Serving remote locations and isolated population

In our special issue exploring the applications of telehealth, we invited teams of authors to present their work addressing innovative approaches to expand mental health care (telemental health) to serve remote locations and isolated populations. Communicating health information over distances using the resources (what we may now call "technology") of the day is not new to human history. For example, it has been suggested that information about bubonic plague was spread across Europe using heliographs and bonfires, the same communication resources used to spread information about war and famine, and telegraph was used to order medical supplies and transmit casualty lists during the American Civil War (1). These represent rudimentary asynchronous communications and we are fortunate that communication technologies have advanced considerably to the point where we can gather, transmit, and discuss health information almost instantly.

The modern use of communication technologies to specifically impact health care in remote locations may be traced to The National Aeronautics and Space Administration's (NASA) pioneering efforts to develop applications to monitor astronaut health for the manned space program (2). NASA needed to solve how to have physicians on earth constantly monitor the physiological functions of astronauts in space. As manned space travel evolved into extended flight times so too did the development of NASA's telemedicine capacity, such that systems able to diagnose and help treat in-flight emergencies are now in place.

Telemental health has expanded rapidly over the last 20 years concurrently with technology revolutions such as the Internet and devices such as the smartphone. Overall changes in the health care landscape that focus on improving access and care outcomes, while efficiently using resources, have also driven telemental health developments. This more recent evolution to provide care to remote locations and isolated populations is in many ways a return to the roots of telemental health, and health care in general such as home visits. The birth of telemental health is often cited as a project in 1959 when clinicians at the University of Nebraska used two-way interactive television to transmit neurological examinations across campus to medical students (3). This project evolved into an established telemedicine link with Norfolk State Hospital in 1964. The 1970s saw the development of the STARPAHC (Space Technology Applied to Rural Papago Advanced Health Care) program, which was a public-private partnership designed to pilot the provision of care to remote populations via communications technologies.

While these programs, and many other pilots that followed, demonstrated feasibility it wasn't until institutional-based videoconferencing became the norm that telemental health expanded (4). The use of institutional-based telemental health services afforded the expansion of usability, efficacy, and cost efficiency research, and the piloting of innovative approaches to critical concerns such as safety planning and ultimately the development of best practice guidelines for the delivery of telemental health care. This in turn promoted the evolution of regulatory changes allowing for continued advances in telemental health delivery options beyond those from one institution to another. For example, in the United States (US), the Constitution provides certain powers to the states and one of those powers is the regulation of licensure requirements for a wide range of health care professionals (5). This power is not absolute, and the US Federal Government has been able to allow some categories of health care providers to practice their federal duties in any state assuming the provider is licensed to practice in at least one state. Other solutions have been recommended to ease the regulatory burden of obtaining multiple licenses to deliver telemental health services across state lines and a 2015 article provides a history of the Association of State and Provincial Psychology Board's (ASPPB) Principles and Standards for Telepsychology with potential solutions to cross-jurisdictional care provision (6).

The articles in this edition demonstrate how the continued technology and regulatory evolutions have allowed specific aspects of the telemental health field to return to its roots of delivering care to remote locations and isolated populations. Often, telemental health services are touted as "patient-centric" such that care is delivered at times and locations that are accessible and convenient for patients. We have broadened this concept in our own practice to also develop services that are "provider-centric" to develop greater accessibility for patients and to more efficiently deliver care. For example, weather can make it difficult for patients to travel to a clinic to receive services and it is becoming more common to offer patients the option of staying home rather than travel. However, in this scenario there is no guarantee that the provider can safely travel to a clinic and we are now offering provider home to patient home services as a solution.

Kaftarian presents a model of delivering telemental health services to corrections institutions from a provider's home office. Similar with the scenario above this allows providers to maintain their own office and deliver necessary care in safe and efficient ways. While beneficial to both the provider and the patient, this solution is helpful for workforce shortages as it is difficult to find providers willing to live in more remote communities and work within prison walls. This also provides societal solutions in the form of more efficient use of health care resources, the avoidance of transport for medical care, and ultimately the provision of mental health care to a population in need.

Calderone *et al.* also present a model that is both patient- and provider-centric. The use of telepsychiatrists to virtually integrate with primary care is increasing as this solution has the potential to more efficiently use both psychiatrists and primary care physicians and provide patients with more access points for mental health care. This paper is written from the perspective of the telepsychiatrist and provides a model for effective interactions between the health care providers. These interactions include systems infrastructure, clinical consultations requirements, definitional understanding, and ongoing support and education from both perspectives.

An important concept in the Calderone *et al.* model is proper training and education for integrated services. Hilty *et al.* greatly expand upon the need for training and focus on the need to enhance telemental health and cultural competencies among providers delivering services to remote and rural populations. They conducted a review and found that while cultural competency training improves skills and clinical outcomes, there is heterogeneity in approaches resulting in varied knowledge sets. They propose a conceptual model that both addresses and integrates competencies for culture and diversity, rural settings, and telemental health. They recommend this conceptual model to further address the following issues during clinical encounters: culture issues are often lumped into social history, social history competes for time with clinical presentation, culture is best kept as part of a general approach or as part of an explanatory model, and complexity of issues are not well addressed by checklists.

Cultural understanding is also a core aspect of the Dawson *et al.* article discussing the use of telehealth technologies to reach Indigenous peoples. Indigenous peoples make up 5% of the world's population, yet account for 15% of the extreme poor and have life expectancy rates that are 20 years shorter than non-Indigenous people. Access to health care is an important determinant of health outcomes and Indigenous peoples often face multiple barriers to care. The authors conducted a review of clinical trials utilizing two-way, synchronous, video-chat technologies to provide physical and mental health care for Indigenous peoples. Six articles were included in the final review and while there is limited data in the literature, the findings do suggest that culturally tailoring programs is important and that certain modalities including telephone-only are possible solutions.

Famina *et al.* further address education of psychiatric residents in the use of telemental health services. Telemental health training is not a requirement in most US residency programs and, when available, it is usually introduced in the last year of training. The authors describe a pilot program where second- and third-year psychiatry residents provided telemental health services under the guidance of supervising attendings. While the focus was on early training on the psychiatrists, results did note patient satisfaction with the service. The residents indicated that early exposure to telemental health was a positive experience with benefits to their training and expressed a desire to continue with the service.

Telemental health has proven to be an effective aspect of the overall mental health system and a standard of care for many mental health concerns. However, the promise of telemental health has not been met with broad-based implementation success (7). Some of the issues with implementation include looking to find a use for technology rather than using technology to meet a defined need, not understanding patient populations and staff willingness or capacity to deliver services, and not developing programs that fit within existing regulatory environments. Two articles address implementation and offer solutions for other similar programs.

Day *et al.* discuss an approach used within the US Veterans Health Administration (VHA) to implement telemental health services that better recognize the needs of rural veterans. The VHA has a robust telemental health network that was originally based on the more traditional hub-and-spoke network that includes regional centers. While this network has greatly improved access to care, it has not fully recognized the needs of veterans living in rural areas where uptake and implementation has been more problematic. The Personalized Implementation of Video Telehealth for Rural Veterans (PIVOT-R) approach is a flexible implementation strategy that is adaptive to site-specific contexts to improve rural implementation. The authors describe a project in a large, rural mountain state in the western US that piloted PIVOT-R. The results showed that 10 times

as many veterans used telemental health following the pilot, demonstrating that inclusion of a comprehensive assessment of the rural system greatly improves understanding of a system's specific needs and enables a tailored approach targeting relevant barriers.

Tkach and Wesloh present lessons learned from the development and implementation of a patient portal designed to support the treatment of substance use disorders. While there is support for longer-term care in treatment of substance use disorders, average length of stay and treatment duration continues to shorten. Patients also have difficulty engaging in on-going after treatment recovery and patient portals provide a solution for improved engagement, although there are challenges with developing, maintaining, and utilizing portals. The authors provide lessons learned from implementing and gaining clinician buy-in to use of a patient portal.

Much of the existing literature focuses on telemental health services to individuals. Lopez *et al.* discuss a pilot program using telemental health technologies to delivery services for therapy groups. Although evidence does exist demonstrating the delivery of psycho-education to groups using technology, there is less evidence about the group cohesion required for therapy. The authors report on a study comparing group cohesion between patients who participated in a dialectical behavioral therapy (DBT) via telemental health and in-person. Although those in the telemental health group didn't feel as connected initially to other group members, they felt similar levels of connection to the facilitator. The use of different technologies such as live chat helped to mitigate the initial feelings of disconnect, and it should be noted that many of the telemental health group members reported they would not have been able to participate in therapy without the technology option.

Telehealth represents an important evolution in health care delivery and will continue to expand beyond traditional brick-and-mortar facilities to promote accessibility. Interestingly, the advances in communications technology are allowing for health care providers and systems to return to more patient-centric services that allow patients to receive care in places they find accessible and comfortable. Mishkind provides an overview of telemental health services into what is considered non-traditional telehealth locations. While some of these locations were once considered traditional for in-person services, such as a patient home, others such as post-disaster locations are only now accessible due to technology. The articles in this special edition provide varied perspectives on the continued evolution to reach remote and isolated populations.

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