

THE VALUE OF TELEMEDICINE IN RURAL  
HEALTHCARE AND ASSOCIATED  
FINANCIAL OBLIGATION

by

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## ABSTRACT

The purpose of this project was to raise awareness of the vital impact emergency room telemedicine has on rural residents and health care and the financial challenges facilities face to maintain these services following implementation. Limited knowledge is available to determine how rural critical access hospitals are able to financially sustain emergency room telemedicine long term.

The study completed found that more than half of the Critical Access Hospitals utilize telemedicine in their emergency rooms. Funding emergency room telemedicine projects is an area of concern at many of these hospitals. As health care continues to advance with the use of technology, health care facilities are in need of more research in this area to develop policy that could potentially improve sustainability and increased reimbursement to offset the cost.

## CHAPTER ONE

Introduction

The state of Montana is geographically vast, comprised of a large population living in rural or frontier settings. Montana has 145,546.91 square miles of land area (Community Commons, 2017). According to the United States Department of Agriculture, Montana currently has a population of 1,042,520 and 674,907 of those people live in rural areas (2017). The Montana Health Care Innovation Plan, a plan put together by the Governor's Council on Health Care Innovation, identifies 54% of people living in Montana have to travel more than five miles to see a health care provider; 13% travel greater than 30 miles; seven percent travel more than 50 miles (2016). Fifty-nine of Montana's sixty-five hospitals are located in rural or frontier counties (Montana Innovation Model Design Project, Montana, 2016).

Centers for Medicare and Medicaid Services (CMS) define a Critical Access Hospital (CAH) as a Medicare participating hospital that meets the following criteria:

- Location in a State that has established a State Medicare Rural Hospital Flexibility Program;
- Designated by the State as a CAH;
- Located in a rural area or an area that is treated as rural;
- Located either more than 35-miles from the nearest hospital or CAH or more than 15 miles in areas with mountainous terrain or only secondary roads; OR prior to January 1, 2006, were certified as a CAH based on State designation as a "necessary provider" of health care services to residents in the area.
- Maintains no more than 25 inpatient beds that can be used for either inpatient or swing-bed services;
- Maintains an annual average length of stay of 96 hours or less per patient for acute inpatient care (excluding swing-bed services and beds that are within distinct part units);
- Demonstrates compliance with the CAH conditions of participation and

- Furnishes 24 hour emergency care services 7 days a week (CMS.gov)

As of April 6, 2016, there are 1,332 certified CAHs located throughout the United States (“Rural Health”, 2016). Montana has 48 CAHs. Nationally, CAHs provide care to eight million emergency room patients annually (National Rural Health Association, 2017). Other annual services provided by CAHs include, 39 million outpatient visits, 809,000 hospital admissions and the delivery of 82,000 babies (National Rural Health Association, 2017).

Health care facilities are very important to the residents of rural areas. Patients have been found to have a preference of receiving medical care in their local setting (Finlayson, Birkmeyer, Tosteson & Nease, 1999). These local rural hospitals are vitally important because without them, patients would be required to travel very long distances to find the next nearest hospital for care. Traveling in rural areas can be challenging for patients when seeking such care. More than 40% of rural patients have to travel more than 20 miles to receive specialty care, compared to three percent of patients that reside in metropolitan areas (National Rural Health Association, 2017). Much of rural Montana is isolated and has lots of agricultural terrain accessible primarily by secondary roads with minimal cell phone reception and traffic. Travel can also be affected by extreme cold and icy roads in the winter and torrid heat and road construction in the summer and fall months. Traveling these long distances becomes even more difficult when the patient has a life threatening condition.

Critical Access Hospitals are not only important for the delivery of care to patients but they are also a large revenue yielding business in rural areas. Local residents



of small towns often view the hospital as a resource that can make a fundamental difference in the quality of their town (Potter et al, 2016). Nationally, CAHs provide more than 300,000 skilled health care jobs (National Rural Health Association, 2017). These hospitals are often one the largest businesses and employers in the area and are therefore paramount to the community and other local businesses. Hospitals are often only second to education as the largest employer in rural communities (Doeksen, St. Clair, & Eilrich, 2012).

Emergency care is important for all populations, including rural residents. Access to higher levels of care in rural settings is limited in emergent situations, which increases the time it takes for treatment. This increase in time can have negative effects on patient outcomes. However, technology has opened up many new opportunities for rural health care settings. One opportunity is the use of emergency room telemedicine, which gives health care providers in rural emergency departments the ability to access assistance from specialists at larger tertiary centers providing higher levels of care. According to CMS definition, “Telemedicine seeks to improve a patient's health by permitting two-way, real time interactive communication between the patient and the physician or practitioner at the distant site. This electronic communication means the use of interactive telecommunications equipment that includes, at a minimum, audio and video equipment (Medicaid.gov, 2017).” Rural personnel are able to utilize this equipment to provide synchronous audio and video assessments from providers in specialty facilities or higher levels of care. Rural health care providers are often infrequently exposed to high acuity patients that can therefore pose a need for more support from those who have consistent

opportunities to care for these types of patients. This support has been embraced by many rural CAHs with the adoption of telemedicine technology having increased by roughly 3.5% per year from 54.5% in 2014 to 61.3% in 2016 (Fitzgerald, 2016).

Hospital Chief Executive Officers (CEO) often feel telemedicine not only improves patient care but also enhances the reputation of the hospital in the community (Potter et al, 2016).

### Local Problem

The location of this project is the Garfield County Health Center. This health care facility is a small four bed CAH located in eastern Montana. The Garfield County Health Center became one of the first medical assistance facilities (MAF) in the United States in 1987 (Medical Assistance Facilities, 1993). These MAF facilities were eventually converted to CAHs through congress designation within the Balanced Budget Act of 1997. The Garfield County Health Center is the only health care facility in the county and serves an area of 4,676.55 square miles (Community Commons, 2017). Garfield County is similar in size to the state of Connecticut. The Garfield County Health Center implemented telemedicine in their emergency room four years ago with the help of grant funding through the Helmsley Charitable Trust. This grant provided the facility with equipment, installation and financial assistance with startup and connection fees. Since the grant funding is no longer available, the facility needs to determine how to continue to fund emergency room telemedicine. The purpose of this project is to determine if other Montana CAHs that are using telemedicine are having positive patient outcomes

and if they are also facing the same funding problems. This author is currently the Director of Nursing at the Garfield County Health Center and was actively involved in the facility's implementation of emergency room telemedicine. Telemedicine has greatly improved quality of care at the Garfield County Health Center by providing staff with valuable assistance. Having telemedicine available in the emergency room has helped recruit medical providers with a sense of security knowing that they will have a physician available to assist and offer support with decision making if needed.

## CHAPTER TWO

Literature Review

The use of telemedicine is on the rise in the United States. According to the American Telemedicine Organization 2017, there are currently about 200 telemedicine networks, with 3,500 service sites in the US and over one half of all hospitals are now using some form of telemedicine. The use of telemedicine is not only increasing in popularity among health care facilities, but patients are appreciating it as well. Emergency room telemedicine has been shown to benefit rural hospitals by providing positive patient experiences that enhance the hospital's reputation for quality (Potter et al, 2016). Studies show that patients often report satisfaction with the use of telemedicine including the overall experience and interaction with the consulting telemedicine health care professional (Ward, Mirou & Natafqi, 2015). Clinicians and administrators report that patients and community members respond positively to telemedicine for a number of reasons including: impressive technology, community contribution to modernization, immediate access to hospital resources and the feeling that they were receiving the best possible care (Potter et al, 2016). The support provided to staff, provider satisfaction and improved quality of care are all positive features that telemedicine brings to health care facilities.

### Improving Quality Care

Telemedicine has brought numerous advances to rural facilities including an enhancement in the quality of patient care by improving the evaluation and management of trauma patients in rural hospitals. Even though only 20% of Americans live in rural areas, 60% of trauma deaths occur in the rural areas of the United States (National Rural Health Association, 2017). Studies show patients that are severely injured related to trauma are able to be identified quickly and transferred more rapidly to a trauma center with the help of telemedicine (Duchesne et. at, 2008). Introduction of telemedicine consultation to rural local community hospital (LCH) emergency departments expanded trauma capabilities and conserved trauma center resources, which were directed to more severely injured patients (Duchesne et. at, 2008). Many trauma patients have received potentially lifesaving changes in care due to onsite health care providers using telemedicine (Latifi et al., 2009).

Patient safety studies have identified the emergency department as the location within a hospital that has the highest percentage of preventable and negligent adverse events such as medication errors (Schenkel, 2000). Preventing injury and errors in the emergency department can be improved by utilizing system level efforts that focus on teamwork (Schenkel, 2000). Telemedicine in rural emergency rooms has the ability to improve teamwork by providing additional health care providers to consult with for support when making decisions regarding treatments for patients.

The use of telemedicine in rural emergency rooms has been shown to consistently improve patient outcomes (Mueller, Potter, MacKinney, & Ward, 2014). One study

found that telemedicine was statistically significant in increasing the number of packed red blood cells transfused, improving the blood pressure of patients upon arrival to a trauma facility, decreasing the transfer time to a trauma facility and reducing overall hospital costs (Duchesne et al., 2008). Telemedicine has also been shown to decrease the number of unnecessary patient transfers thus saving on the costs associated with those transfers (Latifi et al., 2009). Telemedicine in the prehospital rural setting has helped improve outcomes for patients who experience ST elevation myocardial infarctions (Tanguay, Dallaire, Herbert, Begin, & Fleet, 2015).

Another emergency room telemedicine service being utilized in some rural health care facilities is telestroke. Telestroke is telemedicine specifically for improving assessment and treatment of stroke patients. Telestroke provides facilities with a connection to a remote neurologist to conduct neurological assessments of a patient, review brain imaging and assist bedside health care providers with diagnosis and treatment (Kulcsar, Gilchrist & George, 2014). This includes assistance determining the need to administer tissue plasminogen activator (tPA) for a patient. There is a narrow window of time in which tPA can be effective after the initial signs of stroke symptoms. Telestroke has helped increase the appropriate use of tPA and therefore improved favorable outcomes in stroke patients (Hess & Audebert, 2013).

#### Positive Effect on Health Care Providers

Early studies showed that some medical providers had initial concerns about telemedicine including personal barriers, clinical workflow and technology barriers, and

licensure, credentialing, and reimbursement issues. These concerns, over time, have resolved and confidence and buy-in has significantly improved when they were given the opportunity to actually use telemedicine (Brooks, Turvey & Augusterfer, 2013).

Telemedicine in the emergency room can provide health care workers with consulting services, documentation assistance, medication calculation assistance and transfer arrangements. A systematic review found that physicians and nurses report good image quality and excellent user satisfaction when using telemedicine compared to telephone based communication (Ward, Mirou & Natafqi, 2015). One study found that a majority of medical providers felt that telemedicine improved patient care for trauma patients (Ricci, Caputo, Amour, Rogers, Sartorelli, Callas & Malone, 2003).

#### Decreasing Staffing Burden

Staffing rural emergency rooms can be a challenging task due to shortages of physicians and other health care providers in rural communities (Stingley & Schultz, 2014). Health care providers that work in rural areas are ageing and there is an immense shortage of physicians (Bailey, 2009). Seventy-seven percent of the nation's 2,041 rural counties are areas with health professional shortages (National Rural Health Association, 2017). Several rural and underserved populations are depending on nurse practitioners and physician assistants to provide care in communities to counterbalance the limited number of physicians (Bresnik, 2017). Health care facilities that have telemedicine available in their emergency room can utilize nurse practitioners and physician assistants more often, knowing that a physician will be available to them for consult.

Often in rural facilities, emergency room patients will present on nights and weekends when a physician, nurse practitioner or physician assistant is not onsite. This can be extremely stressful for nursing staff who are working with minimal staffing and lack emergency room experience (Stingley & Schultz, 2014). The availability of telemedicine can provide nursing staff with support while they are waiting for the on call provider to arrive at the facility to assume care, easing the stress of the onsite nurse. One study showed that thirty percent of the patient cases treated with emergency room telemedicine, the telemedicine physician was available an average of 10 minutes before the local medical provider (Stingley & Schultz, 2014). Ten minutes can be extremely valuable time when experiencing an emergent situation. Some emergency room telemedicine programs offer documentation assistance which allows the staff onsite to be able to provide more hands on care to their patients. This is especially helpful during catastrophic events such as multiple traumas or cardiopulmonary resuscitation.

Rural Nursing Theory guided this study by examining how a piece of technology can impact rural hospitals and their challenges. Winters and Lee (2010) expanded the Rural Nursing Theory by examining the unique health problems and health care needs of states with low populations such as Montana. They completed studies related to the perspective of the rural consumer. A key rural nursing theory concept is the self-reliance and independence of rural residents. Along with the unique characteristics of rural people, this population faces unique challenges that make telemedicine very valuable to both the patient and the health care provider.



Winters and Lee's (2010) expansion and revision of Long and Weinert's (1989) Rural Nursing Theory also includes several concepts including limited staffing, isolation and distance. Telemedicine helps bridge the gap in these areas by acting as an additional member of the health care team and providing consulting services that wouldn't normally be available due to the remote location.

### Emergency Room Telemedicine Programs Utilized in Montana

One emergency room telemedicine service utilized in Montana is AVERA eCARE from Sioux Falls, South Dakota. This telemedicine service provides rural health care providers with access to a board certified emergency room physician and an emergency room nurse within seconds at the push of a button. AVERA eCare provides consulting services, documentation assistance, medication calculation assistance and transfer arrangements. According to Mary Adams RN and Account Executive at AVERA eCARE, AVERA currently has 15 sites in Montana and four additional sites in the implementation process (personal communication, July, 7, 2017). Midlevel providers feel more comfortable working in rural facilities with AVERA eCARE in place (M. Adams, personal communication, July, 7, 2017). Health care providers appreciate the time that is saved when using AVERA charting because the onsite health care staff does not have to worry about timelines and can provide more hands on care (M. Adams, personal communication, July, 7, 2017). Health care providers appreciate the improvement AVERA provides with getting patients transferred in a more timely manner (M. Adams, personal communication, July, 7, 2017).

The St. Vincent Health Care organization has recently introduced an emergency room telemedicine tool to provide outlying health care facilities the ability to consult with a medical doctor via an iPad. According to Eric Pollard, regional director for innovation and virtual health, St. Vincent has been live with this service for two years. There are currently 12 facilities in Montana utilizing this tool and one in the process of initiating services. Patients and medical providers are providing positive feedback with this new technology (E. Pollard, personal communication, August, 28, 2017). The objective of the program is to keep patients in their local community to be treated as much as possible. Patients from outlying facilities that require transfer to St. Vincent Health Care can be directly admitted and skip an additional emergency room visit when using this telemedicine (E. Pollard, personal communication, August, 28, 2017).

#### Financial Burden to Rural Health Care Facilities

Rural health care facilities are plagued by various types of financial difficulties. The National Rural Health Association states that since 2010, more than seventy-five rural hospitals have closed and currently 673 additional facilities are vulnerable to closing. This represents more than one-third of rural hospitals in the United States. This closure rate has been steadily increasing, resulting in a rate six times higher in 2015 compared to 2010 (National Rural Health Association, 2017). With rural health care facilities providing essential health care services to nearly 57 million people, increased closures could result in numerous health disparities for the rural population (Rural Health Care, 2018). The transition from fee-for-service reimbursements to performance-based

reimbursements has also affected already struggling rural hospitals financially. The readmission penalties rural health care facilities face with the Hospital Readmission Reduction Program (HRRP) along with other reimbursement cuts add to the financial problems that CAHs are facing (Balaubramanian & Jones, 2016). Rural health facilities rely on government payments because of the small size and limited assets and financial reserves (Rural Health Care, 2018). CAH's also depend on 45% of Medicare payments for their total income and Medicare and Medicaid reimbursement is much lower than the actual cost of care (Balaubramanian & Jones, 2016). Additional difficulties contributing to closure vulnerability include the expensive and increased cost of managing critical patients and facility financial margins too narrow to support any investments in critical plant and technological upgrades (Bailey, 2009).

There is strong evidence to substantiate the importance of telemedicine in rural Critical Access Hospitals, but unfortunately many of these facilities struggle to fund this project. Many grant funders provide financial assistance to health care facilities to initially start a technology project such as telemedicine, but after a certain period of time, the hospital must be able to provide payment for the service and sustain the use of the program. The difficult situation presents when CAHs recognize the positive patient outcomes as well as health care provider's satisfaction compared to the high costs for maintaining the service, placing CAH administrators and community leaders in a very real dilemma.

### Available Funding

There are several funding options available for health care facilities to use when introducing telemedicine. The Office for the Advancement of Telehealth (OAT) promotes the use of telemedicine technologies for health care delivery, education, and health information services in rural areas (Telehealth Programs, n.d.). The Telehealth Resource Centers (TRCs) are funded by the Office for the Advancement of Telehealth to assist health care organizations, health care networks, and health care providers with implementing telehealth programs to help serve rural and medically underserved areas and populations (Telehealth Resource Center, 2018). In 2009 the Leona M. and Harry B. Helmsley Charitable Trust created the Rural Health Care Program to improve access to and quality of care in areas challenged by health care workforce shortages and low population density in Midwest states (Stingley & Schultz, 2014). The program has focused on providing telehealth to seven upper Midwestern states including Montana. Since 2009, the Rural Health Care Program has approved \$22 million in grants to 85 rural hospitals to implement emergency room telemedicine services (Stingley & Schultz, 2014).

### Implications for the CNL

The American Association of Colleges of Nursing (AACN) states the Clinical Nurse Leader (CNL) identifies the need for new policies and practices, participates in their development and provides leadership in implementation of guidelines. The CNL in rural and trauma facilities could influence the need for more research, as literature reports

improved outcomes, decreased mortality rates and improved transfer times to trauma facilities. Health care organization's administration and governing board may be hesitant to adopt telemedicine due to the expense. The CNL can serve as the advocate for the implementation and continuation of telemedicine for their organization. This may involve speaking at a board meeting and presenting research that shows the improvements telemedicine can provide a health care organization.

## CHAPTER THREE

Methods

Email addresses for the Chief Executive Officers (CEO) and the Director of Nursing (DON) at each CAH were obtained by reaching out via telephone or sending emails through the facility's website. After the email addresses were collected survey methodology was used to help gain a better understanding of how emergency room telemedicine impacts CAHs in Montana. A total of 90 surveys were emailed via Survey Monkey. The survey also assisted with learning if emergency room telemedicine has caused a financial burden to CAHs in Montana.

Sample

Convenience sampling was utilized for the survey. Potential survey population included the CEO and DON at all of the Critical Access Hospitals in Montana. Surveys were emailed from Survey Monkey to all potential participants with instructions for completion. Yes/no response and descriptive questions were included in the questionnaire. The CEO questionnaire included the following questions:

1. What is your position/title at your organization?
2. How long have you worked in your position?
3. Do you currently use telemedicine in your emergency department? If yes, what program do you use? If no, why not and are you planning on implementing telemedicine in your emergency department in the future?
4. Do you feel satisfied with the use of telemedicine in your emergency room? Please describe.

5. Do you feel like telemedicine helps improve patient care at your facility? Please describe.
6. Do you anticipate continuing to use telemedicine in your emergency department in the future?
7. How are you currently funding telemedicine in your emergency room?
8. What is the cost of having telemedicine in your emergency room?
9. Have you encountered any barriers to funding telemedicine in your emergency room?

The DON questionnaire included the following questions:

1. What is your position/title at your organization?
2. How long have you worked in your position?
3. Do you currently use telemedicine in your emergency department? If yes, what program do you use? If no, why not and are you planning on implementing telemedicine in your emergency department in the future?
4. Do you feel satisfied with the use of telemedicine in your emergency room? Please describe.
5. Do you feel like telemedicine helps improve patient care at your facility? Please describe.
6. Do you anticipate continuing to use telemedicine in your emergency department in the future?

#### Ethical Issues

An application for institutional review board exemption with Montana State University was completed and approved. There were no ethical issues or need for Health Insurance Portability and Accountability Act (HIPPA) protection statements. A consent

to participate form was included in each survey stating that by completing the survey they were consenting to participation.

### Analysis

All CEO and DON responses received were included in the analysis. Qualitative comments from the survey's narrative data were analyzed by using content analysis methods guided by the need to condense the words of the text into content categories (Polit & Beck, 2012). An inductive approach was utilized for the content analysis along with a data driven approach to classify parts of the material as types of the categories of a coding framework. This approach works well for topics where previous research is limited (Vaismoradi, Turunen, & Bondas, 2008). The coding frame was built by reading the qualitative data multiple times and then developing codes by grouping together similarities in content. Categories and sub-categories were developed by linking descriptions with related content, evaluating their relationship to one another and labeling with a title that covered the entire content. The categories were then organized into themes and were summarized and identified using the actual phrases of the respondents.

### Results

Surveys were emailed from Survey Monkey to 45 CEOs and 45 DONs inviting them to participate in the project. Two facilities were in the process of recruiting for these positions and one facility had a combined CEO/DON position. This author's

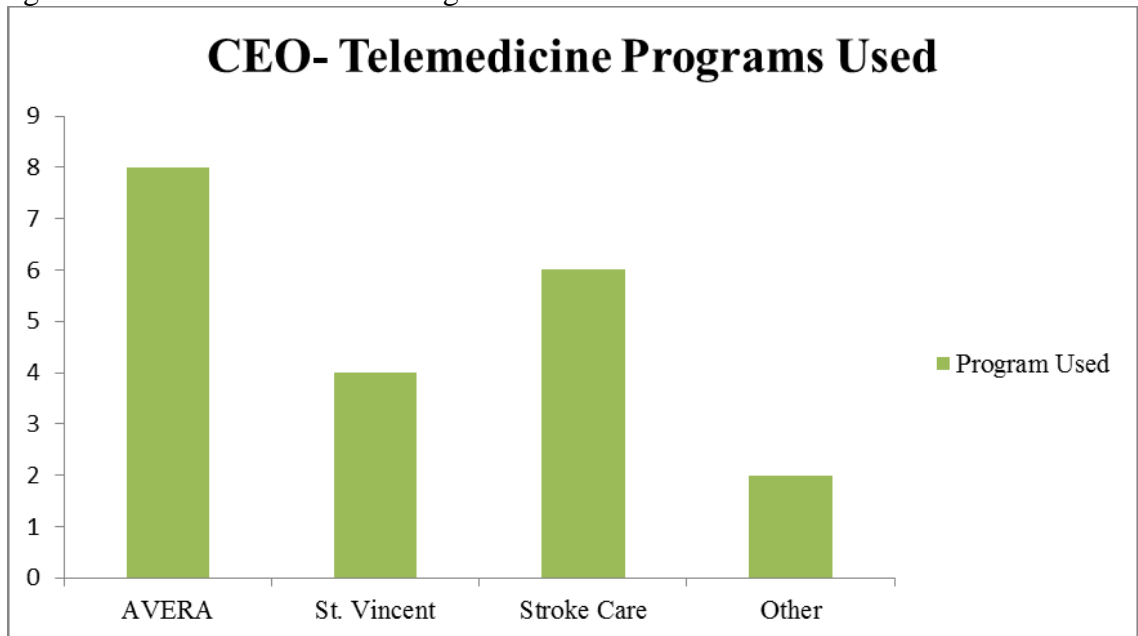


facility, which is one of the 48 CAHs in Montana, was not included in the survey to prevent bias.

The CEO survey had a 58% response rate. Responding CEOs had been employed in their position from a range of 9 months to 40 years with a mean of 10 years.

Telemedicine was currently being utilized or in the process of being implemented in 80% of the facilities. The most commonly reported telemedicine programs utilized by the respondents included AVERA eEmergency, St. Vincent telemedicine, and telestroke programs.

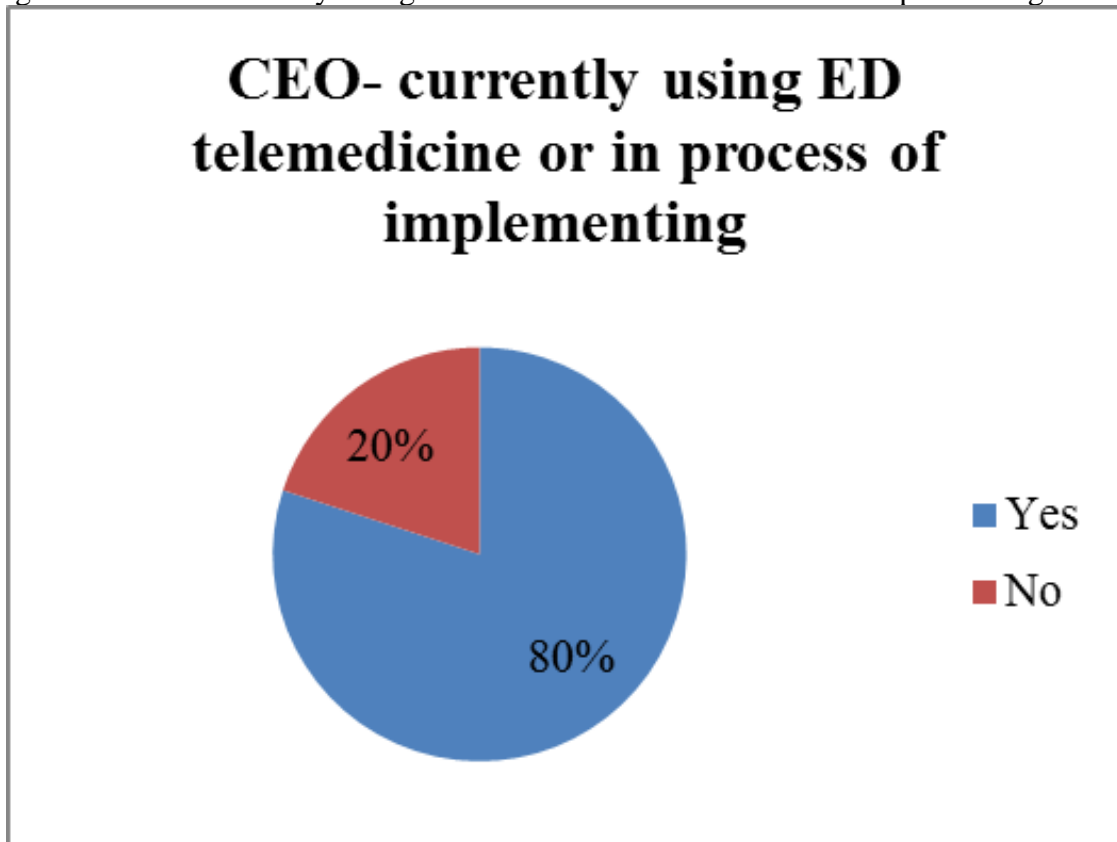
Figure 1. CEO – Telemedicine Programs Used



Two facilities reported using telemedicine for behavioral health purposes to provide patients with access to a mental health specialist when needed. A major theme identified was provider buy in and provider underutilization. All respondents reported satisfaction with telemedicine itself but many also reported dissatisfaction with provider

resistance to utilizing it. One respondent stated “There is some resistance to using the system. Providers can feel threatened that someone is looking over their shoulders.” Another rationale for underutilization was that some facilities are already staffed with physicians available onsite.

Figure 2. CEO – Currently Using ED Telemedicine or in Process of Implementing

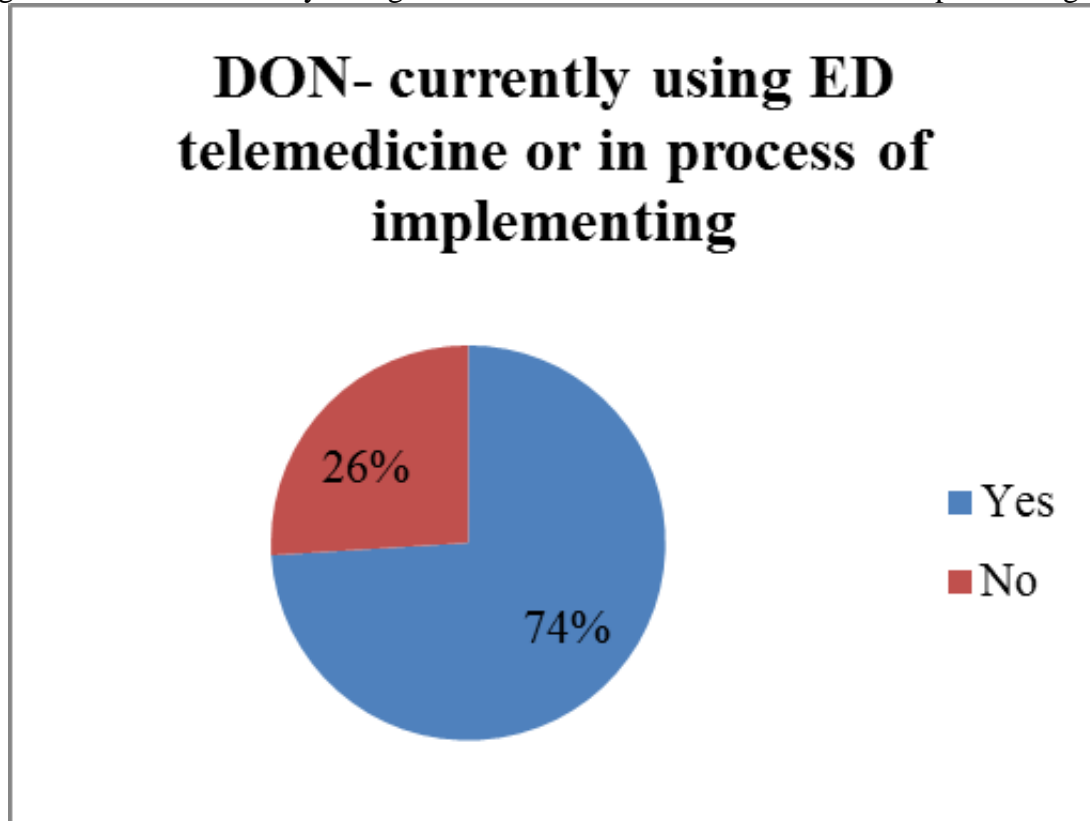


The CEO responses for the cost of having telemedicine in their emergency room were extremely varied. Some reported that they did not even know how much it cost. Twelve CEOs reported receiving grant funding to cover the cost. Three CEO and DON responses indicated they were worried about how they were going to fund the service once the grant monies ran out. Facilities in which telemedicine was not being funded by

a grant or the grant had expired reported paying anywhere from \$40,000 to \$70,000 per year. One respondent reported that they do not utilize telemedicine enough to justify the cost but telemedicine does help them care for patients for which they do not have expertise. Another respondent stated “Every budget year, it is a consideration to be cut because of operations being negative” meaning the expenses of the emergency room exceed reimbursement amount. Anticipation of using telemedicine in the future was reported by 84% of the respondents.

The DON survey had a 60% response rate. The respondents had a variety of titles including chief nursing officer, interim director of nursing, chief nursing officer, chief clinical officer, emergency department manager and vice president of nursing services. Respondents had been employed in their position from a range of four months to 40 years with a mean of 19 years. Telemedicine was currently being utilized or in the process of being implemented in 74% of the facilities. The most commonly reported telemedicine programs utilized by the respondents included AVERA eEmergency, St. Vincent telemedicine, and telestroke programs. Anticipation of continuing to use telemedicine in the future was reported by 95% of the respondents.

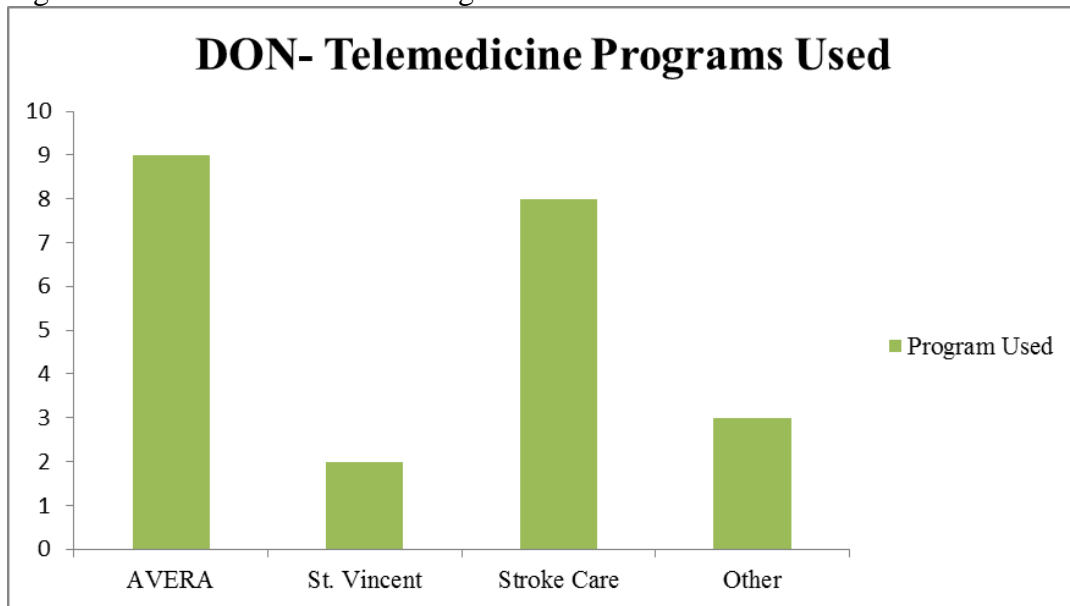
Figure 3. DON – Currently Using ED Telemedicine or in the Process of Implementing



Interestingly, although no questions were asked about the financial implications, funding concerns were mentioned by four respondents. When asked about anticipating continuing use of telemedicine in your emergency department in the future, one respondent stated “Yes. If funding allows. Currently our telemedicine is provided with grant dollars. A fear of the loss of grant dollars could be a loss in the telemedicine. The facility is currently looking at ways to continue, as it has been an added resource.” When asked why they were not using telemedicine and if they are planning on implementing telemedicine in the emergency department in the future, one respondent stated “Yes, the

added cost has made it not feasible at this time.” Another stated “Too expensive. No, not planning on it.”

Figure 4. DON – Telemedicine Programs Used



Positive responses about patient care were consistent. Additional positive themes identified were transfer assistance, time saving, immediate assistance and documentation assistance. One respondent stated “we can access ER nurses and physicians 24/7 with the push of a button. They can provide assistance with any task, such as determining mixing of intravenous bags, recording a code, or providing advice about how to suture or cast. This is especially appreciated by our mid-levels”. Another response felt that telemedicine was helpful especially during codes and transfers because it cuts down on the computer time and puts the nurse back at the bedside.

### Limitations

Inquiring about facility size in the survey would have helped improve this study. Comparing facility size to respondent answers would have provided important data to include in the analysis. Respondents reported working in their positions for as little as three months up to as long as thirty years. Some respondents reported being an interim in their position. An argument could be made that respondents that have only worked at an organization for a short period of time wouldn't have enough experience or be knowledgeable enough to provide appropriate judgement about the impact of telemedicine.

### Conclusions

The majority of CAH hospitals have some form of telemedicine in their facility and are planning on continuing to use in the future. Concepts from the Rural Nursing Theory that emerged from the data included limited staffing and access to resources. Negative provider utilization was an unexpected result of this study. Results of this study indicate the need for further research to explore rationales as to why there is medical provider resistance to the utilization of telemedicine. This is especially important due to the numerous responses indicating that telemedicine improves patient care in rural CAHs by providing various clinical support tools.

Hypothesizing that the larger CAHs do not have the appreciation or need for telemedicine use seems appropriate. Three respondents stated that they already staff their emergency departments with 24/7 physician coverage. This is not a possibility for some

of the smaller CAHs that do not even have a provider onsite due to the expense and limited availability of physicians. The projected future physician shortage will continue to make it difficult for CAHs to staff their emergency departments. Responses indicate CAHs that are unable to staff their emergency departments with physicians will more likely use this technology in the future. As this technology becomes more accepted, health care facilities will need to have a secure funding plan in place to ensure sustainability into the future.

### Discussion

Throughout the years, the CAH designation has experienced many modifications including the criteria to have a CAH designation. Differences in CAH size and resources show a potential need for a model change from the current CAH model. A new model that differentiates between facility sizes would be helpful as some CAHs are much more rural and isolated than others and therefore have increased staffing and financial difficulties.

MAFs, later converted to CAHs, were developed to address a growing concern about hospital closure in frontier Montana that would leave residents without access to health care (Medical Assistance Facilities, 1993). The CAH designation was established to reduce the financial vulnerability of rural hospitals and improve access to health care by keeping essential services in rural communities (Rural Health, 2018). Telemedicine is helping achieve the goal of improving patient access to health care for which Congress intended when designating the CAH. Although the CAH designation was meant to

reduce financial hardships for rural hospitals, data shows that many are struggling. To ensure that health care facilities will be able to implement and continue to have access to this important technology, CAHs need to be provided improved reimbursement for the telemedicine service. Intervention and support of policy makers and government agencies such as CMS would be necessary to overcome the financial barriers CAH facilities face with funding telemedicine and overall operation.



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APPENDICES

APPENDIX A

CEO SURVEY THEMATIC CODING FRAMEWORK

Category	Theme	Descriptors	
Provider Response	Underutilization	have implemented in the past and providers didn't use it	could be utilized much more. We are having trouble getting provider buy-in.
		the actual service itself is very good, just underutilized	it is underutilized
		Providers can feel threatened that someone is looking over their shoulders.	I feel it is completely underutilized
		providers don't use enough	
Staff Support	Provider Back Up	it has helped validate the care outlined for the patients by the PA's was correct	We staff with Mid-Level Providers so this gives us a neurologist in the facility.
		We have providers in the ER but they use it if they need a specialist.	It allows another set of eyes on the patient that can be valuable to their care.
		Having another set of eyes and a board certified ER physician involved is a great upgrade.	They can provide assistance with any task
		This is especially appreciated by our mid-levels	Provides immediate input while we are waiting for our providers to arrive
	Patient Care	Better continuity with patients	It helps for patients that we do not have the expertise in.
		supports the assessment and diagnosis of patients	helps facilitate transfers when needed
		improves time to thrombolytic for stroke patients	assistance with any task, such as determining mixing of IV bags, to recording a code, to providing advice about how to suture or cast
	Behavioral Health	We primarily use it for behavioral health patients	It provides the deeper knowledge related to behavioral then what we have at this time.
Facility Non-Utilization	On Site Physician Support	We have 24 hour MDs on site and can manage most things with our staff	We have full time board certified emergency physicians in the department
		The ER is staffed with Residency Trained and Board Certified ER Physicians	



Expense	Funding Barriers	Every budget year, it is a consideration to be cut because of operations being negative	We don't use it enough to justify the cost
		It is costly to keep the service open	The grant doesn't pay 100%
		concerns when the grant runs out	money
		sustainability due to no way to pay for it out of charges	We changed from a previous telemedicine provider due to cost
	Grant Funding	we are currently part of a grant but will continue because of the value in patient care and outcomes we find using the technology	grant and proceeds from the 340B program
		The program is currently supported by grant funding	There is no cost to us. We received the equipment through a grant.
		We obtained an initial grant and have not had problems since	We received a three-grant through the Leona M. and Harry B. Charitable Trust
		grant funding for now	no barriers due to grant monies
	No Funding Barriers	right now we are in the infancy of use and it does not impact our finances or at least very little	IPad technology is through a grant we are partnership with ST. Vincent's
		minimal. Not sure of the exact cost	no cost to us, outreach program

APPENDIX B

DON SURVEY THEMATIC CODING FRAMEWORK

Category	Theme	Descriptors	
Staff Support	Time Management	It cuts down on computer time and puts the nurse back at the bedside	It has saved time and provided better care.
	Clinical Support/Patient Care	reminders of when to repeat medications	help nursing complete clinical documentation when they need all hands on deck for patient care
		it aids in nursing charting, management of complex patients not typically seen in rural hospitals as well as transfer and staff assist	they are very helpful and can give direction right away when the provider is not in house
Expense	Financial Burden	A fear of the loss of grant dollars could be a loss in the telemedicine. The facility is currently looking at ways to continue, as it has been an added resource.	Financially it is not in the budget
		Too expensive	has capacity to use more but expensive
Provider Response	Underutilization	we don't use it as much as we probably could. We have good physician support and they often don't feel like it is beneficial.	had avera for 3 years providers used very little
		we have yet to use it. We are covered 24/7 with MDs and a flight team in town, so the MDs do not feel like they need the tele emergency at this time.	