UTILIZATION/ROI OUTCOMES

Remote Patient Management (RPM) not only improves clinical outcomes and engagement, but can also lead to an improved ROI. Patients with chronic disease, receiving remote at-home care, are less likely to utilize an emergency room and the inpatient care services of a hospital. For example, a study performed at the University of Mississippi Medical Center resulted in a savings of $339,184 after 100 patients started receiving remote care. During this time, there were zero hospitalizations and zero emergency room visits. Other organizations saw similar drops in inpatient and emergent stays.

LOTHIAN

Study

NHS Technology Adoption Centre: Telehealth in Lancashire

Study Description

This was a study undertaken by NHS Central Lancashire and NTAC during 2010/11, where Telehealth technology was introduced to monitor patients who suffer from Chronic Obstructive Pulmonary Disease (COPD). The goal was enablement of community clinicians caring for patients with COPD to track and maintain patients in their own home by way of remote monitoring. This was done through video consultation and patient recorded metrics.

The COPD remote monitoring system was used by community matrons, respiratory care nurses and palliative and community care nurses, who provided advice/treatment to monitor patients, with the aim of: 1) improving self-management, 2) increasing patients' understanding of their condition, 3) effective support during exacerbations, and 4) reducing hospital admissions for COPD patients.

Results

Overall, the COPD Telehealth pilot study undertaken by NHS Central Lancashire was highly successful and demonstrated favorable outcomes and the achievement of a number of goals in patients, NHS staff and the healthcare system. Evidence from the NHS Central Lancashire study suggests that Telehealth technology has the potential to improve efficacy in the NHS through:

- A reduction of 21% in non-elective admissions for the 17 patients involved in the study, which constituted five fewer emergency admissions and saved £2725 plus MFF (HRG DZ21A) for the NHS.
- A 25% reduction in the length of hospital stay.
- Reducing the number of Accident and Emergency contacts that did not require hospital admission.

Publication

The NHS Technology and Adoption Centre, C LANCS Lothian Project, Telehealth in Lancashire© December 2011

FRASER HEALTH

Study

Fraser Health (British Columbia, Canada) used new technologies to help COPD patients 'BreatheWELL at Home'

Study Description

Fraser Health launched the BreatheWELL at Home initiative in Burnaby and New Westminster. It was a program designed to educate COPD patients on how to better manage their disease, including learning what can trigger a flare-up and understanding how to take medications properly. Fraser Health Authority used an innovative patient-centered approach involving collaboration, education and home health technologies to provide improved care for patients with chronic obstructive pulmonary disease, or COPD.

Results

The BreatheWELL at Home program contributed to a 35% reduction in the total number of ER visits related to COPD from the previous year. The total number of acute admissions dropped by 51% and the average length of stay of those admitted was cut by 48%. The total number of acute re-admissions fell by a remarkable 54%.

The program's goal was to reduce ER visits and admissions as well as length of stay by 25%. In the 18 months since the launch, actual outcomes had exceeded expectations. Fraser Health immediately expanded the program to include residents in Langley and Chilliwack. The collaboration yielded impressive results.

Testimonial

Paula Young, director of infrastructure, primary health care at Fraser Health says the most meaningful outcome has been for the patients themselves. Some didn't realize they even had COPD and would end up in the hospital multiple times a year. Now, they have learned how to manage their condition in the comfort of their care facility or home and dramatically reduce their ER visits, she says.

Publication

White Paper: Hospitals of Distinction, Fraser Health uses new technologies to help COPD patients 'BreatheWELL at Home'

UNIVERSITY OF MISSISSIPPI MEDICAL CENTER DIABETES TELEHEALTH NETWORK

Study

Improving type 2 diabetes self-management: remote monitoring technology facilitates patient engagement

Study Description

This study was designed to measure the impact of connecting rural diabetics to chronic care managers utilizing a remote care management solution. The Mississippi Telehealth Network was established to demonstrate the effectiveness and cost

savings of providing diabetes management in the home, with the ultimate goal of obtaining legislation that would reimburse for this intervention.

Results

A total of 100 patients completed the study. There was a 1.7% average reduction in HbA1C for the intervention group. There were zero hospitalizations and emergency department visits during the time the patients were in the monitoring program. Health session compliance was 83%; medication compliance improved to 96%; 9 patients were diagnosed with retinopathy as a result of the intensive monitoring program; and 71 patients in the study lost weight. The estimated mileage saved from patients not having to come into the clinics for care was 9,454. The total cost savings for Medicaid for this population was $339,184. Mississippi amended the Medicaid rules and regulations to further support telehealth as a result of this study. Mississippi was the first state to pay a transmission fee for telemedicine and Medicaid reimbursement has now been introduced based on the results of this study.

Publication

Poster Presentation: Henderson, K., 2015, How Mississippi is Leading the Way in Innovation.

ALBERTA HEALTH SERVICES

Study

My Home Health: A Virtual Care Management Pilot Program for Self-Management of Congestive Heart Failure

Study Description

The Ivey International Centre for Health Innovation at the Ivey Business School, the Institute of Health Economics, and GE Healthcare collaborated with the Government of Alberta via Alberta Health Services (AHS) to conduct research exploring innovative models in which costs and healthcare challenges could be addressed through a virtual care management (VCM) model. The objective of the project was to explore the effectiveness of a remote monitoring model for patients with congestive heart failure. The intervention was for a duration of 6 months, with a continued followed up for another 6 months after the intervention was completed.

Results

A total of 103 patients completed the 12 months study. This study found that the VCM program has the potential to improve patient, caregiver, and provider experiences of care, improve self-reported health outcomes over a relatively short 6-month period, and potentially reduce health system costs in the CHF population.

The researchers reported the following key results:

POPULATION HEALTH RESULTS

- The population health impact was not limited to the duration of the program. Patients reported that one of the primary benefits of the VCM program was establishing a routine. Even after the program had ended, 79% of participants

indicated that they were still using at least one element from the VCM program in their regular routine.

- Compared to the baseline, health related quality of life of patients increased at 6 months but decreased at 1 year, 6 months after enrolment in the VCM program was discontinued. This decrease in health status from 6 to 12 months may be due to the removal of the VCM after the first 6 months.

PATIENT EXPERIENCES OF CARE RESULTS

- Patients believed that the VCM program yielded better patient care and health outcomes. In particular, patients felt more secure in having a healthcare professional readily available for any questions, more confident that any potentially dangerous health scenarios would be caught, and more certain that unnecessary or conflicting medications would be corrected.
- Patients felt that the technology was easy to use in the program. 86% of participants indicated that using the VCM was somewhat to not difficult.
- Patient ratings of the VCM were very positive, with 89% of participants indicating they would “probably” or “definitely” recommend the program to others, and 77% rating the program 8-10 on a 10 point scale (where 10 is most positive).
- Positive patient perceptions of the VCM program were long-lasting. At the 12-month mark, 6 months after the VCM program had ended, 89% of patients would still recommend to others.
- Participants’ responses to surveys demonstrated that the VCM program is more effective to, and valued by, participants with specific demographics. In particular, participants who had a more basic computer proficiency rated the program higher than those with more advanced proficiency. Similarly, individuals over the age of 64 were more likely to rate the program higher than those under 64.

CAREGIVER EXPERIENCES OF CARE RESULTS

- Caregiver participants indicated that the VCM program reduced their caregiver burden. By empowering patients to self-manage more than they had in the past, many of the tasks that once had to be completed by caregivers could now be completed by the patient. The emotional burden was also reduced, as caregivers felt reassured that they were no longer “alone” in managing care, and had the support of regular monitoring and communication with health providers.
- Caregivers felt that the VCM program improved their awareness and knowledge surrounding CHF management. Both the educational modules and regular conversations with the VCM nurse were highlighted as key beneficial resources for patient and caregiver education.

PROVIDER EXPERIENCES OF CARE RESULTS

- Providers indicated that upon implementation of the VCM, their workload increased due to the extra patient education required to introduce them to the VCM. However, they also highlighted that this diminished over time, and ultimately resulted in a decreased workflow. Much of this decrease is due to the VCM program’s ability to catch clinical problems as early as they present, so that less time-consuming preventative measures can be implemented immediately, avoiding major complications.
- Providers suggested that patient compliance increased as a result of the program, as patients were empowered to take responsibility for their own health.

PER CAPITA COSTS RESULTS

- After enrollment in the VCM program, patients used less health services resulting in reductions in health care costs.

- Majority of the reductions occurred in the period from 0 to 6 months after enrolment in the VCM program when the intervention was going on.
- Reductions in hospital admissions accounted for most of the reductions in health care costs.

Publication

Home Health: A Virtual Care Management Pilot Program for Self-Management of Congestive Heart Failure. Final Report. Ivey International Centre for Health Innovation and Institute of Health Economics, Edmonton, Alberta. February 2016.

ST. VINCENT

Study

Reducing Hospital Readmissions via Remote Patient Management

Study Description

- St. Vincent implemented a remote care management program and utilized the Care Innovations® Guide platform to facilitate care delivered in the home.
- St. Vincent had a goal of reducing hospital readmissions for patients with congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) in an effort to help them stay out of the hospital, away from the emergency room, and reduce the frequency of readmission. A total of 142 patients were recruited for the trial.

Results

The key outcomes included:

- Readmissions in the intervention group were reduced by 64% compared to the study control group 2 readmissions in intervention group; 7 readmissions in control group, statistical significance p=.04.
- Patient Activation Measurement (PAM) levels of engagement were 18% higher for the intervention group. This is important because patients with higher PAM levels have 21% lower health care costs than patients with the lowest PAM levels, even after controlling for demographics and condition severity.

Testimonial

The biggest individual success story from the project, according to the Principal Investigator, Dr. Snell, involved a woman in her early 50s with nine chronic conditions and 11 total admissions in 2011, which cost roughly $156,000 that year. Over a seven-month span participating in the project, the woman did not return to the hospital once.

Publication

Published on FierceHealthIT (http://www.fiercehealthit.com) 2012

AMERICAN HEART ASSOCIATION

Study

An Observational Study of Deployment of American Heart Association Heart Failure Protocols and Educational Content Within the Intel® Health Guide System Post Discharge.

Study Description

- This was a single center, unblinded, non-randomized feasibility study of tele monitoring with embedded patient education. The University Hospitals Home Care Services program is a large home care agency in Ohio and was chosen for the study and was the source of referrals.
- This nurse-driven program was available to Medicare recipients who were discharged home and met eligibly criteria for home care services.
- The Institutional Review Board of the University Hospitals Case Western Medical Center approved the study. The purpose of this study was to examine short-term (60-day) health-related quality of life and re-hospitalization after implementation of the Care Innovations® Guide deployed with the American Heart Association guideline-based heart failure protocols for monitoring and managing clinical status, symptoms and delivery of relevant patient education to enhance patients' understanding of and management of heart failure.
- Utility was defined as days of activity and interaction of the patient with the monitor / days of actual monitoring possible.
- Adherence was defined as the percent of actual completed sessions from the number of scheduled sessions. Re-hospitalization data were acquired directly from patients or caregivers and primary care physicians.

Results

Improved Quality of Life

Health status was assessed by the Kansas City Cardiomyopathy Questionnaire (KCCQ) pre and post monitoring periods. The KCCQ is a 23-item, self-administered instrument that quantifies physical function, symptoms (frequency, severity and recent change), social function, self-efficacy and knowledge, and quality of life. The Care Innovations® Guide, when used by a clinician to deliver a heart failure program, improved health related quality of life, as evidenced by Kansas City Cardiomyopathy Questionnaire clinical scores increased significantly from 49 ± 25 at baseline to 63 ± 26 at 60 days ($p=0.039$).

Relationship of Compliance and Utility with Re-hospitalization

There was a statistically significant association noted between utility, adherence, and rate of re-hospitalization. Using generalized estimating equations, greater utility (days with activity per monitored days) but not adherence (completing scheduled sessions) scores were correlated with improvements in health status by KCCQ Clinical Summary score ($p=0.013$) and Overall Summary score ($p=0.0056$). Less patient utility and adherence were associated with re-hospitalization. Median adherence and utility for those not re-hospitalized (97.2% and 96.9%, respectively) were greater than for those re-hospitalized (67.4% and 82.2%: $p=0.013$, $p=0.006$, respectively).

Publication

Piña, I.L., Albert, N.M., Fonarow, G.C., Catha, G., Wayte, P., Plank, T., Bruckman, D., Holmes, P., & Kikano, G. (2011) An Observational Study of Deployment of American Heart Association Heart Failure Protocols and Educational Content Within the Intel® Health Guide System Post Discharge. In Press.

AMERICAN PHYSICIAN HOUSECALLS

Study

Remote Patient Monitoring via Care Innovations® Guide as Implemented at American Physicians House Calls

Study Description

American Physician Housecalls (APH) implemented the Guide for seriously ill patients with chronic conditions in the fall of 2010. APH used the Guide within its own unique care model of providing physician home visits. The Guide was added to assist its clinicians in the disease management of complex senior patients with multiple chronic illnesses. The goal of the program was to help keep patients healthy at home, and to decrease their utilization of higher levels of care. This included reducing hospital admissions and emergency room visits. A total of 50 patients participated in the pilot study.

Results

Drive Appropriate Utilization

Hospitalization and emergency room visits are of interest when assessing innovative health care systems. During the time period from November 1, 2010, through April 20, 2011, for the 50 patients in the study, there were 14 inpatient hospitalizations and eight emergency room visits. For the entire study population, this equates to an overall annual rate of about 0.85 hospitalizations per patient per year and 0.48 emergency room visits per patient per year. The table below presents a study of the national Medicare population of hospitalization rates for chronically ill populations for comparison, since a matched control group was not created for this pilot study.

NUMBER OF CHRONIC CONDITIONS IN THE MEDICARE STUDY	AVERAGE NUMBER OF INPATIENT DISCHARGES PER YEAR IN THE MEDICARE STUDY
None	0.12
One	0.35
Two	0.78
Three or More	1.76

Improve Medication Compliance

In the APH study, during a follow up call, diet education, symptom review, and/or chronic disease management education was provided to the patient. If a patient's condition deteriorated, the RN would contact the physician, review the case, and discuss possible medication interventions. Other interventions including a follow up visit, a specialty consult, imaging studies, lab work, or referral to a higher level of care were also considered. The table below reviews the number of vital signs measured by the Guide in a given month. It gives the breakdown on how often a nursing assessment occurred, and how often a medication adjustment occurred during a given month.

MONTH	# ACTIVE PATIENTS	# OF VITAL SIGNS MEASURED	% OF VITAL SIGNS OUT OF THRESHOLD	% OF ABNORMAL VITAL SIGNS FOLLOWED UP ON BY PHONE	% OF PHONE ASSESSMENTS RESULTING IN MEDICATION ADJUSTMENT
November	27	2143	41% (n = 888)	13% (n = 135)	17% (n = 24)
December	31	1709	40% (n = 690)	16% (n= 138)	18% (n = 25)
January	35	1986	42% (n = 825)	14% (n = 132)	10% (n = 13)
February	36	1632	42% (n = 683)	18% (n = 139)	9% (n = 13)
March	40	2258	39% (n = 875)	12% (n = 120)	15% (n = 18)
April	41	2270	38% (n = 853)	13% (n = 140)	19% (n = 26)

Publication

White Paper: Remote Patient Monitoring via Care Innovations® Guide as Implemented at American Physicians House Calls; DHF-4409 Rev 1-2.0-APH White Paper, Care Innovations®.

Condition prevalence and per capita utilization for 2005, by number of chronic conditions. Schneider, KM, O'Donnell, BE, Dean D, Prevalence of multiple chronic conditions in the United States' Medicare population, Health and Quality of Life Outcomes Volume 7, Number 1, Dec 2009, pp 1-11.)*

**Note that for the Medicare study, only six chronic condition variables were used for analysis. The diseases represented included cancer, chronic kidney disease, chronic obstructive pulmonary disease, depression, diabetes, and heart failure.*