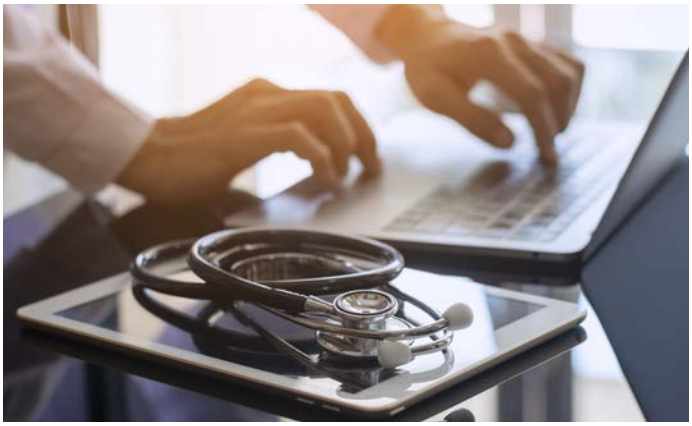
MARCH/APRIL 2022

The Value Examiner®

A PROFESSIONAL DEVELOPMENT JOURNAL *for the* CONSULTING DISCIPLINES



Valuation of Telemedicine: Technology (Part V of V)

By Todd Zigrang, MBA, MHA, FACHE, CVA, ASA, and Jessica Bailey-Wheaton, Esq.

This fifth installment in a five-part series on the valuation of telemedicine[1] focuses on the technology available to telemedicine providers, how that technology has evolved, and its anticipated development going forward. The first installment[2] introduced telemedicine and its increasing importance to, and popularity among, providers and patients. It also discussed the current and future challenges related to telemedicine. The second installment[3] took a deeper dive into the reimbursement environment in which telemedicine providers operate, both before and during the COVID-19 pandemic; the third installment[4] examined telemedicine's regulatory environment, with a specific focus on fraud and abuse laws; and the fourth installment[5] discussed supply and demand related to telemedicine, as well as how telemedicine may change healthcare competition generally.

History and Development

Telemedicine in the modern sense began nearly 60 years ago, but remained out of reach for the general public until much more recently. The U.S. National Aeronautics and Space Administration (NASA) began using telemedicine out of necessity as a way to treat and conduct symptom management for its astronauts in space.[6] In the decades since this initial innovation, the uptake of telemedicine has been slow among the general population. Technological, financial, legal, and human resource barriers have all contributed to this slow adoption by providers and demand by patients.[7] Some of these barriers—including the lack of proper reimbursement, high upfront investment costs, geographic and provider limitations set by the Centers for Medicare & Medicaid Services (CMS), and other medical information protection and security issues—have been addressed in previous articles in this series. Consequently, this article will focus on the technological barriers and advancements that slowed telemedicine's adoption rates by patients and providers in the past but have now thrust telemedicine into the foreground of the U.S. healthcare delivery system.

Over the past 15 years, targeted legislation, healthcare reform, and government funds have intersected with widening broadband availability; increased investment in developing new telemedicine technology, including the evolution of Mobile Health (mHealth); and the ability of various technologies to become sufficiently secure so as to satisfy Health Insurance Portability and Accountability Act of 1996 (HIPAA) requirements.[8] National legislation advancements include the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, which was part of the broader American Recovery and Reinvestment Act of 2009 (ARRA). Through these acts, $32 billion was allocated to subsidies for modern health information technology (HIT) systems, health research, and facility construction.[9] As discussed in previous articles in this series, various recent measures passed by CMS during the COVID-19 public health emergency (PHE) allowed providers greater flexibility in, and incentives for, offering telemedicine services.[10]

1 For the purposes of this series, the terms "telemedicine" and "telehealth" will be considered to be synonymous, with the former used exclusively for the sake of consistency.
2 Todd Zigrang and Jessica Bailey-Wheaton, "Valuation of Telemedicine: Introduction (Part I of V)," *The Value Examiner* (July/August 2021): 35–39.
3 Todd Zigrang and Jessica Bailey-Wheaton, "Valuation of Telemedicine: Reimbursement (Part II of V)," *The Value Examiner* (September/October 2021): 30–35.
4 Todd Zigrang and Jessica Bailey-Wheaton, "Valuation of Telemedicine: Regulatory (Part III of V)," *The Value Examiner* (2021): 28–33.
5 Todd Zigrang and Jessica Bailey-Wheaton, "Valuation of Telemedicine: Competition (Part IV of V)," *The Value Examiner* (January/February 2022): 35–39.
6 Cynthia LeRouge and Monice J. Garfield, "Crossing the Telemedicine Chasm: Have the U.S. Barriers to Widespread Adoption of Telemedicine Been Significantly Reduced?," *International Journal of Environmental Research and Public Health* 10, no. 12 (December 2013): 6472–84.
7 Ibid.
8 Ibid.
9 Ibid.
10 *See* Todd Zigrang and Jessica Bailey-Wheaton, "Valuation of Telemedicine: Introduction (Part I of V)," *The Value Examiner* (July/August 2021): 35–39.

Many aspects of telemedicine are dependent on robust technological networks; broadband in particular. When the Federal Communications Commission (FCC) released its National Broadband Plan in 2010, which included the goal of providing every American with "access to broadband capability," approximately one-third of the country—100 million Americans—did not have broadband at home, despite unprecedented growth over the previous decade from 8 million to 200 million Americans with broadband access.[11] The plan focused on several areas of broadband improvements related to healthcare: electronic health records (EHRs), video consultation, and remote patient monitoring.[12] First, hosted EHRs, where one computer acts as a server for the patient record system database, require internal IT expertise and broadband availability, but cost less and provide tools to patients more quickly than traditional solutions.[13] Cloud-based EHR systems similarly require a strong and consistent internet connection for access to files.[14] Second, video consultations, with store-and-forward technology (discussed below), could lead to cost savings and increased access to care, especially to specialists.[15] Finally, remote patient monitoring for symptoms can aid in early detection and, consequently, better health outcomes.[16] According to the American Telemedicine Association (ATA), mobile applications generally fall into "acute care telemedicine," where clinicians diagnose and treat ill patients, and "chronic disease management telemedicine," where chronically sick patients are regularly monitored and managed for symptoms.[17]

In order to further the nation's technological networks, a number of recent legislative acts have allocated funds to the cause. In 2019, the FCC established a $20.4 billion Rural Digital Opportunity Fund to provide greater broadband access to currently underserved areas.[18] The FCC set aside $61.8 million of that total to expand rural broadband as a part of Phase II of the Connecting America national plan, which will allocate nearly $1.5 billion in total to expanding broadband access to over 700,000 homes and small businesses over the next decade.[19] The 2020 Coronavirus Aid, Relief, and Economic Security (CARES) Act similarly allocated $500 million to increase broadband access for rural communities to help support telemedicine, distance learning, and social distancing.[20]

Technologies such as mHealth, mobile sensors and monitors (e.g., heart rhythms, vital sign indicators, and motion and fall detectors for older adults living independently), telemedicine kits, biosensor recliners, and remote medicine robots, all represent great potential in expanding remote patient care.[21] Similarly to the FCC, the ATA, in a 2006 report, identified five types of services that can be delivered through telehealth:

1. Specialist referral services involving a specialist visit using video technology
2. Direct patient care using audio or video technology for diagnosis, treatment, prescriptions, advice, or patient monitoring
3. Remote patient monitoring using devices that collect medical data
4. Medical education and mentoring for health professionals and seminars
5. Consumer medical and health information, or using the internet to find health information, discussion groups, and peer support for specialized issues[22]

11 *Connecting America: The National Broadband Plan* (Washington, D.C.: Federal Communications Commission, 2010), xi, https://transition.fcc.gov/national-broadband-plan/national-broadband-plan.pdf.
12 Ibid., 201.
13 Ibid.; "Hosted vs. Cloud-Based EMR Systems: What's the Difference?," *PracticePerfect* (blog), March 15, 2019, https://practiceperfectemr.com/blog/hosted-vs-cloud-based-emr-systems-whats-the-difference/.
14 Ibid.
15 "Connecting America: The National Broadband Plan," 201.
16 Ibid.
17 Yulun Wang, "Innovation in Telemedicine Technology: An Entrepreneur's Perspective," *Healthcare IT News,* May 6, 2013, https://www.healthcareitnews.com/news/innovation-telemedicine-technology-entrepreneurs-perspective.
18 Federal Communications Commission, "FCC Authorizes Over $61.8 Million in Funding for Rural Broadband," news release, October 10, 2019, https://docs.fcc.gov/public/attachments/DOC-360165A1.pdf.
19 Ibid.
20 American Farm Bureau Federation, "Keeping Rural Communities Connected while Socially Distanced," *Market Intel* (blog), August 10, 2020, https://www.fb.org/market-intel/keeping-rural-communities-connected-while-socially-distanced. (Accessed 6/7/21).
21 "Connecting America: The National Broadband Plan," 201–202; "Crossing the Telemedicine Chasm: Have the U.S. Barriers to Widespread Adoption of Telemedicine Been Significantly Reduced?"
22 The American Telemedicine Association, "Telemedicine, Telehealth, and Health Information Technology" (white paper, May 2006), 3, https://pdf4pro.com/download/telemedicine-telehealth-and-health-information-technology-3fb1d8.html.

However, utilization of the many technologies available to healthcare providers has not been uniform. In a 2013 survey:

1. Video conferencing, wireless technologies, and data monitoring were used by approximately 50 percent of healthcare organizations.
2. Internet-based technologies, smartphone apps, interactive voice response technology, and fax were used by at least 33 percent of organizations.
3. Audio conferencing, mobile broadband, and fixed-line broadband were used by 25 percent or more of organizations.
4. Mobile diagnostics and narrowband technologies were used by less than 20 percent of healthcare organizations surveyed.[23]

A more recent study from early 2020 similarly found that telemedicine applications and utilization are increasing. Communication through EHR almost doubled from 2018 (38 percent) to early 2020 (63 percent).[24] Remote monitoring (6 to 13 percent), video visits (14 to 19 percent), and physician-to-physician virtual consultations (17 to 22 percent) all increased from 2018.[25]

Current Applications of Telemedicine

Telemedicine technology grew rapidly over the past decade as well as during the COVID-19 PHE. As of mid-2020, telemedicine services included: patient portals for scheduling appointments, communicating with clinical staff, refilling prescriptions, and reviewing test results; virtual appointments through teleconferencing or phone calls; remote monitoring through mobile applications and monitoring devices; virtual consultations between doctors, especially between specialists and primary care physicians; personal EHRs for emergency vital information; and personal health applications for tracking caloric intake, physical activity, and other measures.[26] As noted above, the four main types of telemedicine currently utilized by healthcare providers include:

1. Store-and-forward or "asynchronous" telemedicine, where information such as medical histories, reports, or other data is sent to a specialist for diagnosis and treatment;
2. Remote patient monitoring, where a patient's clinical status is evaluated continuously through video monitoring, images, or remotely reviewing tests;
3. Real-time or "synchronous" telemedicine, which consists of a live conversation between the patient and provider; and
4. mHealth, which involves the provision of health information—such as educational information, targeted text messages, and notifications about disease outbreaks—through mobile devices.[27]

Availability and affordability has allowed telemedicine technology to grow considerably in recent years. However, internet issues are still a problem for approximately one in five adults living in rural areas and have led to lower adoption and utilization rates for telemedicine.[28] While the main advantages of telemedicine include quality, accessibility, and efficiency, some remaining concerns include potential gaps in care and continued limitations related to broadband internet access and the cost of mobile devices. These limitations may disproportionately affect rural patients, who may also be some of the most at-need patients.[29]

23 Becker's Healthcare, "12 Technologies Used in Telehealth Programs," *Becker's Health IT* (blog), August 15, 2013, https://www.beckershospitalreview.com/healthcare-information-technology/12-technologies-used-in-telehealth-programs.html.

24 Ken Abrams, Urvi Shah, Casey Korba, and Natasha Elsner, "How the Virtual Health Landscape is Shifting in a Rapidly Changing World," *Deloitte Insights,* July 9, 2020, https://www2.deloitte.com/us/en/insights/industry/health-care/physician-survey.html.

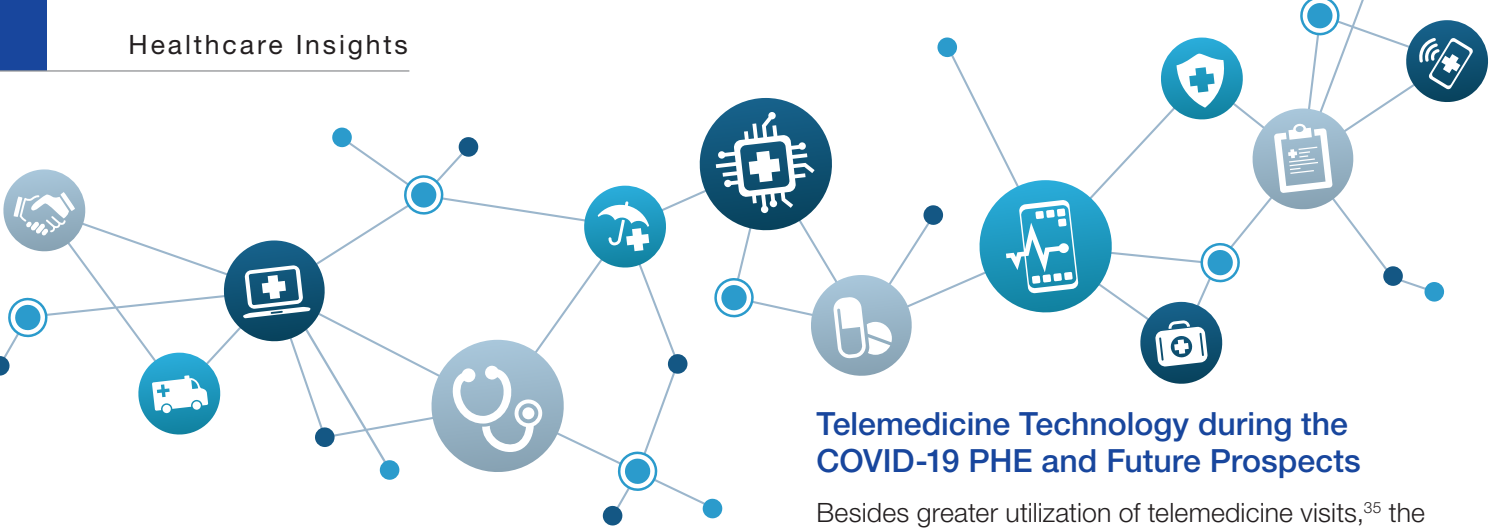
25 Ibid.

26 "Telehealth: Technology Meets Health Care," Consumer Health, Mayo Clinic, May 15, 2020, https://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/telehealth/art-20044878.

27 Oren Mechanic, Yudy Persaud, and Alexa Kimball, "Telehealth Systems," StatPearls, last updated September 18, 2021, https://www.ncbi.nlm.nih.gov/books/NBK459384/; "Telemedicine and Telehealth," HealthIT.gov, September 24, 2020, https://www.healthit.gov/topic/health-it-health-care-settings/telemedicine-and-telehealth.

28 "HHS Issues New Report Highlighting Dramatic Trends in Medicare Beneficiary Telehealth Utilization amid COVID-19," Department of Health & Human Services, July 28, 2020, https://www.hhs.gov/about/news/2020/07/28/hhs-issues-new-report-highlighting-dramatic-trends-in-medicare-beneficiary-telehealth-utilization-amid-covid-19.html; Harvard T.H. Chan School of Public Health, *Life in Rural America: Part II* (Washington, D.C.: National Public Radio, May 2019), 10, https://media.npr.org/documents/2019/may/NPR-RWJF-HARVARD_Rural_Poll_Part_2.pdf.

29 "Telehealth: Technology meets health care."



Software and Hardware Requirements

Modern telemedicine setups involve equipment and program requirements. First, a computer, tablet, or smartphone with an appropriate operating system is required.[30] Second, a camera or microphone is also necessary; this technology may be built into the computer or mobile device or may be external.[31] Software for live video conferences, store-and-forward technology, and patient data collection and monitoring software (which may be located physically on the desktop or mobile device, or in the "cloud") may all be needed.[32] Because of this significant software requirement—especially for uploads, downloads, and live video streaming—an internet connection with sufficient speeds is also integral.[33] Other technology that aids in telemedicine includes mobile medical devices, such as mobile electrocardiogram (ECG) devices, vital signs monitors, and scopes, such as stethoscopes that can capture both visual and audio information.[34] For all of these technologies that deal with sensitive patient information, data security and HIPAA compliance are of the utmost concern.

Telemedicine Technology during the COVID-19 PHE and Future Prospects

Besides greater utilization of telemedicine visits,[35] the COVID-19 PHE has brought about several changes in the development of telemedicine technology. Recent developments include an emergency medical service (EMS) remote monitoring and defibrillator device; wearable biomedical electronics that can be drawn onto the skin using special inked pens to monitor vitals and other measurements; an ultrasound device that connects to a smartphone; and a wireless, smart hospital bed with numerous monitoring features.[36]

Today, in order to provide telemedicine services, a healthcare organization must have a secure broadband connection with sufficient internet speed to handle intensive technologies, a video connection and platform, technical support staff, the ability to record virtual visits and interactions, and mobile telemedicine units or similar technology that can be used during a telemedicine visit to diagnose and treat ailments.[37] Limits on broadband connections, a lack of staff training and licensure, and the cost of purchasing, setting up, troubleshooting, and maintaining this technology may all be deterrents.[38] More research is needed to develop effective best practices, and there are still some exams and procedures that must be conducted in person.[39]

30 Teresa Iafolla, "What Are the Basic Technical Requirements for Telehealth?," *The Virtual Care Blog,* eVisit, May 12, 2016, https://blog.evisit.com/virtual-care-blog/what-are-the-basic-technical-requirements-for-telehealth.

31 Ibid.

32 "Telemedicine Devices, Equipment, Technologies & Products," eVisit, accessed June 7, 2021, https://evisit.com/resources/telemedicine-telehealth-equipment/.

33 American Academy of Allergy, Asthma & Immunology (website), Telemedicine, Technology Requirements, accessed March 11, 2022, https://www.aaaai.org/Allergist-Resources/Telemedicine/technology; Teresa Iafolla, "What Are the Basic Technical Requirements for Telehealth?"

34 "Telemedicine Devices, Equipment, Technologies & Products."

35 "Trump Administration Proposes to Expand Telehealth Benefits Permanently for Medicare Beneficiaries Beyond the COVID-19 Public Health Emergency and Advances Access to Care in Rural Areas," Centers for Medicare & Medicaid Services, August 3, 2020, https://www.cms.gov/newsroom/press-releases/trump-administration-proposes-expand-telehealth-benefits-permanently-medicare-beneficiaries-beyond.; "HHS Issues New Report Highlighting Dramatic Trends in Medicare Beneficiary Telehealth Utilization amid COVID-19," Department of Health & Human Services, July 28, 2020, https://www.hhs.gov/about/news/2020/07/28/hhs-issues-new-report-highlighting-dramatic-trends-in-medicare-beneficiary-telehealth-utilization-amid-covid-19.html.

36 Michael Batista, "Philips Wins FDA Clearance and Launches EMS Remote Monitoring and Defibrillation Solution in U.S.," *Medgadget,* July 30, 2020, https://www.medgadget.com/2020/07/philips-wins-fda-clearance-and-launches-ems-remote-monitoring-and-defibrillator-solution-in-u-s.html; "Drawing Biomedical Electronics Directly Onto Skin," *Medgadget,* July 30, 2020, https://www.medgadget.com/2020/07/drawing-biomedical-electronics-directly-onto-skin.html; "PulseNmore At-Home Tele-Ultrasound for Pregnant Women," *Medgadget,* August 10, 2020, https://www.medgadget.com/2020/08/pulsenmore-at-home-tele-ultrasound-for-pregnant-women.html; "Stryker Unveils Wireless Hospital Bed with Smart Monitoring Features," *Medgadget,* October 22, 2020, https://www.medgadget.com/2020/10/stryker-unveils-wireless-hospital-bed-with-smart-monitoring-features.html.

37 "Technology Requirements in Telemedicine."

38 Bill Siwicki, "Telemedicine during COVID-19: Benefits, Limitations, Burdens, Adaptation," *Healthcare IT News,* March 19, 2020, https://www.healthcareitnews.com/news/telemedicine-during-covid-19-benefits-limitations-burdens-adaptation; Lisa Esposito, "What Are the Limits of Telehealth?," *U.S. News,* May 13, 2020, https://health.usnews.com/conditions/articles/what-are-the-limits-of-telehealth; "Technology Requirements in Telemedicine."

39 Lisa Esposito, "What Are the Limits of Telehealth?"

Whether this will change as technology continues to develop remains to be seen. If past patterns continue, however, it can be expected that telemedicine technology will only become more prevalent in our everyday care outside of the physician's office and that this technology will become more capable and accessible. Until then, it is vital that nationwide technological infrastructure rise to meet the demands of this new technology so that all patients (especially those in rural, underserved areas) can have wider access to remote care and so that new gaps and barriers in access to care do not emerge as a result of healthcare becoming increasingly reliant on internet, mobile devices, and other technologies. VE

Todd A. Zigrang, MBA, MHA, FACHE, CVA, ASA, is president of Health Capital Consultants, where he focuses on the areas of valuation and financial analysis for hospitals and other healthcare enterprises. Mr. Zigrang has significant physician integration and financial analysis experience and has participated in the development of a physician owned, multispecialty management service organization and networks involving a wide range of specialties, physician owned hospitals, as well as several limited liability companies for acquiring acute care and specialty hospitals, ASCs, and other ancillary facilities. Email: tzigrang@healthcapital.com.

Jessica L. Bailey-Wheaton, Esq., serves as vice president and general counsel of Health Capital Consultants, where she conducts project management and consulting services related to the impact of both federal and state regulations on healthcare exempt organization transactions, and provides research services necessary to support certified opinions of value related to the fair market value and commercial reasonableness of transactions related to healthcare enterprises, assets, and services. Email: jbailey@healthcapital.com.