

A LeadingAge CAST Report

TELEHEALTH AND REMOTE PATIENT MONITORING (RPM)

Provider Case Studies 2013

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LeadingAge Center for Aging Services Technologies:

The LeadingAge Center for Aging Services Technologies (CAST) is focused on accelerating the development, evaluation and adoption of emerging technologies that will transform the aging experience. As an international coalition of more than 400 technology companies, aging-services organizations, businesses, research universities and government representatives, CAST works under the auspices of LeadingAge, an association of 6,000 not-for-profit organizations dedicated to expanding the world of possibilities for aging.

For more information, please visit LeadingAge.org/CAST

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1 INTRODUCTION

The LeadingAge Center for Aging Services Technologies (CAST) is pleased to provide the following six case studies on the impacts and benefits of telehealth and remote patient monitoring (RPM). We hope they will demonstrate for providers the benefits of using telehealth and RPM products.

The case studies are designed to help long-term and post-acute care (LTPAC) providers understand the benefits that telehealth and RPM products can offer to their care settings.

This set of case studies is a companion to the 2013 CAST whitepaper entitled [Telehealth and Remote Patient Monitoring for Long-Term and Post-Acute Care](#). The whitepaper includes a [Telehealth and RPM Selection Matrix](#) that compares 23 telehealth and RPM products from 16 vendors with respect to embodiments, different LTPAC settings, functionalities and features. Telehealth and RPM vendors that chose to participate in the self-review were offered an opportunity to nominate a provider to write a case study on its use of the vendor's telehealth and RPM product.

1.1 Case Study Guidelines

CAST provided guidance as well as a template for the case studies to help case study contributors. The template included the following required sections:

- Case Study Category (case studies may cover more than one category)
 - Impacts and Benefits of Telehealth and Remote Patient Monitoring (RPM) in:**
 - Health Outcomes (Blood Pressure, Blood Glucose, etc.)
 - Staff Efficiencies
 - Quality of Life/Satisfaction with Care
 - Hospitalization and Hospital Readmissions
 - Cost of Care and Return on investment (ROI) to:
 - Providers;
 - Payers; or
 - Consumers.
- Organization Name
- Organization Type (Housing with Services, Home Health/Home Care, Hospice, Adult Day Care/Senior Centers, Assisted Living Facilities, Acute Rehab Facilities, Long-term Acute Care Hospitals, Long-term Care Rehab Facilities, Skilled Nursing Facilities, Intermediate Care Facilities, Intellectual Disabilities/Mental Retardation/Developmental Disabilities (ID/MR/DD) Facilities, Continuing Care Retirement Communities (CCRC), Program of All-Inclusive Care for the Elderly (PACE))
- Other Partners (Payer/Health Plan, Physicians' Offices, Emergency Department, Hospital, Accountable Care Organizations (ACO), Pharmacies, Others)
- Organization Description
- Project Description
- Telehealth and RPM System Type (Store-and-Forward: Interactive Voice Response System (IVR), Store-and-Forward: Biometric RPM, Other Store-and-Forward Systems: Other than IVR & Biometrics (e.g. Imaging,

Consultation Notes, etc.), Real-Time Biometric RPM, Real-Time Interactive Two-Way Video Conferencing with Clinician)

- Telehealth and RPM System Embodiment (Single-User/Patient Home Base Unit, Single-User/Patient Mobile/Wearable Unit, Staff-Operated Multi-User Mobile Unit, Multi-User Unit/Kiosk)
- Business Model (Medicare Reimbursement, Medicaid Waiver Coverage, Private Health Insurance Coverage, Private Pay, Standard of Care, ACA-Related Opportunity (ACO, Hospital Readmission Reduction Program, Bundling of Payment, etc.))
- Implementation Approach
- Outcomes (Health Outcomes (Blood Pressure, Blood Glucose, etc.), Staff Efficiencies, Quality of Life/Satisfaction with Care, Hospitalization and Hospital Readmissions, Cost of Care and Return on investment (ROI) to Providers, Payers or the Consumer, etc.)
- Challenges and Pitfalls to Avoid
- Lessons Learned
- Advice to Share with Others

CAST received six completed case studies from nominated providers. We believe that LeadingAge members and other LTPAC providers will benefit from these case studies and learn from other providers who have already selected, implemented, and used telehealth and RPM products.

2 LESSONS LEARNED AND ADVICE DRAWN FROM THE CASE STUDIES

Readers can learn many lessons from the following case studies. Each participating provider took a slightly different approach to choosing and utilizing a telehealth or RPM system, and shared the factors that led to their success. They offer the following advice:

Leadership and Buy-In

- Engage leaders; their engagement is key to the success of a telehealth and RPM program. It takes leadership to change behavior – and persistence to change culture.
- Engage staff; their engagement, buy-in and support are critical to a program's success.
- Choose a telehealth system that is simple, reliable, easy to use, easy to maintain and affordable to providers and patients to warrant buy-in and sustained use. Ensure the telehealth solution can easily integrate into the patient's daily activities.

Enrollment

- Understand the patient population and plan the program based on the organization's unique needs and goals.
- Establish selection/inclusion criteria around specific conditions in which telehealth has shown efficacy.
- Focus on high-risk, high-cost patient populations, at least initially.

- Ensure all patients who qualify for telehealth are assigned at the time of intake, rather than later in the care episode.
- Ask a trusted clinician to provide an introduction to telehealth. Patient telehealth program enrollment is most effective when introduced by a trusted clinician.
- Streamline the hospital and skilled nursing discharge planning process to incorporate enrollment into a telehealth program.

Education and Training

- Work with the telehealth partner to develop a communication strategy regarding the benefits of the telehealth program for internal stakeholders and referral sources.
- Provide traditional clinical call center nurses with additional disease management education. Effective nurse communication training is vital to patient enrollment and engagement.
- Ensure that case managers and field staff understand the value of telehealth, including what is in it for them: reducing readmissions for their patients and better clinical care.
- Empower the patient with the knowledge of his or her own health readings. Patients want to be informed, active participants in their care program.

- Offer real-time education to patients during a teachable moment. This increases self-management.
- Make sure the patient's primary care physician is educated about the program, so they can reinforce its value when the patient visits them in the office.
- Telehealth technology is an enabling tool, not an end unto itself; focus on patient services versus telehealth equipment. Improving wound care or chronic disease management is a quality initiative, not an information technology initiative.

Process Redesign and Improvement

- Telehealth clearly impacts the efficacy of health care delivery at every point in the care continuum, providing the opportunity to reduce readmissions and improve the quality of patient care coordination. In nursing facilities, telehealth can transform the way nurses do their work and enable continuous improvement in quality and outcomes while containing costs. Consider how telehealth will change care processes and workflows, and redesign processes to take advantage of telehealth data in driving efficiencies and ongoing process improvements.
- When selecting a telehealth solution, take the integration of telehealth data into the electronic health record (EHR), which is not straightforward, into account. Partner with a vendor who not only implements interoperability standards, but is willing to work with others, like the EHR vendor.
- Work with the telehealth partner to establish a clinical program design that will have maximum clinical and financial impact.
- The connection between the clinical staff and the patient is critical to the success of the telehealth program. Integrate visits to the home into the clinical program to reinforce the importance of using the telehealth equipment to the patient.
- Share clinical outcome data with all applicable practitioners across the full care continuum. Analyze the data, along with the financial data, to validate system cost savings, and report regularly to the physician group and senior leadership.
- Establish physician pro re nata (PRN), as needed, orders for telehealth patients to maximize efficiency of monitoring.
- If managing the telehealth inventory, make sure to apply an organized approach to inventory management including signing the equipment in and out. Make sure the telehealth system allows inventory to easily move between patients. Ask telehealth partners for a process to effectively manage the equipment.

Financial Data Matter

- Understand your return on investment (ROI), collect and analyze the data that will demonstrate ROI.
- Develop business partner relationships.
- Partnership/collaboration with the organization's chief financial officer is important to collect and analyze financial data.

Planning and Looking Ahead

- Plan to expand the program to a larger number of patients. Take into account the possibility of linking projects into partnerships with payers, hospitals, Patient-Centered Medical Homes and accountable care organizations (ACO).
- As health care organizations work to form integrated delivery networks or become ACOs in order to leverage a more streamlined health care model, the system-wide embrace of telehealth solutions as a communication bridge for the patient discharge process, can (quite literally) be the missing link.

The case studies presented here represent great examples of using telehealth and RPM products. Each case study demonstrates how using telehealth and RPM has impacted each organization, and in turn the care they provide. Building upon the experience of these organizations can help other providers write their own success stories and case studies.

3 ENHANCING THE HOME TELEHEALTH PROGRAM WITH CALL CENTER ACTIVITIES

Centura Health At Home



3.1 Provider: Centura Health at Home

Contributor: Erin M. Denholm, chief executive officer



3.2 Vendor: Cardiocom

Impacts and Benefits of Telehealth and Remote Patient Monitoring (RPM) in:

- Health Outcomes (Blood Pressure, Blood Glucose, etc.)
- Staff Efficiencies
- Quality of Life/Satisfaction with Care
- Hospitalization and Hospital Readmissions

Organization Type

Centura Health at Home provides services in home, hospice, senior and palliative care.

Other Partners

Approximately 14,500 of the health care industry's best and brightest, including more than 6,000 physician partners, deliver advanced care to more than half a million people each year, across 14 hospitals, seven senior living communities, medical clinics, affiliated partner hospitals, Flight For Life® Colorado, and home care and hospice services.

Organization Description

Centura Health at Home is a part of Centura Health, Colorado's largest hospital and health care network. Its strength lies in its ability to offer a team of connected networks and shared resources to deliver accessible, reliable and cost-effective health care across the state of Colorado. As a not-for-profit organization, Centura Health has no shareholders to whom returns are distributed; all profits are reinvested in its mission and communities.

Project Description

The purpose of the Centura Health at Home project was to decrease 30-day rehospitalization rates and to increase older adult quality of life by augmenting the current telehealth continuum by merging the two, independently successful, call center and telehealth programs.

The successful integration of these two programs has significantly expanded the populations Centura Health at Home serves geographically and has also created a deeper level of service by making telehealth monitoring available 24/7. Another key component to this project was the integration of the Centura Health at Home staff into the telehealth program, establishing telehealth as a new standard of care.

Telehealth and RPM System Type

Centura Health at Home selected Cardiocom's COMMANDER FLEX® for this project because of its array of unique telehealth features, ease of use and modular design as a store-and-forward biometric RPM telehealth solution.

Telehealth and RPM System Embodiment

Centura Health at Home found that the system chosen, a single-use/patient home base unit, provided the most suitable and cost-effective solution for its needs.

Business Model

Centura Health at Home provides services under Medicare, Medicaid, private pay, Accountable Care Organizations (ACO), bundled service and a hospital readmission program for high-risk patients.

Implementation Approach

Specific project goals and parameters guiding the measurable outcomes of this project included:

- Decreased rates of recidivism for 30-day readmissions at identified Centura Hospitals (St. Anthony 's Central, St. Anthony 's North, Parker Adventist, Littleton Adventist and Porter Adventist Hospital) by 2% after year one;
- Increased quality of life for project participants as measured through the Quality of Life SF-36, a short-form health survey;
- Increased number of patients served in the telehealth program by a minimum of 200 per year after year one.

All project participants were located in the Denver Metro area. The typical participant was an older adult, living in his or her own home, managing co-morbid conditions who had just experienced a hospitalization related to an exacerbation of his or her chronic health condition.

The project enrollment criteria included discharge from one of the participating hospitals into the telehealth program or the Porter Adventist Hospital Congestive Heart Failure (CHF) Callback Project. Because the participants were part of existing Centura programs, they were identified through the efforts of highly trained case managers and home service coordinators at the hospitals. The number referred to the project and invited to participate was 273. Seventy three declined to participate and the remaining 200 patients participated and completed the telehealth program. Thirty-four patients did not complete the SF-36 assessment post-telehealth participation.

Outcomes

Reduction in frequency of re-hospitalizations

In alignment with the Tufts Medical Center Study¹, Centura Health at Home's RPM project found that over a 30-day period following the initial hospital stay, hospitalizations related to heart failure, chronic obstructive pulmonary disease (COPD) and diabetes were reduced by 62%. Rehospitalization rates for patients receiving telehealth home care (6.28%) were significantly lower than those for traditional home care patients (18%). During the project period, emergency department (ED) utilization decreased from 283 visits in the year preceding the study to 21 ED visits.

¹ Brookes, Linda (2005). SPAN-CHF II: Specialized Primary and Networked Care in Heart Failure II. In Weintraub, A.J., Kimmelstiel, C., Levine, D., et al. *A multicenter randomized controlled comparison of telephonic disease management vs. automated home monitoring in patients recently hospitalized with heart failure: SPAN-CHF II trial*. Program and abstracts from the 9th Annual Scientific Meeting of the Heart Failure Society of America, Boca Raton, Florida.

Improved Quality of Life of Older Adults

Quality of life, which was measured at baseline and at the end of the study period using the SF-36 scale, increased for patients receiving home telehealth care averaging a 4.8 point increase in both physical health component summary (PCS) and mental health component summary (MCS) (pre PCS = 29.46, post PCS = 34.3; pre MCS = 47.63, post MCS = 52.5). While these results were not statistically significant overall (statistical significance required over a 5-point increase), the specific components of the quality of life survey did demonstrate statistically significant increases across gender and all ages: physical functioning (5.44), role physical (7.18), social functioning (6.81) and role emotional (6.74).

Improved Patient Self-Management and Education

The project improved chronic disease management by extending the reach of the nursing staff. Thus, field nurses were able to focus their time and attention on intentional visits dictated by health circumstances, rather than routine assessments, which can be done via telehealth equipment. Another noted improvement was the improved opportunity for patient education. The monitoring nurse was able to connect with the patient in real time, helping patients to make the connection between cause and effect. Patient actions such as missed medications or a meal high in salt were reflected in the monitoring.

Reduced Frequency of Home RN Visits and Cost Savings

The typical frequency of visits for the registered nurse (RN) in a traditional home care model with similar patients sets is two or three times per week over a 60-day episode of care. The frequency of RN

visits was reduced to approximately three (2.69) visits over the entire 60-day telehealth care management period. This resulted in cost savings between \$1,000 and \$1,500 per patient per episode. By using daily telehealth monitoring biometrics, the RN was able to closely monitor and take action toward early and timely intervention. As a result, around-the-clock telehealth monitoring became the standard of care.

Challenges and Pitfalls to Avoid

Select a technology that will work in the long term and monitors by exception—the original program design involved use of either two-way video technology to meet the needs of patients with a very high acuity level or RPM technology, to routinely monitor patients with chronic conditions. The Cardiocom platform offers the ability to monitor by exception, thereby allowing the program to scale by placing the emphasis on those patients needing immediate attention.

Lessons Learned

Staff engagement and buy-in are critical to program success

In order to have a successful program, home care nurses and clinicians need to see value in the telehealth intervention for patients, nurses and physicians. Establish an open house for the home care nurses to interact with the telehealth technology and ask questions. Key discussion points used to demonstrate the value of the telehealth intervention to patients, nurses and clinicians should focus on outcomes, visits, episode, rehospitalization rate, as well as patient satisfaction data.

Effective nurse communication training vital to patient enrollment and engagement

Home service coordination nurses, who introduced patients to the program during their hospital stay, required additional training for effective communication, particularly to emphasize the value of the program to patients. Clinical call center nurses also benefited from effective communication training to bolster confidence in decision-making processes to actively manage patients in response to issues raised during calls. Training focused on key words and phrases that are simple yet effective in describing the program and the intended outcomes for the patient. There was also some scripting of the initial RN call to the patients after installation as well as discussion of key elements of focus for the installers in training patients and families.

Traditional clinical call center nurses require additional disease management education

Clinical call center nurses also underwent specific disease management education that improved their problem-solving and critical thinking skills while fostering confidence. Among the challenges encountered, clinical call center nurses who were previously accustomed to directing patients with symptoms to emergency rooms required training on the new paradigm, which emphasizes chronic disease management at home.

Streamline discharge planning process to incorporate enrollment into telehealth program

Centura Health at Home's experience indicates that attention to strategic home service coordination is a key factor to program success. Case managers were trained to identify patient eligibility and enrollment criteria for patients discharged without home care.

Before discharge, introduction to the telehealth intervention takes place while in the hospital. Within 48 hours of patient discharge, a personalized telehealth algorithm is created, and telehealth technicians install and train on how to use the device within their homes. This streamlined process encourages patient and caregiver engagement as they begin to follow their treatment plan at home.

Patient telehealth program enrollment most effective when introduced by a trusted clinician

Increasing a patient's likelihood to enroll in the telehealth program was found to be most effective when the program was introduced during the hospital stay by a home care nurse or physician or by a primary care physician after discharge, but not during the initial home care visit. Once patients were enrolled, repeat visits from the telehealth device installer were required to train older adults on using the technology.

Establish physician PRN orders for telehealth patients to maximize efficiency of monitoring

Monitoring nurses are able to react to trending and monitoring data more quickly by utilizing physician pro re nata (PRN), as needed, orders. To operate on a larger scale, these orders need to be ready to go with physicians establishing the orders when patients are enrolled into the program.

Real-time education to patients during a teachable moment increases self-management

The monitoring nurses were able to connect with the patients in real-time, helping patients understand the relationship between cause and effect of lifestyle-related behaviors. For example, the reflection in patient monitoring data of missed medications or a meal high in salt provided opportunities

to educate the patient in a “teachable moment” in order to make the correlation between actions and outcomes.

Advice to Share with Others

Plan to expand the program to a larger number of patients as well as the possibility of linking projects into Patient-Centered Medical Homes and ACOs. Centura Health at Home’s director of telehealth is working to help develop evidence-based training programs for home care nurses with modules around telehealth with the Colorado Center for Nursing Excellence. Additional opportunities lie within expansion of telehealth programs to Centura Health’s seven other senior living communities and particularly with the independent living community at the Garden’s at St. Elizabeth in Denver.

4 IMPROVING PATIENT OUTCOMES AND PROVIDER EFFICIENCY WITH EASY TO USE AND AFFORDABLE REMOTE PATIENT MONITORING



4.1 Provider: EnJOY Life! Health Consulting, LLC

Contributor: Joy Pape, RN, BSN, CDE, WOCN, CFCN, FAADE, president



AMBIO HEALTH™

4.2 Vendor: Ambio Health

Impacts and Benefits of Telehealth and Remote Patient Monitoring (RPM) in:

- Health Outcomes (Blood Pressure, Blood Glucose, etc.)
- Staff Efficiencies
- Quality of Life/Satisfaction with Care

Organization Type

EnJOY Life! Health Consulting, LLC provides patient health monitoring, diabetes education, weight management, case management, healthy lifestyle education, management, and coaching.

Other Partners

None.

Organization Description

Joy Pape, president of EnJOY Life! Health Consulting, LLC is a certified diabetes educator, case manager, and care coordinator.

Project Description

Joy Pape, RN, BSN, CDE, WOCN, CFCN, FAADE, is an internationally known certified diabetes educator (CDE) and president of EnJOY Life! Health Consulting, LLC. She has been working with people who have diabetes for over 30 years. She chose to evaluate the Ambio Health wireless remote health and activity monitoring system to see if Ambio was accurate, timely, and easy to use. She also wanted to evaluate if it helped her patients manage their diabetes, and save time for her, as the health care provider.

Telehealth and RPM System Type

EnJOY Life! Health Consulting, LLC used a store-and-forward biometric RPM product from Ambio Health.

Telehealth and RPM System Embodiment

The system chosen was a single-user/patient home base unit.

Business Model

EnJOY Life! Health Consulting, LLC accepts private pay.

Implementation Approach

Patients who have diabetes were invited to partake in a pilot project in which they were given a blood glucose meter, blood glucose strips, and the supporting equipment needed to wirelessly send their blood glucose readings to Ms. Pape. Some patients were also provided with a blood pressure monitor.

Using the Ambio Health system, Ms. Pape provided the same diabetes education and coaching she had provided prior to using the Ambio Health system. She found the Ambio Health system to be accurate and easy-to-use, and that it saved time for both her and her patients, who most importantly, saw improvements in their diabetes management.

Outcomes

As a health care provider, Ms. Pape found the system to be a time-saver because it was much easier to obtain her patients' blood glucose and blood pressure readings in one place, in a format that allowed her to educate them. She also liked the fact that she could receive the information when she chose to. She could get it at the time her patients checked, or she could get it prior to their health care appointments.

The patients reported that they found it surprisingly easy to use; much easier than keeping a log of their own, or even downloading readings from meters. One patient commented, "The Ambio setup is pretty slick. Hard to believe everything worked the first time I set it up with no help required. I'm impressed!"

Telehealth in Use

Case 1

William is a 62-year-old man, who had a stroke

three years ago. He has type 2 diabetes, high blood pressure, and a family that loves him. Before using the Ambio Health system, he and Ms. Pape talked weekly. He wasn't writing down his blood sugar levels, and he would have to read off every number to Ms. Pape. She was never sure they were correct, and it took a long time to go through them. William was not even checking his blood pressure. Once on the Ambio Health system, Ms. Pape received his blood sugar and blood pressure results automatically. The numbers were all high. The Ambio Health system provided a record of all the readings. She then shared them with his physicians. Medication changes were made immediately. One important point here is that William's blood pressure was only high in the morning, which is the most dangerous time for high blood pressure. A lot of people miss that number if they don't check at home. William's early morning blood pressure is now in his target range. Bringing William's numbers to target range in a timely manner can help him prevent another stroke. He looks forward to his son's wedding this fall. He, his loved ones, and his health care providers are amazed at the simplicity of this device and how William's health monitoring has been improved.

Case 2

John, a 35-year-old man, was recently diagnosed with type 1 diabetes. He was told to check his blood sugar at least four times a day. He was scared of his numbers going too high and having complications of diabetes. Ms. Pape was concerned about his numbers going too low. It is not unusual for people who have type 1 diabetes to need a larger amount of insulin early on, but then need less as their condition stabilizes, and early after diagnosis and initiation of insulin treatment (known as the honeymoon

period²). Although high blood sugar levels can be dangerous in the short-term, it is the long-term high blood sugar levels that can cause a problem. On the other hand, low blood sugar levels can cause more immediate problems, and even death. When they met, Ms. Pape introduced John to the Ambio Health system. Ms. Pape started receiving his numbers right away. She communicated these to his physician who advised him to decrease his insulin. The Ambio Health system allowed him to prevent any seriously low blood sugar levels. He has been amazed by how easy it is to use, and how it has given him and his family a feeling of safety. His numbers have stayed within his target range since starting with the Ambio Health system.

Case 3

Susan, a 60-year-old patient who has pre-diabetes, thyroid problems and allergies, started using the Ambio Health system. Since she had not been told she actually had diabetes or high blood pressure, she wasn't checking her blood sugar or blood pressure. She was aware that too much thyroid and/or allergy medicine could raise her blood pressure. Once on Ambio, she was able to track that her numbers were rising. She immediately contacted her health care provider. Together they worked on changing some of her medications. That worked to keep her feeling good and her numbers in their target range.

Case 4

Tom, a 45-year-old patient who has type 2 diabetes and high blood pressure had a hemoglobin A1C of

² <http://www.diabetes.org/news-research/research/research-database/immune-homeostasis-and.html>

11.5% (normal $\leq 7\%$) when he contacted Ms. Pape. He agreed to enroll in the Ambio Health pilot program. Ms. Pape received his readings daily. In the three months since he has been using the Ambio Health system, his A1C has remained around 5.9%, illustrating the benefit of tracking his readings via telehealth.

Challenges and Pitfalls to Avoid

Ms. Pape had a good experience with the Ambio Health system. She reported that her only challenge was to decide how often she needed to communicate with her patients, since their conditions could change. For example, when someone is newly diagnosed with type 1 diabetes or begins using an insulin pump, they need frequent communication to evaluate present therapy and make changes in a timely manner. Once the blood glucose readings are in target range, they will not need to communicate as often. She understood blood glucose numbers change and may need to be re-evaluated at any time. To avoid pitfalls, Ms. Pape suggested taking this into consideration when setting up schedules, always allowing for some flexibility. She also recommended being very clear with patients about expectations. For example, she recommended setting up a schedule with patients for times to communicate. "Let them know from the beginning that this is not an emergency service. Let them know you are not available to evaluate their readings 24/7. If they think they need to talk with someone outside of scheduled times, have a back-up plan. For example, tell them early on they are to communicate with their health care provider as they always have. If they feel there is an emergency, call 911."

Lessons Learned

Ms. Pape had known that most patients were hesitant to keep records, and many times don't even bring their meters to appointments. She was looking for a system that was more simple, reliable and affordable for both her and her patients than those she had used in the past. She found these qualities in the Ambio Health system. She said, "Ambio has changed the way I practice. I now have the numbers available when I communicate with my patients on the phone, by email, or in person. It has made me much more efficient by spending the time communicating with my patient to help them evaluate their numbers, set goals, and make the treatment changes needed to help them better manage their diabetes. And, it is affordable for most people...the most affordable I am aware of."

Advice to Share with Others

When Ms. Pape made the decision to pilot the Ambio Health system, she was concerned it would be difficult for some of her patients to use and that there would be other technical problems, based on her past telehealth experience. The problems included patients not being able to set up the equipment themselves, patients needing to manually send their data to her themselves, all in-home products needing to be in one room, and the scheduling and wait time for the technology company to make home visits to fix the equipment, which happened often. She found none of these issues with the Ambio Health system. Everyone was able to set up the Ambio Health system at home on their own. "The only technical needs thus far have been to replace a battery, which hasn't been a problem. As a health care provider, I am working towards recommending this simple tool to all of my patients. It's a relief for all of us: health care providers, caregivers, and

most importantly the patient," said Pape.

5 IMPROVING READMISSION RATES THROUGH THE USE OF TELEHEALTH

LEE MEMORIAL HEALTH SYSTEM

5.1 Provider: Lee Memorial Health System Home Health

Contributors: Cathy Brady, RN BS, WCC, clinical manager, lifeline and telehealth program manager

Honeywell HomMed

5.2 Vendor: Honeywell HomMed

Impacts and Benefits of Telehealth and Remote Patient Monitoring (RPM) in:

- Hospitalization and Hospital Readmissions
- Cost of Care and Return on investment (ROI) to:
 - Providers
 - Payers
 - Consumers

Organization Type

Lee Memorial Health System Home Health is a home health agency and an integral part of Lee Memorial Health System.

Other Partners

Lee Memorial Health System is a public health care system that includes four acute care hospitals, as well as other health care facilities and services, including a home health agency, a nursing home, outpatient treatment and diagnostic centers, physician offices, a children's hospital and a rehabilitation hospital.

Organization Description

As part of Lee Memorial Health System, Lee Memorial Health System Home Health is licensed by the state of Florida. It provides professional health care in the comfort of patients' homes through the use of advanced technology, medical equipment and its team of highly skilled registered nurses, physical, speech, and occupational therapists, certified home health aides and medical social workers.

Project Description

As an integrated health delivery system, Lee Memorial Health System has fully committed to the goal of reducing hospital readmissions, which centered on improving patient care transitions with a telehealth solution that can monitor patient biometrics with an RPM device after hospital discharge.

Telehealth and RPM System Type

Lee Memorial Health Systems Home Health group utilized Honeywell's LifeStream Solutions, a combination of RPM devices and back-end support software, which offered analytical tools to help Lee Memorial Health System health care staff track patient outcomes and patient case load, as well as standard reports to measure operational and clini-

cal staff efficiency.

Telehealth and RPM System Embodiment

The system chosen was a single-user/patient home base unit.

Business Model

Lee Memorial Health System Home Health is a Medicare-certified agency which accepts all payers.

Implementation Approach

Recognizing the ability of its newly initiated telehealth program to positively impact the system-wide goal of reduced hospital readmissions, the Lee Memorial Health System Home Health team obtained system-wide support for RPM following patient hospital discharge. This facilitated collaboration between the hospitals, physicians and other care practitioners.

Reducing readmissions at Lee Memorial Health System centered on improving patient care transitions with telehealth because patient biometrics could be regularly monitored with an RPM device after hospital discharge. With that infrastructure in place, any changes in the patient's condition could be detected early on and medical interventions could be initiated to prevent potential complications and hospital readmissions. In addition, its care providers could use telehealth to provide patients and their families with education related to discharge instructions or their diagnoses.

For patients, this experience provided a basis for ownership in the management of their condition, the result of which was increased compliance and patient engagement. This impacted the quality of care, resulting in improved clinical outcomes.

The care model created by Lee Memorial Health System was a team-based approach which involved physicians, nurse practitioners, telehealth nurses, trained technicians, pharmacists and specialists (principally cardiologists). This approach accomplished system-wide buy-in for the program's success, and also ensured all care providers in the patient care continuum were aware of how patient oversight following discharge would occur. In addition, Lee Memorial Health System Home Health established key metrics around readmission rates, which it could then track and communicate to raise system-wide awareness for the program and its effectiveness in impacting the ultimate goal of reduced readmissions.

Launched in 2010, the Lee Memorial Health System telehealth program began with 50 remote patient monitors, and has since grown to more than 250, with more than 6,000 patients monitored to date.

To ensure success, Lee Memorial Health System researched other health systems and benchmarked against other documented programs provided by Honeywell, while also collaborating with a broad-based team of system staff including physicians, discharge planners, case managers and clinicians, as well as the community of patients it serves.

As a result, the program was launched with a strategic plan and triple-pronged approach to continual improvement:

- Collect data from the inception of the program and report metrics within the system.
- Analyze data for trends to improve the program and its methodology.

- Calculate readmission rates on a monthly basis and track results against previous months.

The strategic launch gave Lee Memorial Health System Home Health the ability to develop and implement techniques for improving overall communication across the care continuum. For example, it created a method of interacting with physicians based on the level of patient urgency/emergency using protocols to address common patient symptoms that present in RPM data.

In order to capture the level of program success in addressing the principal goal, Lee Memorial Health System telehealth staff members document interventions that prevent a patient readmission and these interventions are tracked and analyzed and then documented as a “save” for the system. A typical “save” might include the notification of a physician that a patient’s vital signs had fallen out of the established telehealth parameters, for which the physician might provide additional medical orders. An immediate intervention, such as this one, results in a positive outcome for the patient who could remain in his or her home, while also avoiding a trip to the emergency room, which may have also been followed by a hospital admission.

Outcomes

In the two years since its inception, the Lee Memorial Health System telehealth program has helped the system avoid 950 readmissions to the hospital, resulting in an estimated savings of more than \$5.3 million, based on average hospital system costs of \$5,600 per hospital admission or readmission (a figure much lower than the national average of \$9,600, according to the Centers for Medicare & Medicaid Services).

Lee Memorial Health System’s 30-day readmission statistics for telehealth patients:

Fiscal Year	2011	2012	2013 through May 2013
All Telehealth readmissions	13%	10%	9%
Telehealth Medicare Patient Readmissions	12%	10%	8%

Challenges and Pitfalls to Avoid

In order to ensure continued improvement and addressing of issues as they arose, Lee Memorial Health System Home Health implemented a review process that mirrors a true Six Sigma format through the collection and analysis of a series of metrics. The format was designed to measure not only initial results, but provide a deeper insight into potential areas of improvement.

Standard metrics currently utilized include:

- Readmission rates
- Discharges from acute-care for resumption of care by the agency
- The total number of patient home visits per episode
- Feedback from Lee Memorial Health System’s readmission group

Following the telehealth program’s initial launch, the Lee Memorial Health System Home Health team quickly realized one of the biggest pitfalls they faced was waiting for Lee Memorial Health System field clinicians to refer discharged patients for RPM. With the lack of referrals, the Home Health team could not get the RPM census

up to a level that would drive solid results in their efforts to reduce hospital readmissions.

In order to ensure every appropriate patient received the benefits of RPM, Lee Memorial Health System Home Health telehealth nurses took ownership of the patient RPM-referral process. The telehealth nurses reviewed all of the patients scheduled for Home Health admission, and were therefore able to assess which patients would benefit from RPM and schedule equipment installation in patient homes.

Lessons Learned

Clinical outcome data are shared with all applicable practitioners across the full care continuum at Lee Memorial Health System's readmission team meetings. Additionally, the same outcome metrics are analyzed along with the financial data to validate system cost savings and are reported regularly to the Lee Memorial Health System physician group and senior leadership.

Advice to Share with Others

Through the examination of the rate of success in reducing readmissions at Lee Memorial Health System, telehealth clearly impacted the efficacy of health care delivery at every point in the care continuum, providing the opportunity to reduce readmissions and improve the quality of patient care coordination.

As health care organizations work to form integrated delivery networks or become accountable care organizations (ACO) in order to leverage a more streamlined health care model, the system-wide embrace of telehealth solutions – as demonstrated by Lee Memorial Health System – as a communication bridge for the patient discharge process, can (quite literally) be the missing link.

6 IMPROVING OUTCOMES THROUGH THE USE OF A TELEHEALTH WOUND DOCUMENTATION AND REPORTING SYSTEM



6.1 Provider: Presence Heritage Village

Contributor: Beth Florczak, director, quality and clinical excellence



6.2 Vendor: WoundRounds

Impacts and Benefits of Telehealth and Remote Patient Monitoring (RPM) in:

- Health Outcomes
- Staff Efficiencies

Organization Type

Presence Heritage Village is a 51-bed skilled nursing facility.

Other Partners

None.

Organization Description

Presence Heritage Village is a ministry of Presence Health. Formed by the merger of Provena Health of Mokena, IL, and Resurrection Health Care of Chicago, IL, Presence Health is the largest Catholic health provider in Illinois.

Project Description

The purpose of the study was to evaluate whether nurses in a skilled nursing facility could achieve sustained improvement in the management and prevention of pressure ulcers using WoundRounds®, a telehealth wound documentation and reporting system. Nurses were given camera-enabled mobile devices for data collection and a secure website to access wound documentation and reports across multi-disciplinary care teams.

Telehealth and RPM System Type

Presence Heritage Village used a store-and-forward wound image capture system from WoundRounds®.

Telehealth and RPM System Embodiment

The system chosen was a staff-operated multi-user mobile device.

Business Model

Presence Heritage Village accepts Medicare, Medicaid, private health insurance, and private pay patients.

Implementation Approach

Nine nurses were asked to evaluate the wound management process on the basis of perceived ease of use and wound management effectiveness before and after using the WoundRound® telehealth wound documentation system. Data were collected over a seven-month period from 56 residents. Clinical data and digital images of each pressure ulcer were documented using a camera-enabled mobile device and uploaded over the Internet to secure

servers where authorized care team members could access assessments, review treatment recommendations and monitor wound healing trends.

Outcomes

Skilled nurses reported improvements in ease of use and wound care effectiveness after using the telehealth wound care system. The findings were universally positive in terms of improving patient care, reducing redundancies in documentation, and providing better data sharing across the care team. The average rating for ease of use increased by 42%, from a 3.30 to a 4.69 on a 5-point Likert scale. Average ratings for nurses' perceptions of wound management effectiveness increased by 40%, from a 3.20 to a 4.38 on a 5-point Likert scale.

To evaluate clinical outcomes, Presence Heritage Village compared the incidence of pressure ulcers occurring in the baseline month of the study to the subsequent six-month period. The incidence of new facility-acquired pressure ulcers decreased substantially, from 24 during the baseline month to an average of four per month over the next six months. Statistical analysis determined that the odds of a new facility-acquired pressure ulcer occurring were reduced 34 times in the six-month period post-intervention compared to baseline.

Before the study, the facility had concerns about whether staff would embrace the use of telehealth technology for wound care management. The facility found that not only did nurses actually use the mobile devices, but that they reported greater ease and greater effectiveness in managing wound care with the telehealth solution. The areas of greatest increased effectiveness were: "recognizing changes in wound status," "communicating with other professionals," "managing treatment of existing

wounds," and "promoting healing to prevent progression of the wound."

Challenges and Pitfalls to Avoid

- *IT Department Burden*
Even though the burden of support is light, IT departments have limited capacity and are often reluctant to take on new tasks. It is important to engage IT leadership early in the process and to secure its support.
- *Interoperability*
Telehealth solutions capture valuable clinical information that otherwise would not be available. Unfortunately, many legacy electronic health record (EHR) systems make it difficult, if not impossible, to integrate key data from such system. Therefore, data that are essential for care management often reside outside the patient's primary clinical record.
- *Connectivity*
Newer telehealth technology is being deployed on mobile devices that take advantage of today's wireless technology. As is typical in many LTC facilities, the infrastructure may not be adequate (or even available) to support the solution, which adds cost and complexity to implementation.
- *Culture*
Technophobia remains a challenge in LTPAC. Younger workers are comfortable texting their friends and connecting over the Internet; many older workers are not. Their fear of technology goes beyond the mechanics of using new telehealth devices. It includes resistance to the notion of data being transparent, and therefore scrutinized by others within the organization.

Educating users on how telehealth technology will help make their work lives easier and benefit patient care is key to overcoming technophobia.

Lessons Learned

Use of the telehealth wound documentation and reporting system from WoundRounds® increased wound care effectiveness and improved outcomes by standardizing documentation and improving communication among caregivers. The system also decreased nursing time and improved efficiency.

With increased patient care time, there is better potential for wound care improvement from the nursing staff. Having data and images available anywhere, anytime facilitates remote monitoring of wounds, and improves communication and collaboration across team members. Lastly, better documentation simplifies the process of reporting for quality assurance and regulatory compliance, which are critical for facility risk management and reimbursement.

Advice to Share with Others

- Telehealth technology can transform the way nurses in skilled facilities do their work and enable continuous improvement in quality and outcomes while containing costs.
- Telehealth technology is an enabling tool, not an end unto itself. Improving wound care is a quality initiative, not an information technology initiative.
- It takes leadership to change behavior—and persistence to change culture. The fact is that Presence Heritage Village was very concerned that its nurses might not be willing to use

the technology. However, as Aubrey Daniels points out in his book *Bringing Out the Best in People*, they found that “people don’t resist change if the change provides immediate positive consequences for them.”

7 REDUCING HOSPITALIZATIONS AND HOSPITAL DAYS THROUGH TELEHEALTH



7.1 Provider: Vidant Health

Contributor: Bonnie Britton, MSN, RN, ATAF,
Vidant telehealth program administrator



7.2 Vendor: Ideal Life

Impacts and Benefits of Telehealth and Remote Patient Monitoring (RPM) in:

- Health Outcomes (Blood Pressure, Blood Glucose, etc.)
- Quality of Life/Satisfaction with Care
- Hospitalization and Hospital Readmissions
- Cost of Care and Return on investment (ROI) to:
 - Providers
 - Payers
 - Consumers

Organization Type

Vidant Health is an integrated health system with a tertiary care center, eight rural hospitals, 70+ primary care provider clinics, home health, and hospice.

Other Partners

Vidant Health used Ideal Life to provide in-home monitoring equipment (phone, Internet or cell transmitting portable open database (POD) station, and wireless peripheral sensors for blood pressure (BP), pulse, oxygen saturation, scale, and finger stick blood sugar (FSBS) and its Employee Health Wellness Kiosk Program).

Organization Description

Vidant Health is one of the largest health care systems in North Carolina. It is the parent company of Vidant Medical Center, the tertiary services hub that operates or manages eight diverse community hospitals throughout the region and a number of subsidiary corporations including physician practices, outpatient services, wellness services, critical care transport, home health, hospice, and more. Vidant Health serves 29 counties and more than 1.4 million people through an extensive regional network. The system's combined operations include more than \$1.5 billion in net revenues, more than 12,000 employees and more than 1,400 licensed beds.

Project Description

Vidant Health implemented a post-hospital discharge telehealth program to increase patient access to care, lower hospitalizations and bed days, enhance patient and provider communication and engage high-risk, high-cost, low-engagement cardiovascular disease and pulmonary disease patients. A Patient Activation Measurement Tool is used to identify low-engaged patients. Ideal Life's

telehealth equipment was installed and medication reconciliation was completed in the patient's home. Daily, patients collected their blood pressure, pulse, weight and oxygen saturation level, which were encrypted and sent to a secure cloud server. Data were reviewed by a nurse and actions or interventions were taken as needed.

Telehealth and RPM System Type

Vidant Health used Ideal Life's real-time biometric RPM system.

Telehealth and RPM System Embodiment

The systems chosen were single-user/patient home base units and a multi-user unit/kiosk for employee wellness.

Business Model

Vidant Health's business model is to reduce unnecessary hospital readmissions, emergency room visits and lower hospital bed days to lower costs, maximize reimbursement, and avoid Medicare re-admission penalties. During the business plan development, initial assessment identified Medicare, self-insured and uninsured cardiovascular disease (CVD) and pulmonary disease patients as the initial patient population. After the first six months of implementation, the program began accepting any CVD and/or pulmonary patients regardless of payer. During the first year, 56% of patients who completed monitoring were Medicare, 14% Medicaid, and 11% self-pay. Vidant Health is currently analyzing year one data to include hospital bed days, charges, costs and reimbursement.

Implementation Approach

During the first year of the telehealth program, Vidant Health enrolled 1,323 cardiovascular and

pulmonary disease patients. One hundred twenty-six patients declined participation in the program. Fifty-six percent of the participating patients were African American females. Patient ages ranged from 19 to 101 years of age with thirty-two percent of patients between the ages of 18-59, which was significantly higher than expected. Fifty-four percent had a primary diagnosis of hypertension and thirty-three percent had a primary diagnosis of heart failure.

CVD and pulmonary disease hospitalized patients were identified through Vidant Health's electronic health records (EHR). Once identified, the patient completed a 13-question Patient Activation Measurement (PAM) tool. The answers were recorded in Vidant Health's EHR and patient engagement scores (0-100) and patient engagement levels (I-IV) were determined. If the CVD and/or pulmonary patient was a PAM Level I or II, the patient was approached by a telehealth nurse technician (TNT) in the hospital. The patient and family were informed of the program and consent to participate was obtained. Following patient approval, the TNT contacted the patient's doctor or care manager for an electronic referral to the telehealth program. Upon hospital discharge, the TNT scheduled a time to come to the patient's home to install the equipment, conduct a home safety assessment, train and validate the competency of the patient in the use of the equipment, and collect the patient's medications and compare medications at home to the hospital discharge medication list. If there was a discrepancy, the TNT contacted the telehealth nurse who followed up with the patient's primary care physician to perform medication reconciliation.

On a daily basis, the patient self-collected his or her data (BP, pulse, oxygen, weight, FSBS) which were

encrypted and transmitted to a secure cloud server. Daily, the telehealth nurses reviewed the patient data and contacted all patients who had abnormal parameters. The telehealth nurse conducted an assessment, evaluated medication and nutrition compliance and provided patient education. If the telehealth nurse believed the patient may have needed a medical intervention, the telehealth nurse contacted the patient's doctor via the EHR. Patients were monitored for a three-month period and evaluated for discharge from the program or a three month extension.

Outcomes

Patient outcome data were pulled for the three months prior to being enrolled in the telehealth program, during the three months of telehealth program and again for the three months post-discharge from the telehealth program. During the

first year, hospitalizations were decreased by a total of 550 admissions (820 during the three months before implementation of the telehealth program, and 270 during the three months of the telehealth program) for patients enrolled in the telehealth program. This was a 67% reduction in hospitalizations as a result of the use of telehealth. Also, the number of patients hospitalized decreased by 341 during the telehealth program (512 patients prior to telehealth use and 171 patient during the telehealth program), as figure 1 below shows.

Hospital bed days during the telehealth program decreased by 2,596 as compared to before enrollment in the telehealth program, as illustrated in figure 2 below.

Hospital costs, charges, readmission and reimbursement analysis will be completed at the end of Vidant Health's fiscal year.

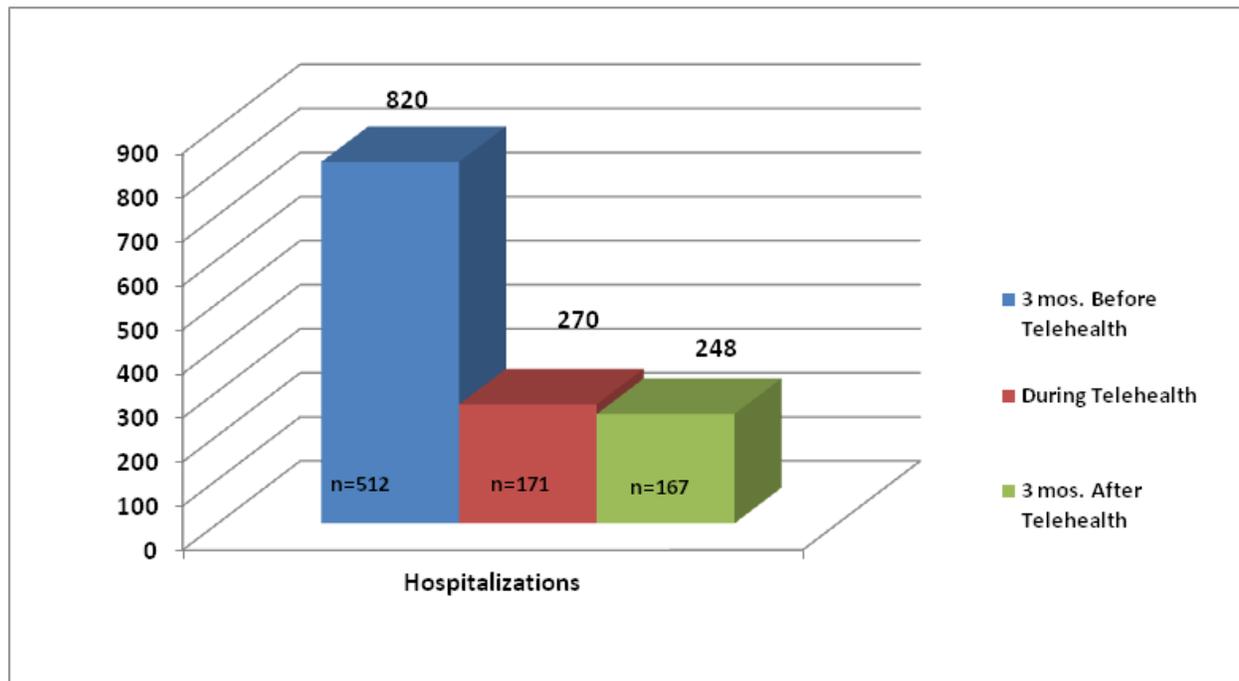


Figure 1. Number of Hospitalizations and Patients Hospitalized Before, During and After Enrollment in the Telehealth Program (n = 695 patients total).

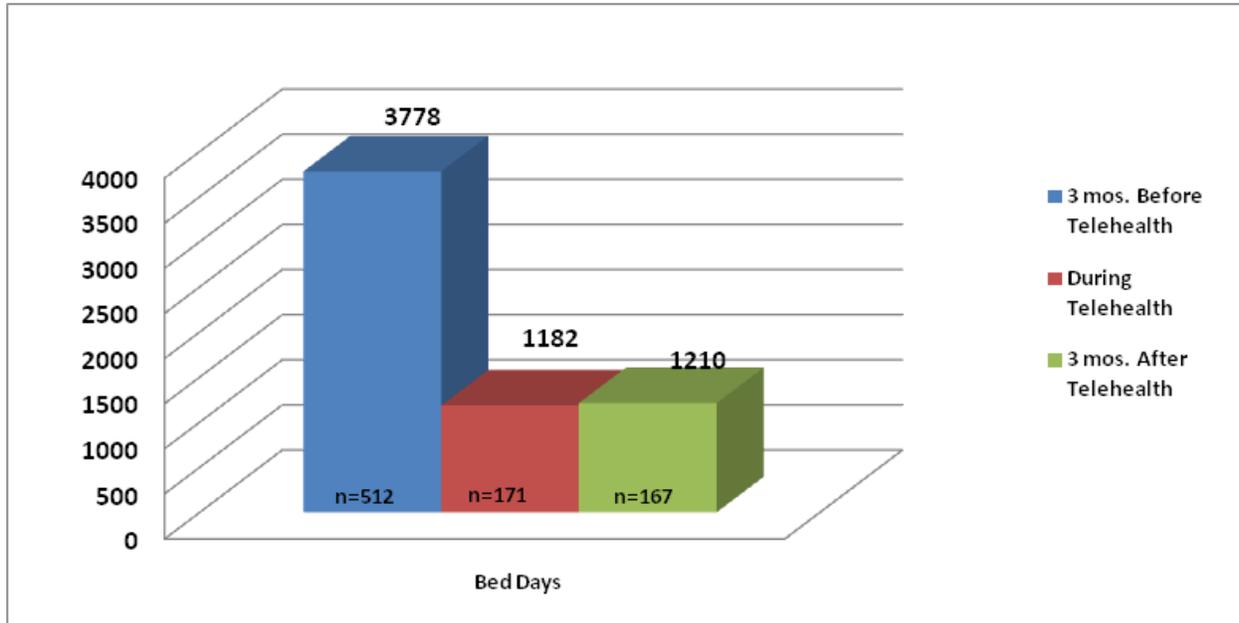


Figure 2. Number of Hospital Bed Days Before, During and After Enrollment in the Telehealth Program
(n = 695 patients total).

Financial Benefits - Total Health Care

- Hospitalization costs to payers were 68% lower as a result of the telehealth program
- More effective and efficient care
- Improved access to care at the most appropriate level
- Increased patient satisfaction

Patient Satisfaction

As illustrated in Figure 3 below, patients were extremely satisfied with the telehealth services and equipment. Patient satisfaction was assessed at the mid-point of the telehealth program.

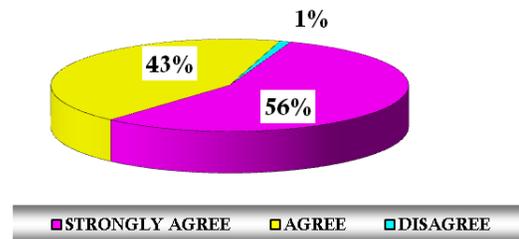


Figure 3. Patient Satisfaction with the Telehealth Program

Take Home Points

Conducting in-home medication reconciliation and providing RPM services resulted in:

- Early identification and treatment of disease exacerbation
- Reduced hospitalizations
- Reduced bed days
- Reduced emergency room visits
- Reduced health care costs
- Actively engaged patients

Challenges and Pitfalls to Avoid

- The greatest challenge for telehealth implementation is having a clear vision, business plan and model with quantifiable return on investment (ROI).
- Hospitalist and primary care provider buy-in.
- The buy-in from the provider organization's chief financial officer, which is related to the ROI mentioned above.
- Integrating the telehealth data with the organization's EHR.

Lessons Learned

- Understand the patient population and plan the program based on the organization's unique needs and goals.
- It is much more difficult to integrate EHRs with telehealth vendor software than initially believed.

Advice to Share with Others

- If one has seen a single telehealth program, one has seen a single telehealth program. One needs to design his or her own telehealth program based on the desired organizational goals, population, competencies, and partnerships.
- Focus on patient services versus telehealth equipment.
- Partnership/collaboration with the organization's chief financial officer is important to collect and analyze financial data.
- Collect and analyze the data that will demonstrate ROI.
- Focus on high-risk, high-cost patient populations.

8 USING TELEHEALTH TO LOWER HEALTH CARE COSTS BY DELIVERING HOME AND COMMUNITY-BASED SERVICES TO THE FRAIL ELDERLY POPULATION OF KANSAS



8.1 Provider: Windsor Place

Contributor: Monte Coffman, executive director

Home Monitoring by PHILIPS

Lifeline Medical Alert Service
Telehealth Solutions
Medication Dispensing Service

8.2 Vendor: Philips Healthcare

Impacts and Benefits of Telehealth and Remote Patient Monitoring (RPM) in:

- Health Outcomes (Blood Pressure, Blood Glucose, etc.)
- Staff Efficiencies
- Quality of Life/Satisfaction with Care
- Hospitalization and Hospital Readmissions
- Cost of Care and Return on investment (ROI) to:
 - Providers
 - Payers
 - Consumers

Organization Type

Windsor Place offers in-home services, assisted living, and skilled nursing care.

Other Partners

The Medicaid Home and Community-Based Services/Frail Elder (HCBS/FE) pilot study was a collaborative effort between the Kansas Department on Aging (KDOA), University of Kansas Center for Telemedicine and Telehealth and Windsor Place At-Home Care.

Organization Description

Windsor Place provides a continuum of services for seniors including in-home services, assisted living arrangements, skilled nursing care, and such innovative models as intergenerational kindergarten and extended community integration.

Project Description

Though existing telehealth studies have demonstrated a variety of health service and cost reductions, none of them combined cost analyses, nursing home deferrals and patient perceptions over an extended period of time.

The Medicaid Home and Community-Based Services/Frail Elder (HCBS/FE) pilot study is the first known longitudinal assessment of home telehealth on emergency department (ED) visits, hospital visits, nursing home placements and the associated costs of these services for elders with a variety of chronic conditions and multiple comorbidities.

Patient perception data were also collected, particularly the extent to which patients felt more engaged in their health care via telehealth monitoring.

The HCBS/FE clients chosen for the study all had at least one hospitalization in the 12 months prior to their enrollment. Before receiving telehealth monitoring equipment, they signed an informed consent form for participating in the study and agreed to assist researchers with collecting their Centers for Medicare & Medicaid Services (CMS) claims data.

The study group consisted of 85 women and 22 men. Ages ranged from 65 to 96 years, with an average age of 79. Hypertension was the single most common diagnosis with 19 participants having this condition. Ten participants had congestive heart failure (CHF), followed by diabetes (9) and chronic obstructive pulmonary disorder (COPD; 5). The remaining 64 participants had multiple comorbidities of these four illnesses.

The study posed nine questions:

- RQ1: Are hospital days reduced as a result of home telehealth monitoring?
- RQ2: Are hospital visits reduced as a result of home telehealth monitoring?
- RQ3: Are ED visits reduced as a result of home telehealth monitoring?
- RQ4: Are costs due to hospitalizations reduced as a result of home telehealth monitoring?
- RQ5: Are costs due to ED visits reduced as a result of home telehealth monitoring?
- RQ6: Are total costs reduced as a result of home telehealth monitoring?
- RQ7: What are client perceptions of home telehealth monitoring?
- RQ8: Is the rate of nursing facility placement reduced as a result of home telehealth monitoring?
- RQ9: How are clients' vital signs affected by home telehealth monitoring?

Telehealth and RPM System Type

The telehealth system used was from Philips. It used a store-and-forward biometric RPM approach. The patient provided vital readings each morning, prompted by the telehealth central station. The patient was able to take his or her readings in any order he or she wished. The patient also answered symptom questions on the central station as scheduled by the nurse or as generated in response to the day's vital readings.

Telehealth and RPM System Embodiment

The telehealth system was for a single-user/patient, installed in his or her home. Cellular connectivity was provided for patients without landline phones. The vital sign equipment was wireless, enabling it to be placed throughout the patient's home in areas where it was most convenient for the patient and most likely to result in compliance with taking measurements as well as reliable and accurate readings.

Business Model

The patients were from the Kansas Medicaid program. The State of Kansas was interested in innovative care models that would improve beneficiary quality of life, improve clinical outcomes, and reduce costs by reducing hospital and nursing home claims of these beneficiaries.

Based on the success of the program, the KDOA has expanded the program. Providers within the extended pilot program are paid by KDOA a flat monthly fee for the management of this population. The provider then contracts with a telehealth provider, and ensures adequate staffing to provide both the monitoring and the home visits.

Patients were contacted by phone as warranted to check in on their status. Home visit frequency was tailored based on nursing judgment and informed by objective and subjective data collected. The daily objective readings of each participant were then sent each month to the participant's attending physician.

Implementation Approach

The Philips telehealth equipment was installed by Windsor Place staff in the patients' homes. Windsor Place staff performed the clinical monitoring of the patients. If patients' vital signs and symptoms exceeded limits set by their physician, the telehealth system would flag them for further follow-up by the Windsor Place clinical staff.

The research method used in the project was a within group, pre- and post-test design with data collection completed at the end of the project for both the baseline and intervention periods. The length of the baseline period was equal to the length of the intervention period for clients and was capped at 274 days, or approximately nine months, for this three-year study. For example, if a client was on home telehealth monitoring for 223 days, the baseline period was also established as 223 days. This was done to standardize the baseline period for the pilot in order to complete the appropriate statistical analyses. Similarly, the minimum length of time for both intervention and baseline was estab-

lished at 90 days. This parameter was determined as the minimum length of time needed for participants to become comfortable with the equipment and for it to have any effect on their health and care needs.

Outcomes

The results of this home telehealth pilot project demonstrated that home telehealth intervention had a significant and positive impact on clinical and financial measures:

- Telehealth reduced the rate of emergency department utilization, inpatient hospitalizations and the associated Medicare costs for HCBS/FE clients.
- The cost savings of a hospitalization alone (\$26,298 per patient annually) compared to the cost of the telehealth equipment, labor, and program (\$2,160 total per patient annually) are substantial.
- The annual rate of nursing home placement for the telehealth patients during the three-year period was lower than the observed rate for all Kansas HCBS/FE clients.
- Patient perceptions of the intervention remained positive and stable over time.

Variable	Rate of Change	Significant Change?	p-value*
Hospital Visits	↓ by 38% per day	Yes	.0000
Hospital Days	↓ .028 day per day or 10.23 days per year	Yes	.0014
Hospital Costs	↓ \$72 per day or \$26,298 per year	Yes	.0024
ED Visits	↓ by 67% per day	Yes	.0290
ED Costs	↓ \$21.10 per day	Yes	.0300
Total Costs	↓ \$73 per day or \$26,663 per year	Yes	.0004

Table 1. Comparison of baseline and intervention mean rates of pilot variables.

**Probability at the .05 level*

Patient Perception Outcomes

Patient perceptions were positive throughout the program, as seen in the following table:

Item	Mean (1-4 scale)
This health monitoring technology improves my health care.	3.23
I would rather go to my doctor than use this technology.	2.30
This technology improves my life.	3.11
I am more involved in my health care as a result of this technology.	3.16
I do not trust this technology to help me with my health.	2.18
This technology will help me live in my home longer.	3.18
Using this technology has been a positive experience for me.	3.20
This technology is easy to use.	3.27
I am confident that this technology will help me if my health starts to decline.	3.23
I feel better able to manage my health care with use of this technology than I did before.	3.18
I have gone to my doctor at least once because of what I found out with the technology.	2.81
I would like to use this technology for as long as I can.	3.23

Table 2. Mean scores of perception items on 1 (strongly disagree) to 4 (strongly agree) Likert scale for all participants (Years 1-3) at the end of Year 3.

Challenges and Pitfalls to Avoid

- Clarify objectives – Have clear program objectives that are supported by validated resourcing plans.
- Maintain organizational priorities – Make sure that telehealth, and the organizational goals that it enables, remains a top priority for the staff involved.
- Partner with payers – Develop a mutually beneficial relationship with the payer, and have a clear understanding of how the program’s objectives tie directly to the payer’s objectives.
- Develop People – Ensure proper training is provided to staff on installing and supporting the equipment. Ask the telehealth partner for an online learning approach to help bring new staff on quickly.
- Keep it simple – This population requires simple devices to interact with in the home. Excess complexity in the patient’s interaction with the monitoring leads to patient frustration and withdrawal from the program. Select a solution that meets programmatic and clinical needs, but also one that ensures patient adoption through a simplified daily experience.
- Build on success – Don’t try to grow too large, too fast. Gradually develop organizational competency to steadily deploy telehealth and to consistently execute clinical telehealth-based programs. At the outset, there will be scenarios that had not been previously planned for, and it will be beneficial to have the time and capacity to systematically adapt the program based on these lessons.
- Partner thoughtfully – Select the telehealth partner based on their ability to help clients build a *program*, not just provide the technology. Telehealth requires organizational changes in clinical and operational practice. Partners should be in it for the long haul, and capable of providing the knowledge, resources, flexible pricing arrangements, and leadership to help transform the organization to the intended state.

Lessons Learned

- The connection between the clinical staff and the patient is critical to the success of the telehealth program. Integrating visits to the home into the clinical program reinforces the importance of using the telehealth equipment to the patient.
- Make sure the patient’s primary care physician is educated about the program, so he or she can reinforce its value when the patient visits them in the office.
- Establish a selection/inclusion criteria around specific conditions in which telehealth has shown efficacy.
- Ensure all patients who qualify for telehealth are assigned at the time of intake, rather than later in the care episode.
- Work with the telehealth partner to establish a clinical program design that will have maximum clinical and financial impact.
- Empower the patient with the knowledge of his or her own health readings. Patients want to be informed, active participants in their care program.

Advice to Share with Others

- Develop business partner relationships.
- Make sure case managers and field staff understand the value of telehealth, including what is in it for them: reducing readmissions for their patients and better clinical care.
- If managing the telehealth inventory, make sure to apply an organized approach to inventory management including signing the equipment in and out. Make sure the telehealth system allows inventory to easily move between patients. Ask telehealth partners for a process to effectively manage the equipment.
- Ensure the telehealth solution can easily integrate into the patient's daily activities.
- Work with the telehealth partner to develop a communication strategy regarding the benefits of the telehealth program for internal stakeholders and referral sources.

The complete program overview, entitled “Real Customers, Real Results” can be viewed at the following website: <http://telehealth.philips.com/testimonials.html>.