medical Society.

Since 2012, **Mark H. Belfer, DO, FAAP** has served as Chief Medical Officer for the Greater Rochester Independent Practice Association (GRIPA). Prior to this role, Dr. Belfer served in the US Army as a family physician; has been in private practice; served as a residency program director for several years. For the past eight years he held positions as either president or CMO in large medical groups. Dr. Belfer has also been very involved in organized medicine, leading state and national medical organizations. He has lectured and published extensively on several health care topics. Dr. Belfer is a Fellow of the American Academy of Family Physicians and is certified by the American Board of Family Medicine.

Jamie Hayslip, is the Chief Information Officer for the Greater Rochester Independent Practice Association (GRIPA), where he is responsible for managing overall IT operations for both GRIPA and its subsidiary, Cognisight. He earned a BS in Mechanical Engineering from Kettering University in Flint, MI. His continued education includes certified training for project management professional, software development, and data warehousing.

Helen A. Zamboni, Esq. is senior counsel at Underberg & Kessler LLP. Following more than a decade practicing law in-house at Frontier Communications, Helen spent several years leading billing operations at that company, then Global Crossing (now Level 3 Communications). From that experience, she gained important insights into how computer systems affect people, processes and procedures, and the legal risks of the companies that deploy them.

Amy S. Warner, Esq. , MBA brings more than 20 years of legal, compliance and management experience to her position as General Counsel, Privacy and Compliance Officer at the Greater Rochester Regional Health Information Organization. Amy has worked in several roles, including litigation, risk management, quality management and compliance before moving into a leadership role. During her tenure at the RHIO she has served on several committees including the Statewide Privacy and Security Policy Committee, Privacy Tiger Team, Minor Consent Tiger Team and the Certification and Policy Adherence Committee.

F. Paul Greene, Esq. is chair of the Harter Secrest & Emery LLP Privacy and Data Security Practice Group. He counsels clients of all sizes in a wide range of industries concerning all aspects of pre-breach preparation, risk management and breach response and remediation.

Christopher Bell, MFT, MBA is the Director of the Children's Health Home Implementation at Health Homes of Upstate New York (HHUNY). HHUNY is the region's largest network of care management agencies, providing support to Medicaid recipients with chronic conditions in 22 counties in the Finger Lakes, Southern Tier, Western, and Central New York regions. He has previously worked with the Finger Lakes Performing Provider System and UR Medicine, supporting state and federal programs that are transforming health care, including the Delivery Service Reform Incentive Payment Program, Patient Centered Medical Home, Meaningful Use, and Physician Quality Reporting System.

Michelle Barber, MA, RD, CDN has been a practicing Registered Dietitian Nutritionist for more than 10 years. She is currently a Nutrition Specialist at the American Dairy Association and Dairy Council, where she has a strong focus on child nutrition. Michelle completed her undergraduate education at Rochester Institute of Technology and received her Master's in Nutrition from the Syracuse University. She is an active member of both the New York State Academy of Nutrition and Dietetics and the Central NY Dietetic Association.

The Evolution and Impact of Technology on the Practice of Medicine:
The Movement From Reactive to Predictive Health Care

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Over the past half-century, medicine has seen several technological breakthroughs that have impacted both hospital and office practice. With the advent of computers in the mid-20th century to computerized axial tomogram scans and magnetic resonance imaging a few years later, technology has tremendously impacted how physicians diagnose and treat their patients. This paper will review where we have been and predict where medical technology is going, especially where outpatient care is concerned.

The past

Before the electronic health record was born, paper charting was the norm in practice. Data was in the form of "hard copy." Physicians would order a test and wait usually 24-48 hours for the results to return via mail or facsimile. Patients were told to either call for the results or on occasion, the physician or office staff would call the patient. Clinical pathways or guidelines were available, but had to be recalled by memory if utilized at all. Handwritten records gave way to dictation and transcription. The sharing of data between physicians was via phone call or a consultation in hard copy. Patients had their vital signs taken and recorded manually. In the office, technology used included the stethoscope, otoscope, ophthalmoscope, EKG machine and possibly a pulse oximeter. These same items are still found in most offices. Many of these technologies are used *reactively*, in response to a complaint or condition, and require the patient to be present in a physician office or hospital setting.

The present

The information age has been established, ushering in a new era of technology affecting the practice of medicine. The use of "smartphones" and tablets has made Internet access and communication between people easier than ever. Over the past two decades, the electronic health record has transformed the medical practice and continues to evolve. The digitization of clinical information is enabling analytical processing and secondary uses of patient data, resulting in information technology tools like disease registries and gaps in care reporting. This is allowing clinicians to not only treat individual patients, but to think in terms of caring for whole populations of patients with specific problems.

Health information exchanges have been created, allowing for data transfer to move seamlessly between providers. Clinical decision support tools aid the clinician with the touch of a keystroke. Actionable reports can be provided for clinicians to aid them in not only population health endeavors but assist them in reducing costs (i.e., pharmaceuticals and readmissions) utilizing national benchmarks. Preventive screening guidelines and clinical pathways using "best practice" protocols are the norm.

As fewer primary care physicians care for their patients within the hospital, concentrating on caring for their patients in the office setting, communication between providers, hospitals, nursing facilities and other entities has changed from the daily face-to-face contact with colleagues. Communication using smartphones and the EHR is now the norm. Clinicians may view radiographs, MRI and CT scans in real-time in their offices or anywhere they have Internet access using a picture archiving and communication system (PACS).

The sharing of data with patients is mandated and welcomed by patients. Patients utilize "patient portals" to communicate with their physician, allowing them access to their individual health record, obtain results of their tests, schedule appointments online, refill medications, and leave messages for their provider.

Clinical applications ("apps") for smartphones are used in a multitude of ways by both physicians and patients. Decision support tools, i.e., Epocrates®, MedCalc®, Visual Dx®, and a host of other apps provide clinicians knowledge at their fingertips which in the past would have taken a significant amount of time to look up in a library of books. Apps for entire medical books and medical periodicals now allow the seeking of knowledge to occur in mere seconds to minutes during a patient encounter.

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Patients have become consumers of healthcare, obtaining health information not only from their physicians or advanced practice provider, but via the Internet as well. There are now numerous websites for medical information, i.e., Web MD® and websites from organizations representing specific diseases. Patients have access to care-finder apps where they can schedule a visit with any provider. Technology has also allowed patients the ability to track their own health and fitness goals wearing small biosensor devices, i.e., the Fitbit®. Patients also now have access to provider pricing and outcomes due to increased transparency.

Telemedicine or telehealth is now in the mainstream. At the onset, it consisted of portable devices that could measure vital signs and weight, enabling homebound patients and their clinicians to monitor these things. Now, with the use of advanced communications, patients may have "virtual" visits with their own physician using a smartphone or computer. In addition, several telehealth "vendors" have begun to market virtual visits between patients and online physicians, ushering in a new wave of accessibility to care.

All of these improvements in communication technology, portability of data, and accessibility to information are being used to react more quickly to patient needs as well as be more *proactive* in the approach to health care.

The future

We are in the midst of an explosion in technology that will affect the practice of medicine. As consumers demand more accessibility, the use of telemedicine will increase significantly with the use of "robotic" visits using a video monitor, perhaps with attached medical monitoring equipment. Smartphone capabilities will continue to improve. EKGs can be transmitted and viewed now and the FDA has been reviewing and approving newer technologies, i.e., echocardiography, ultrasound, and otoscopy on smartphones. Cardiac patients will soon have smartphone apps that will track an EKG for arrhythmias to send in real time to a provider. The stethoscope in the office and at the bedside will become obsolete. Further advances in smartphone-enabled sensing technology will provide a greater amount of biometric (and other) data, i.e.,

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Health Home Care Management Eligibility Criteria:
- Medicaid FFS or Medicaid Managed Care patients (includes dual Medicare/Medicaid patients)
- Must have one or more of the following:
  - » Two or more chronic health conditions (such as asthma, diabetes, heart disease, substance use disorder, or mental illness), or
  - » Serious mental illness (SMI), or
  - » HIV/AIDS

How to make a referral:

You and your staff can reach out directly to our Community Referral Coordinator, Tracy Marchese, via telephone (585-613-7642) or email (tmarchese@hhuny.org), or you can access our community referral form for HHUNY Finger Lakes online at http://www.hhuny.org.

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changes in breathing or wheezing, from the patient's home directly to their physician. Even brain computer interfaces are being developed for consumers allowing for meditation at the time of episodes of depression and anxiety. Diabetics will be pleased when transdermal biosensor patches are used instead of obtaining blood through needle sticks to monitor glucose levels.

Since the genome was decoded, increased testing of individual genes and genetic markers will occur. Population health management will be enhanced by personalized measures for several diseases. Dr. Eric Topol, in his book, *The Creative Destruction of Medicine*, believes that "…instead of using the same mass screening policies for diseases, i.e. breast or prostate cancer, or using the same dosages of medication for all patients for a particular ailment, we will fully define patients at the individual level by 'digitizing' humans

at the molecular level allowing physicians to care for the individual person."

As the amount of information available for each individual increases, and analytic and computing power rapidly expands, a full transformation will be achieved from a *purely reactive to a predictive approach* to the practice of medicine.

In summary, healthcare and the medical practice continue to evolve with the increase in technological advances. There will be a continued demand to integrate devices, "smart" data, and low-cost genomics. Technology will be a great "enabler" and move the practice of medicine from being truly reactive to a predictive form of care, where we will be able to more easily anticipate problems as well as provide care targeted for the individual's needs.

The Legal Implications of Medical Records in the Digital Age

entries into text fields may avoid making entries or keep them extremely short. The loss of extensive narrative in records can result in decreased quality of care. A provider who finds use of the EMRS burdensome and has his/her assistant, who was not present during an event, make the entry about it into the EMRS has arguably committed an act of professional misconduct.

The technology that enables real-time charting may carry some of the biggest risks of EMRS. If the person making the entries is also the provider, the provider may be more focused on navigating the screens and making entries than listening to the patient – or being perceived by the patient as not listening, because the provider is unable to make eye contact with the patient. In a hospital or long term care setting, bedside charting carries the potential of unauthorized disclosure of PHI

to nosy visitors. The small screen size of tablets and smart phones may discourage detailed charting and increase the risk of error in entry selections. Also, it is much easier to lose or misplace a small device, significantly increasing the risk of unauthorized disclosure of PHI.

The increasing use of scribes to record the real-time interaction between patients and providers indicates a recognition of the legal risks arising from changes in business process occasioned by EMRS and a means of mitigating those risks. To reduce potential legal liability, managers of medical practices, hospitals and nursing homes that have implemented EMRS need to move beyond training staff in their use and focus more intently on how their business processes have changed as a result.