Osteopathic medicine is one of the most rapidly growing health professions in the United States. Its promise lies in the training of osteopathic physicians (ie, DOs) to provide comprehensive health care by partnering with patients to keep them well. In today’s highly connected environment, electronic tools and social media provide clinicians with the ability to understand patients and their social interactions far more completely than in previous generations. This interconnectedness has given rise to a new means of expanding the patient-physician relationship, commonly called telehealth (also known as telemedicine and e-health). Implementation of this technology has the potential to revitalize the health care delivery system in a manner similar to technology’s impact on the retail and manufacturing industries.

Although telehealth is in its infancy, existing research demonstrates its effectiveness. A systematic review conducted by the Agency for Healthcare Research and Quality in 2016 concluded that telehealth is beneficial for communication and counseling for chronic conditions, as well as for interventions such as psychotherapy.¹² The review also noted benefit for remote monitoring in chronic cardiac and respiratory illnesses with improvements in mortality and quality of life and reductions in hospital admissions.¹² Patients engaged in telehealth have easier access to care and improved satisfaction. Those in rural and remote areas can receive high-quality care without long distance travel.²

Despite these advances, uptake of telehealth has been slow. Health care delivery is a complex system involving patients, payers, health care professionals, and institutions where care is provided. Each must evolve to make this new system work. Much of our current health care system is built on the acute-care model. Investment has primarily been in institutions providing that care, as opposed to the chronic and preventive care model. Like the societal changes resulting from internet connectivity, telehealth has the potential to transform and extend health care to a broader population. To achieve this goal, patients and health care professionals must be confident that this technology can be trusted to be equivalent to a direct personal encounter. The tools used must be affordable, reliable, and portable. By reaching beyond institutional walls, telehealth has the ability to extend into the lives of our patients. That is the promise of the next generation of advances, Telehealth 2.0.

Telehealth 2.0 integrates existing technologies (medical apps, wearable sensors, virtual electronic health record platforms) to focus on population health and prevention.³ To move forward, these integrated systems must allow for continuous monitoring and secure data sharing. To be truly integrated, Telehealth 2.0 must take advantage of the Internet of Things (IoT) and advances in artificial intelligence while remaining patient centered.

Development of these models of care is occurring incrementally throughout the health care system. The following trends illustrate this incremental growth:

- In the United States in 2015, 15 million people received remote medical care, with projected growth of 30% the following year.⁴
- The portable telehealth industry (apps, remote care monitoring, and telemedicine) is projected to reach $227 billion by 2025.⁵
- More than 80% of health care organizations have a mobile strategy; of those, approximately 80% have had a positive return on investment.⁶
- The wearable device industry is projected to reach $70 billion in sales by 2025.⁷
- Data have demonstrated patient satisfaction with self-care through the use of medical-related apps to support patients with HIV and other diseases.⁸
Data have also demonstrated greater provider and patient satisfaction and improved outcomes with wearable devices such as cardiac rhythm monitoring.\(^2,9\)

To create this system requires interconnectivity between personal devices and the patient’s electronic medical record. Each currently sits in disparate environments controlled by different industries. Placing the patient at the center of this interconnected world is likely the key to success. To be successful, more technological integration and cloud-computing technology is needed. This integration could enable primary care physicians to provide prevention and wellness counseling outside the clinic visit and potentially reduce the burden of chronic illness.\(^3\) Counseling and real-time interactions could be provided by teams directed by the primary care physician through smartphone messaging apps. These tools can then be used to monitor and amplify the physician’s recommendations regarding exercise, nutrition, and behavioral changes (e.g., smoking cessation) to promote prevention and wellness as a part of the larger system.\(^10\) Continuous, noninvasive sensors are being designed to allow for daily monitoring,\(^8\) which can provide real-time alerts to physicians and enable prompt action.

By taking advantage of more frequent encounters and continuous monitoring through wearable devices, Telehealth 2.0 potentially enables physicians to focus their clinic time on directed interventions such as osteopathic manipulative treatment, procedures, and patients with complex presentations. Smartphone apps and wearable technology provide additional tools for enhancing wellness.

Telehealth 2.0 also goes beyond monitoring. For example, the use of drone-based technologies allows the delivery of these tools to the point of care. In Project HiRO (Healthcare Integrated Rescue Operations), we have used the advances of telehealth 2.0 to bring the capabilities of the emergency department directly to bystanders using a highly advanced lightweight telemedical kit. This technology includes permission-required access to medication-dispensing systems and other interventions, enabling a bystander to help save lives in disaster or medical emergencies. The medical kit is supported by cloud analytics and artificial intelligence. The kits are lightweight (<15 lb) and can be flown on a drone-based telemedicine emergency response system. The medical kits support a layperson bystander or first responder to take immediate action(s) during a medical emergency. (To view a scenario demonstrating the use of this technology, visit https://www.youtube.com/watch?v=VwXJn4s6Ps.) These interventions may provide a bridge for emergency medical services to reduce the time to evaluation and intervention while enhancing the quality of care and potentially reducing morbidity.

Telehealth 2.0 may also enhance continuity of care. Creation of a virtual clinic, for example, can offer extended hours for better patient satisfaction. In addition, we have developed an augmented reality-based electronic health record, and we are developing holographic technologies, which can likewise enhance care. The possibilities are endless.

However, these tools are not without challenges. The primary challenges to physicians who wish to implement these systems are liability and reimbursement. Reimbursement can easily be adapted through existing systems (e.g., Apple Pay). Technology and adaptation of IoT may provide physicians more confidence in these systems, lessening liability concerns.

The pathway to health care reform lies in innovation. Osteopathic physicians have been leaders in reforming health care and now have the opportunity to help lead the next revolution of integrating technology into the longitudinal care of the patient. By embracing the osteopathic tenet of patient-centered care, Telehealth 2.0 can bring the clinic to the patient. (doi:10.7556/jaoa.2017.117)

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References


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