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## **Exploring the workforce shortage of dermatologists through telehealth as an innovative supply chain and logistics management technological solution.**

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### **Abstract**

As COVID-19 continues to evolve in the United States (U.S.), now more than ever, medical care is leveraging technology and innovation in its delivery of treatment to patients in need of healthcare. The average wait time nationally for a new patient dermatology is 33 days, but the average wait time is 96 days in rural areas. As a result, many healthcare researchers are not evaluating workforce shortages of specialists like dermatologists as a supply chain and logistics management issue. The paper uses a content analysis of the literature to explore the ability of telemedicine as a logistics management tool that uses technology to meet the patient demand for dermatologists.

**Keywords:** telehealth, teledermatology, public health supply chain, public health logistics

### **Introduction**

Healthcare in the U.S. is one of the most advanced globally but is also one of the heavily affected systems by disparities. In 2018, the U.S. had spent 16.9 % of its GDP on healthcare, yet it has the lowest life expectancy among 11 high-income countries (Tikkanen & Abrams, 2020). The average U.S. citizen spent \$1122 on out-of-pocket healthcare costs, covering insurance deductibles, visit co-pays, and prescriptions. Residents of France paid less than half for the same services (Tikkanen & Abrams, 2020). Furthermore, as the world continues to deal with epidemics and adjust to new ways, some initiatives established to lessen the healthcare cost burden on underserved communities are also vanishing.

However, one of the side effects of COVID-19 was the emergence of telemedicine not only as an alternative but, in some cases, a better solution to the regular practice of medicine. Telemedicine is establishing itself, among other things, as a means to increase access to healthcare among the underserved. Telemedicine is not a new concept. The start of it can be traced back to 1879, when doctors started to use phones to provide consultations (Rheuban & Krupinski, 2018). Over time with the advances in technology, video and complete medical data were transmitted at the University of Nebraska in 1959 (Rheuban & Krupinski, 2018).

### **Tele-dermatology**

Dermatology is the medical specialty involving the treatment of various skin conditions. These skin conditions can range from inherited diseases to malignant diseases, such as malignant melanoma (Hoey, 2012). Dermatology is the medical specialty involving the treatment of various skin conditions. These skin conditions can range from inherited diseases to malignant diseases, such as malignant melanoma (Hoey, 2012). Therefore, treatment for these various

conditions is of utmost importance, especially with patients who live a considerable distance away and might not have access to reliable transportation for medical treatment. According to Leath et al. (2018), approximately one-fifth of the American population lives in rural areas. However, more than a hundred rural hospitals have closed since 2010 (O'Hanlon et al., 2019). Many rural areas are experiencing a tremendous shortage of dermatologists. According to Story (2016), Logistics and supply chain management refers to the process of managing how resources or services are acquired, stored, and transported.

Teledermatology (T.D.) is a specialty of dermatology that uses different communication mediums to diagnose, monitor, treat, and prevent skin diseases over distance (Pasquali et al., 2020; Marchetti et al., 2020). Primary T.D. is the direct communication between a patient and the dermatologist or nurse practitioner (Pasquali, 2020). Secondary T.D., on the other hand, is the indirect communication that occurs between the patient and provider. This aspect even includes the other intermediaries in a telehealth visit, such as health insurance providers (Pasquali, 2020). Tertiary T.D. is the second opinion among specialists, such as a dermatologist to a dermatologist or a different specialty (Pasquali, 2020). Patient assisted is when a patient communicates with the professional to follow up on a condition (Pasquali, 2020). The final form is direct to the patient. This type is when the patient contacts the healthcare provider through a technological device (Pasquali, 2020).

### **The practice of Telemedicine as Solution**

Telemedicine is the practice of providing healthcare through technology, especially to rural areas that lack specific specialties (Serper & Volk, 2018). Telemedicine also helps reduce costs and leads to favorable outcomes (Rheuban & Krupinski, 2018). Not only will these rural patients save money on their appointments, but they will also save money by not having to commute and putting ample gas mileage on their cars. These patients can also speak to a dermatologist more often if a particular bump arises on the skin that requires more intense monitoring (Rheuban & Krupinski, 2018). This will allow the dermatologists to keep up with the condition of patients and ensure they receive proper treatment if the condition worsens. Lastly, a telehealth visit closely resembles an in-person visit. Both parties are present, which allows for back-and-forth communication (Lyuboslavsky, 2015). Dermatologists will be able to ask the patients questions regarding their skin condition and see the skin through video. This will give the dermatologist a more in-depth diagnosis and eliminate any other potential diagnoses (Lyuboslavsky, 2015). Real-time telemedicine can be thought of as the more common form of telemedicine; however, store-and-forward telemedicine is as effective as real-time. Store-and-forward telemedicine does not require the presence of both parties at the same time for an appointment (Lyuboslavsky, 2015).

This form of telemedicine even uses more mediums for communication, such as photos, medical images, and forms (Lyuboslavsky, 2015). This can be highly beneficial for the field of dermatology because a patient could send a photo of a mysterious skin bump and await the results from a physician over the phone. This could save the patient time and worry because the dermatologist would send the results that day without the patient needing to commute three hours.

The benefits of store-and-forward telemedicine are similar to those of real-time telemedicine. For example, practice efficiency and access to care benefit from store-and-forward telemedicine. Patients who need regular check-ups will benefit incredibly from this form of telemedicine because these patients only need monitoring (Lyuboslavsky, 2015). Rural

Americans will also benefit since they do not even have to take an hour off from work to have a "visit."

### **Recommendations from the literature**

To successfully manage the logistics of connecting providers with patients has, three parts have to be addressed: the equipment, the medium, and the providers.

As of 2018, it is estimated that 81% of Americans have a smartphone (Camhi, 2020). Roughly 75% of adults have a desktop or a laptop, and 50% have access to a tablet. Because of technological advances, people of all backgrounds can afford these technologies, which makes them capable of engaging in telehealth (Camhi, 2020). Owning a piece of technology capable of connecting remotely and allowing video conferencing capabilities is not enough. Quality internet access is of vital importance when providing telehealth. About 62% of the rural population have broadband in their homes; however, those services are expensive. Moreover, about 39% cannot purchase internet services that satisfy FCC's minimum standard for high-speed access at all (Lahanas, 2017). For any telehealth initiatives to be successful, access to the internet has to be provided. However, if some families or individuals do not have a mobile device that allows them to connect virtually, "access points" have to be established in the communities.

One of the **access points** can be created through schools in the neighborhoods. To not compromise the security of schools, mobile pods can be retrofitted and placed on campuses away from classroom buildings. These pods can be equipped with a kiosk to provide virtual access to the desired specialist. By placing the pods adjacent to school buildings, a reliable internet connection can be established by utilizing the school's network to connect to services.

**High-speed internet** is firmly embedded in our society and can benefit underserved communities in even more ways. Millions of people rely on it to socialize, shop, and work from home, affecting the quality of life and hence health. Currently, the FCC uses its Rural Digital Opportunity Fund to provide \$20.4 billion in assistance to areas without internet access (Solon, 2020).

**Partnerships** with Hospitals and other Community organizations can also bring telehealth to communities. Salt Lake City Intermountain Healthcare and United Way of Salt Lake partnered up to provide a telehealth kiosk at the city's Columbus Center (Cohen, 2017). Patients can connect with physicians through a telehealth service called Intermountain Connect Care. The services provided cover such conditions as flu, sore throat, or rash symptoms. The kiosk also has a blood pressure cuff, thermometer, and other diagnostic tools (Cohen, 2017). Such partnerships can serve as examples for all communities. Churches can partner with hospitals or other charitable entities to bring these health kiosks to communities. At times, however, a kiosk is not even needed. A simple iPad is all that is needed to connect a patient to the doctors they need. An 18-year-old Keilan Rambo who lives in Campton drives the "TeleHealth Van" (Eng, 2020). It is a service to connect doctors virtually to their patients in low-income and underserved communities. His uncle founded the service after his mother, who has diabetes, could not see a doctor due to her condition worsening. The "TeleHealth Van" is partnered so far with Southern California Health and Rehabilitation Program and reaches about 150 families each month or averaging about eight stops a day. The company currently operates nine vans equipped with iPads and drivers who are also trained medical assistants (Eng, 2020). Such services could be crucial to patients who do not have transportation, or their condition does

not allow them to leave their house. The health department can utilize volunteer organizations to provide the above service.

**Mobile units** can be created to deliver smart devices like iPad to patients for an immediate consultation and then transport them to the next patient.

**Grants** are also available to support rural communities. The U.S. Department of Agriculture has 65 million available for Learning and Telemedicine Programs that "help rural communities use telecommunication to connect to each other and to the world" (EkoHealth, 2020).

One of the significant resources that can be used to implement telehealth is **Community Health Centers (CHC)**. They provide health and support to more than 28 million underserved Americans (Wicklund, 2020). CHCs have been playing a significant role in dealing with Covid. More than 90% of them have become Covid testing sites as well (Kishore et al., 2020). The positively tested patients in CHS ratio is more than double the national average (Kishore et al., 2020). However, CHSs are vital in treating other medical problems in underserved communities. There is evidence that health outcomes are just the same or better than private clinics. (Kishore et al., 2020). CHCs are trying to keep up with the modernization of the health industry. The adoption of the electronic health record system is 99%. However, as of 2018, only half of CHCs have adopted other telehealth services (Lewis et al., 2019). Because of the importance of CHC in underserved communities, an extra added benefit of implementing the telehealth program for the Health Department will be the upgrading (if needed) of any CHC in the area.

Another indispensable tool in promoting and implementing telehealth in the communities is **community health workers**. Community health workers (CHW) are the frontline of public health because they are "culturally competent" and serve with the trust of their communities (Higgins, 2020). They are uniquely positioned to address the issues that underserved communities are facing. A study done by JAMA Oncology showed that community health workers improved clinical outcomes while keeping the costs down (Heath, 2020). It was deducted that a CHW program showed a 1:10 return on investment. Patients saw a reduction of \$781.29 in the cost of coordination of services needed per person per quarter. That resulted in a savings of \$19 million annually across a single care network (Heath, 2020). Therefore, CHWs can also provide unique approaches for implementing new services like telehealth, which could result in even greater cost savings initiatives for the patients. With proper training, they can teach and engage the communities in using technology for telehealth.

By exploring all alternatives, quality telehealth can be successfully implemented to serve underserved communities by bridging the logistics between communities with a limited number of dermatologists with patients in need of medical services. Telehealth is one of the most efficient tools that can be used to address the health disparities in all underserved communities.

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