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Recommended Citation

Soman SS, and Yee J. Nephrology and telehealth: Now? Or now! *Adv Chronic Kidney Dis* 2017; 24(1):1-3.

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Nephrology and Telehealth: Now? or Now!



In this issue of *Advances in Chronic Kidney Disease*, Clarissa Diamantidis, Andrew Narva, and colleagues provide examples of telehealth within the field of nephrology that are actively utilized today. They also offer descriptions of real-world approaches to the development and sustainability of such telehealth programs.

The concept of and the ability to provide health care from a distance has been appealing to society and has been practiced for centuries. This has taken the form of warnings of impending threats and epidemics from drums and smoke signals, written communications, and more recently, via radio, telephones, television, and Internet-based technologies. Historically, telemedicine can be traced back to the mid- to late-19th century, with one of the first published accounts during the early 20th century when electrocardiographic data were transmitted over telephone wires. Telemedicine, in its modern form, began in the 1960s, in large part driven by the military and space technology sectors, as well as a few individuals using readily available commercial equipment.¹⁻³

In 1996, the Institute of Medicine defined telemedicine as the use of electronic information and communication technologies to provide and support health care when distance separates “participants.”⁴ Currently, the terms telehealth and telemedicine are used interchangeably. However, telemedicine typically describes direct clinical services, whereas telehealth refers to a broader range of health-related services such as patient care, education, remote monitoring, and provider-to-provider consultation.⁴

Traditional modalities of telehealth include real-time telehealth services (a live, two-way interaction between a patient, surrogate, or caregiver and a health care provider using audiovisual, real-time, store and forward (permitting electronic transmission of medical information, such as digital images, documents, and prerecorded videos through secure portals), and remote monitoring (involves collection of a patient’s personal health and medical data via electronic communication technologies. Once collected, the data are transmitted to a health care provider at a different location, allowing the provider to continue tracking the patient’s data once the patient has been released to his or her home or another care facility). Mobile health is a newer concept that describes services supported by mobile communication

devices, such as wireless patient monitoring devices, smartphones, personal digital assistants, and tablet computers. Mobile applications (apps) and, in some instances, companion mobile devices and sensors are the enablers of mobile health and drivers of systems. Meaningful use has specific requirements for patient engagement that can, in part, be addressed with mobile health technologies.^{5,6}

Telehealth offers one potential strategy to help achieve the triple aim of better health care, improved health outcomes, and lower costs. States spend a significant portion of their dollars on health care, and despite a recent slowdown, new projections estimate that health care spending in the United States will increase by an average of 5.8% per year from 2014 to 2024.⁷ The cost of health care represents approximately 18% of the US Gross Domestic Product. Chronic conditions affect 140 million persons in the United States and account for 80% of health care expenditure.^{8,9} Among the general Medicare population aged 65 years and older, aggregate costs for parts A, B, and D rose 3.7% to \$251 billion between 2010 and 2013, whereas such costs rose 22.3% to \$50.4 billion among patients with CKD. Therefore, costs in the non-ESRD CKD population exceeded those in the ESRD population (\$30.9 billion USD). Costs for these patients with CKD now represent 20.1% of all Medicare parts A, B, and D spending. Although there was a universal rise in expenditure for all covered groups, certain patient populations with comorbid conditions in addition to CKD experienced higher rates of growth. Costs for patients without CKD, diabetes mellitus, or heart failure increased by only 0.8%, the costs for those with one or more of these three conditions increased by \$9 billion, equivalent to the \$9 billion increase in general Medicare spending on all elderly patients between 2010 and 2013.¹⁰

Given greater interest in bending the cost curve, telehealth may increasingly deliver intensive services, especially to the 20% of persons who account for 80% of

health care expenditures. As articulated by the US Senate Committee on Finance, "Traditionally telehealth has been viewed as a tool to improve access to services, but interest is growing to see if telehealth has the potential to reduce health care costs."⁹ Telehealth has the potential to improve patient access to care, decrease costs, and, possibly, improve health care outcomes, adding to the value component of health care.

Telehealth is suited to provide care in part or whole to patients with CKD and can easily align within the framework of the Institute of Medicine, which espoused these six aims for health care systems: safe, effective, patient centered, timely, efficient, and equitable. What remains to be seen is which models of care succeed on a wider scale. Telehealth can provide evaluation and management services to non-dialysis-dependent CKD patients, particularly those at CKD stages 3–5. Decreased number of clinic visits, telemonitoring and virtual rounding in dialysis units, and intensive postdischarge home telehealth monitoring, with the goal of avoiding readmissions and unplanned visits, all may derive from well-implemented telehealth in CKD, otherwise referred to as telenephrology in Europe, where unlike in the United States, widespread adoption has already occurred.¹¹

In a recent, randomized, controlled trial where telehealth CKD care was delivered by an interprofessional team and compared to patients with CKD was compared to standard care, the authors concluded that telehealth by an interprofessional team is a feasible care delivery strategy in patients with CKD. However, there was no statistically significant evidence of superiority of this intervention on health outcomes compared to usual care.¹² However, the telehealth costs were not described in the paper. Peritoneal dialysis patients have been managed with telehealth, which provides an additional resource for patient self-management. Patient satisfaction scores and retention rates suggest a high level of acceptability of peritoneal dialysis in this population.¹³

Challenges to widespread use of telehealth remain, including credentialing, licensure, ethical, legal, and front-end investments issues. Traditionally, each state and health care facility has its own processes and procedures for medical licensure and credentialing. Since telemedicine applications often cross state borders and different facilities, the potential need to obtain licensure and credentialing from several states and facilities may become problematic. Policies and procedures for telemedicine reimbursement continue to evolve and remain in transition. Also, given that policies have focused on the provider–patient interface, determinations of how telemedicine will be reimbursed for provider-to-provider consultation remain to be determined.^{11,14}

Ethical dimensions of telemedicine must be confronted and clarified prior to implementation to ensure ethical deployment. Ethical issues for patients that must be addressed include equity, privacy, confidentiality, and informed consent. Likewise, telemedicine influences the provider–patient relationship, which may influence ethical concerns such as the capacity for equitable treatment, cost, quality of life, and exploitation.^{11,15,16} In

summary, a telemedicine precondition is equitable access to quality health care for all patients.^{11,17,18}

Matching patients with appropriate technologies is critical. The population is aging, and those aged 65 years and older will likely constitute 19% of the US population by 2030.¹⁹ Accompanying the aging population is the increasing frequency of chronic health conditions and expenditures associated with chronic disease management. Novel telehealth platforms require matching based on age, education, interests, physical capabilities and potential limitations, familiarity, access to technology, and support to help with self-care and functional independence. Matching patients to a proper device and gathering large amounts of meaningful data promotes improved insight into an individual's disease state and better assessment of the success of care management strategies.²⁰

In some applications, there has been useful information for comparative costs of telenephrology and usual care, albeit typically short term and directed toward costs to providers. McLean, Sheikh, and colleagues reviewed 24 cost-effectiveness studies that included formal trial data, yet only four studies included an evaluation that encompassed the broader societal perspective. A societal perspective considers the interests of providers, patients, caregivers, and other stakeholders and yields the most inclusive accounting of the resource implications of interventions. In the management of CKD and associated conditions, cost-effectiveness studies with a societal perspective could provide greater insight into the likelihood of patient adherence, overall value, and programmatic sustainability.^{21,22}

As telehealth plays an even greater role in global health care delivery, it will be increasingly important to develop a strong evidence base of successful, innovative telehealth solutions that can lead to scalable and sustainable telehealth programs.²⁰ Data regarding the provision of telehealth by separate groups remain limited. Among hospitals, about 4 in 10 US hospitals have adopted telehealth, and decisions to do so appear to be shaped by a combination of hospital-, market-, and state-level factors. Telehealth adoption seems to be driven in part by the need to improve access, with hospitals in more rural areas more likely to offer telehealth than those in more urban areas. Adoption appears shaped by perceived strategic advantages that telehealth offers hospitals. Technologically advanced teaching hospitals in competitive markets are more likely to have adopted telehealth compared to hospitals without advanced technology, which do not have residents and are in less competitive markets. A key advantage of telehealth may be the ability to support the delivery of more complex and efficient care. The former is of value to teaching hospitals that care for patients with more complex conditions and located in areas with limited access to specialists. The latter may be of importance to hospitals in more competitive markets that seek technologies to help lower the cost of care delivery, such as with teleradiology and electronic intensive care units.²³ Telehealth adoption varies greatly across states. In some, most hospitals offered telehealth services, whereas in others, adoption was minimal. State policies related to

reimbursement and licensure likely influence the rate of adoption of telehealth.²³

The advent of telehealth has been compared by some to the history of the automated teller machine (ATM). From its humble and uncertain beginning nearly 50 years ago, the ATM has become pervasive. When introduced in the 1970s, the ATM was an expensive, clunky, unfriendly, and inflexible device solely serviced to dispense cash. Previously a financial loss leader, the ATM is now an essential component of financial institutions that is fully integrated into the global, electronic banking system.^{4,24}

In summary, key issues that are driving the future of telehealth are many and include the following: (1) personalization of health care; (2) matching patients with appropriate technologies; (3) optimal use of health care data, including developing a secure interface between patient-generated data and electronic health record; (4) new education paradigms for patients and providers; (5) new communities of knowledge and practice; (6) new care and business models tailored to sustainability and scalability of telehealth initiatives; (7) transfer of scientific knowledge from research to implementation and practice; and (8) innovative research methodologies within telehealth.²⁰

Ironically, to fully harness the power of telehealth, smartphones, and apps in health care, we must simultaneously look forward while firmly planting our footing into our past and the time-honored tradition of caring for our patients. We must not forget or ignore the significance of the in-person, provider-patient visit, and the provider-patient relationship. It rests on the shoulders of clinicians to integrate new technology with the time-tested, traditional, doctor-patient interaction. Many of us will rely on those who are on the leading edge of creating and using technology to shepherd such technology into health care as a supplement of and not a replacement of this privilege.²⁵ Many of us already have, and most of the rest of us will. For telehealth in nephrology, it is now or now.

The beginning is always NOW.

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REFERENCES

- World Health Organization. Telemedicine: opportunities and developments in member states. Report on the second global survey on eHealth. 2010; Available at: http://www.who.int/goe/publications/goe_telemedicine_2010.pdf. Accessed January 14, 2017.
- Craig J, Patterson V. Introduction to the practice of telemedicine. *J Telemed Telecare*. 2005;11(1):3-9.
- Einhoven W. Le télécardiogramme. *Arch Int Physiol*. 1906;4:132-164.
- Schwamm LH. Telehealth: seven strategies to successfully implement disruptive technology and transform health care. *Health Aff*. 2014;33(2):200-206.
- Weinstein RS, Lopez AM, Joseph BA, et al. Telemedicine, telehealth, and mobile health applications that work: opportunities and barriers. *Am J Med*. 2014;127(3):183-187.
- Advancing Telehealth through Connectivity. Available at: www.aha.org/advocacy-issues/testimony/2015/150501-tes-telehealth.pdf. Accessed December 27, 2016.
- Keehan SP, Cuckler GA, Sisko AM, et al. National health expenditure projections, 2014-24: spending growth faster than recent trends. *Health Aff*. 2015;34(8):1407-1417.
- Daschle T, Dorsey ER. The return of the house call. *Ann Intern Med*. 2015;162(8):587-588.
- Dorsey ER, Topol EJ. State of telehealth. *N Engl J Med*. 2016;375(2):154-161.
- Saran R, Li Y, Robinson B, et al. US Renal Data System 2015 Annual Data Report: epidemiology of kidney disease in the United States. *Am J Kidney Dis*. 2016;67(3 Suppl 1):Svii. S1-S305.
- Gordon EJ, Fink JC, Fischer MJ. Telenephrology: a novel approach to improve coordinated and collaborative care for chronic kidney disease. *Nephrol Dial Transplant*. 2013;28(4):972-981.
- Ishani A, Christopher J, Palmer D, et al. Telehealth by an interprofessional team in patients with CKD: a randomized controlled trial. *Am J Kidney Dis*. 2016;68(1):41-49.
- Dey V, Jones A, Spalding EM. Telehealth: acceptability, clinical interventions and quality of life in peritoneal dialysis. *SAGE Open Med*. 2016;4. 2050312116670188.
- Carroll M, Cullen T, Ferguson S, Hogge N, Horton M, Kokesh J. Innovation in Indian healthcare: using health information technology to achieve health equity for American Indian and Alaska Native populations. *Perspect Health Inf Manag*. 2011;8:1d.
- Demiris G, Doorenbos AZ, Towle C. Ethical considerations regarding the use of technology for older adults. The case of telehealth. *Res Gerontol Nurs*. 2009;2(2):128-136.
- Fleming DA, Edison KE, Pak H. Telehealth ethics. *Telemed J E Health*. 2009;15(8):797-803.
- Clark PA, Capuzzi K, Harrison J. Telemedicine: medical, legal and ethical perspectives. *Med Sci Monit*. 2010;16(12):RA261-RA272.
- Sequist TD, Cullen T, Acton KJ. Indian health service innovations have helped reduce health disparities affecting American Indian and Alaska Native people. *Health Aff*. 2011;30(10):1965-1973.
- Welcome to QuickFacts. Available at: <https://www.census.gov/quickfacts/table/PST045215/00>. Accessed December 27, 2017.
- Dinesen B, Nonnecke B, Lindeman D, et al. Personalized telehealth in the future: a global research Agenda. *J Med Internet Res*. 2016;18(3):e53.
- Hailey D. Some successes and limitations with telehealth in Canada. *J Telemed Telecare*. 2001;7 Suppl 2:73-75.
- McLean S, Sheikh A, Cresswell K, et al. The impact of telehealthcare on the quality and safety of care: a systematic overview. *PLoS One*. 2013;8(8):e71238.
- Adler-Milstein J, Kvedar J, Bates DW. Telehealth among US hospitals: several factors, including state reimbursement and licensure policies, influence adoption. *Health Aff*. 2014;33(2):207-215.
- Bátiz-Lazo B. A Brief History of the ATM. Available at: <https://www.theatlantic.com/technology/archive/2015/03/a-brief-history-of-the-atm/388547/>. Accessed December 23, 2016.
- Desai T, Yee J, Soman S. Smartphone apps: a patient's new best friend? *Clin J Am Soc Nephrol*. 2016;11(6):935-937.