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Update on the Most Rural American Telemedicine Program — The Present and Future

Edward T. Zawada Jr, Dana Buus, Don Kosiak,
Pat Herr and Michael Heisler

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1. Introduction

1.1. Review of previous experience and accomplishments

As previously published (1) the Avera Health system launched its telemedicine program by offering consultation by video connectivity from the main tertiary hospital in the largest city of the multi-state North Central Region of the United States to some of its smallest partner clinics and hospitals. Between 1993 and 2004, medical providers and patients learned what it was like to practice medicine and receive care via a telemedicine connection. A major growth spurt in Avera's rural telemedicine program came in 2004 after the initiation of a virtual ICU service staffed by intensivist physicians and critical care nurses; Avera *e*ICU CARE™1. Since 2004, Avera has initiated and rapidly expanded multiple other telemedicine programs to meet demand for additional services and coverage. These around-the-clock, always available services are unique as stand-alone programs, but combined provide one of the most robust telemedicine platforms on the planet.

In the previous report, the goals, expectations and consequences of the Avera *e*ICU CARE program were described. Avera *e*ICU CARE initially started with the system's tertiary hospital, Avera McKennan Hospital & University Health Center, serving as the hub location for the provision of twenty-four hour per day remote patient care and monitoring of seriously ill patients in three medium-sized rural hospitals. Over time it evolved to include several more hospitals of that size called "Rural Regional Hospitals." Additionally, remote Critical Access Hospitals (CAHs) began to request *e*ICU coverage. Intensivist-led medical supervision and

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1 Avera eICU CARE is a registered trademark of VISICU, Inc.

monitoring further expanded to hospitals outside of the Avera Health system, including those with different medical record or electronic record platforms. Finally, Avera *e*ICU services expanded into multiple states.

Avera *e*CARE™ has several years of experience in providing a broad expanse of telemedicine services. Each service has enjoyed similar growth and success. Avera's programs have also experienced similar and unique challenges in implementation, growth, and cultural adaptation. The expansion of Avera's telemedicine program was born in the success of Avera eICU CARE, and lead to the development and expansion of programs such as *e*Emergency and *e*Pharmacy. Like the Avera eICU CARE™ program, these services provide rural facilities access to additional health care services and providers. *e*Emergency and *e*Pharmacy have expanded faster and are more widely distributed than Avera *e*ICU CARE™. This could be the result of several factors, but one could postulate that perhaps these services have been more useful to rural sites of care. Today, a variety of services are being researched, designed and piloted to provide care to an amazing assortment of patients, medical providers, clinics, hospitals, and other health care facilities to be described later. Many of these pilots have been launched and have been well received. The goal of this chapter is to describe the status of the comprehensive Avera *e*CARE™ system and to hypothesize the future of this very successful paradigm of care.

As time progresses and needs arise, unique applications of telemedicine supervision are developed. Many of these applications are in the pilot stages of development as part of Avera's comprehensive program. Avera's suite of telemedicine services are now largely sustained without any outside financial support. Avera's telemedicine start-up costs have been off-set, in part, by grants and other funding opportunities. Avera's growing breadth and scope of telemedicine service offerings lead to a decision to bring *e*CARE together as a "Virtual Hospital". With this goal in mind, and generous financial support, Avera has developed a co-located telemedicine center that brings together all of Avera's telemedicine services under one roof, offsite from any traditional hospital or clinic location. Side-by-side, the medical providers, nurses and support staff work toward multidisciplinary success in each patient encounter. This telemedicine center is unique in the practice of telemedicine and is called the Avera *e*Helm™.

2. Current programs and their results

Figure 1 displays the geographic breadth of the Avera *e*CARE™ program which is of one of the most comprehensive rural telemedicine programs in the world by geographic breadth, number of sites served, and number of unique telemedicine services operating from one location. It can be noted from the figure that the greatest concentration of activity is along the borders of five states of the North Central region of the United States: South Dakota, North Dakota, Minnesota, Iowa, and Nebraska. However, the greatest recent growth is westward including expansion into the states of Wyoming and Montana.
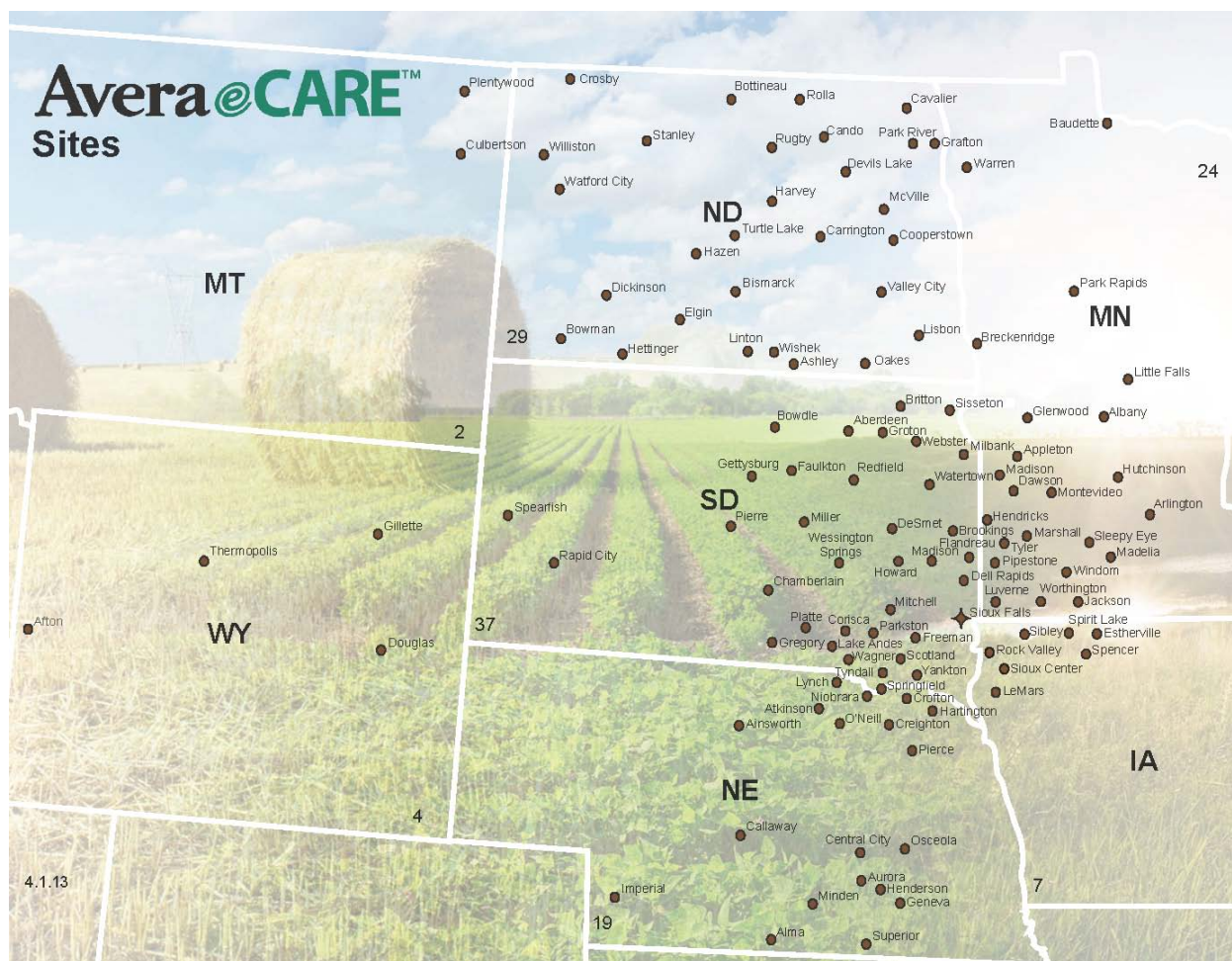
Figure 1. shows the seven states of the North Central United States which receive Avera eCARE™ services: Wyoming (WY), North Dakota (ND), South Dakota (SD), Nebraska (NE), Minnesota (MN), Montana (MT) and Iowa (IA).

Avera's telemedicine experience initially shows the seven states of the North Central United States which receive Avera eCARE™ services: Wyoming (WY), North Dakota (ND), South Dakota (SD), Nebraska (NE), Minnesota (MN), Montana (MT) and Iowa (IA).started by using video-conferencing equipment to facilitate medical consultations between primary care providers and patients in rural locations in South Dakota to specialists in a tertiary setting. It now is an active and robust program spanning seven states of the North Central region of the United States. Expansion of the type of programs and number of sites served has pushed Avera's total service area to include more than one hundred sixty-five hospitals and clinics within and outside of the Avera Health system.

The six primary eCARE services are shown in Figure 2: eConsult, ePharmacy, eEmergency, eLong Term Care, and eUrgent Care in Correctional Facilities.

These telemedicine programs are shows the six telemedicine services offered by Avera eCARE™ to date.designed to benefit rural patients and medical providers by improving the speed of care delivery and helping ensure the highest quality of care is provided locally where the patient resides. For the remote medical provider, Avera eCARE services offset a lack of

specialists in rural areas affected by fewer resources and limited medical professional assistance and consultation. In addition, the facilities served may lack access to educational and career growth opportunities. These medical providers often have large patient loads and are required to be available to provide patient care many hours per week[2],[3]. Patients in remote, rural locations are often more elderly and are more likely to suffer from chronic disease than their urban counterparts[4]. The cause of this startling statistic may be multifactorial but may include reasons such as greater distances to travel for specialty consultation, delays in seeking care due to higher rates of lacking primary health insurance or being underinsured, and in some cases inclement weather delaying access to care.
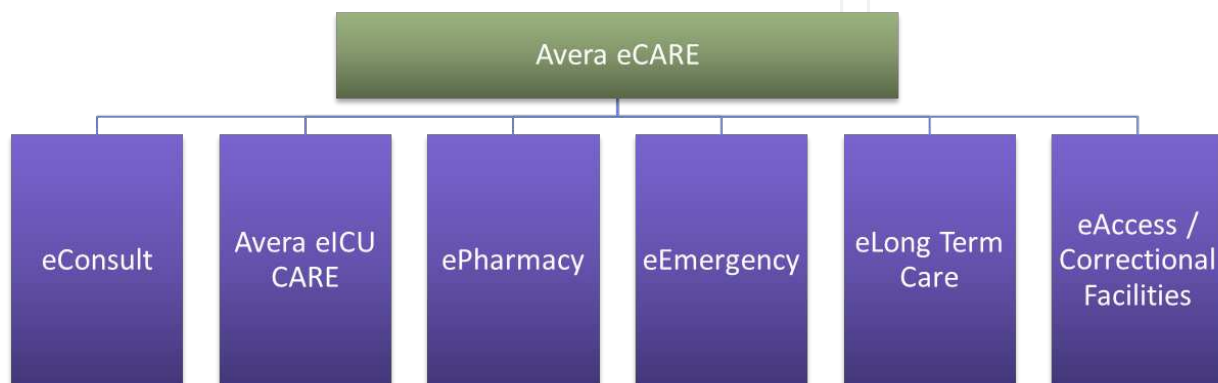

Figure 2. shows the six telemedicine services offered by Avera eCARE™ to date.

2.1. The Avera *e*CARE™ programs

*e*Consult allows patients to access scheduled specialty consults at their local facility through two-way video technology. These consults are supported by special telephonic stethoscopes, otoscopes, and examination cameras. Avera first began providing virtual visits in 1993. *e*Consult benefits patients by saving time away from school or work and by saving the expenses of roundtrip travel. Figure 3 illustrates the utilization of this service by specialty over the past twelve months. As can be seen, primary specialties such as pediatrics or mental health are regularly requested. Many rare subspecialties are also utilized monthly. Infectious disease expertise is the single most frequently scheduled telemedicine consult provided to rural medical providers and their patients.

The status of this program is summarized as of May 30, 2013. *e*Consult is live in 109 sites; 76 patient sites and 33 specialty sites. Over a twelve month period, 5,900 *e*Consults were conducted by 88 unique specialist providers. *e*Consult services have saved an estimated 28,500

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2 Ormond, B., Wallin, S., Goldenson, S. (2000). Supporting the rural health care safety net. The Urban Institute, Occasional Paper 36.

3 2009. Rural practice, keeping physicians in. AAFP Position Paper. http://www.aafp.org/online.en/home/policy/policies/r/ruralpracticekeep.html

4 Joynt, K., Orav, J., and Jha (2013). Mortality rates for medicare beneficiaries admitted to critical access and non-critical access hospitals, 2002-2010.

patient travel hours and more than 1.8 million patient travel miles. Additionally, access to specialist care via *e*Consult has resulted in a cost savings of more than $425,970 for rural patients[5].
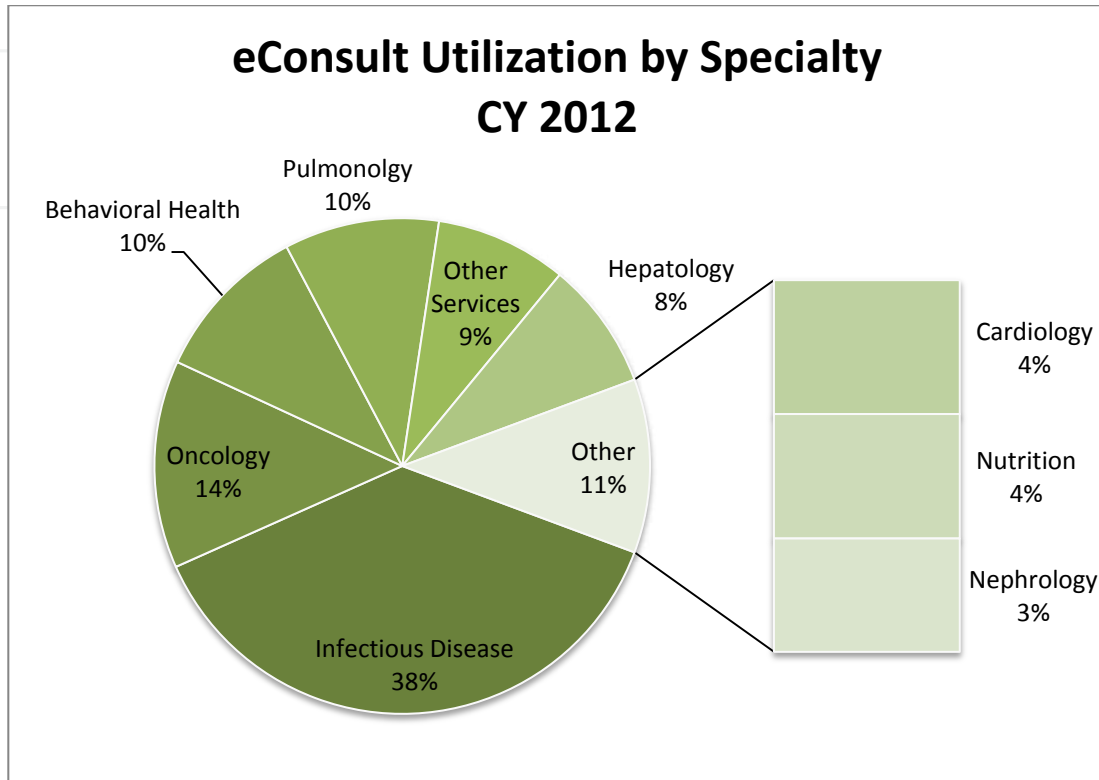
"Other Services" illustrates the utilization of telemedicine consultations by specialty over the past twelve months include those specialties that average <100 consults/year: Rehab, Internal Medicine, Gastroenterology, Occupational Medicine, Palliative Care, Women's Services, Dermatology, Pediatrics, Neonatology, Otolaryngology, Neurosurgery, Neurology, and Endocrinology

Figure 3. illustrates the utilization of telemedicine consultations by specialty over the past twelve months.

Avera *e*ICU Care™ (*e*ICU) began in 2004 and had accounted for the largest quantum of growth in the history of Avera's telemedicine services until just recently. As stated earlier, Avera *e*ICU CARE provides around-the-clock remote intensive care monitoring of seriously and critically ill patients in the thirty-three hospitals served. With the inception of this program, Avera was able to electronically quantitate the severity of illness for such patients by using an internationally known and validated severity adjustment methodology called the Acute Physiology and Chronic Health Evaluation (APACHE) scoring system. Patient data is automatically calculated from the data entered into the electronic medical record to generate APACHE predictions. The system also analyzes quality measures such as the frequency of ordering "best practice" national guidelines. Avera tracks outcomes such as severity-adjusted intensive care unit (ICU) length of stay, severity-adjusted ICU mortality, severity-adjusted hospital mortality,

5 eConsult Database (2013). Avera eCARE Services.

and severity adjusted hospital length of stay. Avera uses these analyses to design strategies to improve the care delivered to seriously and critically ill patients in the *e*ICU CARE system. Avera *e*ICU CARE has also provided education to medical providers across the region concerning this new high quality service by publishing results in the South Dakota Journal of Medicine (2).

From the initial forty beds, Avera *e*ICU CARE has expanded to include smaller hospitals within the Avera system, hospitals out of the Avera system, and even hospitals out of the state. Avera was one of the first in the nation to offer the *e*ICU service to patients in CAHs. Avera studied whether the Avera *e*ICU program had an impact on patient outcomes. Data revealed that after the program was implemented there was reduction in severity-adjusted ICU mortality, reduction in severity-adjusted ICU length of stay, reduction of severity adjusted hospital mortality, and reduction of severity-adjusted hospital length of stay (3). In addition, Avera *e*ICU CARE has improved compliance with best practice guidelines, and has achieved one hundred percent compliance with stress ulcer prophylaxis and DVT prophylaxis in *e*ICU-monitored patients. APACHE data has shown that ICU mortality among *e*ICU patients is an average of thirty to fifty percent below predicted in comparison to the APACHE database. Avera has also reduced ICU length of stay by an average of twenty-five percent. Using APACHE predictions, Avera has calculated the number of lives saved from the difference between observed to predicted mortality. Figure 4 shows those results from initial analysis to the current year.
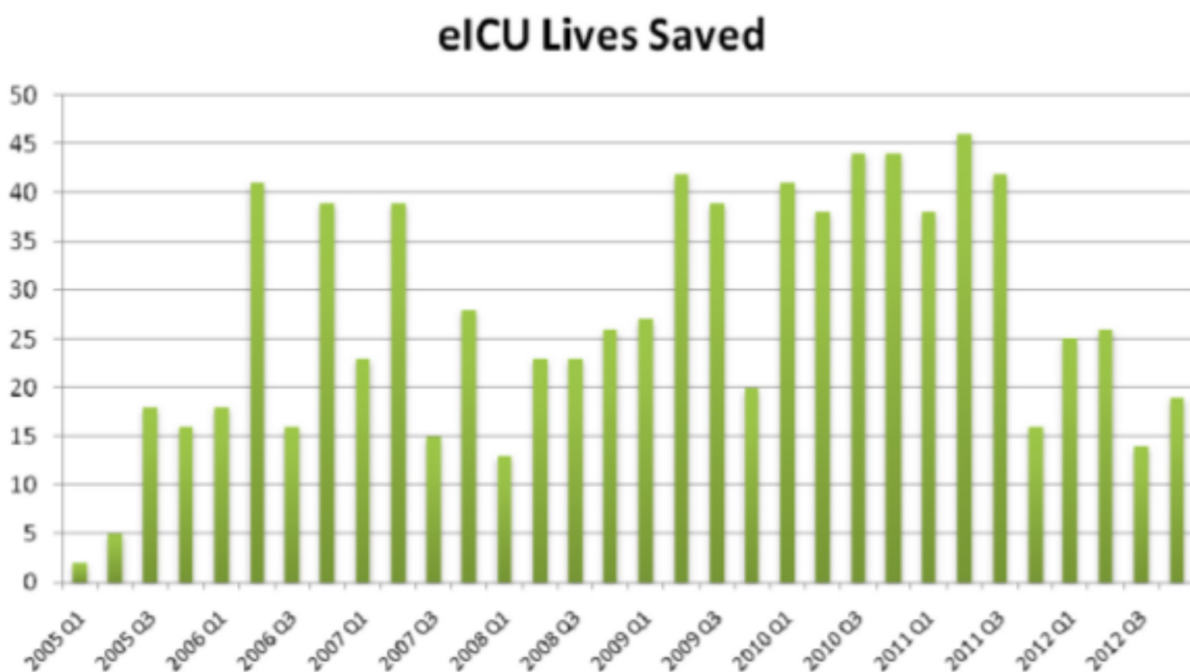

Figure 4. illustrates the number of lives saved quarterly from 2005 to the present.

The around-the illustrates the number of lives saved quarterly from 2005 to the present -clock, direct monitoring of critically ill and seriously ill patients by the intensivist-led team, sup-

ported by sophisticated technology that recognizes and alerts for negative trends in vital signs and abnormalities in laboratory tests is one of the primary reasons for such significant improvement in patient outcomes. The *e*ICU team of intensivists and critical care nurses is alerted to negative trends in patient status and can immediately be present in a patient's room by a two-way interactive televideo system to respond to emergencies. Additionally, Avera *e*ICU CARE supports consistent application of evidenced-based medicine through active rounding on patients, with a focus on ensuring such evidence-based measures are implemented and documented in the medical record.

Avera *e*ICU CARE currently provides coverage for one hundred thirty-two beds in thirty-three facilities across six states, spanning a geography from Wyoming to mid-Iowa and from North Dakota to Nebraska. The Avera *e*ICU CARE team monitors an average of sixty to sixty-five patients at any time, and averages twenty-two admissions per a twenty-four hour period. *e*ICU intensivist physicians write an average of 1,400 orders per month. This greatly exceeds the average number of interventions for other tele-intensivist programs (4), which attests to the welcome invitation by rural sites for continous coverage when primary providers cannot be available. There are no charges to patients for this service.

Although the number of ICU telemedicine programs in the United States has continued to grow rapidly, our program has been recognized for its coverage to the least densely populated geographic rural region (5) and to the largest number of critical access hospitals (those receiving federal pass-through payments for services but limited to 20 beds or less).

***e*Pharmacy was** developed shortly after the quantum expansion of the Avera *e*ICU CARE™ service. Many rural sites experienced long periods of time when a local pharmacist was not available, highlighting a need for this service. Avera's virtual pharmacy service provides remote medication order review and approval before a first dose of medication is administered. ePharmacy uses automated dispensing equipment and remote provider order entry which has led to a reduction in serious safety events related to duplication of medication therapies, allergies, and drug-to-drug interactions. Currently ePharmacy service is provided to forty-six sites. Since its inception in 2009, more than 83,300 patients have been served by ePharmacy. To date more than 1,054,000 orders have been reviewed, and more than 14,200 serious safety events avoided. Each month, the ePharmacy team of pharmacists reviews more than 44,000 orders and documents 800 interventions to promote medication safety and efficacy.

Figure 5 illustrates the breakdown of adverse events noted in a single month.

eEmergency (eED) illustrates the types of errors which have been detected by the ePharmacy service line in a single month.has had the greatest success with expansion and requests for service. As of June 1, 2013, seventy-six sites utilize eEmergency services. Figure 6 illustrates the pace of growth of this highly requested program to the rural communities of the North Central region of the United States. The *e*ED provides immediate, two-way video access to a board-certified emergency physician and a core of experienced emergency nurses. They assist in the management of a multitude of medical emergencies such as trauma, acute myocardial infarction and stroke, to name a few.
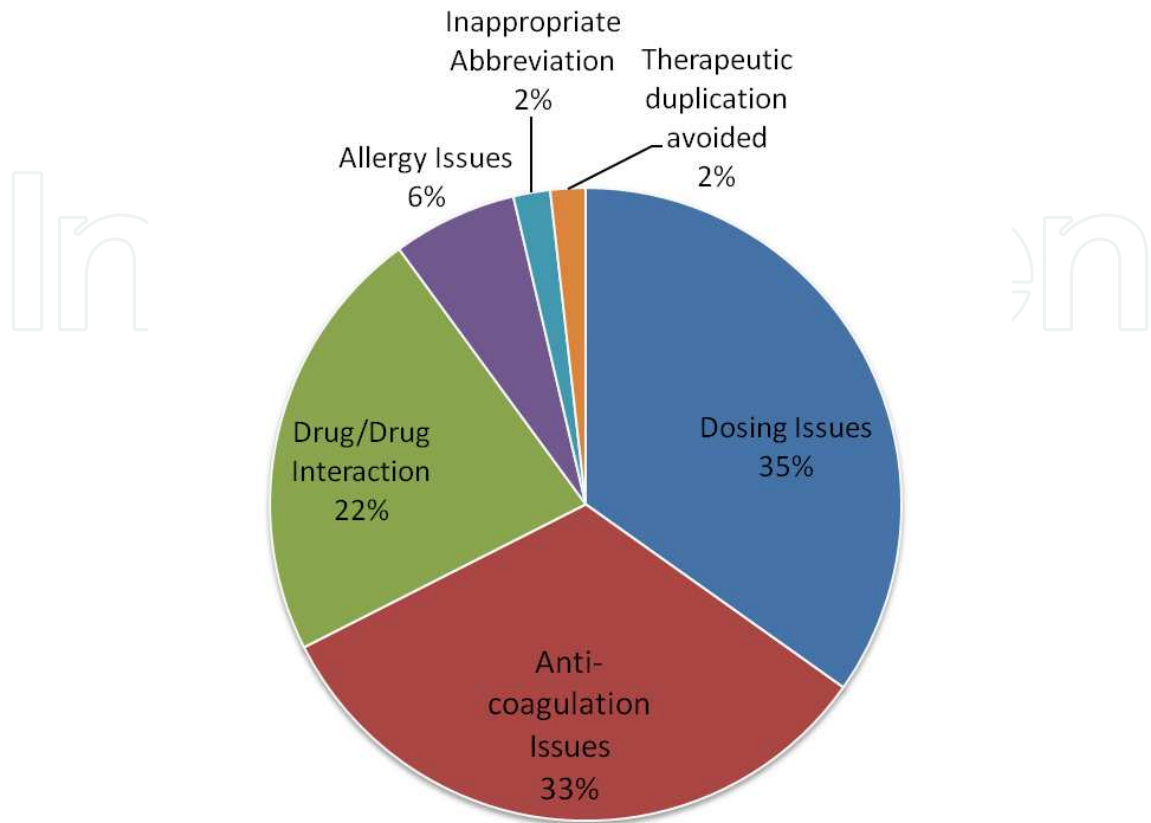
ePharmacy Avoidance of Serious Safety Events

Figure 5. illustrates the types of errors which have been detected by the ePharmacy service line in a single month.
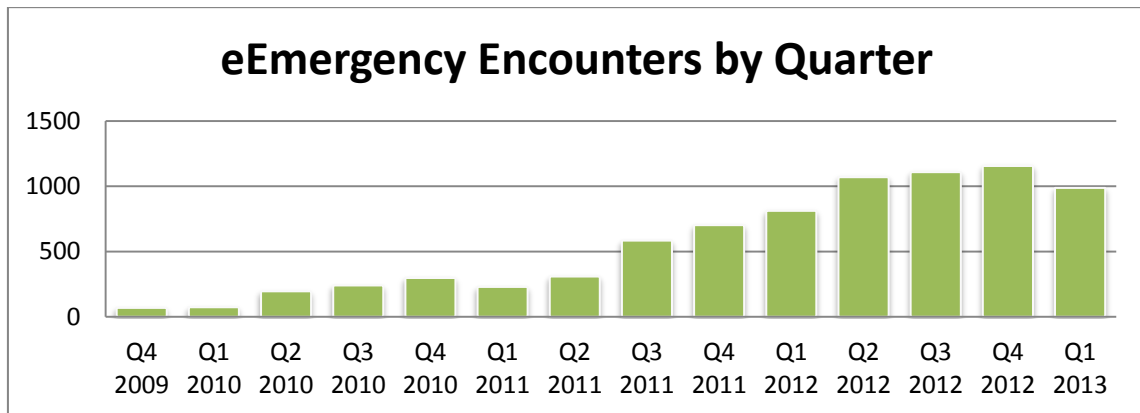

Figure 6. demonstrates the pace of growth of eEmergency services aided by the Helmsley grant to be described below.

eEmergency allows for the demonstrates the pace of growth of eEmergency services aided by the Helmsley grant to be described below.initiation of accurate diagnostic testing before local provider arrival, streamlines emergency transfer arrangements, and eliminates unnecessary transfers. Since inception in 2009 through May 30, 2013, more than 5,900 patients have been

treated, over 10,800 transfers have been arranged, and over 980 transfers have been avoided, resulting in a savings of $7.85 million. Figure 7 breaks down the types of complaints routinely handled by the *e*ED.
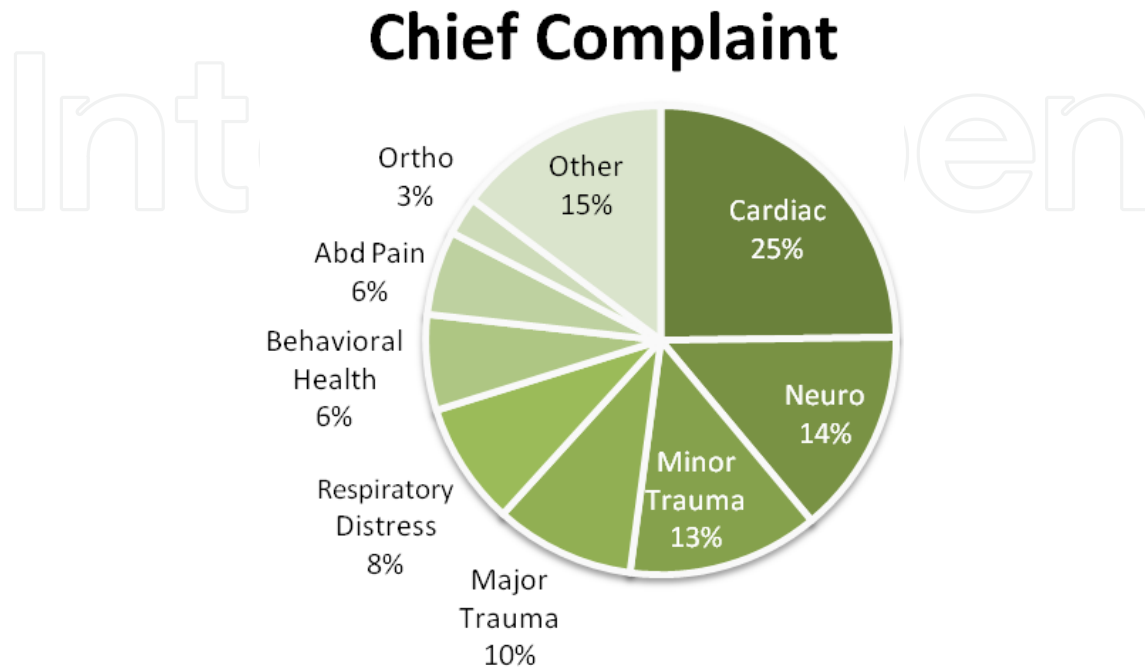
Chief Complaint

Ortho 3%
Other 15%
Cardiac 25%
Abd Pain 6%
Behavioral Health 6%
Neuro 14%
Minor Trauma 13%
Respiratory Distress 8%
Major Trauma 10%

Figure 7. illustrates the frequency of problems handled by the eEmergency program

The *e*Emergency program has illustrates the frequency of problems handled by the eEmergency program expanded to include the initiation of several quality improvement programs with major clinical effect on the region. One example includes what is called the "Chest Pain Initiative." Because the *e*ED is often involved in cases before the local provider has arrived, important diagnostic tests and critical therapies can be initiated that in the past may have been delayed. As an example the program has documented improvement in "door to ECG" times. After implementation of *e*ED project, the median time to ECG has improved and now exceeds the Centers for Medicare and Medicaid Services (CMS) standard of ten minutes as shown in Figure 8.

Another component of the illustrates the improvement in median time to ECG for patients with chest pain presenting to emergency departments in the region due to assistance from eEmergency services.Chest Pain Initiative was improvement in aspirin administration. After the *e*ED project was implemented, participating sites were noted to have 100 percent compliance with established guidelines for aspirin administration. Historically, these hospitals reported compliance as low as 67 percent[6]. Other important outcomes impacted included significant decrease in the time to transfer and the increase in use of thrombolytics for care in the appropriately screened and eligible candidates. This number is at 100 percent.

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6 Avera Health Quality Department Data (2011).

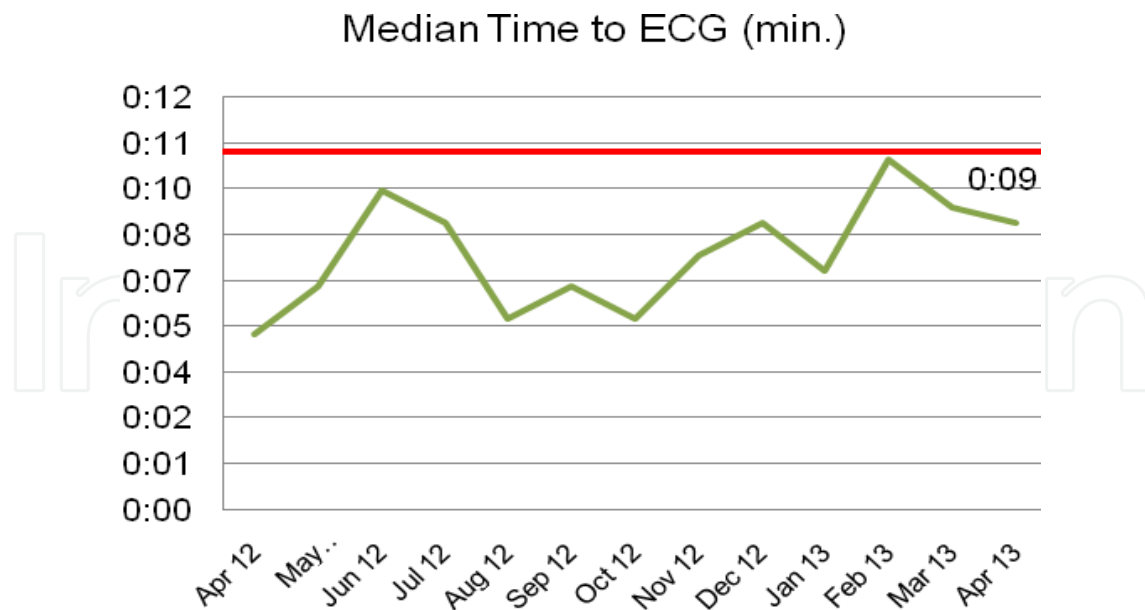## Median Time to ECG (min.)

Figure 8. illustrates the improvement in median time to ECG for patients with chest pain presenting to emergency departments in the region due to assistance from eEmergency services.

*e*Long Term Care (*e*LTC) has developed as an outgrowth of *e*ED, and uses telemedicine technologies to improve long term care staff and residents' access to providers and specialty services in a manner that is high quality, convenient, and low cost. The goal of the program is to provide urgent care services to residents of long term care facilities in an effort to prevent emergency department visits and hospital admissions. This program was launched as a pilot project in January 2012 at four sites, and is currently available in six sites. In the first year of pilot, 120 residents were seen by the eLTC provider. Of these, 30 percent (36 encounters) resulted in an avoided a transfer to the emergency department or clinic. As an additional component of the service, specialist care via *e*Consult is available to residents in participating facilities. Grant support to be described below has assisted in innovating in this branch of telemedicine.

*e*Access in Correctional Facilities has also developed as an outgrowth of *e*ED. In this program, telemedicine technology is used to provide physician-directed urgent care services to inmates, resulting in a reduction of unnecessary and costly transfers. This pilot was launched in May 2012 at four sites. In the first twelve months of service, 372 patients have been served, with thirty-two percent of those encounters resulting in an avoided transfer. The distribution of complaints handled by the virtual physicians was similar to one shown above for the *e*Emergency program as a whole.

2.2. Major lessons learned and challenges

Credentialing and licensure for all these telemedicine services requires considerable amount of time and perseverance. Avera *e*CARE™ medical providers are licensed in every state where *e*CARE services are provided. In addition, medical providers must apply for, and be granted, medical privileges in each hospital in which services are provided. Nursing licensure is no less

challenging. Several states in which *e*CARE services are provided participate in the Nurse Licensure Compact. In these states, licensure in one participating state covers the nurse when he or she is working in other participating states. South Dakota, Iowa, Nebraska, and North Dakota are all compact members. Separate full, unrestricted nursing licenses are needed in Minnesota, Montana, and Wyoming. Nursing staff is not required to apply for any privileges in any of the hospitals currently served.

Two different processes are used for credentialing and privileging, the traditional process that has been in place for many years, and a newer telemedicine application process. Approximately fifty percent of hospitals receiving *e*CARE services have adopted the telemedicine credentialing/privileging process. The other fifty percent have chosen to continue with the traditional route for a variety of reasons including preference for the existing method and the unsure nature of state and federal survey teams' reception of this new process.

The *e*Pharmacy staff of hospital-trained pharmacists are licensed in each state where *e*Pharmacy services are provided. Licensure is highly regulated by each state's Board of Pharmacy. Most of these states require a separate written exam before granting a license. Credentialing and privileging is not required for pharmacists.

2.3. Funding Sources

Avera Health member hospitals and clinics have long been financially supportive of the telemedicine mission. Through the innovative thinking of Avera leaders, telemedicine has been considered a strategic part of Avera's future and has been budgeted for accordingly. In addition to internal financial support, various granting agencies have provided funding for the implementation and growth of many *e*CARE programs. These agencies have ranged from the local, state and federal government, foundations of publicly traded companies, as well as private local and national foundations. Without this generous support, telemedicine expansion on such a broad scale would have been difficult, if not impossible. We will summarize some of *e*CARE's past grant awards and funding opportunities below.

The United States Department of Agriculture (USDA) has funded seven grants exceeding $2.7 million to expand various Avera *e*CARE™ programs. In addition, private foundations focused on rural healthcare have provided financial resources to operationalize some a variety of *e*CARE programs. One particular grant from a private foundation has allowed for greater collaboration between individual Avera *e*CARE™ services. *e*CARE services that were once scattered across a large medical campus are now able to function as a fully integrated virtual hospital, housed in a state-of-the-art building miles from any traditional hospital walls. This new location allows Avera to provide telemedicine based care in a much more cohesive and supportive manner. This new super-hub is called the Avera *e*Helm™. The *e*Helm serves as an incubator for new and innovative telemedicine programs and services by allowing and facilitating dialog and cross-fertilization of existing telemedicine experts.

In 2012, an Avera community hospital was awarded a grant from the Health Resources and Services Administration (HRSA) Office of Rural Health Policy to expand the *e*Long Term Care program to an additional sixteen centers.

2.4. Awards

Avera's telemedicine efforts have been recognized by several national health organizations looking to reform and improve health care. In 2009, Avera was awarded the American Telemedicine Association's President's Institutional Award for leadership in telemedicine. Avera has received thirteen "HealthCare's Most Wired" awards from a consortium that includes McKesson, AT&T, and Care Tech Solutions, in cooperation with the College of Healthcare Information Management Executives, the American Hospital Association, and Health and Health Network (H&HN) magazine. Avera also won one of three 2011 & 2012 "Most-Wired Innovator" awards and was recognized for this accomplishment at the 2011 and 2012 American Hospital Leadership Summits. Avera eCARE was recognized as a finalist for the Monroe E. Trout Premier Cares award in January, 2012, and was nominated for a Catholic Health Association of the United States award in 2013. eCARE has also been recognized internally for its impact on quality of care, and has received three Avera Quality Congress awards; one for ePharmacy, one for eEmergency and another for the eEmergency Chest Pain Initiative.

3. The future –A paradigm shift

The proliferation of different virtual health services in Avera's comprehensive telemedicine program is illustrated in Figure 9. Telemedicine can be used to supplement each phase of the health care continuum. Telemedicine has evolved in the North Central Plains region as a program that supports the entire continuum from primary care, emergency care, critical care, multiple pharmaceutical interventions, and a nascent follow-up program in long term care facilities.

Figure 10 illustrates the illustrates the complete continuum of telemedicine services which now exist and are co-located in a single hub such as the Avera eHelm which coordinates and enhances patient care "air traffic control" model of telemedicine utilization, where telemedicine providers serve as back up for the other components of the continuum. While this may be the case in some urban settings, rural areas might utilize telemedicine in a formal role in direct patient care, leading a local medical team from a remote location. Remote telemedicine care may actually provide total first line diagnosis and therapies in the near future.

To this end, illustrates the important "air traffic control" or back up capability of telemedicine for each phase in the health care continuum.Avera eCARE™ is planning for a major shift in healthcare delivery in the future.

A paradigm shift in health care delivery is being driven by the expansion of telemedicine services. The progression of innovation in telemedicine, especially in remote areas (rural parts of the United States, Third World Countries, Emerging Nations), which cannot develop a full medical infrastructure on their own, will turn to "The Virtual Hospital, The New Doctor's Office, and the New Continuity Service", all expansions of mature telemedicine centers.
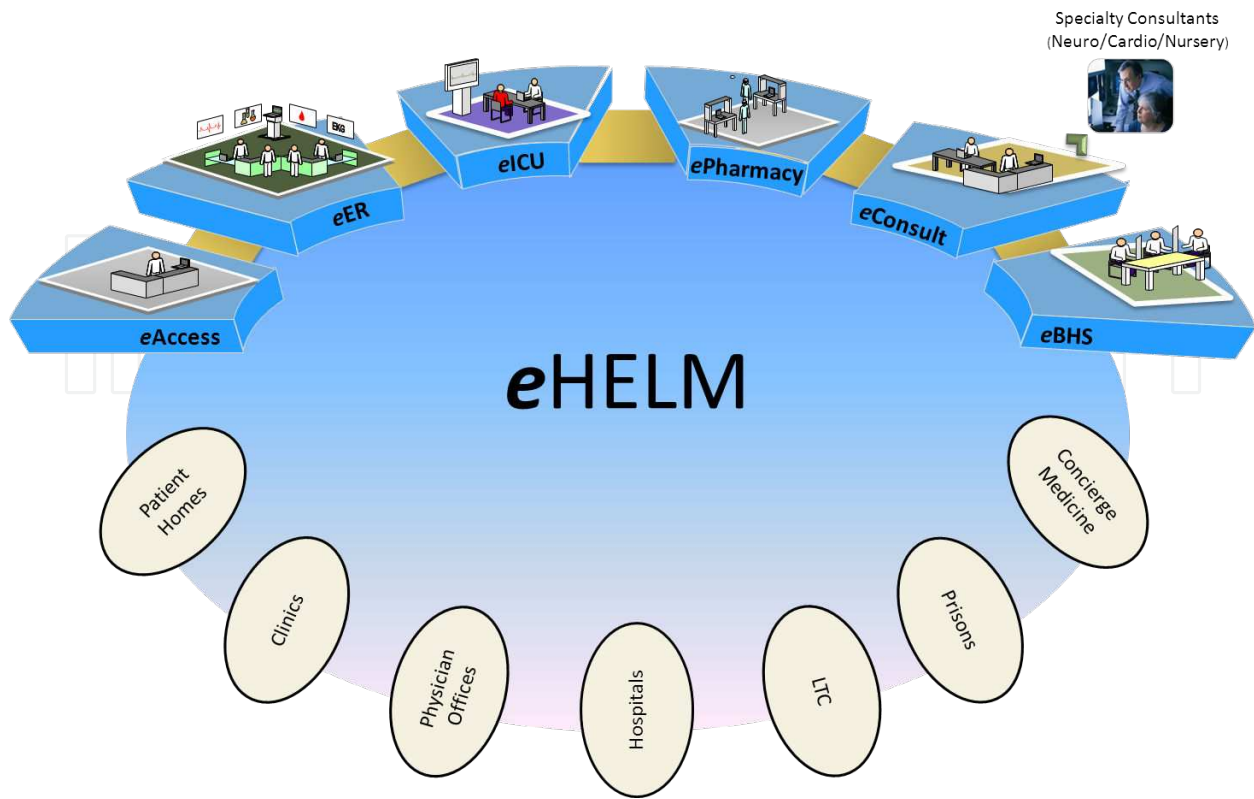
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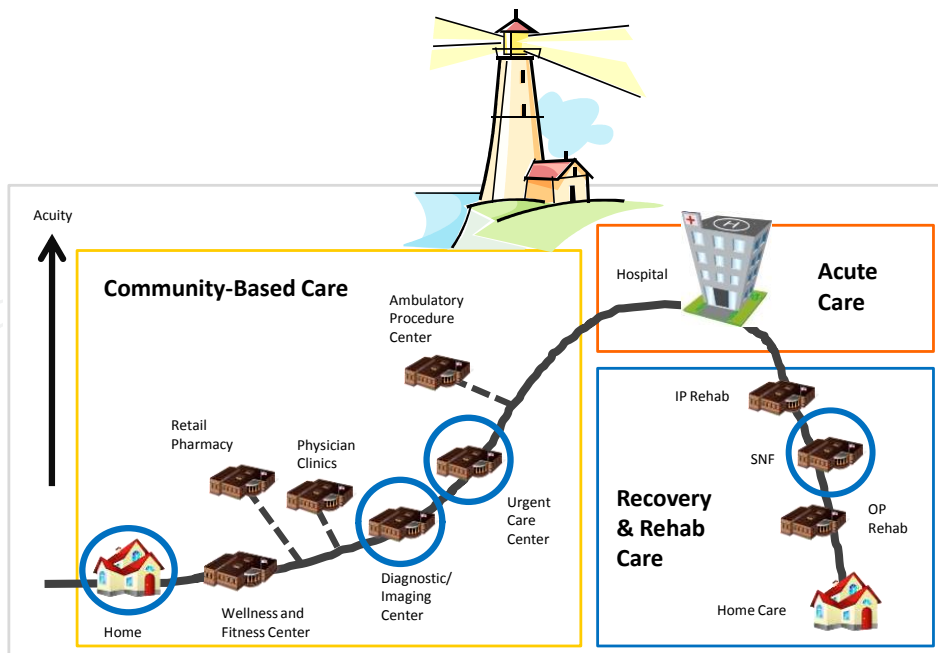

Figure 10. illustrates the important "air traffic control" or back up capability of telemedicine for each phase in the health care continuum..

Instead of increased numbers of brick and mortar tertiary centers to which patients travel, now there is the possibility of a virtual electronic hub to provide tertiary hospital services to remote sites as they currently exist. In effect, telemedicine brings the tertiary care hospital to the patient. Reduced costs of transfer of patients, improved patient and family satisfaction, increased access to specialists and especially rare sub-specialist consultation are all the byproducts of a robust and integrated telemedicine program. Implementation of improved wireless (cellular) technology to allow remotely controlled medical machines such as mechanical ventilators, dialysis equipment, and robotic care is likely imminent as an augmentation of such a tertiary care *e*Hospital. In addition, the challenges of local staffing, supply, and power all need to be addressed as unique challenges.

Another trademark of a highly integrated telemedicine program lies in the doctor's office. In a specialist's office there would be a synthesis of activity which allows more active inclusion of telemedicine into practice. A patient might be seen physically in an exam room next to a telemedicine patient in the next exam room. This seamless integration of telemedicine work stations into the flow of patient care would allow the doctor to see any patients regardless of their location. Physician time could be, and in some cases is, divided equally and seamlessly between time spent with physically present patients and virtual patients. In the future, the physician may also be located remotely seeing patients at all locations via telemedicine.

Electronic continuity services could include nontraditional settings such as long term care facilities, correctional facilities, and expanded telemedicine home-based services. In these new and dynamic locations the goal of telemedicine is to continue to monitor compliance with discharge instructions, meticulously supervise proper medication intake at home or in the facility in which the patient resides, and to ensure timely follow up with the primary medical provider and any needed specialists. This system would be designed to prevent errors, relapses, or delays in follow up which might lead to unnecessary emergency visits, hospitalizations, and premature relapses in medical problems.

Finally,**Figure 11** illustrates how such complete telemedicine services may expand beyond health systems and rural neighbors. It could even result in global extension of successful telemedicine systems of medical care. A telemedicine program with multiple services could be located together in a core such as the Avera *e*Helm™. These hubs could just as easily and efficiently provide telemedicine care to the ends of the earth and beyond as they could in the same city or building. Home care, concierge care, doctor's office care, medical home care, urgent care, emergency department care, behavioral health care, general hospital care, specialty hospital care (behavioral health, cardiac, orthopedic), intensive care, long term hospital care (LTHC), and others could be connected to a core like the Avera *e*Helm™ providing telemedicine care and coordination with its multiple primary care and specialty allied health members, nurses, and physicians.

In summary, to illustrates a model of global care coordinated by multiple electronic telemedicine programs coordinated by a core of expert telemedicine caregivers located in a core such as the Avera eHelm™.date more than 153,000 patients have been touched by at least one Avera *e*CARE™ service. More than 165 hospitals and clinics across a 495,000 square mile service use
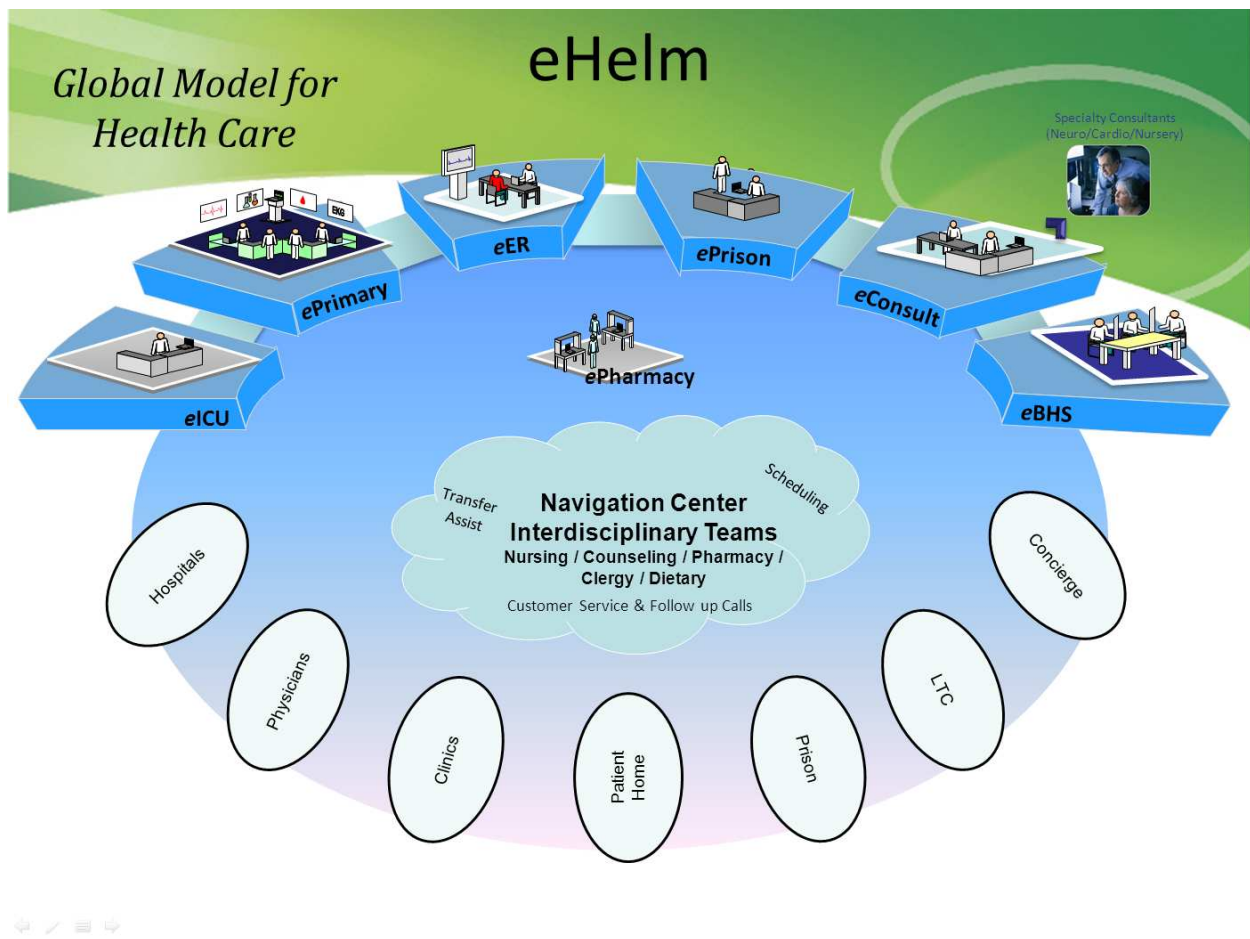
Figure 11. illustrates a model of global care coordinated by multiple electronic telemedicine programs coordinated by a core of expert telemedicine caregivers located in a core such as the Avera eHelm™.

at least one Avera *e*CARE™ service. At the present 650 providers are served by Avera eCARE™. The total financial impact has been greater than 55 million dollars.

The future goals of Avera *e*CARE™ includes a plan to create virtual support for hospitals, clinics, long term care facilities and other nontraditional care locations to provide access to care at the same level of quality available in urban settings. In addition, Avera is exploring a robust home monitoring and coaching system of care that enables providers to interact with chronically ill patients in their home environments. These steps will create a virtual support for patient centered medical homes.

In conclusion, the success of these multiple diverse telemedicine programs in the rural region of the North Central United States has been a result of trying to meet the needs for health care in this area. Telemedicine has been well received due to many factors, including the remoteness of many communities, the frequently inclement weather which impairs urgent face-to-face health care, the lack of health care resources in the agricultural economy, and the extremely low number of specialty and subspecialty providers located these states. The success of Avera *e*CARE has not gone unnoticed. Many have asked to learn how to duplicate some or all of Avera models of comprehensive telemedicine.

Today and in the future, Avera will continue to leverage technology to connect with our North Central USA population, to engage the people of this rural region in prevention and in provision of care and services on the go and where they live. Finally, Avera will partner with stakeholders who will join in the advancement of innovation, research and policy for telemedicine practice and reimbursement.

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Author details

Edward T. Zawada Jr[1,2], Dana Buus[3], Don Kosiak[4], Pat Herr[5] and Michael Heisler[2,6]

1 Avera Health Intensivists/eICU, USA

2 Department of Internal Medicine, University of South Dakota Sanford School of Medicine, South Dakota, USA

3 Avera Health, Sioux Falls, South Dakota, USA

4 Avera Health eServices, Sioux Falls, South Dakota, USA

5 Avera eICU, Avera Health, Sioux Falls, South Dakota, USA

6 Avera eICU, South Dakota, USA

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