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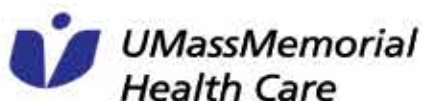
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Editorial

Jane Lochrie, MD



Jane Lochrie, MD

Telemedicine (also referred to as “telehealth” or “e-health”) can be classified into three main categories: remote patient monitoring, store-and-forward and interactive telemedicine.

Remote patient monitoring allows patients with chronic diseases to be monitored in their homes through the use of mobile devices that collect information about blood sugar levels, weight, vital signs, etc. Remote providers can review the data instantly. Store-and-forward telemedicine allows providers to share patient information, such as lab results, x-rays and photos, with a physician at

another site. Interactive telemedicine allows physicians and patients to communicate in real time. Visits can be conducted in the patient’s home or medical facility and include telephone conversations or video conferencing using software that is HIPPA compliant.

Physicians and patients are able to communicate with each other via smartphones, e-mail and webcams. Doctors Without Borders can communicate with experts in the United States from remote war-torn areas for instantaneous support with surgery and uncommon medical problems. ICU physicians can monitor patients in several hospital ICUs from a single command center remote from these health care facilities. In this issue of *Worcester Medicine*, we will learn how telemedicine is being practiced in our community.

Dr. Harriette Chandler, Massachusetts Senate Majority Leader, has been campaigning for telemedicine since 2002. Recently, she introduced a bill to expand general health insurance and Medicaid coverage for telemedicine to the same extent as services that are given through in-person care. The bill also provides important protection for patients, limiting copayments and deductibles.

Dr. David Weinstock, a primary care physician at Grove Medical Associates, writes about his experience of remotely monitoring his patients with telemedicine over the past five years. There are challenges, including the upfront cost, time commitments, cybersecurity and willingness of patients to learn the application. On the positive side, the technology will make our patients healthier and happier faster. Dr. Weinstock uses a device which monitors his patients’ blood pressure, heart rate and blood glucose. Patients can even synch their fitness trackers!! In addition, he can answer routine question, refill prescription requests and answer referral needs.

Paula Freeman, who has a master’s degree from Brown University, speaks from the patient’s point of view. Initially, she had mixed feelings about using the patient portal that was available from her

primary care physician. She was amazed at all the administrative tasks that she could accomplish, and this allowed her access to information about her labs and other health care updates. She opines that the most important aspect of telemedicine is the connection and bond that she has built with her physician.

Dr. David Bader, the president of St. Vincent Radiology Associates, Inc., et al., describes the rapid growth of teleradiology. Radiology is now 33 percent of telehealth services globally, the highest of any branch of medicine. This has been aided by high-speed Internet, the lower cost and availability of computers, innovative data compression and technology that has markedly improved image resolution.

Dr. Craig Lilly and Christine Motzkus explain how the ICU telemedicine unit at UMass cares for patients with complex or rapidly evolving medical problems. Patients are monitored by sophisticated analytical software to detect physiological instability, oftentimes before this can be perceived by the staff caring for the patient. Their team of experts covers 13 ICUs and two post-anesthesia care units. The program has lower mortality, shorter duration of critical illness, briefer time in the hospital, fewer complications and lower cost than standard ICU care.

Dr. John Person describes teledermatology at Reliant Medical Group. A physician or other provider can send a photograph of the problem with a brief history from their HIPPA-compliant cell phone to one of the dermatologists and generally receive a response within three hours. He notes that side benefits of teledermatology is the documentation in the medical record for monitoring future changes and the educational benefit to the sender. He estimates that they are able to save an office visit almost 80 percent of the time.

The dean of Massachusetts College of Pharmacy and Health Sciences, Dr. Anna Morin, defines telepharmacy for us. This is the utilization of telecommunication technology by a pharmacist to oversee aspects of pharmacy operations or provide patient-care services, including both inpatient and outpatient facilities. She describes two recent studies that show telepharmacy improves both patient safety and cost.

The medical student point of view is provided by Nathaniel Erskine and Jason Yang. Nathaniel gives us a time and cost analysis of an average visit to a physician. He states that he does not blame patients for wanting to sit in their living rooms and have an on-demand e-visit with their provider that is more convenient and less expensive than a traditional office visit. There are barriers to telemedicine, including liability concerns, differences in state laws and lack of reimbursement from some insurers. Jason became interested in telemedicine when he made an appointment with his primary care physician and learned about the user-friendly patient portal. He states there are two main benefits of telemedicine: It increases access to care for rural residents and it decreases waiting time. The challenges are reimbursement and laws surrounding net neutrality for Internet service providers.

As always, please take time to read the Society Snippets and the Legal Consult.



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The Future of Telemedicine in Legislation

Harriette L. Chandler, MBA, Ph.D.



Harriette L. Chandler, MBA, Ph.D.

Telemedicine has long been a topic of much discussion, curiosity and research in the Massachusetts Legislature. One of the first pieces of legislation that I sponsored as a state senator in 2002 was An Act Establishing a Medicaid Telemedicine Services Program. This bill allowed the Commonwealth of Massachusetts to establish a rate of reimbursement for home health agencies that allows for the use of technology in the provision

of home health services. “Technology” was defined as: information services or devices that make documentation, charting and staff time more efficient or encourage and allow for care through alternative settings, including, but not limited to, touch screens, monitors, handhelds, swipe cards, motion detectors, pagers, telemedicine, medication dispensers and equipment to monitor vital signs and self-injections and to observe skin and other conditions. Fifteen years later, however, nothing has been accomplished and the Massachusetts Legislature is still considering ways to incorporate telemedicine into the medical field with state support.

Telemedicine is changing the landscape of medical care and serves as an important vehicle of expanding access – and even convenience – to medical care. In this era of Internet reliance and innovative health technology, anyone can look up anything from anywhere and get a quick answer for his or her health-related concerns and questions. This is done from the comfort of an individual’s house, cell phone, tablet, app or computer; all without the guidance of a trained health professional. This Internet era enables people to find solutions with the stroke of a digital keyboard or click of a video without visiting a doctor’s office, urgent care, clinic, hospital or community health center.

In this 2017-2018 Legislative Session, I have filed Senate Bill #501,

An Act Expanding Access to Telemedicine Services, with State Representative Kay Khan (D-Newton), House Chair of the Joint Committee on Children, Families and Persons with Disabilities, and State Representative John W. Scibak (D-Hadley), House Chair of the Joint Committee on Higher Education. Our current bill seeks to expand general health insurance and Medicaid coverage for medical care given through telemedicine for all appropriate services that are covered to the same extent as services given through in-person care.

While many insurers have already taken the initiative to cover telemedicine independently, this bill would ensure consistent coverage for patients in Massachusetts. It would also require adequate reimbursement for services provided via telemedicine, that insurers carrying telemedicine services would determine reimbursement rates on the same basis as in-person services, so that physicians may have more of an incentive to offer telemedicine to their patients. Last but not least, this bill provides the important patient protection of limiting co-payments and deductibles for telemedicine services to no more than the cost-sharing for in-person care.

Telemedicine is a solution for those who live in rural areas, live a distance from the nearest hospital or clinic, or who may be mobility impaired or elderly or single parents juggling health care responsibilities for multiple family members. The Commonwealth of Massachusetts is home to arguably the best and brightest medical professionals in the nation – and perhaps even the world. If they are not being accessed by those who are in the most need of clinical health care, we are doing them a great disservice.

Senate Bill #501 is supported by the Massachusetts Medical Society, which has analyzed this issue thoroughly and given its seal of approval. Many other states have already successfully turned to telemedicine as an important tool for access. It is now time for Massachusetts to follow suit.

Harriette Chandler, MBA, Ph.D., is the current Massachusetts Senate Majority Leader representing the 1st Worcester District.

Telemedicine, the Key to the Evolution of Primary Care

David Weinstock, DO



David Weinstock, DO

As a primary care provider, it's easy to recognize primary care medicine has rarely been thought of as innovative or cutting-edge – and certainly not futuristic. However, with the advances in technology, electronic medical records and use of personal devices, primary care is not only innovative but an increasingly exciting profession. As physicians, we are presented every day with new technology to advance and alter the practice of “everyday” medicine. Physicians are remotely monitoring patients’ blood sugars, weights, blood pressure, heart rates, exercise regimens, caloric intake,

oxygenation and more. All this happens effortlessly, anywhere the patient is and potentially 24 hours a day. All it takes is an interactive patient who can download an app on a personal device that interfaces with the doctor’s office or one who can learn to use a patient portal. Patients are rewarded with the freedom of after-hours communication, viewing test results, making appointments, and emailing or texting their doctor, all on their time schedule. And soon, more commonly, will be real-time video conferencing. In addition, interfaces with hospitals allow your PCP to track and know what is happening to patients when they are in the hospital.

Some honesty: Anything worth doing takes effort. Implementation of such technologies depends on many factors. There are challenges for the patient and physician. For example, there are significant costs upfront, time commitments with training staff and physicians and the willingness of patients to test and learn the ins and outs of applications. Cybersecurity is a serious and necessary component that will grow, adding costs on the physician’s end and, most likely, on the patient’s end, as well. There’s the issue of data collection: how is it stored, what’s done with it as time goes on and how to protect it. But these should not make physicians or patients pause – they are the same issues we’re dealing with moment to moment using social media, online accounts and “surfing the net.” Just as those activities online make our lives easier, technology in medicine will make our patients healthier and happier faster, which makes any physician feel more successful. And success also depends on the ability to include smoother work flow, billing and increasing reimbursement as part of this technology. Some patients and doctors worry about the loss of face-to-face interaction. But most patients are expressing they feel better taken care of when they have greater ability to communicate with the doctor and the office, know test results faster and know their doctor can “check in” on their status at any time outside office hours. Telemedicine has the ability to enhance the interpersonal relationships vital to PCPs and their patients.

At Grove Medical Associates, we’ve been growing with available technology for about 10 years. We started with an electronic health record, and with each opportunity, we’ve grown to provide our patients

more remote access and reporting of their health. For the past five years, we’ve grown with an app that has the ability to interface with monitoring devices and communicates with our office system. The devices monitor blood pressure, heart rate and blood glucose. All it takes is synching from the patient in order for me to know how to manage his or her situation. My patients can even synch their fitness trackers/wearables. These devices populate data directly into a patient’s chart – there’s no staff needed for messages or filing before I get the information. This allows me to be pro-active in my patient’s care. I can make medication adjustments immediately, rather than waiting a few weeks or months until I see someone in the office. It allows me to catch warning signs of trouble and see cycles or events that a patient may otherwise forget or not know to report in the office visit. This not only maintains but builds the traditional, confident relationship between a physician and patient.

The relationship between a patient and physician will always be the cornerstone of primary care. As much as we try to find other ways to meet the needs of primary care, no urgent care or emergency room can ever develop the solid relationship a patient and doctor establish. Many of our patients increasingly communicate via a patient portal with routine questions, refill requests, referral needs and more. This type of interaction is becoming routine and, with the younger generation, even expected. It’s setting the stage for the next step forward: increasing patients’ engagement and ownership of their health, now and in the future, with preventative care.

Advancing patient engagement is vital to the success of health care across the board. Involved patients who have immediate access to their health record have better outcomes. Several of our patients have prevented serious adverse outcomes, and even death, in situations where they needed to communicate their medical information quickly. In one case, a patient was out of state and ended up in an emergency room. With access to her record, she was able to provide all the important information to the emergency room. They had her recent labs, current medications, medical diagnoses and more. This allowed them to respond accurately to her crisis.

Telemedicine is one of the answers to what primary care needs in a time when the goal is to provide everyone access to health care; when the modalities of communication no longer require a telephone, a fax or even office staff; when the ability to track everything about ourselves is automatic and transferring that information can be immediate; when patients can be actively involved and easily educated in managing their own health any time, any place.

Telemedicine can be a critical piece of the puzzle to improving health, outcomes and prevention if we are willing to test it and adapt to what is useful. It can be an instrumental part of making billing, reimbursement and gaining incentives an active and streamlined part of primary care. Difficult and inconsistent payment and reimbursement models are part of the defining reason young doctors do not go into primary care. Technology and telemedicine can show the value of PCPs and support the value of their profession.

David Weinstock, DO, is an instructor at the University of Massachusetts Medical School, board chair of Central Massachusetts Local Chapter Steward Health Care Network and the owner and physician of Grove Medical Associates.

Telemedicine: A Patient's Point of View

Paula R. Freeman, MA



Paula R. Freeman MA

I'll admit it: I'm a chronic worrier. It's an inherited trait from my mother and her family! I worry about everything, but especially my health. Some of the non-pharmaceutical aids for this chronic condition include access to information and medical opinions, reassurance (both personal and professional) and, most recently, yoga lessons.

Working with a science- and health-related company, I have access to information related to clinical work and technical aspects of science and medicine, though I, myself, am not a scientist. I'm also not technically savvy; I can create a basic PowerPoint presentation or Excel spreadsheet, but I am less proficient with more advanced programs. I am, however, proficient with e-mail.

When I learned about telemedicine from articles online and then found out that it would be available at my primary care physician's practice, I had mixed feelings. Would I have to import or link to my information? Would I FaceTime with my doctor to show him where it hurt? Would I have a chip implanted under my skin to track me and my biological systems? (Did I mention I have an active imagination?) Since so much of my life is tied to e-mails and texts, I decided to see what it meant to become a user in a patient portal. My experiences surprised me.

There are administrative tasks that can be accomplished on my computer or a smartphone app. I can make or check an appointment's status, order a prescription refill or request a referral for a specialist in moments. I can read my blood work results quickly. (It's nice to hear that your lipid profile is fine, but I like to see the numbers!) This

saves time and allows me access to information I need to learn from and feel better informed about myself. Additionally, I receive updates to changes in the practice, keeping me informed of new staff, flu shot clinics and more.

The monitoring aspect of telemedicine is amazing. You can record blood pressure and blood glucose readings in the portal. You can also report weight, sleep hours and physical activity to produce real-time data for you and, more importantly, your doctor to monitor. Not only does it save time and travel for the patient, but the physician can also monitor your data to help you control or adjust your medication. I had to do this myself this year, and the data helped with a diagnosis and treatment. For me, it was a way to stay connected with my doctor and to observe my own progress from the privacy of my home, which allows for less disruption during the work day.

The most important aspect of telemedicine is the connection and bond I have built with my physician. Knowing that I can e-mail a non-emergency question that will be answered in a reasonable time is what I need for my own well-being. As my company develops targeted medicines, this tool allows me to continue a personalized conversation with my doctor long after my physical appointment. It is the connection of technology, data and a personal touch that serve me well in my personal situation. It does not replace the in-person appointments or conversations, but it does offer a personal connection at a time when a kind word is the best medicine.

Paula R. Freeman has more than 25 years of experience and expertise as a human resources executive within the biotechnology industry. She holds a BA, magna cum laude, from Eisenhower College of the Rochester Institute of Technology (RIT) and a master's degree from Brown University. Freeman authors an employment-related blog, www.JobEtiquettebyPaula.wordpress.com.

Teleradiology: Thinking Outside the (View) Box

David A. Bader, MD, FACR, and Mani Razmjoo, MD, MA



David A. Bader, MD, FACR, and Mani Razmjoo, MD, MA

Sir Arthur C. Clarke wrote, “Any sufficiently advanced technology is indistinguishable from magic.”

The concept of remote consultation, in the context of radiology, was first explored nearly half a century ago. In the analog age, radiology images were film-based; every facility with imaging capabilities had darkrooms and processors. Radiologists needed to be physically linked to the films for interpretation, and this meant bringing the radiologist to the viewbox. During the 1970s and early '80s, approaches at remote interpretation entailed physically transporting the films to radiologists, who subsequently tape-recorded and returned transcribed interpretations with a turnaround time of days to weeks. The cumbersome logistics, suboptimal quality of images and prolonged turnaround time limited early functional application.

The early '90s was marked by new technology, albeit low-speed Internet, low-resolution digital imaging and low-performance computer systems. These advances, while promising, remained insufficient for impactful evolution of teleradiology. In 1994, a group of radiologists at Massachusetts General Hospital (MGH) established an intercontinental teleradiology link. The group digitized and transmitted 30 radiologic studies from Saudi Arabia to Massachusetts using a landline. Transmission time ranged from two to five minutes per radiograph with a service cost of \$100,000. The implications for global e-health were proven, and the field was on the cusp of major change.

Over the past 20 years, rapid and continuous advancements in telecommunication and imaging have transformed the field of teleradiology. High-speed Internet has provided efficient and cost-effective communication solutions; high-performance, low-cost personal computers are ubiquitous; innovative data compression technology has markedly improved image resolution and data transmission time; and Picture Archiving and Communication Systems (PACS) have provided economical storage and convenient access to multi-modality imaging. By 2010, according to the World Health Organization, radiology had the highest rate of established telehealth service provision globally at 33 percent.

The advancements in technology transformed the delivery of diagnostic radiology services with widespread implementation of teleradiology across institutions and continents. This evolution paralleled the explosion of the number of imaging studies. The rate of CT scans per 1,000 American adults rose from 52 in 1996 to 149 in 2010, an annual rate of 7.8 percent. This dramatic increase in utilization created a mismatch between increases in imaging use and manpower growth. Teleradiology provided a bridge between the supply and demand gap; by 2009, more

than 50 percent of all U.S. hospitals were utilizing teleradiology.

Historically, a teleradiologist providing coverage would dictate preliminary rather than final reports, partly from limited access to pertinent relevant information. In recent years, however, advancement in technology has allowed teleradiologists to interface more easily with off-site facilities, granting access to clinical information and imaging and, therefore, the ability to produce final reports. The increasing number of cases and demand for rapid reads resulted in the expansion of “nighthawk” and “dayhawk” services, with fast and cost-efficient turnaround time the main goal. The driving forces became local needs, with the majority of hospitals in the United States outsourcing their off-hour emergency interpretations today. This new model in many cases led to the commoditization of cost-effective but lower quality radiology services. Conceptually, this evolution strayed from the early visions of teleradiology as a vehicle for bringing remote radiologists into virtual contact with areas of significant need. In addition, the teleradiology model alone does not address the “boots on the ground” direct patient care needs of a wide range of radiology specialties, including interventional procedures, mammography, nuclear medicine and fluoroscopy. For providers, especially subspecialists, having the radiologist available to directly review and discuss cases may be limited to virtual contact.

Delivery system reform is reshaping health care, including the radiology and teleradiology landscape. Value-based purchasing and alternative payment models are refocusing emphasis on quality, which will further enhance the potential of effectively employed teleradiology. The ability to provide high-quality access to subspecialty radiologists 24/7, coupled with local diagnostic and interventional radiologists integrated into a hospital or health care system, is a powerful patient-centered care model.

We have come full circle from the radiologist limited to a viewbox, reading hard copy films, to streaming digital images to the radiologist. Perhaps it is a bit of magic that we now have the ability to virtually transport the radiologist and images directly to the patient or provider on demand with a video link. The possibilities are limitless, and the future of teleradiology shines bright.

David Bader, MD, FACR, is the president of St. Vincent Radiological Associates, Inc., and the chief of Radiology and the director of the Radiology Residency Program at St. Vincent Hospital. Mani Razmjoo, MD, MA, is a PGY3 radiology resident in the Department of Radiology at St. Vincent Hospital.

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ICU Telemedicine: 10 years of service

Craig M. Lilly, MD, and Christine Anne Motzkus, MPH



**Craig M. Lilly, MD, and
Christine Anne Motzkus, MPH**

Mobile communication devices have removed barriers to accomplishing many activities of daily living by providing immediate access to shopping, entertainment and many other services. Our growing enthusiasm for electronically assisted service delivery is directly related to how electronics can support more efficient access to the services we need. The integration of calendar and scheduling functions has allowed us to order taxi-style services directly to where we are when we need a ride.

Our patients believe that access to health care services could be similarly enabled by the electronic

matching of qualified available clinicians to patients and their family members. Our community is increasingly vocal regarding its desire for access to health care when and where patients request it and are increasingly drawn to electronic solutions that increase access, including patient portals. Lawmakers have been receptive to this increased interest and are responding by expanding reimbursement for some professional services delivered through telemedicine programs. The telemedicine professionals at UMass Memorial Health Care have been at the forefront of determining how telemedicine tools can bring value to our patients and increase access to services that our patients need.

UMass Memorial Medical Center is the home of a nationally recognized ICU telemedicine program that supports our most vulnerable patients. Telemedicine solutions can remove geographical and time barriers that make some patient care encounters unnecessarily inefficient and opaque for patients and their families. For patients with complex or rapidly evolving medical problems, these solutions can also be used to get the right expertise engaged at the right time. In the context of critical illness, the availability of biomedical monitoring systems allows sophisticated analytical software to detect evolving physiological instability even before a bedside ICU nurse is aware of it. Our UMass Memorial Health Care ICU telemedicine team has pioneered the deployment of this software to support most Central Massachusetts intensive care unit patients. Our use of the technology has expanded since its introduction in 2006 and now supports the patients of 13 Central Massachusetts ICUs and two post-anesthesia care units (PACUs). The response has been overwhelmingly positive from providers, patients and institutions alike. Our off-site team of intensive care specialists, specialty pharmacists, operations center nurses and information services experts uses the ICU telemedicine monitoring system to ensure that bedside providers are engaged at crucial moments and to offer assistance, enhance communication and get the right people, medications and supplies where they are needed. The telemedicine approach encourages most patients to get their care at community hospital ICUs that are nearer their home. It also rapidly identifies and assists in the transfer of patients to services that our academic medical center can provide.

ICU telemedicine solutions are founded on close collaboration of bedside and telemedicine physicians and ICU teams. The bedside physicians create and implement the daily care plan, and the off-site telemedicine professionals provide off-hours support to ensure that the care plan goals are being achieved. ICU telemedicine devices, which provide support for bedside physicians, use integrated software solutions that include

an electronic medical record, a provider order entry system, access to laboratory studies and radiographic images and the ability to engage and mobilize specialists rapidly when emergent intervention is required.

The ICU telemedicine team provides initial evaluation and management services for patients who develop new problems and assist with the development and implementation of care plans for patients who are admitted at times when critical care specialist physicians are not available. This approach markedly reduces the volume of after-hours requests for bedside physician intervention because most issues are resolved by the on-duty telemedicine team. The best systems include electronic sign-out processes designed to make it easy for bedside clinicians to communicate their care plans.

Evaluation of our UMass Memorial ICU telemedicine program revealed that program implementation was associated with lower mortality, shorter duration of critical illness, briefer time in the hospital, fewer complications and lower costs of care. When best practice adherence is compared among a consortium of 530 ICUs in the United States, our Worcester-centered program has consistently been recognized as having the highest rates of ICU best practice adherence. Similarly, our rankings for infectious complications have been outstanding, and these events are now rare. ICU telemedicine is one way to ensure that our highest acuity patients are receiving the kind of care and extra attention that we would want our family members to receive. The physicians and nurses who care for our highest acuity patients like having telemedicine support. Help that you can call when you need it and can appear when patients display the first subtle signs of evolving instability is reassuring. ICU nurses, residents and specialists have reported an increased sense of confidence, work satisfaction and greater patient safety when telemedicine support is available. One key reason is that bedside caregivers have assistance with identifying which of the myriad alerts and alarms require urgent action. It is increasingly clear that ICU telemedicine programs enable higher quality, lower cost critical care paradigms by removing geographic and temporal barriers to critical care staffing.

Like most of the electronic devices that we use in our daily lives, those which are used for direct patient care are rapidly evolving. David Smith, UMass Memorial Medical Center associate vice president for Virtual Medicine, is leading our Worcester area efforts to bring the best available solutions to our patients. "While our current-generation system focuses on communication among physicians, nurses, respiratory therapists and ICU pharmacists, we expect that patients and families will be able to use next-generation systems to participate in the interprofessional rounds that have advanced the way we practice critical care. These new and innovative technologies can remove the barriers of distance and improve patient engagement at all levels of care through devices that are already integrated into our everyday lives."

The excitement surrounding ICU telemedicine relates to the ability of our electronic and telecommunications technologies to organize clinical information so that the critical situation is more transparent, the care plan more clearly summarized, how the patient is responding to the current plan is more evident and the right expertise is consistently available to provide the right intervention when it is needed. ICU telemedicine is about putting critical care specialists where they need to be when they need to be there.

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Teledermatology at Reliant Medical Group

John Person, MD



John Person, MD

Our Epic-based, store-and-forward teledermatology system was set up more than a year ago by the Reliant IT Department and Dr. Bhaskar Srivistava. My involvement began after Dr. Srivistava left our practice, which is not without irony, considering my total lack of technical and typing skills. My interest and willingness to participate was piqued, not by what I read in my journals, but by Figure 1, a medical website where practitioners post interesting cases and readers comment in two-and-a-

half lines or less. The “two-and-a-half lines” was certainly part of the attraction, and it soon became obvious that my comments were appreciated and I attracted hundreds of “followers.”

Virtually all of our teledermatology consults come from primary care. The practitioner takes a cell phone photograph, includes a brief history and sends it to our teledermatology group. We generally respond within three hours (considerably faster than a three-month wait for a dermatology consultation). Since it is a physician-to-physician system, the responses are diagnosis- and treatment-focused and hence fairly brief. A side benefit of teledermatology is the photo documentation for monitoring future change. Volume is slowly increasing, and we are doing several cases per day now, but it's not nearly sufficient to do it in real time. I estimate that we save an office visit almost 80 percent of the time, but it is difficult to get hard data on this. Much of the success is due to the intelligence and common sense of our primary care providers. They know what is distinctive and probably diagnosable and what is not. We rarely receive nonspecific photographs in the e-consults. My biggest frustration is my occasional inability to zoom in on some photos. Credit goes to the forbearance of our ENT, plastic and general surgeons, who have been willing to do excisional biopsies on lesions that were suspicious to the teledermatologist.

One of the joys of dermatology is the *augenblick* (German for “bat of an eyelash”)

diagnosis. No history or differential diagnosis required – immediate visual pattern recognition. It is teledermatology at its most efficient and non-technical best. I might never have gone into dermatology but for the simplicity of this when I was a medical student. I recall two patients who presented to our inner city dermatology clinic. Both were undocumented aliens. One patient had leonine facies and the other had what looked like cauliflower ears, except that the earlobes were involved. In both cases, the attending dermatologist's *augenblick* diagnosis was lepromatous leprosy, and in both cases, this proved to be correct.

An unexpected benefit of teledermatology is that it is educative. I first became aware of this from my Figure 1 followers. Taking a photograph and taking responsibility for treatment create a learning environment through active responding, which a traditional referral would not do. Some of our primary care practitioners' consults have been decreasing as a consequence of their improved pattern recognition skills. And sometimes, the joy of an *augenblick* diagnosis is contagious.

John Person, MD, is a dermatologist at Reliant Medical Group.

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Telepharmacy

Anna K. Morin, PharmD, RPh

Technologies such as video conferencing, the Internet, store-and-forward imaging, streaming media and landline and wireless communication devices can be used to deliver two-way, real-time health care services between a health care provider and a patient. Telehealth is a term used to broadly refer to the use of the previously mentioned technologies to support and promote clinical health care, patient and professional health-related education, public health and health administration.¹

Telepharmacy is the application of telehealth technology to pharmacy practice. The American Society of Health-System Pharmacists (ASHP) defines telepharmacy as the utilization of telecommunications technology by a pharmacist to oversee aspects of pharmacy operations or provide patient-care services.² Pharmacists have been using the telephone – the earliest form of telepharmacy – for decades to communicate with patients and other health care professionals. Telepharmacy can be expanded to provide access to inpatient and outpatient pharmacy services to populations in rural or underserved communities or to those who have difficulty accessing health care services due to weather, mobility or other barriers. Medication therapy management, patient assessment, patient counseling, provision of drug information, prior authorizations, medication order review, refill authorizations and checking and dispensing of prescriptions can all be performed remotely by a pharmacist. By being part of a health care team and actively managing drug therapy, pharmacists can identify, prevent and resolve medication-related problems.

The safety and cost benefits of telepharmacy have been described in the medical literature. In a study of 450 adults with uncontrolled hypertension, the impact of the addition of home blood pressure telemonitoring by a pharmacist was compared with usual care by a primary physician on the impact of blood pressure control.³ Real-time patient data was transmitted to a pharmacist, who would provide counseling and medication therapy management to the patient via the phone. During phone visits, pharmacists emphasized lifestyle changes and medication adherence and assessed and adjusted antihypertensive drug therapy based on a predetermined algorithm. In addition, following each phone visit, the pharmacist communicated with the patient's primary care team through the electronic medical record. Results showed that home blood pressure telemonitoring by a pharmacist resulted in a significantly higher percentage of patients who achieved blood pressure control compared to usual primary care at six months (71.8% vs. 45.2%; $P<0.0001$), at 12 months (71.2% vs. 52.8%; $P=0.005$) and at 18 months (71.8% vs. 57.1%; $P=0.003$). Additional benefits in the pharmacist intervention group included better self-reported adherence to antihypertensive medication, sodium-restricted

diets and home blood pressure monitoring. These benefits persisted for six months post-intervention. This model could be applied to the management of other chronic conditions, including anticoagulation monitoring, asthma, diabetes, hepatitis C, HIV and pain management. Researchers evaluated the impact of a telepharmacy service on patient safety in three community hospitals in California that did not have 24-hour pharmacy services.⁴ The telepharmacy service was in operation during times when the pharmacy was closed and provided a review of all medication orders prior to dispensing from an automated dispensing cabinet by a nurse and administration to the patient. A pharmacist was also available to answer drug information questions for nurses when the pharmacy was closed. The number of pharmacy interventions increased from 15 interventions per week to 98 per week after the implementation of telepharmacy services, suggesting that drug-related problems were not being identified and potentially prevented during times the pharmacy was not open. Remote review of medication orders by pharmacists when the hospital pharmacy was closed decreased the number of potential adverse drug events reported and improved job satisfaction among nurses. Cost avoidance estimates associated with pharmacists preventing, identifying and resolving medication-related problems were \$15,064 weekly (or \$783,328 annually) for the three hospitals.

As a member of the health care team, pharmacists are strategically positioned to provide cost-effective medication therapy management leading to improved relationships between pharmacists, patients and other health care professionals. Telepharmacy, in an evolving patient care approach, can result in better patient outcomes and lower health care costs and may be especially useful when pharmacy resources may be limited, such as at ambulatory clinics and health care facilities located in geographically rural areas or when pharmacy services are not available 24 hours/day.

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My Smartphone Instead of My Doctor: Telemedicine May Disrupt Outpatient Practices Like Uber Did with Taxis

Nathaniel A. Erskine, BA



Nathaniel A. Erskine, BA

Face-to-face encounters with clinicians are fundamental to the practice of medicine, but costly for patients. On average, Americans spend 30 minutes traveling, 60 minutes waiting and \$32 out-of-pocket for 20 minutes of time with a clinician, while foregoing an additional \$42 of missed work.¹ This imposes an inconvenience for those with means and a substantial barrier to care for patients with limited finances and access to transportation. I could not blame patients for then wanting to be able to sit on the living room couch and have an on-demand “e-consult” with a nurse or doctor on their smartphones.

As an aspiring clinician, should I worry that an iPhone will steal away my future patients? Providers of direct-to-consumer (DTC) telemedicine, such as Teladoc, now allow patients to consult with physicians anytime via phone or secure video links from computers and mobile devices.² An analysis of claims data by the RAND Corporation of 300,000 enrollees of a public employee insurer found the cost of a DTC telemedicine session for an acute respiratory infection was half that of a physician’s office visit.³ Why would patients not spring for medical care that appears to be cheaper and more convenient?

In the short term, it appears improbable that DTC telemedicine will displace many outpatient providers. Structural barriers exist to the broader uptake of telemedicine, including liability concerns, idiosyncrasies in state laws and lack of methods for reimbursement by many (but not all) insurers.⁴ Many patients might not want to disclose an embarrassing health issue online, particularly in light of recent digital security concerns.⁵ Findings from the same RAND study suggest contemporary patients utilize telemedicine more as an add-on to in-person consultations and that patients were getting an e-consult on a sore throat that they would normally not bother having checked.³ As the events of the past year have shown, improbable does not mean impossible.

Changes in health care financing may force the substitution of DTC telemedicine for traditional outpatient care. High-deductible plans will likely encourage patients to shop around for the cheapest care option. Telemedicine services may then outcompete outpatient providers on cost by capitalizing on economies of scale and insights from data collected during digital encounters. Moreover, most outpatient providers rely on fee-for-service models that pay providers per visit. As payers increasingly link reimbursement to patient outcomes, telemedicine services may have greater ease adapting their businesses for the continuous monitoring and management of patients, particularly those with chronic diseases.⁵

Evolution of consumer expectations may lead many patients to prefer

DTC telemedicine over an in-person doctor visit. Experiences of using Amazon and Uber may prime patients to want to receive health care as quickly and cheaply as possible, even if it means turning over extensive personal data to a corporation. A survey of 1,700 outpatients using a video telehealth consult when in-person consultation at CVS Minute Clinics was unavailable found that 90 percent saw their consult as good as or superior to an in-person consultation.⁶

How should stakeholders prepare for the brave new world of telehealth? Health care organizations can start providing DTC telemedicine before losing market share. Kaiser Permanente Northern California has incorporated telemedicine services with particular benefits for treating patients in difficult social situations or who live far away from clinics, such as college students.⁷ Kaiser also eased the implementation of telemedicine by giving providers extra time in their schedules for computer work. Organizations should explore ways to integrate telemedicine in ways that are easier, rather than more burdensome, for providers.

Providers and trainees will need to prepare, as well as receive support, for a greater digital shift in methods of care delivery. As a medical student, I have had multiple opportunities to practice conducting in-person interviews and assessments of patients but have no formal instruction about delivering care over the phone or web. I have witnessed how electronic medical records (EMRs) have contributed to burnout among providers due to poor interoperability and user experience; inadequate telemedicine systems could conceivably exacerbate the problems encountered with EMRs. Providers and trainees will need additional skill sets to handle shifting methods of health care delivery; medical schools and organizations should help prepare clinicians for this shift, while setting up systems to prevent delivery of suboptimal care and provider frustration.

Focusing on ways to better incorporate telemedicine in traditional outpatient practices may help ensure that smartphone services are a complement, rather than a replacement, for our work.

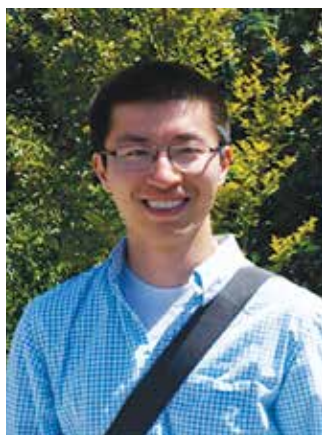
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Telemedicine, are we ready for it?

Jason Yang, BA



Jason Yang, BA

In 1925, Hugo Gernsback, a successful radio engineer and publisher, wrote that in 50 years, doctors could see patients via a video monitor and conduct physical exams by operating a set of mechanical arms remotely. He named it, “teledactyl.”¹

While we don’t yet have the fantastic “teledactyl,” the field of telemedicine has advanced significantly. Telemedicine is the idea of using telecommunication tools to conduct medical care. In 1959, Nebraska Psychiatric institute used video to coordinate care with the Norfolk State Hospital, which was more than

100 miles away.² During the 1960s, NASA, which was trying to solve the problem of making sure the astronauts stayed healthy while they were in space, became another main player in the development of telemedicine technology.² The establishment of the Internet during the 1990s and the creation of chat apps such as Skype during the early 2000s established the necessary infrastructure for implementing telemedicine on a large scale.² Indeed, these improvements have helped to usher in a series of telemedicine services that make it easier to connect a patient and his or her physician.

My first encounter with telemedicine came about two years ago. When I called to make an appointment at the Family Medicine Clinic in the Benedict Building on at the University of Massachusetts Lake Avenue campus, I learned that there was a new system called FollowMyHealth that showed patients their lab results, upcoming appointments and other health record information online. The “bonus” feature was the messaging center, where patients can contact their doctors with questions. I had always assumed that telemedicine involved a complicated system that resembled the various EHRs. Yet, staring back at me on the computer screen was a simple-to-use website that changes the way patients interact with their care providers and access information. With so much potential, I wanted to learn more about telemedicine’s benefits, as well as the challenges it faces in the future.

Telemedicine has two main benefits: 1) it increases access to care for rural residents, and 2) it decreases waiting times for patients. According to information compiled by Rural Health Information Hub, much of Central and Western Massachusetts, as well as Martha’s Vineyard and Nantucket, are rural areas.³ In these areas, there are three critical access hospitals, four federally qualified health centers, one rural health clinic and four skilled nursing facilities as of 2016.³ Using a telemedicine program can help patients in these areas connect with physicians who normally would require a long commute and/or even longer waiting time. The second benefit of telemedicine is that it cuts down on the total time that it takes to visit a doctor. In 2015, a study estimated of the 2.4 billion hours spent visiting doctors, only 17 percent of that time is spent interacting with the doctors.⁴ The rest of the time is spent on waiting and traveling, leading to an economic impact of about \$52

billion. Implementing telemedicine in certain specialties, such as mental health and dermatology, showed a decrease in the total time required for visiting a physician.⁵

But what about the quality of care? Multiple studies suggest that for certain specialties, such as mental health, substance abuse and skin conditions, there is no decrease in the quality of care, whether the patients used telemedicine or not.⁵ Moreover, a study by Dr. Craig Lilly at UMass found that using telemedicine teams to digitally monitor patients in the eICU units led to various benefits, including a 20 percent faster discharge rate from the ICU compared to patients who did not have the telemedicine monitoring.⁶

With all these benefits of telemedicine, a few challenges remain to make it more mainstream. First, not all insurers recognize the importance of telemedicine, and the question of reimbursement remains cloudy.⁵ Moving forward, there must be more research done showing the importance of telemedicine to convince the other stakeholders in the health care system to pay into establishing telemedicine programs. Second, the future laws surrounding net neutrality may negatively impact telemedicine. The net neutrality debate revolves around whether it is okay for Internet service providers (ISPs), such as Verizon, to charge more for allowing certain websites to have a higher priority in delivering their traffic. Imagine you use the Internet for Netflix and reading *The Boston Globe*. Under net neutrality, all the content that comes from Netflix and Boston Globe will be delivered to you at the same speed. Without net neutrality, the ISP (such as Verizon) can charge Netflix a fee so that its content is delivered faster than that of *The Boston Globe*. If Netflix doesn’t pay, Verizon can slow down the traffic from Netflix, resulting in poor video quality for you. Essentially, repeal of the law will let ISPs decide who gets into the fast lane for a price, and that cost will eventually be passed down to the consumer. In other words, the ISPs can charge telemedicine programs more money so that the video chats and other communications are delivered smoothly between the patient and the provider.⁷ This may increase the cost of the programs to the patients, many of whom may already be economically disadvantaged since a lot of the potential of telemedicine is in rural, underserved populations. Facing these challenges, we must urge our government representatives and other health care stakeholders to ensure that the Internet remains open and also work towards a sustainable future for telemedicine.

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Medical Marijuana Laws – Some Head-Spinning Conflicts

Peter J. Martin, Esq.



Peter J. Martin, Esq.

As more and more states adopt medical marijuana laws, health care providers are faced with dilemmas about how to comply at the same time with different bodies of conflicting law, state and federal. A recent pair of trial court decisions from Rhode Island and Massachusetts displays two approaches to reconciling medical marijuana and employment laws. The cases show that medical marijuana statutes are only slowly and incompletely being integrated into a consistent legal landscape that has direct practical effects on practitioners as both providers and businesses.

At least 28 states have passed one form or another of a medical marijuana statute over the past nearly 20 years. These laws

usually require a physician's certification of the patient's need for medical marijuana due to a "debilitating condition." Many such laws provide for a state registry and the issuance of identification cards to qualifying patients. The laws in Rhode Island and Massachusetts generally follow this pattern. Both states' laws generally provide that the state law does not provide any immunity under federal law and does not pose an obstacle to federal enforcement of federal law. (The Rhode Island statute's legislative findings section says: "States are not required to enforce federal law or prosecute people for engaging in activities prohibited by federal law. Therefore, compliance with this chapter does not put the state of Rhode Island in violation of federal law.")

Nevertheless, under the federal Controlled Substances Act of 1970, marijuana is classified as a Schedule 1 substance and any marijuana possession, cultivation or use is a federal crime subjecting a defendant to fines, prison or both. Health care providers who receive federal health care program reimbursement certify that their services to beneficiaries of those programs are in compliance with federal law. Use of medical marijuana in the course of treating such patients thus potentially puts providers in the position of complying with state law at the same time they are violating federal law. Fortunately, the Drug Enforcement Administration has repeatedly stressed that federal enforcement actions will focus on large-scale marijuana growers and dispensaries and not on individual medical marijuana patients.

The risk remains, however, that any implied certification of compliance with federal law might compromise a provider's participation in or reimbursement by federal health care programs. Some providers seek work-arounds to this conundrum by, for example, requiring persons not employed or engaged by the provider to take responsibility for and exclusive possession and control, including administration, of any medical marijuana authorized for the provider's patient. The efficacy of this approach has yet to be definitively tested.

Moreover, the legal conflicts posed by medical marijuana laws are not limited to the potential preemption of state law by federal law. State laws themselves can pose obstacles to the protections afforded under the same state's medical marijuana statute. One example arose in Suffolk Superior Court in May of 2016, *Barbuto v. Advantage Sales and Marketing, LLC*. In that case, employee Barbuto, who had a medical marijuana prescription for Crohn's disease, was terminated from her employment because she tested positive for marijuana during a urinary drug test. Barbuto claimed this violated the state disability discrimination statute. The court disagreed, citing decisions from other states that "the state disability discrimination statutes do not extend to marijuana use for medical purposes because such

use remains illegal under federal law." Consequently, the court held that the employer "need not accommodate Barbuto's disability by allowing her to use a drug that remains illegal under federal law."

The Barbuto court also found that the Massachusetts medical marijuana statute itself does not prohibit disability discrimination in this case, citing a provision in that statute that "nothing in this law requires any accommodation of any *on-site* medical use of marijuana in any place of employment" (emphasis added). In addition, the state law does not explicitly prohibit adverse employment actions on account of an employee's medical marijuana use. The Barbuto court found no private right of action under the medical marijuana statute, characterizing it as an act decriminalizing the medical use of marijuana. Finally, the court dismissed Barbuto's claim that she was terminated in violation of a public policy favoring the right to use medical marijuana. The court read the law as protecting a medical marijuana user from criminal prosecution or civil penalties, but not as protecting that user from an employer's action based on an employee's marijuana use. The court did permit Barbuto to go forward with a claim that the employer's requirement that she take a drug test invaded her right to privacy, since the test was unrelated to her job duties or the employer's business.

The Massachusetts Supreme Judicial Court decided to take direct appellate review of the Barbuto decision, focusing on the questions of whether Barbuto's termination for the lawful use of medical marijuana outside of the workplace violated the disability discrimination statute and whether the medical marijuana statute provides a private right of action to a terminated employee. Similar questions are posed by a more recent decision out of the Rhode Island Superior Court in the case of *Callaghan v. Darlington Fabrics Corporation and The Moore Company*, issued on May 23, 2017. Unlike the Barbuto decision, which involved an employment termination, the Callaghan case arose from the employer declining to hire a potential employee who was an authorized medical marijuana user because she told the prospective employer that she would fail a required pre-employment drug test.

The Rhode Island medical marijuana statute differs from its Massachusetts counterpart in one important respect. The Rhode Island law includes a provision that no employer may refuse to employ or otherwise penalize a person solely for his or her status as a holder of a card authorizing medical marijuana use. The employer in the Callaghan case claimed that it did not refuse to hire her because of her status as a cardholder, but because of her inability to pass the pre-employment drug screen. The trial court judge terms "incredulous" the defendants' argument that the statute thus distinguished between cardholders and users of medical marijuana. Instead, the court focused on another provision in the statute, which states that a qualifying patient cardholder may not be denied any right or privilege due to the medical use of marijuana. Reading the two provisions together, the court concluded that the protections afforded cardholders against an employer's refusal to employ the cardholder (construed as a "right or privilege") cannot be denied on the basis of the medical use of marijuana. To rule otherwise would permit an employer, using a facially neutral drug-testing policy, to treat medical and non-medical users of marijuana in the same way, denying the statute's protections to the medical users of marijuana.

The Callaghan decision also considered the defendants' argument that the employer should not have to accommodate an employee's off-site medical marijuana use. The court agreed with that argument, noting that the medical marijuana statute explicitly does not require an employer to "accommodate the medical use of marijuana *in any workplace*" (emphasis added). The court also pointed out that the statute does not permit any person "to undertake any task under the influence of marijuana, when doing so would constitute negligence or professional malpractice." Thus, if a medical marijuana user came to work under the influence, the employer could discipline that employee under the employer's drug-free workplace policies. This appears to be a more realistic approach to the question of off-site use of medical marijuana than the Barbuto court's emphasis on the

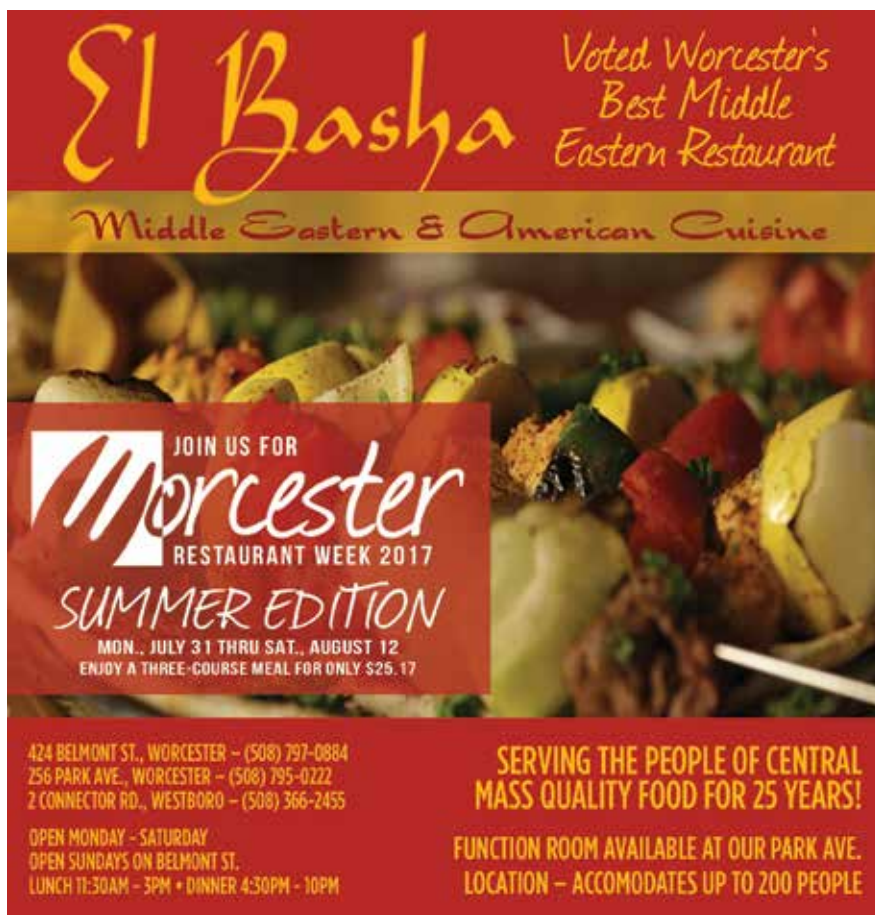
notion that accommodation under state disability discrimination law is not required merely because federal law prohibits marijuana use.

The Callaghan court rejected the employer's claim that since active drug use is not a "disability" under the Rhode Island disability discrimination statute, no such discrimination could have occurred in this instance. The court began with the premise that the employee's disability was the "debilitating medical condition" justifying the legal use of medical marijuana, not the use of marijuana itself. It rejected the employer's argument that it decided not to hire Callaghan solely because of her marijuana use, not the underlying medical condition. This would, in the court's words, be "to completely separate the medical condition from the treatment." Such a distinction would frustrate the intent of the discrimination statute to protect those with disabilities by preventing "the hiring of individuals suffering disabilities best treated by medical marijuana."

The Callaghan court extensively discussed the question of a private right of action under the medical marijuana statute. The law does not explicitly provide for a private right of action, and statutes generally are not construed to imply such a right, unless absent that means of enforcement, the statute would be ineffective. The court noted that the statute contained a provision requiring it to be construed broadly to effectuate its purposes and that other courts have been quick to imply a private right of action in employment discrimination cases. It concluded that such a right of action may be implied under the Rhode Island medical marijuana statute. Again, this appears to be a more nuanced analysis of the private right of action issue than that offered in the Barbuto decision, as it asks the question of how a statute can be enforced in the employment context without such a right of action.

We thus have before us two court decisions from adjacent states issued roughly a year apart concerning the application of similar medical marijuana statutes in the employment context and reaching distinctly different conclusions. It is too soon to tell whether the Rhode Island decision will be appealed, and we don't know how the Massachusetts Supreme Judicial Court will rule in the Barbuto matter. In the meantime, providers are faced with a number of conundrums. How can a provider comply with both the federal ban on the use of marijuana and the state medical marijuana statute? Can a provider adequately and fairly enforce a drug-free workplace policy in light of both state medical marijuana and disability discrimination statutes? How the issues raised in these cases, and the conflicts between federal and state statutes, get resolved may have significant practical effects on practitioners as both providers and employers.

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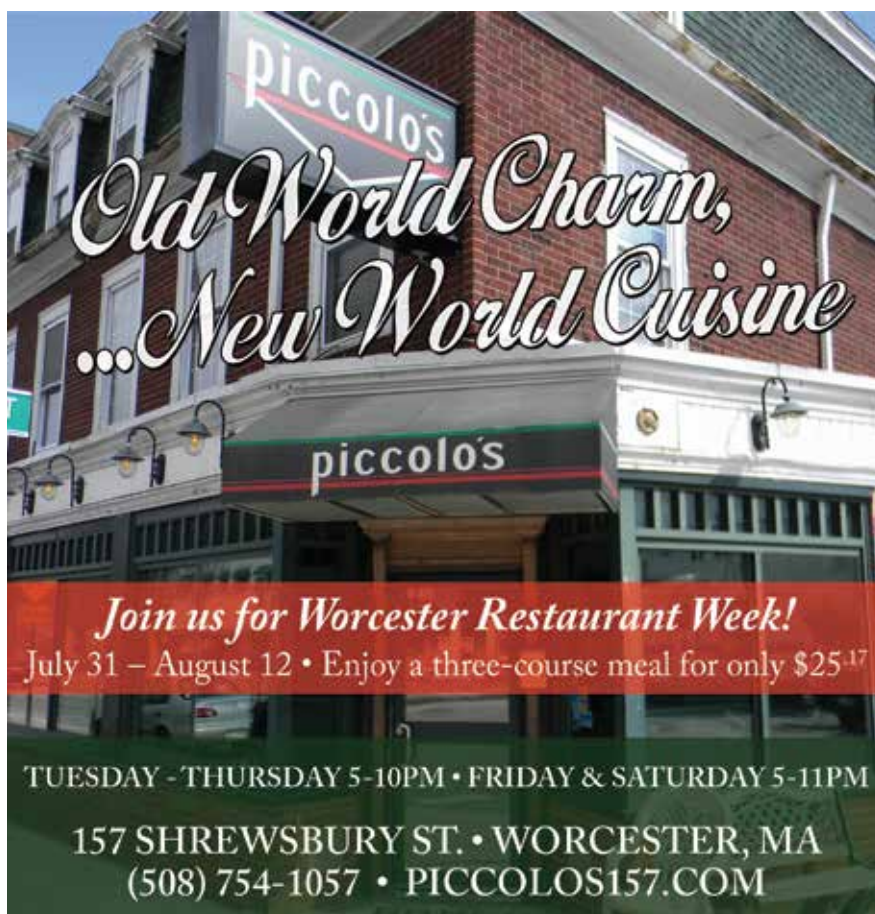
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