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Chapter

Addressing Pain Points: Thinking Outside the Telehealth Box

Lua Perimal-Lewis, Patricia A.H. Williams, Ginger Mudd and Gihan Gunasekara

Abstract

In this chapter, we present the synthesis of six pain points relating to Australia's hospital congestion which is under crisis. The COVID-19 pandemic forced health services to respond rapidly to maintain continuity of care through telehealth. Some of these strategies were anticipated to be short-term arrangements, implemented quickly, and haphazardly deployed. While the health emergency accelerated the adoption of telehealth and models of remote care, this implementation was reactive. It is evident that our hospital systems continue to grapple with the issues of an aging population, expanding demand for mental health services, and escalating costs and too few resources. A shift in philosophy to address these and other recurring pain points presents opportunities to embrace virtual care beyond current implementations of telehealth.

Keywords: telehealth, virtual care, healthcare pain point, hospital congestion, pandemic

1. Introduction

It was a leisurely Sunday afternoon in a small country town with children playing happily until a freak accident on the playground "hamster wheel." A possible fractured finger and a trip to the Emergency Department (ED). Calling ahead to notify the ED of our arrival, the nurse replied, *"Good timing, I was about to head off!"*. The rural ED with a quaint cottage like frontage (complete with doorbell) revealed an empty waiting room. The nurse greeted us and returned with a pile of paper-based forms. Apparently, the doctor on-call would arrive shortly. She joked upon seeing a 30-year-old man, *"I was expecting to see a four-year-old!"*. She confirmed a fracture but advised that she is not able to treat the injury until they could find the radiologist. Since there were no other patients in the waiting room, she went home to feed her 2-year-old. The radiologist arrived after 30 minutes. Within minutes the ED became busy with other presentations; (A) an older patient recently discharged from hospital arrived by an ambulance, (B) a worried young father holding a baby with gastro, (C) a young man with a drug overdose and mental health condition, and (D) another older patient with an allergic reaction to his eyes after tending to the weeds in his garden. The doctor returned to an (E) overcrowded ED but was calm and collected and

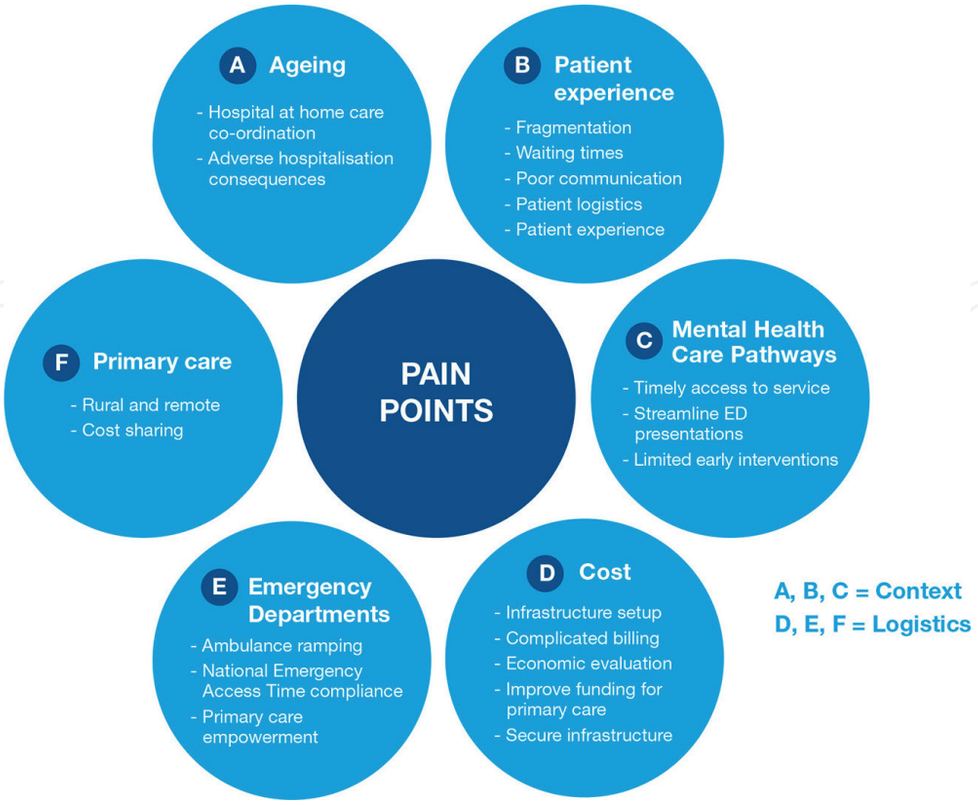

Figure 1.
Australia's recurring healthcare challenges [1, 2].

did a stellar job in attending to all the patients. Despite the chaos, the lack of privacy, the uncertainty, and the frustration of waiting, all the patients were cared for with the limited resources.

As for the fractured finger, the doctor communicated via mobile phone with consultants at a metro hospital, located hundreds of kilometeres away. The X-ray was sent via WhatsApp to the senior consultant and to us (F). Eventually, we left with a taped splint and painkillers.

This real ED experience highlights the issues and pain points (see **Figure 1**) that clinicians at acute care setting have to deal with on a daily basis, and at scale for busy metropolitan hospitals. These recurring issues impact patients, healthcare providers, and the government. Worldwide, such pain points are worsening demanding that hospital administrators and policymakers understand the complexity of these multilevel interactions and look outside of the acute care settings to improve patient outcomes.

This chapter discusses how telehealth and the evolution to virtual care can begin to address the major pain points faced by overburdened hospitals as well as enhance the patient experience.

2. The evolution of telehealth to virtual care?

Virtual care is a broad term for all the digital tools and real-time communication, to enable healthcare providers to remotely work together with the patient [1]. In Australia, like many countries, health services are stretched and faced with an increasing burden from an aging population, rising costs, and increasing demand

(**Figure 1**). Telehealth was vastly underutilized prior to the COVID-19 pandemic. The global response prompted a broad and reactive adoption of telehealth. In Australia, there was a 35% increase in use over only a 2-month period in early 2020 [3]. Greater increases were seen worldwide. In addition, research has shown that consumer acceptance of telehealth has been high and a predominantly positive experience [4].

While telehealth can be defined as the use of telecommunication techniques for the purpose of providing telemedicine, medical education and health education over distance [5, 6], and telemedicine uses advanced technologies [5, 7], virtual care refers to the delivery of patient-centered, cost-effective, and timely clinical care from a distance such as real-time video interaction and online exchange of information between a patient and their doctor and/or clinical team [8]. A wide perspective is needed to rethink delivery of healthcare that ensures continuity of care across multiple providers that can be delivered outside of acute care hospital environments.

As technology, in particular home and remote monitoring devices, evolve, the opportunity to support remote care using technology has increased. In Australia, this is now coined as virtual care to characterize a more complete experience for the patient, rather than telehealth consultation which can be anything from a 5-minute telephone call to a video consultation. It is unfortunate that because of the rapid deployment during COVID-19, the medical interaction was often second to the management and inexperience with the technology. As patients and clinicians have become more familiar with the technology, there is an opportunity to support consultations with home monitoring devices.

The following sections briefly discuss these pain points by giving select evidence where the underlying solution is outside of the acute care settings.

2.1 Aging

Most older patients presenting at acute care settings have multiple chronic conditions and a higher risk of hospital readmission for complications attributed to a different primary condition to the indexed admission [9]. Therefore, recently discharged older patients with chronic health conditions require a well-coordinated solution at home. Simulating a hospital environment, these patients can be effectively managed at home using remote patient monitoring devices or wearables that continuously monitor the patient's condition by tracking vital signs and medication compliance. The data collected is sent to the clinicians allowing them to monitor, identify symptoms, and intervene early. Reducing hospitalization will benefit older patients who are more likely to be affected by adverse drug events [10] and hospital acquired infections which prolong Length of Stay. The implementation and sustainability of virtual care for older adults is contingent on better integration of technology into their lives as well as healthcare providers [11]. Although still in its early stages, experience shows that technologies used in hospital at home are safe and acceptable to both patients and clinicians, as well as it reduces the ongoing resource tension at acute care settings [12].

2.2 Patient experience

Healthcare organizations are striving to provide patient-centered care, yet a long way from addressing the most prevalent patient pain points such as care fragmentation, long waiting times, poor doctor-patient communication, and poor logistics in hospitals, all of which contribute to compromised care and services that are not

personalized to the individual [13]. Analysis of patient satisfaction has been part of healthcare service review for a number of years; however, there is a move from satisfaction to patient experience which is a proxy for one of the six indicators of quality healthcare in the US [14]. The "young father and the baby with gastro" is a classic example of care fragmentation. It was evident when the ED doctor attended to this patient, that the baby has other chronic illness managed by other services. The patient has navigated the health system by moving from one health service to another, and there was lack of communication between the various service providers. Communication is a key factor in measuring patient experience [15, 16]. Fragmentation across continuum of care is common because of the very nature of a patient's journey through disparate systems, availability of medical data, and lack of real-time data sharing. It is the development of secure and scalable digital infrastructure that is the foundation to facilitate a coherent patient journey by moving to an increasingly connected and integrated healthcare system.

2.3 Mental healthcare

Another pain point for the government is the management of mental health patients who tend to have longer wait times in ED, often requiring more time for stabilization and/or to complete investigations and are more likely to present after hours, suggesting the need for community-based services [17]. Reconceptualizing mental health service delivery requires organizations to traverse beyond telehealth; mental health professionals need to embrace smartphone-based digital technology such as Ecological Momentary Assessment (EMA) for continuous monitoring and early intervention outside of acute care, so on demand care can be offered before an adverse event. The "young man with drug overdose and mental health issues" was a regular visitor and could have been better managed outside of ED using EMA. Embracing digital health technology would enable service providers to transition care outside of health facilities by means of continuous digital touchpoints enabling irregularities in behaviors identified in real time, alerting a crisis. A well-implemented virtual care platform can enable continuous data collection from active monitoring and passive sensor data to deliver personalized and timely intervention.

2.4 Costs

The Australian healthcare funding model is complex in nature, funded by all levels of government—federal, state, territory, and local. Virtual care service provision, enabling care outside of acute care settings, will drive innovation in funding as demonstrated during COVID-19, but more is needed. The cost savings gained by keeping patients out of hospitals could be diverted for the setup of virtual care infrastructure, improving primary care funding and extending Medicare supported service provision by allied health professionals. The "patient presenting with allergic reaction to his eyes" could be better managed at a primary care health facility, which was nonexistent in the small country town. Innovative funding model to find synergies on how the government fund primary care will be the driving factor to improve poor health outcomes in rural and remote communities, with less reliance on larger urban centeres. The ED doctor who had to communicate with consultants at a metro hospital is a case in point. In addition, it is vital that all communication regarding a patient is through a secure platform rather than via WhatsApp which poses unprecedented data sharing noncompliance risk. Prioritizing funding to finance secure platforms with the

agility of WhatsApp that ensures confidentiality, privacy of patient, and clinical data should dominate federal healthcare funding conversation.

2.5 Emergency department

Waiting times is a key issue in Eds, with hospitals under pressure to meet National Emergency Access Target targets [18]. Enabling virtual care assessment, management of low acuity patients, and devising innovative ways to empower primary care physicians to keep patients out of hospital would reduce ED presentations, waiting times, and ambulance ramping. Investment into processes and identifying care pathways that can triage patients that do not need hospitalization such as the vast majority of psychiatric patients by offering appropriate interventions and connection to community/primary care would naturally reduce the pressure on ED and would allow emergency resources to be better utilized for more serious cases.

2.6 Primary care

Access to health services remains a problem for residents of isolated settlements [19]. Virtual care is a vital component to addressing this issue. While "telehealth" and "telemedicine" have been widely used in Australia over the past decade as a means of overcoming problems of access to healthcare and the shortage of health professionals in rural and remote areas [20]; in many cases, telemedicine and telehealth are used to augment other service delivery models [19]. There is a need to ensure a comprehensive range of well-coordinated primary healthcare and specialist services are accessible locally and virtual care should be part of this solution, particularly as the prevalence of chronic disease grows with the aging of Australia's rural and remote population [19]. A well-coordinated, technology-enabled acute to primary and specialist care pathways will streamline the process of follow-ups post discharge.

3. Discussion

Sustainable and effective virtual care provision, with telehealth as part of this, is the way forward for healthcare in Australia. Creating a virtual care environment

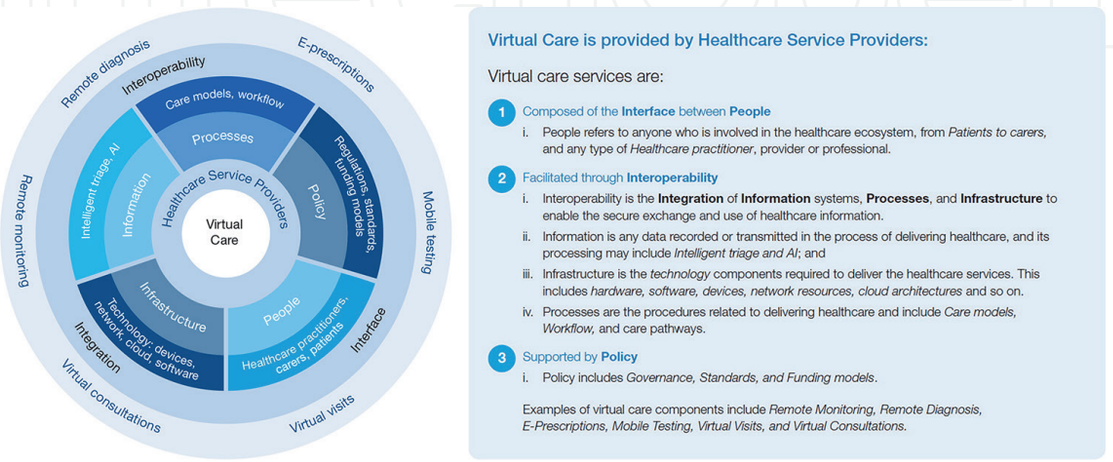

Figure 2.
Virtual care components [1, 2].

means looking at the pain points more broadly from the perspective of how a care team rather than acute services can address the challenges. These solutions must be cognizant of the patient and healthcare provider user experience, fit into clinical workflows and care processes, and supported by the integration of technologies with information systems underpinned by seamless communication. They must also be interoperable, scalable, and secure (**Figure 2**).

These components allow the collation of technologies to generate accessing, sharing, coordinating operations, and security capabilities. These capabilities facilitate the interface between people and integration of information with care processes.

In addition to the virtual care components, there are several actions needed to support the ongoing and increased adoption of virtual care and telehealth in Australia and across the world. Funding and reimbursement for services both for consumers and providers, and investment in infrastructure to support service delivery are issues that need attention given that 7 million people (28% of the population) live in rural

Device category	Device types	Health application
Medical devices	Skin patch sensors	Multi-electrode bioelectronics technology is used for physiological sign monitoring, e.g. pulse, temperature, as well as electrocardiogram (ECG) and electroencephalogram (EEG) readings together with physical activity and sleep patterns. Ultrasound technology is used for cardiac monitoring and diagnosis monitoring blood flow through blood vessels.
	Skin patch for therapeutics	Used for delivery of chemotherapy into melanoma tumors.
	Heart rate monitors	Uses optical (wrist, arm bands or in-ear) or electrical (chest straps) technology.
	Blood pressure monitors	Ambulatory BP monitoring and home BP monitoring devices using finger, wrist, and arm cuff technology, often with Bluetooth communications.
	Smart contact lens	Uses IoT technology to monitor for diabetes, glaucoma, and cataracts.
Accessories	Hearing aids	AI enhanced hearing aids can track blood pressure, notify loved ones in the event of a fall, track activity, and potentially predict early signs of dementia.
	Smartwatches	Fitness tracking, sleep monitoring, and ECG heart reading.
	Fitness trackers	Pedometer (step count), heart rate, and sleep monitoring
	Smart glasses	For use by the partially sighted or blind, connecting glasses to a sighted person. Connecting clinical care specialists in acute care scenarios to one another for instance during operations.
Fashion	Smart jewelery	Step tracking, heart rate, and sleep monitoring
E-textiles	Smart clothing	IoT-based textiles integrated with electronic devices for monitoring heart rate, respiration rates, sleep, and temperature. Examples include smart socks can detect foot ulcer development and smart swimsuits that alert when sunscreen should be applied.
	Smart shoes	Tracking steps, speed, stride rate, foot landing, ground contact, and monitor fatigue on feet.

Table 1.
Examples of the types of devices that have monitoring and diagnostic functions and their application.

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and remote areas in Australia [21]. Another challenge is the integration of virtual care services into routine care and clinical workflows. In Australia, many telehealth consultations were via the telephone only and did not result in optimal healthcare delivery [22]. This in turn also requires a competent workforce to utilize virtual care and new or adopted models of care. As virtual care is dependent of the use technology, there is a need to invest in support structures and infrastructure which includes an ecosystem that supports wearable technology.

Wearable technology can be worn on the body or implanted. They collect data directly from the person and communicate it with other connected devices such as a smartphone or computer, using Bluetooth or the Internet. Digital natives are likely to use these wearable devices without much hesitation, but digital immigrants may need some persuasion. However, a recent study found that older adults, especially those who are familiar with smartphones, are interested in using wearable devices and joining online health community enabling aging in place [23]. **Table 1** lists examples of the types of devices that have monitoring and diagnostic functions and their application.

Like aging in place philosophy, a shift to deliver care in place could see select emergency care generally offered in the ED are taken to patients triaged suitable to receive such care. Patients could be assessed in the comfort of their environment by paramedics connected to emergency physicians located at the hospital through a secure video link. Once stabilized, patients could be left with a remote monitoring device which will continue to send life feed to the clinicians at the hospital who can intervene in an event of health deterioration. The remote monitoring and care can continue until the patient can be safely discharged to primary care services in the community, preventing repeat hospital visits or admission soon after discharge like the older patient who presented at the ED described in the scenario above. The availability of data on the electronic consultation as well as the availability of remote monitoring data can facilitate better informed clinical decision-making based on the trend of the collected data. Such data availability is almost nonexistent in the traditional modality. For an emergency physician who is normally exposed to a chaotic ED environment, a virtual care modality where that care is delivered virtually from the comfort of their home would aid better judgment, thus improving patient outcome and contributing to a less stressed workforce.

4. Conclusions

In the ED presentations described here, there are many opportunities which can be explored using virtual care that could have prevented almost all of these presentations. There is no framework for how to move forward with virtual care in a comprehensive manner in Australia [24, 25]. Without an inclusive and all-encompassing framework for virtual care adoption, the facets it comprises, its challenges and what benefits it can realize, it is not possible to innovate and devise solutions to address these patient and government pain points.

It is the combination of people, monitoring and communication technology, process, infrastructure, information, and policy that form the basis for the future for virtual care solutions to become part of the common practice. Ultimately, it is the benefits for the patient, healthcare providers, and healthcare system that virtual care can deliver that will drive the medium- and long-term adoption. Virtual care has the potential to reform healthcare, providing patient-centered care with more convenience, less costs, and greater productivity.

On a national basis, governments need to devise clear roadmaps for digital health innovation in virtual care to reduce costs and improve accessibility and health outcomes, while solving the acute care sector pain points. Funding, leadership, and policy are key success factors that will strengthen its adoption to realize improvements in patient outcomes. For rural and remote communities in particular, research into the efficacy of remote monitoring and wearable device collected data to support patient-centered healthcare decision-making and patient outcomes will contribute to the introduction of outcomes-based funding models.

From an industry perspective, upskilling the workforce to deliver virtual care services as well as new integrated models of care will help meet the increasing demand for services. Future opportunities using augmented and virtual reality open up new avenues for education of the healthcare workforce in innovative ways.

Ultimately, awareness of virtual care by patients and consumers increased due to COVID-19. The rapid adoption of the technology, arguably not well thought out in the rush, needs to be reassessed to focus on the improvement and reliability and transparency, so that the focus can be on the clinical iteration and patient outcomes rather than the technology used to achieve the communication.

A bold vision needs to emerge for an information and technology enabled healthcare system, where care is virtualized and enabled where it is needed, rather than where it is available. It is a system where clinicians and patients can communicate effectively and one in which clinical process is centered around the needs of the patient. Most importantly, it is an environment in which the patient is better engaged and supported in their journey to wellness. Concerted efforts are needed to systematically, rigorously test and evaluate the impact of various modality of care virtualization to address healthcare pain points.

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Conflict of interest

The authors declare no conflict of interest.

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References

[1] Williams PAH, et al. Reimagining a Better Healthcare System through Virtual Care. 2020. Available at: https://www.cisco.com/c/dam/en_us/solutions/industries/resources/healthcare/reimagining-better-healthcare-system-through-virtual-care.pdf. [Accessed: 9 November 2022]

[2] Perimal-lewis L, et al. Virtual Care: The Future for Telehealth. IOS Press; 2021:106-113

[3] Thomas EE et al. Building on the momentum: Sustaining telehealth beyond COVID-19. Journal of Telemedicine and Telecare. 2022;**28**(4):301-308

[4] Manski-nankervis J-A et al. Primary care consumers' experiences and opinions of a telehealth consultation delivered via video during the covid-19 pandemic. Australian Journal of Primary Health. 2022;**28**(3):224-231

[5] Australian Institute of Health and Welfare. Australia's Health 2020 Data Insights. Canberra: Australian Institute of Health and Welfare; 2020

[6] International Organization for Standardization [ISO]. ISO/TR 14639-1 Health Informatics - Capacity-based ehealth Architecture Roadmap. ISO; 2012

[7] International Organization for Standardization [ISO]. ISO/TR 16056 Health Informatics - Interoperability of Telehealth Systems and Networks, Interoperability of Tele-learning Systems. ISO; 2004

[8] Schwamm LH, Erskine A, Licurse A. A digital embrace to blunt the curve of covid19 pandemic. NPJ Digital Medicine. 2020;**3**(1):64

[9] Westley-wise V et al. Patterns of morbidity and multimorbidity associated with early and late readmissions in an australian regional health service. Chronic Illness. 2022;**2022**:1742

[10] Paradissis C et al. The type and incidence of adverse drug events in ageing medical inpatients and their effect on length of hospital stay. Journal of Pharmacy Practice and Research. 2017;**47**(5):347-354

[11] Watt JA et al. Barriers and facilitators to virtual care in a geriatric medicine clinic: A semi-structured interview study of patient, caregiver and healthcare provider perspectives. Age and Ageing. 2022;**51**(1):Afab218

[12] Conley J et al. Technology-enabled hospital at home: Innovation for acute care at home. Nejm Catalyst Innovations in Care Delivery. 2022;**3**:Catalysis 21.0402

[13] Radenkovic B. et al. Progressing the patient experience in iot connected healthcare, H. Series, editor. 2018

[14] Golda N et al. Analysis of the patient experience measure. Journal of American Academy Dermatology. 2018;**78**(4):645-651

[15] Street RL et al. How does communication heal? Pathways linking clinician-patient communication to health outcomes. Patient Education Counselling. 2009;**74**(3):295-301

[16] Street R. How clinician-patient communication contributes to health improvement: Modeling pathways from talk to outcome. Patient Education Counselling. 2013;**92**(3):286-291

[17] Shafiei T, Gaynor N, Farrell G. The characteristics, management and

outcomes of people identified with Mental Health issues in an Emergency Department, Melbourne, Australia. Journal of Psychiatric and Mental Health Nursing. 2011;**18**(1):9

[18] Perimal-Lewis L. et al. The relationship between in-hospital location and outcomes of care in patients of a large general medical service. Internal Medicine Journal. 2013;**43**(6):712-716

[19] Kuipers W. et al. Primary health care delivery models in rural and remote australia—A systematic review. 2010

[20] Carey TA et al. What is the overall impact or effectiveness of visiting primary health care services in rural and remote communities in high-income countries? A systematic review. BMC Health Services Research. 2018;**18**(1):476

[21] Australian Institute of Health and Welfare, Rural and Remote Health. Australian Institute of Health and Welfare: Canberra. 2022

[22] Rush LL et al. Videoconference compared to telephone in healthcare delivery: A systematic review. International Journal of Medical Information. 2018;**118**:44-53

[23] Wang J et al. Mobile and connected health technology needs for older adults aging in place: Cross-sectional survey study. JMIR Aging. 2019;**2**:E13864

[24] Shaw J et al. Virtual care policy recommendations for patient-centred primary care: Findings of a consensus policy dialogue using a nominal group technique. Journal of Telemedicne Telecare. 2018;**24**(9):608-615

[25] Waller M, Stotler C. Telemedicine: A primer. Current Allergy Asthma Report. 2018;**18**(10):54