IMPROVING TELEDERMATOLOGY UTILIZATION IN AN ALASKAN HEALTH CARE SYSTEM

By

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Abstract

The consistent demand for dermatology services, within an Alaskan health care network, warrants an organized, collaborative approach to acquiring a higher capacity of teledermatology consultations. The lack of uniformity among providers for using telemedicine technology in dermatology can hinder cost-saving care. Understanding the obstacles and utilization practices surrounding teledermatology adoption is a crucial objective for a project conducted in an integrated health care system. Devising a protocol with supporting education may reinforce expectations for primary care providers and community health aides and practitioners to be consistent with the utilization of dermatology consultations. A Teledermatology Utilization Project was conducted in an Alaska urban facility to affect change throughout an integrated system. Results indicated a significant increase in teledermatology cases since implementing a protocol and supportive education.

Keywords: Dermatology, Telehealth, Teledermatology, Store-and-Forward (SAF), Community Health Aide and Practitioners (CHA/P), Community Health Aide Program (CHAP)

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Nomenclature

AAD	American Academy of Dermatology
AAFP	American Academy of Family Physicians
AANC	American Association of Colleges of Nursing
AFHCAN	Alaska Federal Health Care Access Network
AI/AN	American Indian/Alaska Native
ANEC	Alaska Native Epidemiology Center
ANHB	Alaska Native Health Board
APRN	Advanced Practical Registered Nurse
ATA	American Telemedicine Association
CHA	Community Health Aide
CHP	Community Health Practitioner
CHAP	Community Health Aide Program
CHA/P	Community Health Aide and Practitioner
CITI	Collaborative Institutional Training Initiative
DNP	Doctor of Nursing Practice
HER	Electronic Health Record
HIPAA	Health Information Portability and Accountability Act
HSR	Human Subjects Research
HIS	Indian Health Service
IRB	Institutional Review Board
OHRP	Office of Human Resource Development
PCP	Primary Care Provider

SAF	Store-and-Forward
SCOT	Strengths-Challenges-Opportunities-Threats
SMEBP	Stetler Model of Evidence Based Practice
TAM	Technology Acceptance Model
VHA	Veterans Health Administration

Chapter One: Overview of the Problem

The concept of telehealth involves the delivery of health care remotely via methods such as electronic mail with an accompanying image (Ford & Pereira, 2015). It also includes telephone and wireless devices including cellular phones, which may or may not include video access (Campion, Dorsey, & Topol, 2016). According to the American Telemedicine Association ([ATA], 2018), telemedicine is defined as "the remote delivery of health care services and clinical information using telecommunications technology" and offers no distinction between "telehealth" and "telemedicine" (para. 1). It is a growing method of health care delivery which can positively impact the health care of numerous individuals (Campion et al., 2016). Using telecommunication to provide care has been an essential part of the U.S. Indian Health Service's (IHS) method of delivering health care since the 1970s, with the primary objective of improving access to health care in the setting of a limited budget while maintaining quality services (Kruse, Bouffard, Dougherty, & Parro, 2016).

Though the ATA does not discriminate between the terms of telehealth and telemedicine, the American Academy of Family Physicians (AAFP) does offer somewhat more specific definitions. “Telemedicine is the practice of medicine using technology to deliver care at a distance,” (AAFP, 2019, para. 4). “Telehealth refers to a broad collection of electronic and telecommunications technologies that support health care delivery and services from distant locations,” (AAFP, 2019, para. 5). Both concepts, however, support the practice of dermatology via teledermatology as it relates to the focus of this project and both terms are used throughout the course of this paper.

Teledermatology is defined as “the delivery of dermatology specialty services (advice, diagnosis, treatment planning, and education) to patients and other healthcare providers remotely

using information and communication technology" (ATA, 2016, p.14). Dermatology is especially compatible with telehealth, given the visibility of skin disorders, which can be addressed and reviewed with photographic images (McKoy et al., 2016). The role of telemedicine for dermatology has been in existence since 1995 (Tensen, van der Heijden, Jaspers, & Witkamp, 2016). Appropriate dermatological management is essential for wellbeing, cost control, and reducing health disparities (Wilmer et al., 2014). As with the broad concept of telehealth, teledermatology can facilitate access to care based on geographic and socioeconomic status (Campagna, Naka, & Lu, 2017). According to McKoy et al. (2016), teledermatology is a solution to specialty care that is not appropriately utilized despite its ability to provide quality care to those who are geographically disadvantaged.

Muir (2014) identified several other advantages of teledermatology, such as decreasing the burden of clinic demand, expediency, and avoiding higher priced visits for in-person dermatology consultation. Campagna et al. (2017) asserted there was less time involved in teledermatology consultation allowing greater provider productivity. Encounters done in a virtual capacity could circumvent the potential to miss appointments, since accessibility to a dermatological specialist is easily facilitated electronically (Naka, Lu, Porto, Villagra, Wu, & Anderson, 2018).

The expense of skin disease is also noted throughout the literature. The cost of dermatological care in the United States was estimated at $75 billion in 2013; however, when factoring in productivity issues, the cost was closer to $96 billion, and cost per patient was $240 (Lim et al., 2017). Campagna et al. (2017) maintain teledermatology provides cost savings by minimizing salary loss from missed work and the cost of travel. Another particular benefit of

teledermatology is that it facilitates the education of primary care providers (PCPs) who can receive the dermatologist's diagnosis and recommendations (Wilmer et al., 2014).

Despite the overwhelming potential for teledermatology, this highly functional application is underutilized in the dermatology field. According to Muir (2014), few skin conditions necessitate in-person dermatological evaluation; though many patients sent for dermatology consultation could have received more timely care via teledermatology consult (McKoy et al., 2016). The dermatology clinic of a particular health network reviews approximately nine teledermatology cases per week (S. Freeman, personal communication, September 15, 2017). Generally, it may take three to six weeks for patients to receive an in-person consultation. Even though teledermatology has been available to this health care system for decades, only a small percentage of patients are evaluated and treated in this capacity, with many of them traveling extended distances for these visits. Knowing that few conditions require an in-person consultation, it is apparent that teledermatology is not used to the extent that it could be to promote the benefits of the service.

Barriers to the use of teledermatology have been identified in the literature; for example, providers may have a knowledge deficit regarding the actual existence of this technology (Muir, 2014). Additionally, a variety of solutions were also identified in the literature, including education and portable devices. Understanding the unique features of PCPs and community health aides and practitioners (CHA/Ps) could be beneficial in providing a strategy for higher utilization of technology designed to improve care. Ultimately, a dedicated approach to skin care, diagnosis, and management for the patient via teledermatology will enhance the dermatological management for recipients of dermatological care.

Problem Statement

Teledermatology is an underutilized function of providers within a prominent Alaskan health care system, contributing to the burden of cost, efficiency, and quality of care. Maximizing the use of dermatological telehealth is a significant quality improvement initiative which would result in cost savings to patients and the health care facility while maintaining safe and effective services. Understanding the unique background and clinical practice unique to the health care system of focus, assists in the development of the problem question and a process for quality improvement.

Background

Alaska is home to more than 150,000 tribal affiliates, among 229 tribal groups within the state (Alaska Native Health Board [ANHB], n.d.). The population associated with the tribal network includes an area of nearly 600,000 miles (ANHB, n.d.). According to the Alaska Department of Labor statistics, there were 143,367 American Indian/Alaska Native (AI/AN) individuals residing in Alaska in 2014 (Alaska Native Epidemiology Center [ANEC], 2016). Of this population, approximately one-third live in Anchorage and the Matanuska-Susitna areas (ANEC, 2016). Only those AI/AN beneficiaries residing within the designated Anchorage municipality (which includes five residential areas) receive primary care within a centralized facility on the main health care campus (S. Freeman, personal communication, September 22, 2017), where teledermatology may not have as high of a need as the remaining state population of customers (beneficiaries). The tertiary facility which houses specialty clinics, including dermatology, also provides care to recipients throughout the state. Also, stand-alone clinics established for the AI/AN communities were established throughout the state to provide regional care to residents. Many communities in Alaska are only accessible by plane, and these

communities are associated with unique service unit hubs. Telehealth can be the solution to access problems for many individuals residing in challenging areas (McKoy et al., 2016).

Telehealth is accommodated through a specific software system called Alaska Federal Health Care Access Network (AFHCAN) which has been used in Alaska since 2001 (Carroll et al., 2011). AFHCAN has been useful in primary and specialty care arenas, especially Ear-Nose-and-Throat (ENT) (Carroll et al., 2011). There are approximately 200 telemedicine units deployed throughout tribal network clinics in Alaska (S. Freeman, personal conversation, October 02, 2017). AFHCAN may be assessed via the internet or mobile devices (Alaska Native Tribal Health Consortium [ANTHC], 2015). Typically, teledermatology involves various methods of delivery: store-and-forward (SAF), video conferencing, and a combination of the two (McKoy et al., 2016). The SAF modality involves transmitting a photographic image with supporting details for consultation purposes (McKoy et al., 2016). According to recognized industry guidelines, information deemed as protected health information should be treated as such, in line with standard practice, and facility staff employed in technology should be aware of security requirements (ATA, 2016).

Provider barriers to telemedicine and teledermatology acceptance are problematic and well documented. According to Cassels and Zuehlke (2017), physicians were hesitant to use this application because they perceived that patients were not ready to participate in teledermatology and preferred in-patient visits. Muir (2014) noted that using teledermatology services places far more responsibility on the PCP, as interventions generally deferred to the specialist (i.e., procedures, medications, and education) would now be the responsibility of the referring provider. Campagna et al. (2017) noted that inadequate reimbursement for providing teledermatology services was also seen as a challenge to teledermatology.

Clinical Significance

According to Wilmer et al. (2014), one-third of Americans experience a dermatological illness. Most patients with a skin condition will first contact a non-dermatology provider (Wilmer et al., 2014), even though dermatological conditions are more accurately diagnosed by dermatology providers (Nelson et al., 2016). Using teledermatology at the early onset of skin disease would not only be cost-effective and convenient but would result in better treatment outcome.

Due to the insufficient number of dermatologists in the United States, patients are waiting for more extended periods to be treated (Campagna et al., 2017), and future shortages of dermatology providers can be expected (Wilmer et al., 2014). In the dermatology clinic within this Alaskan health care network, there were 3,509 dermatology encounters in 2013; 3,807 encounters in 2014; 4,928 in 2015; 4,626 in 2016 and 5,422 in 2017. These figures include SAF encounters; 110, 122, 242, 250 and 253 respectively (S. Freeman, personal communication, March 19, 2018). With this information, the volume of patient encounters can be appreciated when considering teledermatology as an option. Utilization of teledermatology can also be assessed regarding percentages of overall care, typically 4%, according to historical aggregate data.

Current Practice

The consistent demand for dermatology services warrants an organized, collaborative approach to increase the number of teledermatology referrals and reduce the number of unnecessary in-person referrals. There is a wide variation among PCPs in this network as to when a patient should be referred and whether these referrals are completed via teledermatology or in-person. There are currently no established facility protocols to guide PCPs in selecting

cases for teledermatology SAF versus in-person consultations; however, there are technical and clinical guidelines established by the ATA (McKoy et al., 2016). PCPs use the teledermatology software at their discretion and comfort level.

Another caveat of clinical practice in this health care network is that referrals are sent to specialty clinics by one of several methods. First, local providers send local patients for specialty services. These patients are often scheduled for in-person visits. Second, local patients are referred by other specialty providers or emergency department providers. Third, out-of-area patients are often referred by providers who either oversee the clinic or are positioned in remote areas. Lastly, rural patients in town to see other specialists are often referred to the dermatology provider while visiting locally. These patients may have immediate needs associated with oncological or surgical care and customarily referred to a dermatology provider while they are in town. Such a process is challenging, however, if all clinic appointment times are full, especially with non-urgent cases or with patients who do not keep appointments.

Consultations among providers who would like assistance are often done on a "curb-side" approach, through electronic mail (e-mail), secured texting, phone consultation, or by face-to-face examination of the patient in a nearby room. There is no direct method to bill for these interprofessional interactions. The preferred method for consultation from distant locations has been through AFHCAN.

Typically, teledermatology consultation cases originate in the service unit hubs or village clinics. Images are taken, and the history is obtained, which may be initiated by CHA/Ps and endorsed by PCPs. Cases are then sent to the tertiary facility for dermatology review. Routinely, a response is made to the service unit with recommendations and diagnosis within 24 to 72 hours. The wait time for an in-person dermatology visit, with two full-time providers, has

been four to six weeks; and with a third provider working three-quarters time, the wait is approximately two to three weeks (A. Kapotak, personal communication, September 22, 2017). The dermatology providers at the urban tertiary facility are the only dermatology providers for this network. There are telehealth coordinators who can reach out to the various service units to support teledermatology needs.

During the period January to August 2017, there were 195 SAF dermatology cases, the majority of which originated from a select few service units (S. Freeman, personal communication, September 22, 2017). One particular regional corporation with road access to Anchorage is a consistent user of teledermatology. During the 2017 calendar year (January to August), 77 teledermatology cases originated from this facility. In contrast, one of the rural regional sites only sent four teledermatology cases.

Statistics from the 2017 calendar year show 3,461 dermatology outpatient encounters (S. Freeman, personal communication, September 26, 2017) (not including SAF). Of the 3,461 patient visits, 2,166 visits were by patients in Anchorage or the general proximity, and 1,295 from outside the immediate area (S. Freeman, personal communication, September 22, 2017). Presumably, many of these visits could also have been seen by the SAF technology, but patients will often drive into Anchorage if they reside in a community with a road system to the city.

Clinical Practice Question

PICOT question. Would providing teledermatology education and protocols for PCPs and CHA/Ps increase utilization of teledermatology over three months? Because quality improvement for teledermatology utilization is the intended purpose of this doctoral project, focusing on methods and strategies to promote provider appreciation of teledermatology for patients with skin related disorders can result from accomplishing this objective.

Population (P). The population for the project was PCPs and CHA/Ps who provide care to beneficiaries who live outside of the Anchorage area. Providers located in distant and logistically challenging regions have the most excellent opportunity to impact patients to a greater degree with teledermatology services. The total minimum number of potential subjects collected from multiple resources is estimated at 1000 providers. This estimation includes the number of CHA/Ps in this health care system which is estimated to be 550 individuals (Alaska CHAP, n.d.). The actual number of subjects included in the project, following institutional approval, was 311 providers.

Intervention (I). A survey was disseminated to service units throughout the network who have accepted participation in the project. The survey was sent via Listserv to the appropriate provider groups and CHA/Ps. This baseline tool was created to identify practice and knowledge gaps in the use of teledermatology SAF. Understanding impediments to teledermatology provides insight on how service units with the steadiest use maintain this high-level consistency, as opposed to those with far lower utilization rates. The highest using regional facility has been a consistently high user for the last three years. Conceivably, utilization may be associated with the connectivity of providers to the culture and the patients. According to Kruse et al. (2016), cultural awareness is a supreme quality in telehealth care delivery within the Native American culture, and telemedicine should be modified to accommodate the cultural climate.

Following the survey, an educational module was developed to discuss teledermatology. The intent was to provide education, support, and connectivity. Addressing skin illness from a systematic approach is necessary and could likely lessen delay in treatment, promote quality of life and minimize health disparities often seen in populations that reside remotely (Wilmer et al., 2014).

The concept of standardizing teledermatology throughout a system is elusive in literature; however, there are several pragmatic reasons why this would be advantageous to the patients served within the system. Such reasons include access to care, cost-reduction, and timeliness (Kruse et al., 2016). The ATA has developed clinical practice guidelines for dermatology to guide providers in the appropriate use of teledermatology (McKoy et al., 2016). The authors noted the guidelines are applicable to many types of health care facilities (McKoy et al., 2016). Guiding providers within a network to use this system requires a unique kind of protocol or guidance from an administrative position. This guidance could establish expectations for PCPs to initiate consultation for dermatology support versus referral to dermatology. PCPs should at least have the option to use consultative services if they exist.

Guidelines, in general, yield opportunities for specialists to give recommendations for submission of consults for a variety of skin conditions. Special equipment or attention may be warranted for full body assessments, hair-bearing areas, pigmented lesions, skin tone, and mucosal areas (ATA, 2016; McKoy et al., 2016). Though protocols can incorporate guidance in such areas, at a minimum, establishing a concrete visual consult and referral pathway provides practical direction for potential users.

Following the consult and referral workflow expectations, creating education regarding teledermatology was the final portion of the intervention. The educational module was based on literature and surveys to encourage providers and to consult via the established software. Responses and comments from surveys addressed knowledge gaps and concerns and presented opportunities for PCPs and CHA/Ps to discuss what is not working well and what may help other providers and service units. All such information was valuable feedback for the dermatology and telemedicine department.

Comparison group (C). The comparison group was utilization data before intervention and post-intervention. Information may be obtained from existing aggregate data of teledermatology utilization. These records reflect the teledermatology practices before the institution of guidance.

Outcome (O). The primary outcome goal for this project was an anticipated overall increase in teledermatology SAF consultations. Such an expected rise reflects the adoption of teledermatology by PCPs and CHA/Ps. Additionally, as the adoption of the technology advances, further expansion of utilization is projected. In-person referrals from distant and remote communities should decrease while SAF cases increase. Because of such outcomes, the appointment times in the clinic will be more flexible to allow for treatments best rendered by experienced dermatology providers, as well as hospital consults and urgent issues.

Time (T). Changes to an existing system were gradually implemented. Collecting preliminary utilization information and introducing a method to guide providers in the use of teledermatology was done following the completion of an internal review board process (IRB). The evaluation was completed three months following implementation. A timeline was developed and constructed to monitor progress and maintain project trajectory.

Conclusion

For many dermatological cases, teledermatology is an appropriate methodology for improving dermatological health care. Judicious consideration of this process could increase consultations, as teledermatology becomes more acceptable for appropriate conditions and patients. Introducing a method which primary providers could accept and sustain is rewarding for the patients and the entire health care network. The patients will have access to quality care

in their local environment, costs will decrease, and providers will be more educated regarding dermatology conditions and potentially be more involved with their patient's care.

Chapter Two: Review of the Literature

The numerous benefits of teledermatology, including improved access to care, cost savings (Campagna et al., 2017) and timely evaluation through examination of images, have been identified (Ford & Pereira, 2015). Due to the extended wait times to see a dermatology specialist, this commodity is particularly valuable (Nelson et al., 2015). The advantage of providing education to providers can eventually augment the types of cases submitted for dermatological expertise (Barbieri, Nelson, Bream, & Kovarik, 2015; Ford & Pereira, 2015; Vyas et al., 2017). Ford and Pereira (2015) noted the mechanism for teledermatology permits greater ease of consultation; therefore, more cases can be sent for teledermatology review, sparing PCP of trial and error. Nelson et al. (2016) noted dermatologists and general practitioners often have a significant disagreement for both diagnosis and treatment plans for most skin conditions, favoring the dermatologist for greater accuracy.

Teledermatology has been associated with numerous positive benefits, and it has the capacity for much greater use. Presently, there is potential for higher integration into primary care practice, specifically those affiliated with the Alaskan health care system. The purpose of this literature review is to identify and synthesize findings that may help to improve the teledermatology process for the AI/AN population in Alaska.

Clinical Questions

1. What are the barriers to teledermatology utilization in this Alaska health care system?
2. How can obstacles to teledermatology utilization be minimized?
3. Can the implementation of local utilization protocols and education on teledermatology improve the use of teledermatology?

Methodology

The literature search was conducted through the University of Alaska Anchorage Consortium Library and databases such as PubMed, CINAHL, and Google Scholar. Methodology for searching literature involved attempts to search for barriers and guidelines in teledermatology. Search terms included: "telemedicine," "telemedicine Alaska," "teledermatology," "teledermatology and acceptance," "teledermatology barriers," "implementing a process for improvement of telehealth," "teledermatology Veterans Administration," "teledermatology guidelines," "teledermatology protocols," "underserved populations," and "telemedicine and Native American." Limits included: "systematic review" "meta-analysis," "observational study," "practice guidelines," "full-text," and "published within the last five years." PubMed search was the most useful database for the topic of teledermatology.

Strategies. With the use of these search terms, articles were filtered by date, titles, cultural relevance, and reviewed for applicability. If titles were deemed applicable, abstracts were then reviewed. The majority of literature was accessed through PubMed. Of these, 15 articles were examined to determine relevance to the problem question. Two of these were identified as more appropriate for background information, and 11 were accepted for the literature review. Though a generous amount of information on telemedicine exists, locating studies which were pertinent to the scope of teledermatology and the needs of the Alaska Native population was a challenge. The literature focused on publications regarding both, telemedicine and teledermatology. Themes pertinent to the problem question were identified. Articles which addressed these themes were selected for critical appraisal for the literature review.

Data evaluation. The 11 articles were scanned for elements that addressed barriers and methods for overcoming these barriers. Although this subject was common, information about guidelines and protocols was more elusive. For many articles, information about these themes was not exclusively the main topic of the study but was included as background information. Some items contained only a small amount of detail associated with the proposal topic themes but were still included in this review. Due to limited literature addressing the barriers and remedies to teledermatology and the concept of standardization, articles that supported the problem questions were included in the literature review.

Critical Appraisal

The critical appraisal worksheet from University of New South Wales (UNSW) Australia (Bennett & Thompson, 2013) was used for quantitative studies, and the Melnyk and Fineout-Overholt, as cited by Powers (2015) was used for the qualitative studies. Literature review articles were appraised with the Critical Appraisal Skills Programme worksheet (University of Glasgow, n.d.). The Dearholt and Dang, (as cited in Spiva, 2013), Johns Hopkins evidence rating scales (Newhouse, Dearholt, Poe, Pugh, & White, 2005) and Stillwell, Finout-Overholt, Melynk, & Williamson (2010) scales were used to evaluate the strength and quality of the evidence. Strength was rated using a scale of one through seven, with one indicating the highest level and seven, the lowest (Stillwell et al., 2010). The quality was rated on an A-C level; ‘A' indicated the highest quality and ‘C' the lowest. The concept of best practices aligns with the strength and quality of evidence (Dearholt & Dang, as cited in Spiva, 2013). The articles included in this study were assigned a level of strength and quality, represented by the number and letter. The results of the evaluation of the 11 articles chosen for inclusion are indicated in Table 1.

Table 1

Strength and Quality of Evidence

	Strength of Evidence						
Quality of Evidence	1	2	3	4	5	6	7
A	-	n=1	n=2	-	n=3	-	-
B	-	-	n=2	-	n=1	n=1	-
C	-	-	-	-	n=1	-	-

Analysis. Of the 11 qualifying articles, four addressed telemedicine in general with one emphasizing dermatology, and seven articles were specific to dermatology. Two of the articles, one quantitative and one qualitative, addressed the Native American population which is a significant factor in the proposed project (Hiratsuka, Delafield, Starks, Ambrose, & Mau, 2013; Kruse et al., 2016). As part of the critical appraisal, strengths and limitations were evaluated. Per Melnyk and Fineout-Overholt (2015a), the primary components to critical appraisal are validity, reliability, and relevance to the population. Overall, all 11 studies demonstrated validity and reliability; the chief element was the applicability to the patient population identified in the problem question.

Five of the evidenced-based literature articles were systematic literature reviews, though only one of these contained enough randomized control studies, and therefore, assigned a level of evidence strength as a two (Mounessa et al., 2017). One article provided quantitative data in ranking order for variables such as cost, access, and quality (Kruse et al., 2016). The narrative review by Tensen et al. (2016) was very informative and contained a significant amount of literature. The remaining six articles included case-control studies, case studies, surveys, time series analysis, focus groups and expert reporting from the Veterans Health Administration (VHA).

Strengths. Each article used in this literature review possessed unique strengths. All articles supported the review and the critical use of teledermatology. Tensen et al. (2016) discussed the Teledermatology Technology Acceptance Model (TAM), or modified TAM- (Orruño, Gagnon, Asua, & Ben Abdeljelil, 2011) which has value in addressing the problem question with PCPs of this integrated health system. Mounessa et al. (2017) provided a robust literature review of global studies, concluding that providers were, overall, satisfied with teledermatology. The systematic review by Trettel, Eissing, and Augstin (2017) focused on international dermatology. One-fourth (n=56) of the studies were published in the United States. Additionally, Landow, Mateus, Korgavkar, Nightingale, and Weinstock (2014) noted specific elements to be considered in a teledermatology program, which could be a useful part of protocols or guidance development.

Barbieri et al. (2015) discussed teledermatology by using the mobile app, which was one of the first studies to address this modality. The mobile app could be an important consideration when contemplating decreasing barriers. Vyas et al. (2017) identified license issues related to reimbursement and acknowledged barriers and possible remedies to the teledermatology adoption problem. Landow, Oh, and Weinstock (2015) provided original research and was the first to focus on VHA teledermatology programs. The VHA is an integrated system with similar features as the health network in this project. Piccoli, Amorim, Wagner, and Nunes (2015) recognized that teledermatology could spare unnecessary dermatology referral in the setting of skin cancer concern.

Kruse et al. (2016), as well as Hiratsuka et al. (2013), provided a cultural perspective for the use of telehealth, which is applicable across different populations. The authors offered additional views on the patient-provider relationship that is vital for the integrity of a telehealth

program. Taylor, Coates, Wessels, Mountain, and Hawley (2015) developed a framework to promote the adoption and improvement of telehealth. Additionally, they demonstrated the benefit of using case studies and action research to support practice improvement as well as institute structure to a telehealth program (Taylor et al., 2015).

Limitations. Though each article demonstrated strengths; limitations were noted or acknowledged throughout the review. Trettel et al. (2017) recognized the possibility for publication bias since the articles selected might have positively presented teledermatology. Kruse et al. (2016) reviewed the literature to ascertain the advantages of teledermatology and discussed cost, quality, and access and concluded there was substantial research on access, and a lack of research on quality of care and cost. Mounessa et al. (2017) acknowledged there was no universality when reporting provider satisfaction and Barbieri et al. (2015) also noted limitations based on the small sample size. Vyas et al. (2017), in general, does not acknowledge limitations but concedes to the minimal randomly controlled studies available.

Limitations to the VHA study were associated with potential data entry flaws and encounter errors (Landow et al., 2015). Landow et al. (2014) also acknowledged a need for better evaluation of teledermatology programs to evaluate access and savings associated with in-person appointments. Additionally, clinical data and information about quality were not included in the Telehealth Workload Cube used by the VHA (Landow et al., 2015). Hiratsuka et al. (2013) acknowledged limitations including small sample size, as well as the inclusion of participants, who were not representative of the larger population, as most were college educated. These authors identified the existence of potential cultural differences between Native Hawaiian and Native Alaskan. Piccoli et al. (2015) recognized only one dermatologist was evaluating the images of this study. The study by Tensen et al. (2016) used only one database

and one reviewer. Finally, Taylor et al. (2015) reported there was some conflict in use of some control methods, mainly since the study used ever-progressing commodity, such as technology.

Synthesis. All articles involved in this literature review demonstrated some degree of merit to address the clinical practice problem; though the focus of these articles may not have discussed them directly. The main themes extrapolated from the literature review included: barriers to teledermatology, overcoming these barriers, and establishing structured protocols for guidance. These elements are discussed below.

Theme I: Barriers. Approximately seven articles addressed barriers to telemedicine/teledermatology. Issues with the equipment, imaging, internet, and technology were discussed throughout most of the literature (Barbieri et al., 2015; Hiratsuka et al., 2013; Kruse et al., 2016; Mounessa et al., 2017; Taylor et al., 2015; Vyas et al., 2017). Taylor et al. (2015) also noted several barriers to the implementation of telehealth in an organization, including data sharing, insufficient resources to execute the activity, inadequate staff involvement, and uncertainty of appropriate candidates for telehealth (Taylor et al., 2015). Vyas et al. (2017) noted potential infrastructural problems such as sustaining telehealth in the event of a natural disaster. Vyas et al. (2017) also noted additional barriers including issues with the capture of images; specifically, with regards to the depth of certain skin conditions.

Cost and reimbursement were also identified as barriers to teledermatology and telehealth utilization (Kruse et al., 2016; Mounessa et al., 2017; Tensen et al., 2016; Vyas et al., 2017). According to Vyas et al. (2017), reimbursement is tied to documentation that is associated with the elements of an in-person physical exam. If there is less reimbursement, due to the nature of a telehealth exam, less money is received from investing in the technology (Vyas et al., 2017). This view was similarly shared by Kruse et al. (2016). Vyas et al. (2017) also noted medical

licensure laws might not reflect the currency of technological advances in health care, posing additional barriers for the use of telemedicine (Vyas et al., 2017).

Increased demand for workload, workflow changes, and time consumption were frequently mentioned as barriers to the use of teledermatology (Barbieri et al., 2015; Landow et al., 2015; Mounessa et al., 2017; Taylor et al., 2015). Security and privacy issues were also identified (Barbieri et al. 2015; Tensen et al., 2016; Vyas et al., 2017), as well as an unwillingness to adapt to change (Kruse et al., 2016). Tensen et al. (2016) and Barbieri (2015) discussed legal issues in using teledermatology; while Tensen et al. (2016) argued the degree of provider satisfaction could be associated with provider adoption. Another potential barrier included is the time required to train staff in the use of teledermatology. The absence of skin palpation as part of the examination may also inhibit providers from using this (Tensen et al., 2016).

Theme II: Overcoming barriers. The literature search addressed several strategies to overcome the obstacles to teledermatology, including technology support, use of mobile phones and portable devices (Barbieri et al., 2015; Hiratsuka et al., 2013; Kruse et al., 2016; Mounessa et al., 2017; Vyas et al., 2017). Barbieri et al. (2015) noted the use of a mobile phone was the solution for barriers such as workflow disruptions, equipment issues, and imaging problems. Vyas et al. (2017) discussed the addition of portable devices (such as Google Glasses) might aid in ease of use of telemedicine and also reduce the size of accommodations needed for telemedicine.

Taylor et al. (2015) provided many recommendations for improving telemedicine practices. Promoting access between software and the electronic health record was recommended, as well as acquiring financial support for telemedicine (Taylor et al., 2015).

Evaluating staff proficiency, as well as promoting and educating dedicated staff was additional recommendations (Kruse et al., 2016; Taylor et al., 2015). Additionally, Kruse et al. (2016) also noted other improvements including the reimbursement for cultural interventions, such as traditional healing and spiritual modalities and culturally appropriate telemedicine practices.

The expansion of health insurance to cover the telemedicine costs to recoup needed telemedicine funding would promote costs (Kruse et al., 2016). Modification of licensure laws to permit licensing of providers across state lines instead of only licensing within the state of the consulting provider would diminish some of the barriers to telehealth (Vyas et al., 2017). Such concessions would promote adequate reimbursement, which would also support the cost of equipment (Vyas et al., 2017).

Tensen et al. (2016) discussed the value of a business model in the adoption of teledermatology practices. This model includes five necessary steps: (a) understanding the organization's manner of rendering care; (b) determining alternative methods of care and the cost; (c) having the support from the organization; (d) creating a plan; and (e) educating and training staff. Landow et al. (2015) acknowledged successful implementation of teledermatology required support from the organization. Instituting performance measures for the adoption of telehealth was addressed as an incentive for users, as well as a training program established for teledermatology (Landow et al., 2015). Both Landow et al. (2015) and Hiratsuka et al. (2013) acknowledged the need for support staff for telemedicine/teledermatology. Trettel et al. (2017) advocated for the placement of financial protocols and financial procedures as vital to assimilating this practice into the day to day routines.

Theme III. Protocols. Little was discussed in the literature on the topic of health network standardization of teledermatology and recommended local protocols or processes.

Vyas et al. (2017) noted the need to improve existing processes and add new programs for telemedicine. Barbieri et al. (2015) suggested a potential liability for providers if they avoid teledermatology for care when it is available, which could result in a delay of diagnosis and treatment. Piccoli et al. (2015) discussed the establishment of teledermatology-specific protocols for suspected cancerous lesions and supported the use of the protocol for images when skin cancer is a concern. The authors reported a reduction of inappropriate consults through the use of a protocol (Piccoli et al., 2015). Taylor et al. (2015) suggested making referral/discharge telemedicine plans standardized by establishing a "telehealth pathway" (p. 5), and Hiratsuka et al. (2013) indicated it was important for the first appointment to be in-person and for patients to have the same provider on follow-up encounters. Additionally, Tensen et al. (2016) acknowledged there should be standardization for equipment requirements and imaging requirements. Barbieri et al. (2015) identified which dermatological conditions were amenable to teledermatology and which were not, which could be part of protocol development.

Landow et al. (2014) discussed elements of a teledermatology program that would promote the reduction of in-person visits. These include (1) pre-selectivity of patients for teledermatology, (2) taking good pictures, (3) using teledermoscopy, and (4) promoting infrastructure and culture that align with the program goals. Pre-selection involves categorizing the referral. For example, a category may include referrals sent by PCPs but screened by a dermatologist. Selections can also be determined by a team which consists of a dermatology provider or a PCP with training in dermatology. Other categories may be included or exclude various conditions. Quality imaging is particularly germane to the scope of teledermatology and requires training, as well as guidelines. In addition to appropriate pictures, teledermoscopy (a tool to help provide diagnostic confidence) can increase reliability and ultimately reduce

unnecessary in-person visits. Lastly, the organizational infrastructure is the ability of the organization to manage patient care without a dermatologist when care beyond the skills of the teledermatology provider is needed. Culture, in the professional sense, refers to the receptivity of providers to use teledermatology and receive recommendations (Landow et al., 2014).

Clinical guidelines for teledermatology should be in place to promote confidence for patients (Trettel et al., 2017). Landow et al. (2015) reported standardized operational manuals had been developed, and SAF templates are available for use by the provider, imager, and the reader. Additionally, the VHA system ensures every VHA clinic applies the same standards to support quality and sustainable teledermatology program (Landow et al., 2015).

Limitations

Overall, there was a disparity in the literature supporting the need for protocol practices for unique health care networks, populations, and geographical locations.
Moreover, there was a lack of evidence suggesting the provision of directives by the organization can produce outcomes associated with the known benefits of teledermatology such as improved access, timeliness, cost-effectiveness, and enhanced quality of health care. Evidenced-based literature specific to the AI/AN population regarding telemedicine was also minimal.

Conclusion

Teledermatology has a widely accepted role in telemedicine and the dermatology field. The benefits are well recognized, and currently, research is limited regarding widespread implementation and provider engagement. Barriers to the use of telemedicine were presented throughout the literature, with many recommendations on overcoming some of these impediments. The identification of obstacles may be purposeful in guiding protocol development as well as the reasons for impediments to teledermatology use, although there may

be other barriers yet to be recognized. Development of an efficient, quality, and structured process using teledermatology within a complex system was not found in the literature. This health care network has many features that would make teledermatology a robust utility, increasing quality and decreasing cost; however, widespread adoption is hindered by obstacles and barriers still to be identified and reconciled. Once this has been accomplished, an accurate systematic approach to teledermatology guideline/protocol processes can be implemented.

Chapter Three: Organizational Framework

Teledermatology is a specialty form of telemedicine, currently practiced within an Alaskan integrated health care system to provide remote dermatological care to patients residing in urban and rural areas throughout the state. Low levels of utilization teledermatology among providers within the health care system have been the focus of this quality improvement project. The *Stetler Model of Evidenced Based Practice* is a functional model for the proposed initiative to advance teledermatology utilization within this unique Alaskan health care system. The health care system consists of many geographically dispersed facilities which ultimately receive specialty care from one urban tertiary center. Adherence to the Stetler Model may guide the development of "new policies, procedures, protocols, programs and standards" (Dang et al., 2015, p. 282) regarding teledermatology practice, which are the ultimate objectives of this project.

Evidenced Based Practice Model

The Stetler Model of Evidenced-Based Practice (SMEBP) is designed for the nurse practitioner's unique relationship with evidenced-based practice (Stetler, 2001), Figure 1. Though modified several times, the most recent revision became associated with evidenced-based nursing practice (Dang et al., 2015). As currently written, the SMEBP is an appropriate and suitable model for this project. Figure 1 below depicts and describes the useful and practical stage SMEBP (Stetler, 2001).

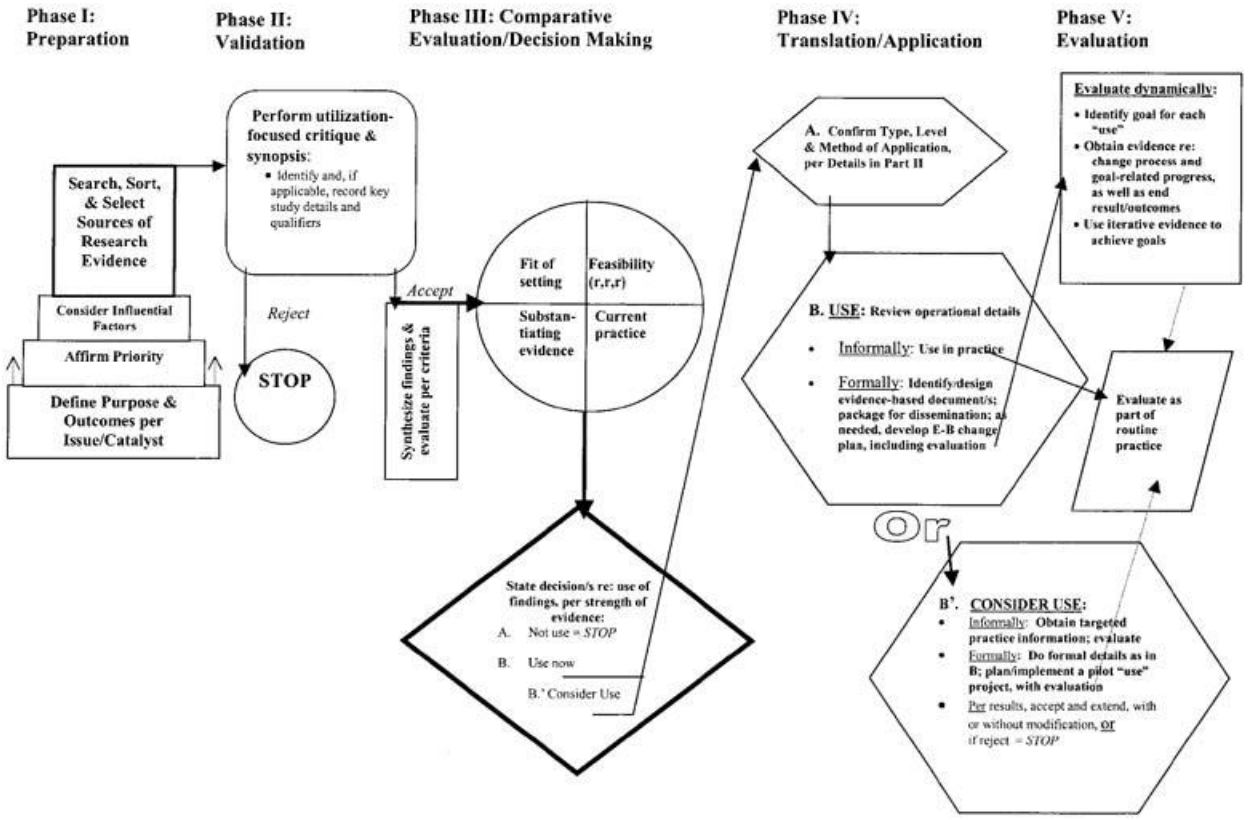

Figure 1. Stetler Model of Evidenced Based Practice. The SMEBP is comprised of a sequence of five stages, guiding the nurse practitioner toward goal of practice change. Stetler (2001).

Beyond the stages supporting this evidenced based model, the revised SMEBP includes six unique assumptions (Stetler, 2001).

1. An individual's use of research may be involved at the organizational level.

2. There are three types of research utilization: instrumental, conceptual and symbolic; moreover, one or more can be involved.

3. Decision-making can occur by blending research conclusions with other types of information.

4. Perspectives and utilization of evidence are influenced by both internal and external dynamics.

5. Research and subsequent assessment result in only likelihoods, not definite conclusions.

6. Research utilization and evidenced-based practice knowledge and competence deficit can result in ineffectual use (Stetler, 2001).

Using evidence in a stepwise fashion will improve the practice of teledermatology as it exists currently within this system. This project entails the exploration of barriers and solutions to teledermatology adoption. This action followed by the establishment of systematic guidelines for use within the network, and the Stetler Model supports the application of evidence, including consensus guidelines, in a variety of ways (Dang et al., 2015).

Steps of the Stetler Model in Support of the Teledermatology Utilization Project

Dang et al. (2015) describe the five stages of the SMEBP, presented in a step-wise fashion. The sequence is described below concerning the teledermatology utilization project. The project followed the direction of these steps to fully support the project completion and success.

Phase I: Preparation. This initial step involves prioritization, assessment, organization, and searching for evidence (Dang et al., 2015). One significant aspect of this step is to identify the problematic areas of the internal evidence. Internal evidence is information that can be obtained on a local scale (Dang et al., 2015). This evidence has been casually observed in the clinic setting. With the current practice, providers within the network have the option of using teledermatology or referring the patient to the dermatology clinic. At present, there are a disproportionate number of patients seen in clinic versus telemedicine, despite the vast geographical area assigned to the dermatology clinic at this urban tertiary health care facility.

Understanding barriers to provider utilization are one of the main foci of the project. According to Tensen et al. (2016), there are numerous barriers to teledermatology practice. Some of these barriers, however, are not applicable to this group of providers given the unique features of the health care system, namely direct reimbursement. Additionally, practice limitations are another potential problem, as providers must be licensed in the state of the consultation (Lowie, 2012).

Although the resource of teledermatology is widely available throughout the health care network, there are several reasons many providers in the health care system do not use the technology. Specific reasons for not utilizing the service may include those cited in the literature, but others are likely to exist. Further exploration would require the collection of additional internal evidence. For this purpose, creating a survey instrument was a reasonable method of acquiring additional internal evidence. The survey was developed with existing evidence regarding barriers to teledermatology and utilization practices.

The instrument chosen in the internal evidence process must demonstrate validity to accurately measure the construct it is intended to measure (Langbecker, Caffery, Gillespie, & Smith, 2017). In addition to an instrument having validation qualities, it must also align with the telehealth specialty being studied. Caution must be exercised with adopting the instrument to a subspecialty. Finding the most appropriate survey or tool to collect evidence is an important step and can be modified if necessary. Adaptation of a survey can be made in a variety of ways, such as changing the wording, or choosing a portion of the survey; piloting the survey is an appropriate method for making these adjustments (Langbecker et al., 2017).

When considering a source of data collection related to barriers to teledermatology, the Technology Acceptance Model (TAM) is a well-established theoretic framework associated with

telemedicine (Langbecker et al., 2017). This model was developed by Davis (1989). The TAM measures constructs that are relatable to providers' attitudes about using telehealth. These include "perceived usefulness, perceived ease of use, attitude and intention to use" (Langbecker et al., 2017, p. 5). This model does not consider elements such as barriers to acceptance of teledermatology, external variables or social environment (Orruño et al., 2011). The modified TAM, however, according to Orruño et al. (2011), focuses on modifications to the original TAM. The model explicitly addresses provider receptiveness of teledermatology, and the intent to use it (Tensen et al., 2016).

Since the modified TAM was used by Orruño et al. (2011) in Spain, acquiring permission to use it would be problematic. The constructs were identified by Orruño et al. (2011) in literature and guided the development of an original questionnaire to understand the impediments to teledermatology or telemedicine adoption. A brief survey was developed for use at the local dermatology clinic and circulated among other providers for clarity and appropriateness, before entering into the SurveyMonkey.com (2018) for electronic distribution. The survey instrument selection and development underwent a series of adjustments to ensure appropriate questions and de-identification of subjects. Faculty advised maintaining brevity with the use of closed-answers. The option of "explain" permitted some allowances for the detailed feedback.

As intended, the survey described perceptions of value and facility support in conjunction with the providers' involvement in teledermatology. By the advice of program faculty and the IRB, the instrument was revised several times, condensed from 18 questions to five, with a Flesch-Kincaid reading level of 8th grade (Appendix A). The simplicity of the survey and the shift from research to non-research were not expected to change the nature of the project, nor involve utilization patterns specific to the location site. In general, the survey indicated the

overall potential for use, without informing on barriers and utilization patterns particular to the region.

The subjects of this project have also changed as the early stages of the project developed. Additionally, it was initially thought that only licensed providers would be surveyed. However, the Department Chief of ENT suggested the community health aide and practitioners (CHA/Ps) also be given the survey. The CHA/Ps may or may not be using the technology due to the acceptance by the overseeing licensed provider, and this may impact utilization (J. Koresh, personal communication, February 7, 2018).

Phase II: Validation. Examining research which supports the project is part of the validation step in the SMEBP (Dang et al., 2015). There are numerous studies, literature reviews and expert opinions which describe and explore impediments to teledermatology utilization. Teledermatology adoption is discussed on a full-scale regarding barriers and suggestions to improve on these hindrances.

A literature review was conducted to gather what is known about barriers to using teledermatology. Additionally, information regarding the resolution of these barriers was also noted. Both, telemedicine and teledermatology related articles were reviewed, and the primary themes were identified. All articles involved in this literature review possessed elements associated with the clinical practice problem, although overwhelmingly did not address the issues directly.

Strengths and limitations were easily identifiable and shaped the body of evidence supporting this problem focus even further. Additionally, validity, reliability, and relevance to the population were also evaluated as part of the critical appraisal (Melnyk & Fineout-Overholt,

2015a). Determining the association and applicability to the study population was the primary concern, although all demonstrated validity and reliability.

Phase III: Comparative evaluation/decision making. Considering which portions of evidence are most applicable to the project objectives is the next critical stage (Dang et al., 2015). For the teledermatology utilization project, much of the evidence-based information pertains to cost, access to care and timeliness, greatly underpins the necessity to adopt teledermatology fully. These are all uncontestable benefits of teledermatology. Although literature and research findings support favorability of teledermatology in practice, little is known regarding the barriers within this integrated system, which are preventing providers from adopting this practice on a full scale. Considering the Alaskan health care network is unique from those which have been studied, understanding barriers to this population must be considered. The evaluation of literature was helpful in the development of the survey tool.

Establishing a dialogue with other departments who have had success with telehealth was enlightening. The otolaryngology, or ENT department, has had widespread success working with telemedicine. Per conversation with John Kokesh, MD, this department evaluates up to 4,000 cases per year (J. Kokesh, personal communication, February 7, 2018). Dr. Kokesh believes working with CHA/Ps is an essential part of success, as these providers are in close contact with patients. Using telemedicine versus face- to- face consultation can allow a department to provide coordinated care and allows families to be prepared before coming into Anchorage (J. Koresh, personal communication, February 7, 2018).

Phase IV: Translation/application. This step involved the transformation of evidence findings into modifications, execution of a plan and finally, implementation (Dang et al., 2015). The protocol development was a critical step in this process and will be the catalyst to practice

change. Organizational approval should be met before implementing the protocol (Sparger et al., 2012, as cited by Dols et al., 2017), and this was done through IRB and facility approval. The proposed protocol was developed for both the CHA/Ps and the PCPs. According to Dols et al. (2017), the protocol must direct the staff (or subjects) through the process in a stepwise fashion. These protocols should be conducive to both the process of patient care and the way the provider is thinking. Using evidence-based material was essential to the process (Dols et al., 2017). This is consistent with Melnyk's (2016) recommendations to find the best practice solution instead of continuing with the current practice.

The project protocol developed was merely a reinforcement of the existing workflow/consult pathway, as it currently exists in this practice. Additional recommendations were added for clarity. Its purpose was to prompt the consideration for teledermatology, where it is appropriate. This protocol, or process, has been translated into a visual flow for users. Both licensed and non-licensed providers were included in individual and adjoining pathways. Eliciting input from staff dermatologists was helpful and promoted professional collaboration. Information was added to support project goals, and clinic recommendations were offered by dermatology providers and added to the guidance (Appendix B).

Additionally, this step of the Stetler Model involves the potential of organizational modifications of policy (Stetler, 2001). Using published teledermatology guidelines offers direction and parameters. The American Telemedicine Association (ATA) has established practice guidelines which involve clinical practice, technical and administrative guidelines basis (McKoy et al., 2016). These were adhered to, all the while observing the ATA clause asserting that providers will decide as to what is appropriate for a teledermatology on an individual basis (McKoy et al., 2016). Since the objectives of the project are to provide influence and guidance

to changing and improving practice, not regulation, this protocol will from here on out, be referred to as workflow guidance.

With information regarding provider utilization patterns and potential barriers to teledermatology gathered, an educational module was developed to assist, direct, and encourage providers to use this technology. According to Stetler (2001), this stage considers the person, place, time, and purpose of formulating the plan. The surveys were helpful in assessing learning needs to develop the education. Using the educational module, not only to educate but also to encourage certain behaviors, was valuable especially when initiating a relationship between providers and the telehealth department. As part of the educational PowerPoint, the proposed protocol was explained. Melnyk (2016) noted describing the development of educational materials to explain each piece of the protocol improves utilization. Indeed, the effect of the diffusion between providers, departments and service units will cascade over time as providers become more open to dialogue, suggestions, and knowledge sharing (Melnyk & Fineout-Overholt, 2015b).

Phase V: Evaluation. In the final stage, the project team evaluated how well the plan was implemented and whether the evidence resulted in meeting the project objectives (Dang et al., 2015). This occurred three months post-intervention. Aggregate data from teledermatology utilization was evaluated to examine the number of SAF cases and service unit utilization. Aside from aggregate data, several other types of outcomes, such as survey results, educational attendance, practice changes, and new user data was examined to forecast the success of project interventions.

Conclusion

The Stetler Model is a linear methodology for guiding a practitioner through an evidenced-based project. The teledermatology utilization project relied on each of these steps. This model provides a sound compass for the nurse practitioners who are involved in the project because of their critical thinking skills and advanced knowledge (Dang et al., 2015). Each step is anticipated to carry the plan through all stages until teledermatology utilization has been maximized and standards of practice are improved.

Chapter Four: Project Design

The purpose of this evidence-based practice change project was to improve teledermatology utilization within a circumscribed integrated health care system. Teledermatology is a well-documented modality to improve access to care (Nelson et al., 2016), as well as reduce the burden of cost and wait times for treatment (Campagna et al., 2017). This commodity has not been practiced by all PCPs within this health care system, preventing uniformity of care among PCPs attending to dermatological issues. Therefore, directing the course of a project through the application of a framework or model to successfully deliver an anticipated clinical practice change is imperative.

The Stetler Model facilitated the execution of a plan designed to improve this teledermatology adoption and utilization process by establishing a method of standardized work-flow for teledermatology consultations. The steps of the model guided the project from beginning to end, with the anticipation that efforts to increase utilization will continue beyond the dates of the doctoral project. Beyond these essential elements, attaining determination and approval through the university and project site's IRB was necessary. The following paragraphs highlight the IRB function.

Institutional Review Board

The IRB has the responsibility of protecting the well-being of humans who are subject to research (Seklwitz, Epley, & Erickson, 2018). This teledermatology project was determined suitable as a non-human subjects research (HSR) quality improvement project by both the University of Alaska Anchorage and the tertiary health care facility, therefore requiring no formal IRB process. The determination of non-HSR is provided (Appendices C and D).

Additionally, each organization which fell under the umbrella of this integrated health care system was required to provide authority for the project. The organizations, which jointly own the tertiary facility, also rendered authority for the project whether research or quality improvement. One of these co-owners involves primary care facilities, many PCPs, and the most significant potential for expansion of teledermatology use. The tertiary health care facility houses the hospital, specialty clinics (including dermatology), and also a large primary care facility for patients who reside within the urban area, which also provides health care support to multiple distant sites. Many sites do not have road access to Anchorage and vary in size and provider staffing. The concept proposal (Appendix E), as well as the project (Appendix F), were approved by several corporations. One of the corporations supported the project, though clarifications to the proposal and edits in the survey were requested. This facility does not employ PCPs, though does staff the tertiary care facility with many specialists.

Subjects. The project subjects were PCPs and community health aides and practitioners (CHA/Ps) who have the potential to utilize teledermatology services. Privacy was not be an issue since patients, individually, are not being studied. According to Cushman (2018), the Health Insurance Portability and Accountability Act (HIPAA) mandates protections of identifiable health information, generated from institutions safeguarded by HIPAA. For purposes of this project, it was not the individual patients under study, but the overall process of teledermatology utilization.

Risks and benefits to subjects. Consideration of risks and benefits aligns with the The ethical principle of beneficence (U.S. Department of Health and Human Services, Office for Human Research and Protection [OHRP], 2018). Within research, a benefit demonstrates something favorable associated with health and risk, without probability. The term, risk,

however, when contrasted with benefit is a consideration of the potential harms (OHRP, 2018). Both PCPs and CHA/Ps were given the opportunity to complete a voluntary survey. Additionally, PCPs and CHA/Ps were given the opportunity to watch an educational video which included a protocol for future guidance on teledermatology use.

***Risks*.** PCPs and CHA/Ps were not exposed to any health risk, though there will be some impact on the work environment. Inconveniences were anticipated initially, as the workflow guidance becomes part of the work environment. Additionally, participation was optional. PCPs and CHA/Ps were not required to complete the survey or watch the educational module.

Benefits. PCPs and CHA/Ps benefitted from this project by acknowledging their concerns using teledermatology. Experiencing reduced barriers and improved access to a standardized process was also anticipated. Participants received continuing education credit on completion of the educational module.

Evidenced-Based Practice Change Design

This quality improvement design, as discussed by Melnyk and Fineout-Overholt (2015b), aligned well with the *Rogers Diffusion of Innovations*, Figure 2. According to Zhang, Yu, Yan, and Spil (2015), the term diffusion is the process by which the innovation information flows from one person to another over time within a social system. This theory has been applied to various studies regarding adoption of technology, including a cited telehealth project, internet health care services for family, providers, and a computerized nursing care plan (Zhang et al., 2015).

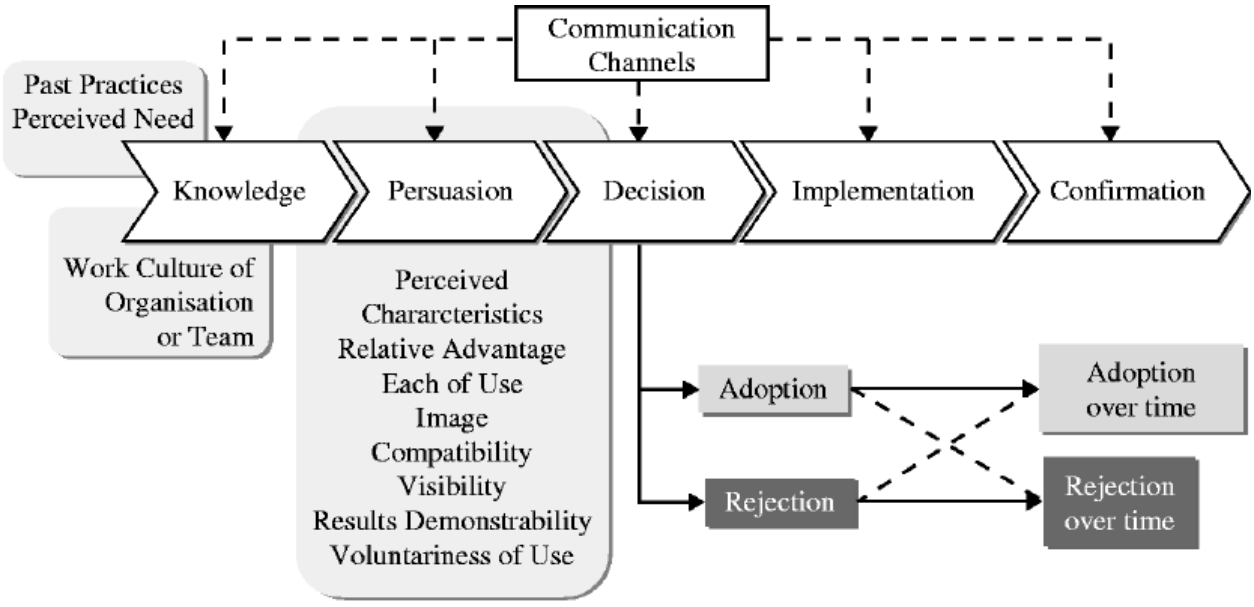

Figure 2. Rogers Diffusion of Innovations. Schematic depicting the multifactorial elements of the technology adoption process. Pundak (2014).

Innovation as a process involves five different characteristics. The five specific features include: (a) relative advantage; (b) compatibility; (c) complexity; (d) trialability; and (e) observability (Zhang et al., 2015). *Relative advantage* is how much the technology is perceived by the user to be a benefit if adopted. *Compatibility* is associated with the degree the technology agrees with the setting. The greater the agreement, the more likely adoption will occur. *Complexity* has to do with just how much technology is a challenge for users. Simplicity is the key to more prompt adoptions. *Trialability* is the feasibility to pilot a technology with limited obligation. There is a better chance of acceptance with less complication. *Observability* pertains to how significantly the advantages of the technology are recognized. Adoption is most imminent at the point when understanding of the commodity's value takes place (Zhang et al., 2015).

This design model focuses on various types of adopters, according to their propensity to assume technology. Individuals are categorized into the following classes of technology

adoption: (a) innovators; (b) early adopters; (c) early majority; (d) late majority; and (e) laggards. This model suggests greater success for change comes about by leaning on the early adopters as a more powerful tool for change, and then focusing on the laggards (Melnyk & Fineout-Overholt, 2015b).

The diffusion principal can be considered on various organizational levels. The concept of adopters can be applied to providers, individual health care facilities within the network and specialty departments within the tertiary health care facility. Regarding providers, there are no official records of which providers use the service more, though it is observable that certain providers are more frequent users. Individual departments of this health care facility are more robust users of telemedicine and, therefore, may be looked at as a model for innovation. Within the health system, certain facilities are stronger users of teledermatology, while others have not engaged.

Rogers Diffusion of Innovations, as discussed by Melnyk and Fineout-Overholt (2015b), not only promotes change in an organization but also guides individuals and teams. Overall, organizational change consists of three necessary steps. First, the vision, and the objectives must be identified. The following step involves the concept of belief in the ability of the individual to accomplish this change. Developing a strategy to execute the plan is the final step and should be specific. Elements should involve SCOT (Strengths, Challenges, Opportunities, and Threats) (Melnyk & Fineout-Overholt, 2015b, p. 318).

Leadership. The project leader was the nurse practitioner leading this project, who is also a provider of teledermatology services. This Advanced Practice Registered Nurse (APRN) leader discussed the project, goals, and potential outcomes with members of the project team. This person was also the principal investigator.

Team members. The team members consisted of two dermatologists who also performed teledermatology consultation. They helped to identify cases most appropriate to teledermatology services as part of the daily function. They also provided input and reviewed the protocol or guidance process. The Telehealth Program Development Coordinator was instrumental in providing access to data and allowing the essential telehealth coordinators to participate in the project goals. The activities of the coordinators which was most helpful was assisting with AFHCAN access.

Methodology. A questionnaire was distributed to PCPs employed beyond a circumscribed area of the urban network. The questionnaire asked several questions regarding utilization patterns and barriers to utilization, along with several items consistent with the constructs of the modified-TAM (Orruño et al., 2011). The survey was helpful in understanding individual barriers and organizational obstacles.

Resources. The telehealth department at the health care facility was also a valuable resource, as were other providers and departments who have been strong utilizers of telehealth. The expertise of other dermatology providers should not be dismissed. The ATA guidelines (2016) were supportive in the development of the teledermatology protocols.

Stakeholders. Stakeholders consisted of the corporations involved in the health care network and the recipients that are served. Each corporation within the system would be able to spare costs and inconvenience associated with travel, and improved quality of care for patients. The individual providers were significant stakeholders, and naturally, clinic staff is significantly impacted by changes in clinical practice. Ultimately, patients were the stakeholders most affected by the degree of utilization that takes place. This service promotes timelier and more cost-effective care, in addition to the reduction in travel inconvenience.

Change. Learning barriers preventing teledermatology from being used by providers and guiding direct provider utilization was a substantial change. The Service Chief of the specialty clinics was in full support of the project recommendations. Willingness to adopt the use of teledermatology requires ongoing diffusion among users and potential users.

Materials. The questionnaire/survey tool was used to gather information. Distribution was obtained from a link for electronic completion. Other materials included a protocol and educational module, also distributed electronically.

Education. The guidance on appropriate teledermatology processes was part of the education for all providers. This was delivered in the form of an educational module for voluntary viewing. This involved cases studies directed to both, PCPs and CHA/Ps and involved an understanding of the unique practice requirements of the CHA/Ps.

Collaboration challenge. One of the specific challenges was this project involved more than one organization. The project included many independent organizations that ultimately receive dermatology care at one tertiary health care facility. Resistance from service units in their degree of comfort in using teledermatology was anticipated as well as issues with some facilities not engaging in this service at all. There were strategic hurdles to overcome.

Plan for project evaluation. The goal for this project was to promote an increase in the number of teledermatology SAF consultations over three months. Additional anticipated outcomes initially considered focused on the decrease in the number of in-person visits from designated service units and the decrease in variation among service units regarding the number of teledermatology cases submitted for consultation. Such outcomes were not possible if using only aggregate data but could be evaluated anecdotally, internally.

Data collection and analysis. Data collection methods consisted of the survey submitted through SurveyMonkey.com. The information was then analyzed through the software. Telemedicine aggregate data was the basis of data.

Post-intervention plans. Post-intervention plans consist of provider satisfaction surveys to PCPs to ascertain their satisfaction with the teledermatology service. Understanding the satisfaction of providers several months beyond this project would help to understand the value of the protocols and education and provide a sense of direction for the future. This may need to be considered every three to six months for newer providers. This is part of the data collection process, as well as part of the post-intervention plan in a typical improvement process. The telehealth department monitors the utilization of teledermatology and provides monthly reports to all departments. The Teledermatology Provider Satisfaction survey used by the VHA (McFarland, Raugi, & Reiber, 2013) could feasibly be submitted three and six months after the project. This utilizes the multidimensional concept of domains regarding satisfaction (McFarland et al., 2013) (Appendix G).

Conclusion

Applying the *Rogers Diffusion of Innovations Theory* helped improve the overall outcomes of teledermatology adoption by focusing on the influence of early adopters and potentially high performers. Employing the project design with the SMEBP promoted a sense of working through stages of project development along with correlating the unique strengths and weakness of a telemedicine adopter. Outlining the various components of the project and giving purpose and direction for each of these components, set the stage for early preparatory work. Awareness of potential impediments while implementing the project helped the project team take

extra measures to circumvent or overcome these obstacles. Assimilation of the many nuances of the project objective facilitated the outcome of success and positive organizational outcomes.

Chapter Five: Implementation Process and Procedures

Teledermatology provides an effective means of dermatological care consistent with that of a face-to-face visit (Tensen et al., 2016). This scholarly project explored the possibility that applying workflow guidance and provider education to clinical practice would promote increased utilization of teledermatology. Stakeholders benefit from an economic and efficiency standpoint which promotes quality of care and access to services.

The transition from the literature review and planning portion of the project to the implementation phase required detailed planning and collaboration. Phase IV: Translation/Application of the SMEBP is followed for this process. This step is defined by Dang et al. (2015) as

> "converting findings into the type of change to be made/recommended, planning application as needed for formal use, putting the plan into action by using operational details of how to use the acceptable findings, and then enhancing adoption and actual implementation with an evidence-based change plan" (p. 282).

The following chapter discusses the implementation experience with the above step to steer the progress as appropriate.

Steps of the Implementation Process

Implementation of the teledermatology utilization project required strategic planning to accomplish tasks in an orderly fashion. Much of the original project proposal was augmented to be more conducive to a quality improvement project. The overall intent of the proposal was to promote and increase the utilization of teledermatology, not necessarily go to exhaustive lengths to determine and correct barriers to utilization, before instituting guidance and expectations.

There were, however, several areas of concentration involved in implementation, despite efforts to simplify the project objective. These were as follows: (1) obtaining approval from individual facilities, (2) dissemination of the survey, (3) distribution of the protocol, or workflow guidance, and (4) dissemination of the educational module.

Approval. The process of implementation was not straightforward, as the IRB approval process and organizational approval took approximately three months. As this Alaskan integrated health care system is comprised of independent corporate entities, individual approval from these entities was required. Two locations provided approval, and implementation was done. Two other sites were solicited for participation; however, acceptance to participate was not received or was received far too late into the project evaluation phase.

Survey. Beyond the development and approval of the survey, launching the instrument was much more straightforward, since it was built within the website, Surveymonkey.com. Intended recipients of the survey tool were positioned throughout a variety of individual organizations within the network, and there was no direct method of disseminating the survey tool to providers. Resourcefulness and networking skills were necessary to launch the survey to the intended audience. Focusing on leadership was the best method and included CHAP leadership and clinical management.

The Service Chief of the primary care clinics was aware of the project and approved the release of e-mail addresses for the PCPs. The survey was then distributed via e-mail. Additionally, the survey was also offered to one of the Community Health Provider (CHP) that oversees many other CHA/Ps in this corporation. In total, the survey was initially submitted to 51 providers, 25 PCPs (V. Corbett, personal communication, July 12, 2018) and 26 CHA/Ps (M. Petruska, personal communication, May 26, 2018). After the initial survey launch, it was

realized this Listserv did not include an associated group of PCPs; therefore, another e-mail was sent out to this group with the SurveyMonkey.com link. The survey was sent to 19 providers (B. Bartgis, personal communication, July 16, 2018) who represent a vital source of teledermatology consultations, since patients associated with this practice site are not in close proximity to the dermatology clinic. Achieving access to care in this patient population is highly desirable due to the volume of health care recipients. A second corporation without road access to Anchorage also agreed to participate in the study. The survey link was submitted to the Vice President (VP) of Quality who is also a medical doctor. From there the survey was dispersed to 241 PCPs and CHA/Ps within that corporation (H. Chaney, personal communication, November 15, 2018; November 19, 2018).

Workflow guidance. The telehealth department graciously crafted the flow design of the protocol draft which represented teledermatology expectations and standardizations. This development involved several small meetings over several months. As with the survey, the best method of disseminating the workflow guidance was via e-mail to the same addresses as the survey link. This was distributed along with the educational module discussed below.

Educational module. A meeting was set up with an internet technology professional from another department, who aided in delivering the educational module via Adobe Connect. As with the protocol, the Adobe Connect link was sent out via Listserv, and specific representatives to disseminate the link to view the one-hour presentation. Participants registered online which enabled the principal investigator to identify the number of participants who viewed the module. Materials were disseminated to both participating corporations. The providers from one of the corporations were given gentle reminders to at least view the module for free continuing education credit. A flyer was posted in one of the primary patient clinics break-rooms. At one

point it was realized that several CHA/Ps might not have received the link to the educational module or workflow guidance; therefore, it was necessary to reach out to respective PCPs to ensure materials were received. The protocol and the educational module link were also e-mailed to the VP of Quality, of the rural corporation, but it was questionable if this was further distributed to the subjects. The link was sent individually to two interested nurse practitioners from the area, in anticipation that they would share and promote offering to leadership and other providers.

Implementation Process

Historically, voluntary adoption of telehealth modalities has been a goal for the telehealth medicine and outreach coordinators. The steps to implementation, as discussed in previous paragraphs, required attention beyond anticipated administrative procedures, phone conversations, e-mails, and flyers. Disseminating the project is an integral part of the implementation (Dols et al., 2017). Additional activities to promote successes, as recommended by Adams and Cullen (2011) included: (1) reminders, (2) setting examples, (3) applying the evidence into the practice setting, (4) assessing compliance with the process and results, and (5) acknowledging when processes were successful at the bedside.

Each stage of implementation required unique support, flexibility, and above all, persistence. Periodic meetings with key personnel who supported the goals of this project, priority setting, and time management skills have been imperative to maintain progress and consistency. Publicizing, collaborating, projecting, and networking were essential elements to facilitate progress.

Preparation. Additional actions included participating in the clinical directors meeting with the telehealth department which provided leverage to engage leaders in the project. This

was set up prior to securing IRB and facility approvals. This allowed for an opportunity to discuss the benefits of teledermatology using AFHCAN, the value for patient care, and the goal to involve the network organizations. This included a brief discussion and endorsement of the AFHCAN mobile app. This setting allowed an informal persuasion to use teledermatology for consultations from a specialist perspective.

An early morning clinical manager meeting with the local corporation's clinical providers and nursing support was attended to discuss the project, the survey and the suggestions of using the AFHCAN mobile app for ease of using telemedicine when the opportunities arise. There was receptivity to the aspect of using the mobile application (app) which was a positive way to engage providers in using teledermatology in the future potentially. To secure much-needed attention of the CHA/Ps, requesting a few minutes to speak at a convocation of CHA/Ps from rural areas in the states was a timely opportunity to talk about teledermatology. Most of these CHA/Ps were either part of the health corporation in the study or received support from the PCPs involved in the project.

Collaboration. It was apparent, early on, that networking and collaboration with the target audience in various capacities, was critical to launching the project and getting subjects engaged in the project. For example, closer involvement with the CHAP department facilitated the pilot of a workshop on teledermatology with community health aide (CHA) students. This is planned to continue. Additionally, providing open-ended discussions with clinic perspectives during a statewide telehealth video conference also raised awareness of the value and impact of teledermatology. Collaboration helps to satisfy the objectives of the dermatology department, as well as telehealth. The more it was discussed, the easier it became to talk about it and articulate expectations.

The discussion of the mobile app was presented to one of the primary care practices, located at a respectable distance from the dermatology clinic, and one of the case managers agreed to learn about the app and help the other providers use it. The hope was that technologically savvy personnel would promote and inspire others to use the tool. According to Dols et al. (2017), the addition of super users was a crucial part of dissemination. In this study, super users were added at various times; such as at the onset of dissemination, and at the time of education, and distribution of the protocol. Realizing who might be the champions to the teledermatology project was especially energizing and motivating.

Brief meetings were also held at this same clinic with an early morning nurse group and a later morning provider group of about 19 providers, all of whom see patients several miles from the dermatology clinic. This meeting involved a brief discussion of the project, reminder of the educational module available online, discussion of the workflow guidance and encouragement to trial the mobile app of AFHCAN. On this day, the nurse group was far more interactive and enthusiastic about this tool.

Late into the project implementation, it was realized that the pediatric group had not been included in the project; thus, contact was made with clinical leadership. An early morning huddle provided an opportunity to discuss benefits for teledermatology. There was clear receptivity to the idea. The idea to use the AFHCAN mobile app was also presented with the hospitalist group, who frequently request assistance with in-person hospital consults or secure texting.

Personal attention. Contacting individual providers and asking them to try AFHCAN, emphasizing the mobile app as a desirable method was one of the best methods to influence the use of teledermatology. As providers continue to consult via phone and send images via non-

secure methods, they were asked to consider the AFHCAN mobile app. Because the project was approved by two of the health care corporations within the integrated system, there was a sense that it was permissible to approach providers as convenient, to use the feature. Naturally, responses and receptivity varied, but most were amenable to the concept and willing to use the mobile app. Appealing to providers' sense of duty to provide excellent care efficiently was a catalyst for compelling providers to accept this method of sending consultations.

Time management. Another part of the implementation process was developing a reverse timeline. Since the depth and character of the project has changed and implementation delayed, considering the timeline from a reverse standpoint was necessary to allow for delays, interruptions, and complications. Securing a minimum of three months of data post-intervention was ideal for determining if education and protocol implementation promoted increased use of teledermatology. Although it was not feasible to incorporate many of the network facilities in the project, in time, with evidence of successes with a few regional facilities, the project will continue in some form or fashion until the adoption of teledermatology and efficient processes are part of the typical daily clinical workflow.

Challenges and Barriers to Implementation

One of the significant barriers to the implementation and success of the implementation was getting buy-in from the participants. Though there seemed to be a steady flow of survey responses (likely because the survey was brief), capturing providers' interest in a technology that is mostly voluntary was no easy task. The tools implemented to improve provider adoption, the workflow guidance, and educational module, were not overwhelmingly embraced, despite the educational credit available at no extra cost. There were 12 documented attendees of the educational module.

In addition to the need for provider engagement, working with a health care facility from a distance was a challenge due to the unfamiliarity with the organizational structure. Secondly, project materials may not be dispensed as anticipated. Thirdly, interfacing with clinical personnel was not feasible as it was with providers in closer proximity.

Another area of potential conflict is the continued changing of the electronic health record (EHR) among various sites within the organization. Historically, AFHCAN has been the primary vehicle for SAF teledermatology; however, since the EHR has become instituted, this pattern is beginning to change. This use of various EHRs has created inconsistencies in how service units are requesting consults and referrals, and thus, has made for secondary pathways for teledermatology via e-mails and secure texting. This problem, however, provided an opportunity to strategize methods to engage providers in uniformly using teledermatology in order to eliminate confusion and promote uniformity. Recognizing the difference between consultation and referral is also problematic in EHRs and with providers. Modifying a referral into a consult is a challenge when using the EHR. With AFHCAN, however, it is relatively simple to make this adjustment and bill for consultative services. Understanding the impact and components of referral and consultation was discussed in the educational module.

Lastly, one of the significant barriers to the implementation of the project is that it could not involve the entire health network simultaneously. Individual facilities must approve the participation and would have a process to follow. However, an essential sample of the system was targeted in this project, and lessons learned can later be applied as the expansion of teledermatology is pursued. There are likely a number of political, cultural, and administrative barriers that may result in a barrier to adoption, and future research could help identify important strategies for improving teledermatology utilization.

Considerations

Though one of the entities involved in the project has not been historically receptive to AFHCAN, involvement in the project was very encouraging. The organization would need to support the use of teledermatology and eventually understand the positive impact of adopting access-to-care technology. It is necessary to proceed cautiously to avoid unnecessary loss of gains. This project can potentially change this practice and facilitate easier access to care for those who live at a distance from the tertiary facility.

On the other hand, the other corporation involved in the project has used the system significantly in the past but have ceased actively using the resource. The reasons for the decline in utilization is not clear, but some of the reasons suggested were: (1) the dermatologist had retired, (2) providers may not have been aware that cases could still be sent for the covering nurse practitioner to review, (3) the corporation changed from a paper medical chart to the electronic health record, and (4) difficulties with EHR and AFHCAN integration may have resulted.

Aside from organizational considerations, one potential limitation of this project is the likelihood that there is a shift in wait times for this clinic since there are now three providers working consistently. An increase in the number of teledermatology cases could also be attributed to the heightened awareness in the clinic to improve the process. Providers requested teledermatology consults when appropriate, especially when reviewing incoming referrals. A rise in consultations may be the result of increasing awareness of teledermatology, potentially due to the existence of this project and the perpetual discussions pertaining to such.

Conclusion

Though the implementation of the Teledermatology Utilization Project suffered delayed execution, the intervention was delivered and integrated into the population of providers to the greatest extent possible given elements of resistance, distance, and complexity. The initial tasks and reinforcements have since been activated, and ongoing efforts to engage providers' interests in teledermatology have ensued. Continually laying the groundwork, performing fieldwork, and promoting teamwork ensured a thorough implementation with much potential for future goals for improvement. Finalizing details, collecting surveys, and keeping all project stakeholders informed have been equally important and challenging objectives. Keeping the end goals in mind to reach a successful practice change and foster the momentum of continuous quality improvement is an important objective.

Chapter Six: Evaluation and Outcomes for Practice Change

Teledermatology has been an evolutionary technology with questionable degrees of adoption and acceptance among PCPs. This scholarly project introduced a practice change initiative from a clinical perspective. Though the Alaskan health care system houses a prominent telehealth department that is currently practicing outreach, support, and education, there are varying degrees of individual and regional telehealth participation. One exception to the implementation plan was only a small fraction of health care organizations under the network participated, due to the inordinate amount of time it would require gaining approval of each facility site. Phase V: Translation/Application of the SMEBP was followed for this process (Dang et al., 2015).

Outcome Measures

Selection of outcome measures was significantly adjusted from the original plan to one primary outcome measure: the trend in teledermatology consults generated for areas outside of the immediate urban area. Teledermatology modalities, in general, are directed for these types of patients for improved access to care. There were variables identified that could potentially influence this outcome measure other than the specific implementation interventions. These include: (1) coordinated efforts among dermatology providers to encourage consults as a substitute to in-person referrals, and (2) increased awareness of support staff to request images when referrals are submitted.

For outcomes data, de-identified aggregate data was examined monthly. This was done by reviewing the summation of billed encounters during monthly meetings with the telehealth coordinator. The analysis process is a visual application in chart form, via Excel. Information derived from the survey was processed via SurveyMonkey.com matrix. This involved response

selection and reviewing free-text input. Other outcomes will be presented through discussion in sections below.

Although outcomes are expected to fluctuate and change over several months, the overall trend in utilization is essential to evaluate. Unfortunately, utilization changes may not be evident for many months to come. Many areas can be assessed to ascertain project effectiveness, which impact practice for further provider participation in teledermatology. In addition to aggregate data, these areas include survey analysis, educational attendance, new user information, and changes in other departments; all of which suggest anticipated progress and future impact.

Data Analysis

For outcomes data, aggregate data was examined monthly with the telehealth coordinator. Only deidentified summations of encounters were reviewed. The analysis process is merely a visual application in chart form via Excel. Information derived from the survey was processed via SurveyMonkey.com matrix. This involved response selection and reviewing free-text input. Other outcomes will be presented with a simple discussion.

Aggregate data. Aggregate data is maintained and monitored by the telehealth department. There may be several ways to view the aggregate data, teledermatology SAF data over three months was compared with the same months of the previous two years. The project was mostly implemented between the last part of June and the beginning of August, 2018. Data is presented below in graph format, see Figure 3.

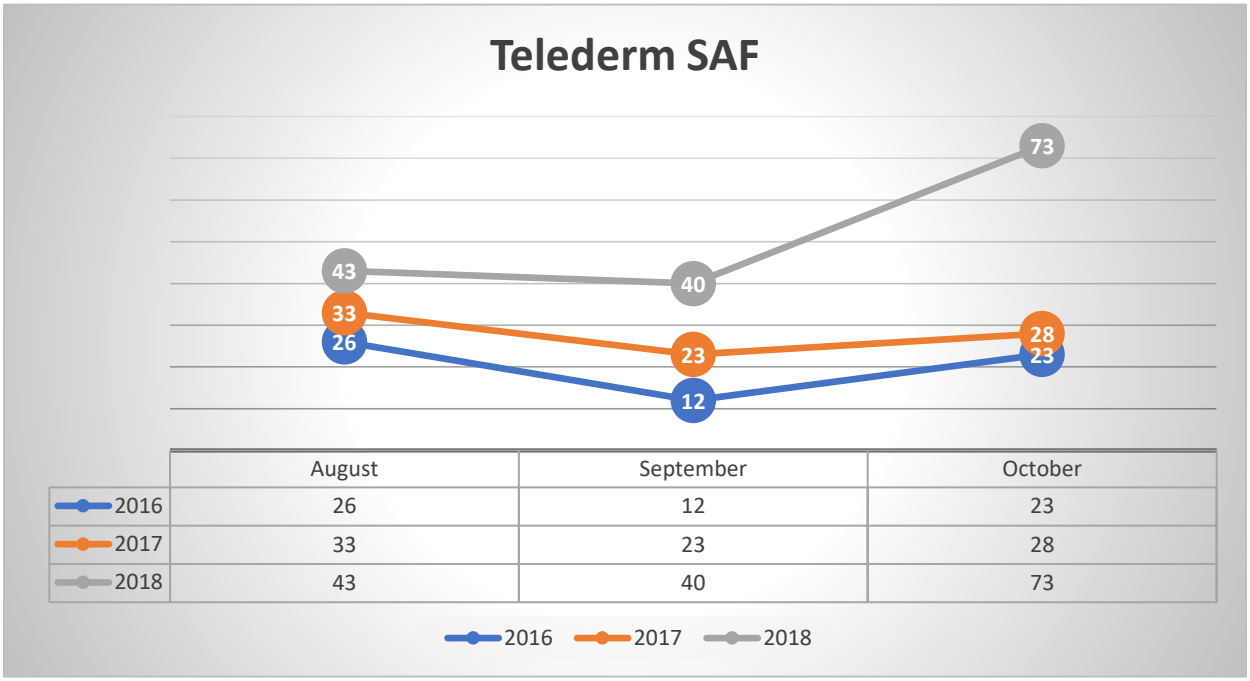

Figure 3. Growth over three months with comparisons of three years. August to October, 2016 to 2018.

Aggregate data represented total AFHCAN cases received from all network sites, although to clarify, only two sites were included to participate in the survey, workflow guidance, and education module. The dermatology providers observed the process of the workflow guidance for all incoming queries, which was applied to all corporations in the network. This was the only feasible method of managing this project since it was not feasible to involve all health corporations in the project. As mentioned previously, all dermatology providers had heightened awareness and vigilance to request teledermatology consults instead of referrals if it deemed appropriate. Support staff also became more stable and cohesive during this project, requiring providers to send images along with referrals. This offered the opportunity to convert referrals into SAF consults. Additionally, it is important to note the outcome data reflects more

than those outside of the primary urban area because providers who have begun to adopt teledermatology practices are occasionally using them for local patients.

Survey. The survey consisted of two demographic questions and five core questions involving general utilization information. After approximately 12 weeks, 70 responses were received and evaluated to develop the educational module. It was determined that there would be 311 eligible respondents between the two involved health care corporations. Determining the eligible PCPs and CHA/Ps was done by asking key personnel including the VP of Quality from one corporation and the CHP and Service Chief from another. Comments were useful in gaining insights into barriers and impediments. According to the analysis, most of the survey respondents were providers in rural areas. Although most respondents did not use teledermatology, most respondents felt that teledermatology was appropriate for the worksite.

The survey continued to be available to groups for ten weeks who later were able to respond; and to date, there have been 73 responses. Bar graphs extracted from SurveyMonkey.com illustrate responses to the five core questions and two demographic questions (Appendix H). In addition to the concrete multiple-choice answers, some responses were free text and can be used as evaluative information. SurveyMonkey.com word analysis was used to review common themes in the "comments" section.

In addition to the multiple-choice questions, there were 155 free text comments. These were evaluated via text analysis, which is a list of the most commonly used words in the responses. Table 2 provides some of these common words per survey question.
Table 3 provides sample responses using keywords obtained from the comments.

Table 2

Text Analysis for Survey Responses in Order of Frequency

Question	Frequent Text
How often have you used teledermatology in the last six months?	Use * Know* Case* Available* Needed
Does teledermatology make your job easier when caring for patients?	Used * Never * Help * Cerner * Pictures
Do you feel that the process of performing teledermatology is challenging and keeps you from using it?	Use * Working * Carts * AFHCAN * Never
Do you feel that teledermatology is suitable for your work area	Used * Patient * Teledermatology * Anchorage * Pictures
Do you feel supported in the use of teledermatology by your job?	Use * Supported

Table 3

Free Text Survey Responses

Text	Responses
Know	"I didn't know this was an option" "I didn't know it was available"
Patient	"Having the ability to consult enhances any patient encounter" "Yes a lot, the providers can see the pictures of our patients and help diagnose and treat"
Working	"The AFHCAN equipment is not overly complicated to use it is just slow and adds unneeded work" "Once the carts are working they are pretty straight forward on how to use. That being said i have never contacted or tried to contact dermatology with the carts or otherwise"
Pictures	"Teledermatology is very suitable, as we are able to send a picture of a derm patient with the history provided to get a diagnosis and plan in place" "We get many pictures sent in to us ("RMT" from the villages), so we are fairly used to trying to diagnose from afar"
Used	"If it was simple and fast I would use it. I have used it once in 5 years 7/11/2018 11:29 AM" "Teledermatology is useful because dermatology issues can be hard to describe but, not through AFHCAN"

Educational module. This module was developed using information from literature, prior aggregate data, and survey responses. Out of 311 eligible participants, 12 participants viewed the educational PowerPoint. It was hopeful that more providers and CHA/Ps would have participated in this activity. Participants demonstrated the intention to use teledermatology as a

result of the education and largely demonstrated comprehension of teledermatology basics based on the post-evaluation.

New user data. Thus far, several PCPs from one of the corporate health facilities have received or refreshed their username and password to AFHCAN. Examining total access numbers are not practical as many providers were assigned usernames in the past but did not use them. Some have gained or regained access, with the intent to use. Each new case represents a motivation to send proper consults that are easily billable for the dermatology provider and remain HIPAA compliant. Having providers send cases, however, has been a gradual process. It should be emphasized that providers at one of the two corporations were not previously users of AFHCAN before this project, except possibly in remote rural areas. Most providers have been assigned usernames and passwords but did not have the direction or guidance to use the technology. An increasing number of providers have been solicited to trial AFHCAN mobile, which is increasing the receptivity for use.

CHAP training. One-hour long workshops have begun with the training sessions for CHA/P, who are uniquely positioned to initiate teledermatology activity through the preferred software. This was not part of the actual implementation but became an evolution from the Clinical Concentration course with the CHAP department. Working with the CHAP department was an excellent way to promote visibility, and there is a current plan in place to continue to offer this workshop.

Results

As data collection is an ongoing process toward the goal of quality improvement, the results of this project are preliminary and should be examined at periodic intervals. The survey response was low, approximately 23%. Responses from the survey multiple choice questions

indicated most individuals did not have experience with the software and could not form overwhelming positive opinions. The largest response groups noted per question:

1. *How often have you used teledermatology in the last six months?* Teledermatology was rarely or never used in the previous six months (81.43%);
2. *Does teledermatology make your job easier when caring for patients?* Teledermatology did not make work easier (32.26%);
3. *Do you feel that the process of performing teledermatology is challenging and keeps you from using it?* Respondents sometimes felt the challenge of teledermatology was a barrier (20%);
4. *Do you feel that teledermatology is suitable for your work area?* Respondents did not feel supported by the job in the use of teledermatology (17%); and
5. *Do you feel supported in the use of teledermatology by your job?* Most respondents most felt it was suitable for the job setting (88.71%).

With new processes in place, the modalities of teledermatology are more likely to be committed to practice, or at least considered. These processes include improved communication and relationships between PCPs, dermatology providers, and telehealth coordinators, along with modifications in training with the CHAP department. Not only are individual providers demonstrating an interest in AFHCAN, but entire groups of providers are also taking an interest in consults via the software. From a clinician standpoint, dermatology providers are exercising more significant control of in-person referrals due to vigilant screening and suggestions for AFHCAN consults as appropriate. Overall, there has been a notable increase in consults to date, since actively promoting teledermatology within the designated health corporations.

Conclusion

Project efforts resulted in an increase in teledermatology adoption and utilization. Aggregate data provided acknowledges a substantial increase, particularly in the third month of data collection. This would likely only have been accomplished by the individual components of this quality improvement activity, but also by specifically marketing a simpler method of using teledermatology software; i.e. the mobile app. The results are focused on a relatively small number of cases overall, though each month of the project yielded a higher number of cases then year prior. The results confirm that concentration on groups with various strategies and mindful evaluation of provider requests can enhance the adoption of the teledermatology process.

Data collecting in a project such as this can be tenuous, and merely a reflection of a much larger development. Data is fluid and varies significantly from month to month for many reasons. Alaska is well known for subsistence lifestyles and weather fluctuations. Persistent attention to incoming referral requests can reduce a percentage of in-person visits that are not necessary, yet it does not account for the many dermatological conditions which may not be considered for assistance. Thus far, new provider engagement appears to be the most significant indicator of teledermatology expansion. Continual marketing and networking with regional health facilities, in some capacity, is critical for practice changes in dermatology.

Chapter Seven: Implications for Practice

Throughout the project course, it was evident that the Doctoral of Nursing Practice (DNP) Essentials were supported in numerous ways. These fundamentals published by the American Association of Colleges of Nursing ([AACN], 2006) affirms the proficiency and qualifications of advanced nurse practitioner regardless of capacity employed. Specific categories are more greatly expressed, depending upon the unique and expert role of the advanced practice nurse and the focus of the project. The DNP Essentials are discussed below in relation to the Teledermatology Utilization Project.

Essential I: Scientific Underpinnings for Practice

This concept asserts the management of clinical matters demands the stability and support of the sciences (AACN, 2006). Because theories are an essential product of nursing science, the DNP must be aware of the ongoing developments of such approaches to positively affect issues in health care while instilling practice methods for the future. Several disciplines of science are incorporated in nursing science, which frames the development of middle-range theories and concepts to guide nursing practice (AACN, 2006).

The social sciences, for example, acknowledge a relationship between health care providers and internet technology. The connection may be one of conflict; however, nursing practice models serve as guides to the practice change and quality improvement (Wagner-Menghin & Pokieser, 2016). *Roger's Innovation of Diffusion* model aligns with the use of adoption of technology, based on a theory by Everett Rogers. This theory involves the adoption of innovations and the rates at which individuals do this (Melnyk & Fineout-Overholt, 2015b). The essence of this model was evident during the progression and fulfillment of the project and will be relevant as the impact of the interventions continues.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

This concept assumes the DNP has attained the necessary knowledge to exercise quality management in health care (AACN, 2006). This involves awareness of productivity requirements while committing to population health needs. It also suggests the ability to improve the standard of care while focusing on organizational goals. Proficiencies in cost-containment, coordination of care, and risk assessment are DNP necessities, as well as knowledge of methods of care delivery (AACN, 2006).

Kirkpatrick and Weaver (2013) discuss research survey results regarding desirable fundamental competencies of graduates of the DNP program as a reflection of the capstone project. Some of the cited qualities were leadership promotion, clinical acumen, and managerial capacity. Furthermore, the ability to initiate best practice measures in the health care system was an expectation (Kirkpatrick & Weaver, 2013).

With the above points in mind, expanding the role of acceptance of teledermatology in an extensive health care network, particularly with regions that have been low use or non-use, aligns directly with the principals of this essential. Leadership has been strongly required to help carry these efforts forward, with an emphasis on meeting the needs of the population. Appealing to leaders and groups have been essential in moving toward this objective, though resistance persists and will so beyond the scope of this project.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice Scholarship Education

This essential embodies the doctoral level nurse's research capacity to process known evidence, produce new information while applying these emerging concepts into health care practice (AACN, 2006). This entire essential involves (1) processing literature, (2) developing

an approach to evaluate practice, (3) establishing modes of improvement, (4) using results to further improve practice, (5) understanding resources for collecting a broad scope of information, (6) assuming an expert role in research and knowledge acquisition, and (7) sharing what has been learned from the experience to improve care (AACN, 2006).

The DNP is focused on applying a solution to an identified health care issue (Leibold, 2016). Applying the SMEBP was the appropriate framework to approach the need for health care delivery. This project aligns strongly with the process of clinical scholarship and quality improvement, via processing of literature, formulating a project plan, and executing the plan (Dang et al., 2015). Beyond this, the process involved a continual reassessment of project direction and effectiveness, while employing strategies to reapply new information — the project allowed for an emergence of other practical ideas to consider for future project work.

Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care

This essential realizes the importance of technology in improving health care and associated systems (AACN, 2006). Gaining perspective of the appropriateness of various technology resources is a DNP responsibility and a key aspect of care. Though straight forward in concept, Essential IV covers a broad scope of skills, from creating programs, appraising information resources, and providing oversight and ethical guidance in areas pertaining to information management (AACN, 2006).

Internet technology involves instruments which empower cognitive abilities and ultimately improve work contentment and interactions with others (Wagner-Menghin & Pokieser, 2016). Health technology encompasses teledermatology, and nursing leadership has an important role to play in this field of health technology while managing the human aspects,

benefits, and fiscal responsibilities. Furthermore, nursing leadership must ensure nurses are competent and ethical in the use of this technology. There are many areas within the scope of technology that nurses must be exposed to while keeping in mind there are positive and negative aspects of technology (Raman, 2017). This project was integrally associated with aspects of internet and health technology. Telehealth and teledermatology require internet capability and competent, reliable communications support to engage others in the resource. It also involves being able to connect on a personal and professional level with providers, which has been key to cultivating genuine interest and desire to augment health care delivery.

Essential V: Health Care Policy for Advocacy in Health Care

This valuable requirement pertains to the role of the professional nurse's influence on health policy at a multitude of organizational levels (AACN, 2006). This essential quality is central to the fate of health care practices. The DNP can use sound judgment and leadership skills when evaluating policies and pioneering for improved practices, while teaching, team building, and inspiring. Serving in a variety of capacities with multiple organizational agendas impacts health care policy positively (AACN, 2006).

One of the goals of the project was to develop workflow guidance to help providers visualize the consult and pathway process. Promoting the voluntary use of methods of health delivery may eventually lead to change in the dermatology practice, and eventually, become a standardized approach. An approach to policy development on a system-wide scale should look to professional organizations for direction. One such organization is the American Academy of Dermatology (AAD), which promotes the use of telemedicine in dermatological care, yet supports the provider's right to choose whether the care should be in person or virtual (AAD, 2017). A desirable policy may be, at very least, to ensure providers have access to the use of

teledermatology methods. Providers are often faced with the task of being stewards of hospital resources and patient advocates.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

This important DNP essential implores the need for the DNP to be prepared to work as a team member professionally (AACN, 2006). This essential is also one of the most common threads of the entire project. The interprofessional collaboration was an active and common theme evident throughout the entire project. Excellent communication and networking skills in several professional, quality focused areas are essential, including a focus on practice policy and standards. The DNP must show leadership capabilities in this area with practice and administrative challenges; as well as encourage groups to unite toward common goals in the health care arena (AACN, 2006).

The collaboration is discussed by Kelley and Littman (2005), as a persona, the *Collaborator*, which is one who can unite individuals beyond their comfort zone to accomplish tasks. They can flexibly work through departmental restraints to influence individuals and groups (Kelley & Littman, 2005). The substance of this project was based on the foundation of collaboration with other individuals and departments, specifically the Telehealth and CHAP department.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

This necessity explores the role of the graduate DNP in a leadership capacity. In this focus, the DNP integrates evidence-based health care interventions for the betterment of larger groups (AACN, 2006). Mentioned earlier in this paper was the tremendous cost burden

associated with skin disease in the United States. According to Lim et al. (2017) over 25% of American citizens, nearly 85 million, suffer from a skin condition. Based on medical claim reporting, this number is more than those with cardiovascular disease and diabetes combined and may be considered a public health issue.

Interestingly, skin disease prevalence is likely underrepresented. Furthermore, when considering population health another point made by Lim et al. (2017), is that the U.S. senior population, aged 65 and older, is projected to increase significantly with an unchanging physician supply. This demographic shift will yield a disparity in dermatology coverage, most noted in the rural areas (Lim et al., 2017).

This project is firmly based on the power of technology as a means of caring for the underserved populations and providing access to care. Maximizing the use of established resources should ameliorate the impact on the population demographic shift. The effective use of teledermatology should result in cost-effective, timely, accessible, and quality dermatological care.

Essential VIII: Advanced Nursing Practice

This final essential recognizes the DNP as having acquired a level of competence in a particular area of nursing (AACN, 2006). Several areas of science are recognized as necessary in the DNP, beyond skills cultivated and regardless of the associated specialty. Though specific domains of science support the area of interest for the advanced practice nurse, several important attributes are significant markers of the DNP graduate. For example, the DNP can evaluate and comprehend the scope of problematic health concerns in a population and develop interventional methods to address health issues. The DNP also possesses the ability to successfully advance quality improvement objectives based on and supported by evidence and provides the necessary

leadership to foster growth in other nursing professionals. Additionally, the ability to apply critical thinking skills to diverse issues and entities associated with health care while providing counsel to those persons in need is a noteworthy characteristic (AACN, 2006).

Efforts to make positive change despite known or perceived organization resistance was somewhat challenging but energizing in the early stages as incremental changes associated with adoption occurred. Merging clinical expertise with the general provider population, while integrating the support of the telehealth department, helped impact provider openness to engage in a contemporary modality of health care delivery. The impetus to positively work toward a shift in health care delivery was not likely positive without the guidance of the DNP process.

Implications

As noted above, each of the eight DNP Essentials can be applied to this project. The essentials are a guide of the minimal DNP graduate necessities, yet most of the learning elements have been uniquely manifested by the originality of the project for each DNP student. The above essentials are an elaborate list of requirements of the DNP program which serve to reinforce the ideologies of the DNP scholarly journey.

According to Volkert and Johnston (2018), DNP students may have concerns which parallel their doctoral counterparts from other disciplines as the DNP capstone can be problematic beyond the typical issues. These concerns include: (1) lack of clarity regarding the program requisites, (2) issues with faculty involvement, (3) the focus skill and interest for the student, and (4) the layout of the courses, according to findings by Grossman, Kazer, Moriber, and Calderwood (2016). There is, apparently, a knowledge deficit on both the student and the educator's part to the real necessities of the program and process, yet essentials get to the heart of the academic program and provide a basis of consistency. If all other issues are unclear, or

unsupported, the essentials should guide the DNP student to the completion of a robust doctoral program.

Limitations

With such a program, it is critical not only to identify the essentials that are readily evident in the project process, but also to be aware of areas that may need special attention as the lack of a natural influence over the project progression. It could be more valuable to the DNP student to internalize and consider these essentials prior to commencing project work in order to synchronize the project themes and efforts with requirements, rather than to match the essentials with incremental milestones experienced along the project pathway.

Conclusion

The DNP educational track is theoretically composed of eight basic areas of aptitude and skill as well as exposure to specific practice domains (AACN, 2006). Each DNP essential reflects an independent element of importance contributing to the integrity of the scholarly work. Understanding the role of each DNP essential provides a sense of value and validity to the efforts made to improve practice in an organization or the community. Without these essentials, there would be insufficient substance to meet the value of an impactful quality improvement project.

Chapter Eight: Summary and Conclusion

Teledermatology is a tool that can enhance the dermatological care of individuals across the lifespan, particularly for those populations where access to care is challenged. Developing strategies to promote system-wide acceptance and adoption required carefully reviewing evidence, selecting a framework, choosing the model, proposing a plan, and then formulating the process. Engagement with the Telehealth Department was necessary though many other individuals and departments were instrumental in the project success.

The objective of this project was to promote the use of teledermatology by identifying barrier issues present in the health care system and developing a process for improvement. A pre-implementation survey identified knowledge gaps regarding the use of teledermatology technology. This led to the development of a workflow pathway designed to prompt provider initiative and submission of teledermatology cases through the established health care network software AFHCAN. In addition to the workflow pathway, an educational module delivered support and education regarding teledermatology, including introductions to the dermatology staff, identification of barriers to teledermatology, the consultation process, and support for decision-making. Providers (PCPs and CHA/Ps) unfamiliar with AFHCAN were encouraged to use the HIPAA compliant, mobile application to get started in using teledermatology processes. The mobile app was used as a vehicle in attracting provider interest.

The two organizations within the health system involved in this project agreed to allow providers to participate and each of these were rare users of AFHCAN. Targeting these two corporations was both productive and challenging. The primary methods of distributing materials were through e-mail; however, opportunities to present information to a live group occurred

periodically. The telehealth coordinator(s) were integrally involved with facilitating provider log-in support.

Engaging with other individuals, such as the hepatitis internet technology support specialist, CHAP medical director, and nurse educator was also necessary. Optimal receptivity for the use of teledermatology was enhanced when the opportunity to promote the service was identified on various occasions, including connecting the provider with the appropriate telehealth coordinator initiate access to AFHCAN. Surprisingly, many individuals knew little about AFHCAN, though this application has been part of the health system for many years. Although it was challenging to reach the CHA/Ps with the workflow and educational module, a process of discussing teledermatology was offered through the CHAP classes since the project was initiated.

Another example which promoted receptivity of the teledermatology process included encouraging use of the mobile app, which is simple to use and acceptable by many providers. As Zuo, Guo, and Rao (2013) note, smartphones are becoming more and more commonplace in medical practice. Not only is the smartphone overall handy to carry, but the quality of imaging and hardware have also improved dramatically in recent years. Additional factors which promote receptivity include increasingly efficient internet access, lack of need for a stationary computer, as well as the fact that teledermatology is inexpensive (Zuo et al., 2013). As Zuo et al. (2013) suggest, one method to increase the use of teledermatology through a mobile app is to incorporate training into education programs for those in the health care profession. This practice is something which could be considered for inclusion in the future, as part of the new provider orientations in primary care.

Though the project was specifically geared toward providers for rural patients, it was interesting that some providers also used the mobile app for in-town patients. This was an unexpected outcome as these same providers often care for out-of-town patients and can encourage assigned CHA/Ps to use the software as well. In addition to patient groups discussed, outreach for teledermatology also was expanded to other special groups, including women seen by OB/GYN providers (including certified nurse midwives), pediatrics, veterans, and homeless adult and youth.

Overall, the range of individuals potentially influenced by this purposefully directed project is extensive, considering the vast geographical landscape of Alaska. Because of the widespread population, this project has a tremendous opportunity for endurance and sustainability. Focusing attention on one or two organizations at a time, applying a needs assessment, guidance, and education will bring continued success to the adoption of teledermatology, increasing access to care, improving quality of care, and decreasing health disparities. Though there were marked successes with adoption and acceptance, there was also resistance and objection apparent during the implementation phases; therefore, more considerable effort to promote the use of the teledermatology was spent on receptive audiences.

Implication for Future Practice

Although this project was directed toward the expansion of teledermatology utilization, it beckoned an obvious need to collect data which identifies rationales for the avoidance of the use of the technology and why acceptance is sluggish despite evidence of the benefits. A health network such as this is conducive to such research, as there are many corporations which fall within the network that use the tertiary site as the centralized specialty care center. The literature supports the experience of the Teledermatology Utilization Project in that there is identified

resistance to technology adoption across many fields. Given the range of stakeholders, including the recipient, provider, specialty provider, and an affiliated organization, there is value in addressing the experiences of this project and engaging in research which explores provider motivation and learning needs. For example, what would cause one provider to readily accept an opportunity to receive treatment help from an accessible dermatology provider, as opposed to one who relied on self-knowledge and other resources repeatedly before reaching out for the expertise of an experienced specialist?

An interesting concept for a future project, maybe to evaluate the role of teledermatology for patients in the urban area. Using the technology, whether in a rural or urban area could reduce no-show rates, as well as save time, money, and avoid delays in treatments. Most of the current referral base is generated from the local, urban area, and quick consultation via teledermatology might reduce the need to schedule appointments for new patients, whose conditions might easily be handled by a brief expert consultation.

Additionally, studies involving descriptive data would be helpful in determining the threshold at which providers will seek out help. There is extreme variability among providers regarding the point at which patients are referred to dermatology. Understanding the comfort levels and tendencies of providers would be helpful in determining teledermatology expectations.

Lastly, investigating the differences in teledermatology utilization among the different regions and tribal affiliations might bring about the most significant knowledge improvement pertaining to barriers and the adoption of teledermatology. Gaining insights into various patterns within institutions and geographic locations can help telehealth leadership develop educational and training tools and apply strengths to areas which demonstrate less inclination for use. In

time, it is hoped there is an equal distribution of teledermatology consults throughout the network, based on population and that accessing this skill is routine and commonplace.

One area that may change as more providers adopt teledermatology is dermatology staff may have to expand or be modified to accommodate the rise in cases. Currently, there is little time devoted to these cases as they can generally be managed between patients or during gaps in the schedule. In time, dermatology providers may need to be incentivized to do as many consults as possible, and likewise, PCPs who send teledermatology cases, could be informed periodically, how much money was saved with this method concerning direct and indirect costs. Utilizing resources designed to bring specialty care closer to primary care of all regions and populations is one step closer to reducing health disparities in underserved communities.

Personal Reflection

The impact of connecting providers with technology was a powerful indicator that the Doctoral of Nursing Practice paradigm could impact organizational leadership and health care delivery. The role of the advanced nurse practitioner can easily become obscured by the public recognition of the physician and role confusion can arise. It is valuable to participate in collaborative changes that will have a lasting effect on the health care network and which can continue with continued planning and dedicated efforts. This project has helped inform future endeavors, regarding organizational skills, networking with stakeholders, educational preferences, and technology support.

Conclusion

Findings indicate practice changes can occur with effort on the part of a motivated person, however, without the authoritative direction of management, changes come about slowly. If indeed there is a clear indication that overall teledermatology is profitable to users as well as

patients, then it is much more likely to meet the approval of management who are supportive of the practice change. Likewise, it is also necessary for leadership to accept the value of teledermatology services as a means to facilitate expert, specialty care. To maintain ongoing expansion, it is imperative that educational needs be periodically re-evaluated, updated, and presented in different formats to ensure skin conditions are mindfully addressed about time, location, treatment options, and financial feasibilities.

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Appendix A

Teledermatology Utilization Survey

Table A-1

Survey for Teledermatology Utilization

This consists if two demographic questions and five core questions to determine teledermatology perceptions and needs.

Survey for teledermatology utilization

1.	What is your job title? Provider Health Aide
2.	Location: On road system Off road system

1.	How often have you used teledermatology in the last 6 months? a) Very Frequently (at least once a day) b) Frequently (1-4 times per week) c)Occasionally (1-3 times per month) d)Rarely (2-5 times in a 6 month period) e)Almost never (once or less in a six month period) Explain
2.	Does teledermatology make your job easier when caring for patients? a) A great deal b) A moderate amount c) Occasionally d) Rarely e) Never Explain
3.	Do you feel that the process of performing teledermatology is challenging and keeps you from using it? a) Always b) Very often c) Sometimes d) Rarely e) Never Explain:
4.	Do you feel that teledermatology is suitable for your work area? yes no Explain:
5.	Do you feel supported in the use of teledermatology by your job? a) Always b) Very often c) Sometimes d) Rarely e) Never Explain:

This survey is being conducted in fulfillment of a doctorate at UAA and there is no requirement to answer the survey.

Appendix B

Workflow Guidance

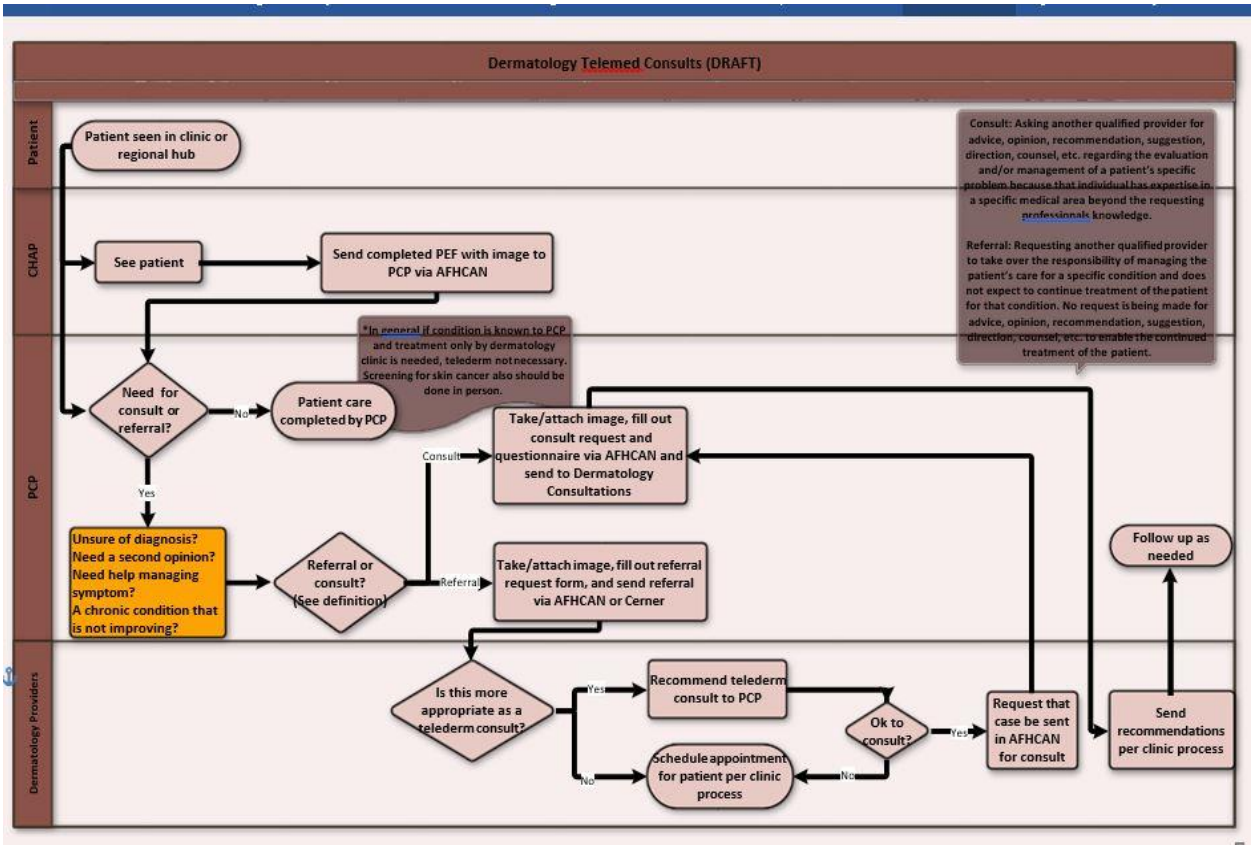


Figure B-1. Workflow guidance to direct the recommended communication pathways of consults and referrals. Represents all levels of providers supporting the care of patient.

Appendix C

University IRB Determination

Research & Graduate Studies
University of Alaska Anchorage

3211 Providence Drive
Anchorage, Alaska 99508-4614
T 907.786.1099, F 907.786.1791
www.uaa.alaska.edu/research/ric

DATE: March 14, 2018

TO: Mary Rowen, MSN
FROM: University of Alaska Anchorage IRB

PROJECT TITLE: [1211119-1] Teledermatology Utilization Project
SUBMISSION TYPE: New Project

REVIEW TYPE Administrative Review
ACTION: ACKNOWLEDGED
DECISION DATE: March 14, 2018

Thank you for your submission of documentation that the activities you have described are not Human Subjects Research (HSR). The University of Alaska Anchorage has acknowledged your submission and you are free to begin your activities as described.

The UAA IRB will retain a copy of this correspondence within our records, and the IRB may conduct periodic audits of Not-HSR Self-Determinations to evaluate their accuracy. In the event an audit identifies activity that has been miscategorized as Not HSR, the IRB Chair may require that the activities be suspended until standard IRB review processes have been completed and the activity judged as exempt or approved.

If you have any questions, please contact the IRB Chair, Robert Boeckmann or the UAA IRB Coordinator through IRBNet Project Mail (accessible on the left hand menu within your IRBNet project). The IRB Coordinator is also available at (907) 786-0916 or uaa_irb_coord@alaska.edu. Please include your IRBNet number and Project Title in all correspondence with this office.

Daniel Allen
IRB Coordinator
Office of Research Integrity & Compliance (ORIC)
University of Alaska Anchorage

Appendix D

Institutional IRB Determination

DATE: May 17, 2018

TO: Mary Rowen, MSN
Principal Investigator
Alaska Native Tribal Health Consortium
Division of Community Health Services
3900 Ambassador Drive
Anchorage, AK 99508

FROM: Alaska Area Institutional Review Board (IHS IRB #2)

STUDY TITLE: [1211119-1] Teledermatology Utilization Project
IRB REFERENCE #: 2018-04-014
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF NOT RESEARCH
DECISION DATE: May 15, 2018

Dear Ms. Rowen:

Thank you for your submission of New Project materials for this research study. Alaska Area Institutional Review Board (IHS IRB #2) has determined this project does not meet the definition of human subject research under the purview of the IRB according to federal regulations. Prior to making any changes to the protocol you must receive approval from the Alaska Area IRB for this decision to remain effective. The following conditions apply to this project:

1. Prior to initiation of this project the student must receive a privacy consult from the ANTHC and the SCF Compliance Departments to make sure that HIPAA requirements are in place for the project.
2. The student must add a question to the survey stating that the survey is being conducted in fulfillment of a doctorate at UAA and there is no requirement to answer the survey.
3. Our decision is valid for 60 months, with an expiration date of April 28, 2023.

We will put a copy of this correspondence on file in our office.

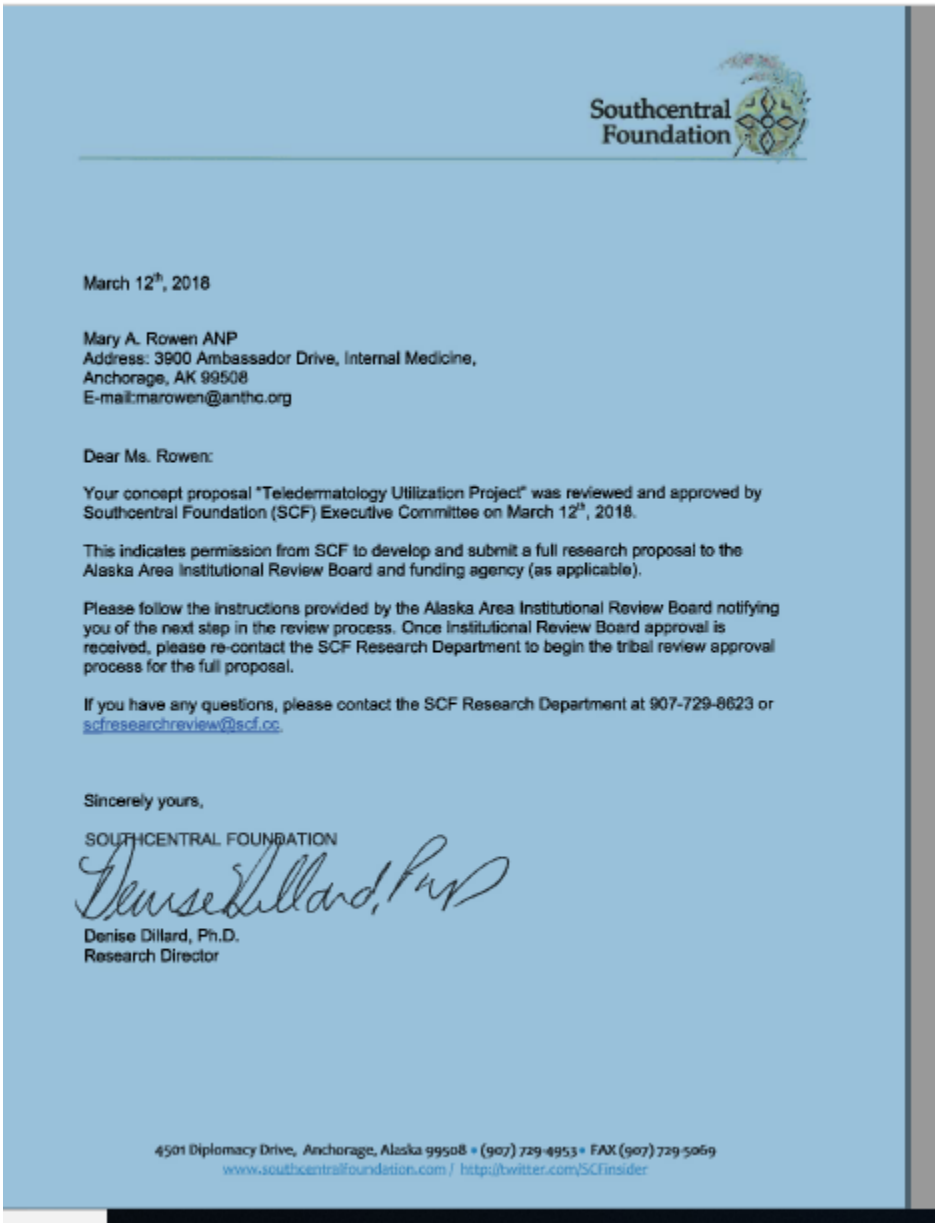
If you have further questions for the Alaska Area IRB you may contact us by email at akaalaskaareaIRB@anthc.org or call (907) 729-3924

Sincerely,

Terry J. M. Powell
Alaska Area Institutional Review Board
IRB Administrator

Appendix E

Concept Proposal



Southcentral Foundation

March 12th, 2018

Mary A. Rowen ANP
Address: 3900 Ambassador Drive, Internal Medicine,
Anchorage, AK 99508
E-mail:marowen@anthc.org

Dear Ms. Rowen:

Your concept proposal "Teledermatology Utilization Project" was reviewed and approved by Southcentral Foundation (SCF) Executive Committee on March 12th, 2018.

This indicates permission from SCF to develop and submit a full research proposal to the Alaska Area Institutional Review Board and funding agency (as applicable).

Please follow the instructions provided by the Alaska Area Institutional Review Board notifying you of the next step in the review process. Once Institutional Review Board approval is received, please re-contact the SCF Research Department to begin the tribal review approval process for the full proposal.

If you have any questions, please contact the SCF Research Department at 907-729-8623 or scfresearchreview@scf.oc

Sincerely yours,

SOUTHCENTRAL FOUNDATION

Denise Dillard, Ph.D.
Research Director

4501 Diplomacy Drive, Anchorage, Alaska 99508 • (907) 729-4953 • FAX (907) 729-5069
www.southcentralfoundation.com / http://twitter.com/SCFinsider

Appendix F

Participating Corporate Approvals

Thank you for your recent proposal " Teledermatology Utilization Project". This submission has been deemed "Not Research" by the Alaska Area Institutional Review Board - IRB Reference#: 2018-04-014, thus not requiring further tribal review. I have included Fran Arseneau on the email, she is the Senior Compliance Analyst for SCF, If you have any questions please contact me.

Thank you,

Tamara Hedlund
Program Coordinator I
Research Department
Southcentral Foundation
907-729-5455
Thedlund@scf.cc

Dear Ms. Rowen,

Your non research proposal "Teledermatology Utilization Project" has been reviewed and approved by the ANTHC AMP Review Committee on behalf of the ANTHC Health Research Review Committee.

Thank you for submitting your proposal and subsequent revisions for ANTHC review and approval. This completes the review process for this proposal.

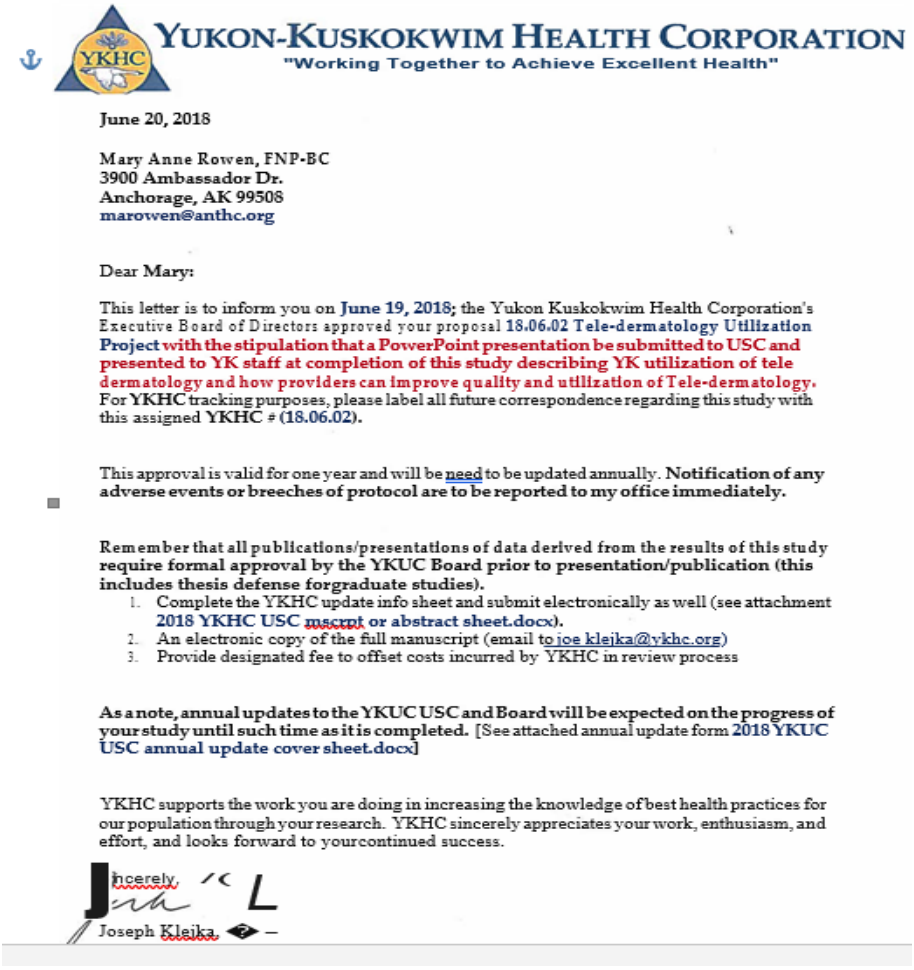
Please submit any abstract or manuscripts associated with this proposal to rampreview@anthc.org for review.

Sincerely,

Abbie

Abbie Willetto, Manager of Research Services
Alaska Native Tribal Health Consortium
3900 Ambassador Dr., Ste. 201
Anchorage, AK 99508
(907) 729-2901 // awolfe@anthc.org // www.anthc.org

Appendix F (continued)



YUKON-KUSKOKWIM HEALTH CORPORATION
"Working Together to Achieve Excellent Health"

June 20, 2018

Mary Anne Rowen, FNP-BC
3900 Ambassador Dr.
Anchorage, AK 99508
marowen@anthc.org

Dear Mary:

This letter is to inform you on June 19, 2018; the Yukon Kuskokwim Health Corporation's Executive Board of Directors approved your proposal 18.06.02 Tele-dermatology Utilization Project with the stipulation that a PowerPoint presentation be submitted to USC and presented to YK staff at completion of this study describing YK utilization of tele dermatology and how providers can improve quality and utilization of Tele-dermatology. For YKHC tracking purposes, please label all future correspondence regarding this study with this assigned YKHC # (18.06.02).

This approval is valid for one year and will be need to be updated annually. **Notification of any adverse events or breeches of protocol are to be reported to my office immediately.**

Remember that all publications/presentations of data derived from the results of this study require formal approval by the YKUC Board prior to presentation/publication (this includes thesis defense forgraduate studies).

1. Complete the YKHC update info sheet and submit electronically as well (see attachment 2018 YKHC USC mscrpt or abstract sheet.docx).
2. An electronic copy of the full manuscript (email to joe klejka@ykhc.org)
3. Provide designated fee to offset costs incurred by YKHC in review process

As a note, annual updates to the YKUC USC and Board will be expected on the progress of your study until such time as it is completed. [See attached annual update form 2018 YKUC USC annual update cover sheet.docx]

YKHC supports the work you are doing in increasing the knowledge of best health practices for our population through your research. YKHC sincerely appreciates your work, enthusiasm, and effort, and looks forward to yourcontinued success.

Sincerely,

Joseph Klejka,

Appendix G

Teledermatology Provider Satisfaction Survey

Table 2. Frequency Agreeing with Satisfaction Domain Statements for Primary Care Providers and Imaging Technicians Participating in the Veterans Integrated Service Network 20 Rural Teledermatology Project (2009–2012)

TELEDERMATOLOGY SATISFACTION ITEM	PRIMARY CARE PROVIDERS (*N*=21)	IMAGING TECHNICIANS (*N*=34)
Global satisfaction with teledermatology		
Overall, I am satisfied with teledermatology.	15 (71.4)	32 (94.1)[a]
Interpersonal manner		
Good understanding of dermatology care needed	14 (66.7)	31 (91.2)[a]
Privacy is protected.	14 (66.7)	24 (70.6)
Lack of physical contact acceptable	11 (52.4)	25 (73.5)
Patient follow-up acceptable	9 (42.9)	24 (70.6)[a]
Technical quality of care/competency		
Can describe the condition better with images	16 (76.2)	33 (97.1)[a]
Can monitor patient's condition well	11 (52.4)	26 (76.5)[b]
Future standard of healthcare	12 (57.1)	29 (85.3)[a]
A good addition to regular patient services	18 (85.7)	30 (88.2)
Continuing education program on dermatology topics useful	20 (95.2)	30 (88.2)
Intermediate surgical training useful	14 (66.7)	17 (50.0)
Annual training program useful	14 (66.7)	21 (61.8)

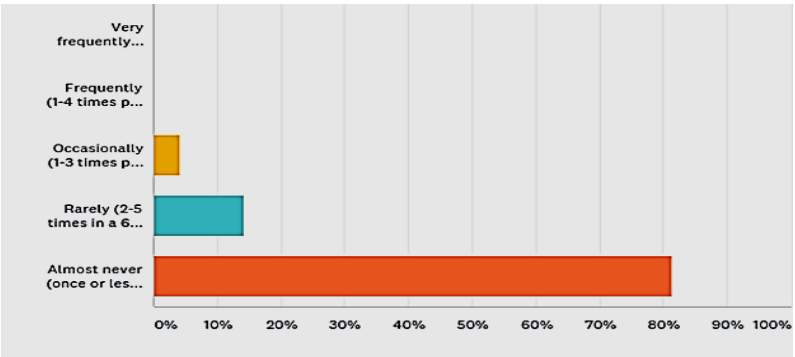
Table 2. *continued*

TELEDERMATOLOGY SATISFACTION ITEM	PRIMARY CARE PROVIDERS (*N*=21)	IMAGING TECHNICIANS (*N*=34)
Efficacy		
Believes it improves patient's health	14 (66.7)	32 (94.1)[a]
Time for consult completion acceptable	17 (80.9)	30 (88.2)
Useful addition to primary care	13 (61.9)	26 (76.5)
Continuity		
Prefer to provide patient care by teledermatology rather than face-to-face	12 (57.1)	21 (61.8)
Prefer process of teledermatology visit over face-to-face visit	5 (23.8)	11 (32.3)
Physical environment		
Equipment easy to use	14 (66.7)	28 (82.3)
Convenient form of healthcare delivery	14 (66.7)	31 (91.2)[a]
Patient confidentiality not threatened	14 (66.7)	29 (85.3)
Can always trust equipment to work	10 (47.6)	25 (73.5)[a]
No problems with computers or information technology	7 (33.3)	13 (38.2)
No problems with provider or imager notes	11 (52.4)	27 (79.4)[a]
Equipment availability		
No problems getting	9 (42.9)	22 (64.7)
Accessibility		
Saves time	13 (61.9)	26 (76.5)
Increases patient access to care	16 (76.2)	30 (88.2)
Easier for patient to contact provider/imager	9 (42.9)	15 (44.1)
Had sufficient dedicated time	9 (42.9)	15 (44.1)
Finances		
Saves money for patient	15 (71.4)	28 (82.4)
Cost of co-pay acceptable	4 (19.1)	14 (41.2)[b]
Reduces cost for the VA	11 (52.4)	25 (73.5)

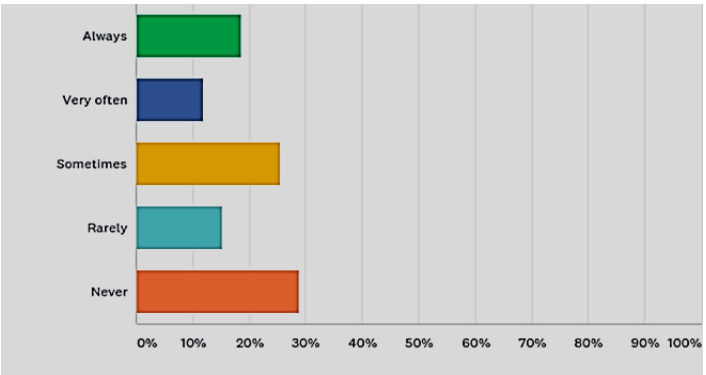
Appendix H

Survey Response Data

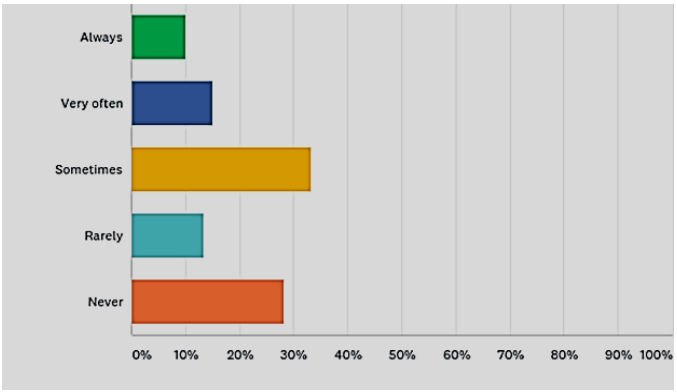
1: How often have you used teledermatology in the last six months?



2: Does teledermatology make your job easier when caring for patients?

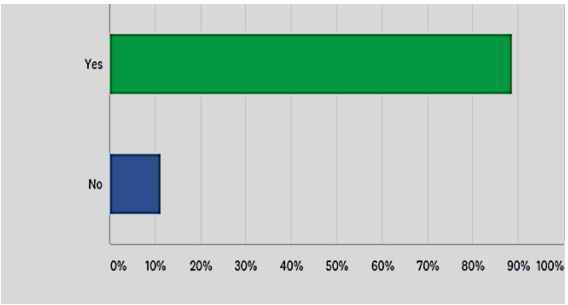


3. Do you feel that the process of performing teledermatology is challenging and keeps you from using it?

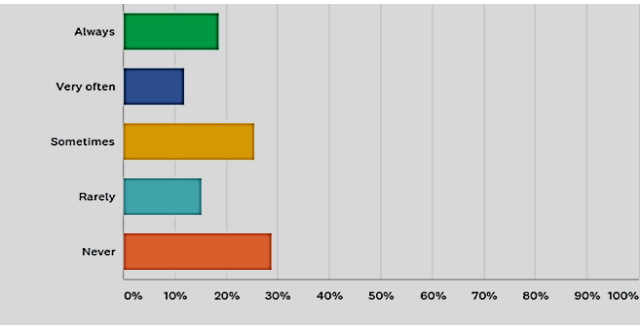


Appendix H (continued)

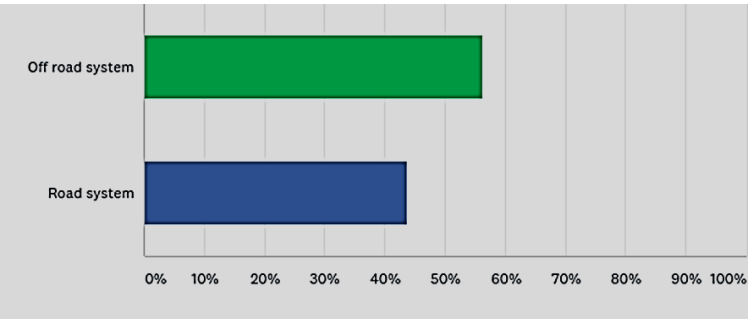
4: Do you feel that teledermatology is suitable for your work area?



5: Do you feel supported in the use of teledermatology by your job?



6: Location



Appendix H (continued)

7: What is your job title?

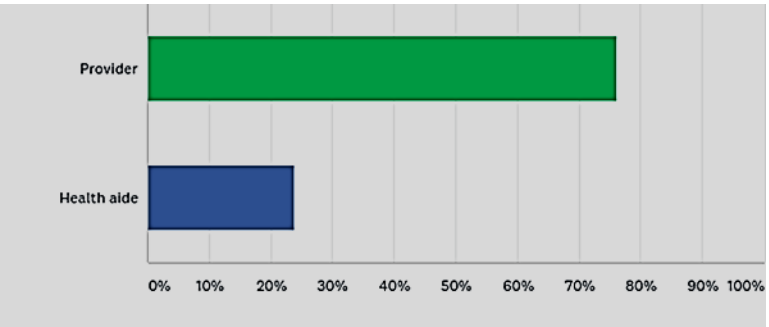


Figure H-1. Results from SurveyMonkey.com
Each question represented in bar graph visual by percentage of respondents.