Effective Interventions to Reduce Rehospitalizations:

A Compendium of 15 Promising Interventions

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Introduction

Hospitalizations account for nearly one-third of the total $2 trillion spent on health care in the United States. In the majority of cases, hospitalization is necessary and appropriate; however, a substantial fraction of all hospitalizations occur when patients return to the hospital soon after their previous stay. These rehospitalizations are costly, potentially harmful, and often avoidable.

Evidence suggests that the rate of avoidable rehospitalization can be reduced by improving core discharge planning and transition processes out of the hospital; improving transitions and care coordination at the interfaces between care settings; and enhancing coaching, education, and support for patient self-management. However, a notable challenge to improving patient care at transitions is effectively applying evidence from individual pilot studies to clinical services in a variety of settings.

This document is intended to provide a sampling of the range of effective programs underway to reduce avoidable rehospitalizations across the US. The programs listed in this document are all very promising approaches to improve patient care; the reader will note that we have distinguished for purposes of clarity the programs that have documented, peer-reviewed evidence of success in reducing rehospitalizations, and other programs with less rigorous levels of evidence available to date.

In total, 15 programs are highlighted in this document: four with very strong trial or evaluation evidence of effectiveness, seven with very good evidence of reduction in rehospitalization rates, and four that are promising interventions but require further data. Our hope is that this overview will serve as a primer for understanding the range of interventions currently being applied or under study for reducing avoidable rehospitalizations.

Interventions with Very Strong Trial or Evaluation Data

Evidence from randomized controlled trials or program evaluations demonstrates the effectiveness of the following interventions: Project RED, Transitional Care Model, Care Transitions Program, and Evercare.

1. RED: Re-Engineered Discharge[1]

Brian Jack, MD, and colleagues at Boston University Medical Center developed a process for improved discharge coordination called Project Re-Engineered Discharge (RED). The project is located at an urban hospital that serves a low-income, ethnically diverse population.

The intervention includes a number of components, which are facilitated by a specially trained nurse called a Discharge Advocate who does the following:

- Educates the patient about his or her diagnosis throughout the hospital stay;
- Makes appointments for clinician follow-up, test result follow up, and post-discharge testing;
- Organizes post-discharge services;
- Confirms the medication plan;
- Reconciles the discharge plan with national guidelines and clinical pathways;
- Gives the patient a written discharge plan, assesses the patient's understanding of the plan;
- Reviews what to do if a problem arises;
- Expedites transmission of the Discharge Résumé (summary) to outpatient providers; and
- Calls to reinforce of the discharge plan and offer problem-solving 2-3 days after discharge.

Results:

- Intervention significantly reduced hospital utilization, incidence rate ratio 0.695, p=0.009.
- 80 patients in intervention group had 116 episodes of hospital utilization (61 ED and 55 readmissions) during 30-day follow-up period; 99 patients in the usual care group had 166 episodes of hospital utilization (90 ED and 76 readmissions) during the 30-day follow-up period.
- Subgroup analyses revealed that the intervention was most effective for patients with higher rates of hospital utilization in the preceding 6 months.

2. Transitional Care Model[2,3]

Mary Naylor, PhD, RN, and colleagues at the University of Pennsylvania School of Nursing created and tested the Transitional Care Model (TCM), which provides pre- and post-discharge coordination of care for high-risk, elderly patients with chronic illness by advanced practice nurses. The core components of TCM include:

- Consistency of provider across the entire episode of care, with the Transitional Care Nurse (TCN) as the primary coordinator of care;
- In-hospital assessment and development of an evidenced-based plan of care;
- Regular home visits with available, ongoing telephone support (24 hours per day, seven days per week) for an average follow-up of two months post-discharge;
- Comprehensive, holistic focus on each patient's needs, including the reason for the primary hospitalization as well as other complicating or coexisting events;
- Emphasis on early identification and response to health care risks and symptoms and avoidance of adverse and untoward events that lead to readmissions;
- Active engagement of patients and their family and informal caregivers, including education and support; and
- Communication to, between, and among the patient, family, and informal caregivers, and health care providers and professionals.

Results:

Two randomized controlled trials have documented that the use of the TCM results in fewer rehospitalizations, lower overall health care costs, and improved patient satisfaction with care:

- Patients in the TCM group were significantly less likely than control patients to be rehospitalized at least once within six months (37.1% vs. 20.3%; $P < 0.001$); a 2004 trial found significantly fewer rehospitalizations at one year among patients who received the intervention than usual care patients (104 vs. 162; $P = 0.047$).
- Patients in the TCM group incurred half the average total health care costs at six months than control patients ($3,630 vs. $6,661; $P < 0.001$); a 2004 trial found total health care costs averaged $5,000 less per patient for patients who received TCM-based care than for control patients ($7,636 vs. $12,481; $P = 0.002$).

3. Care Transitions Program[4,5,6]

Eric Coleman, MD, MPH, developed the Care Transitions Program,[SM] a four-week intervention that focuses on improving care transitions by fostering improved self-management skills.

The four main components of the Care Transitions Program are:

- Medication self-management;
- Patient-centered record (PHR);
- Follow-up with physician; and
- Knowledge of "red flags" or warning signs/symptoms and how to respond.

The Care Transitions Program is designed for community-dwelling patients age 65 and older, and centers on the use of a Transition Coach. The Transition Coach, who is a nurse or nurse practitioner, conducts a home visit within 72 hours of discharge and speaks with the patient by phone on post-discharge days 2, 7, and 14. During these communications, the Transition Coach prepares the patient for upcoming encounters with health care providers. For example, during the home visit, the Transition Coach uses role-playing to prepare the patient for follow-up visits with providers and helps the patient complete a personal health record. The Transition Coach also coaches the patient to reconcile or identify discrepancies in medications, encourages follow up, and serves as a single point of contact.

Results:

One study evaluated 158 elderly patients admitted with one of ten conditions (HF, COPD, CAD, diabetes, stroke, hip fracture, peripheral vascular disease, spinal stenosis, arrhythmias, and DVT/PE):

- Patients who participated in the Care Transitions Program were significantly less likely to be rehospitalized than controls from an administrative database (n = 1,235) at 30, 90, and 180 days after discharge (adjusted odds ratio at 30 days = 0.52; 95% confidence interval = 0.28-0.96)
- The time to rehospitalization was significantly longer for the Care Transitions Program group than the controls (225.5 days vs. 217.0 days; adjusted P = 0.003).

A formal cost analysis was not conducted by the investigators, but they have estimated that the cost savings associated with the intervention for 350 patients would be $296,000 over 12 months.

4. Evercare™ Care Model [7,8]

Evercare is one of the nation's largest health care coordination programs for people who have long-term or advanced illness, are older, or have disabilities. Evercare serves more than 300,000 dual-eligible people nationwide who either reside in a long-term care facility or have severe chronic conditions and live in the community.

The core elements of the intervention are:

- Enhanced primary care and care coordination by nurse practitioners or care managers;
- NP care in the nursing home setting; and
- Development and coordination of personalized care plans with all health care providers.

Evercare services are triaged according to the following four levels of care intensity:

Levels 1 and 2: Individuals are primarily healthy and living independently, or have >2 conditions

- CM provides phone-based services and mail (includes preventive health reminders).
- CM provides phone-based consultation, facilitates care and coordinates community services.

Level 3: Individuals have numerous chronic conditions and/or significant functional disabilities

- For community-based individuals, CMs coordinate care and community services.
- For individuals living in a facility, NPs coordinate and provide care.
- CMs and NPs meet frequently with families in order to discuss the patient's care needs and to address end-of-life issues and jointly prepare the treatment plans.

Level 4: Individuals with advanced illnesses in the last year of life

- Nurses provide hospice and palliative care services; focus of care is to adapt and respond to the needs of the individual and their families, minimize symptom burden, and support the individual's values.

Results:

- Reduced hospitalizations by 45%; the incidence of hospitalizations was reduced from 4.63 to 2.43 per 100 patients in 15 months, P<.001).
- Reduced ED visits by 50%.
- Cost savings estimated at approximately $103,000 a year in hospital costs per NP.

Interventions with Strong Evidence of Reduction in Rehospitalization Rates

The following programs have had success in reducing rehospitalizations. In some cases, these programs have published program evaluation data; in many, however, the results reported are at this time self-reported successes. The programs are Community Care-North Carolina, Commonwealth Care Alliance-Brightwood Clinic, The Heart Failure Resource Center, Home Health Telemedicine, Novant Physician Group Practice Demonstration, Kaiser Permanente Care Coordination, and IHI Transitions Home.

1. Community Care North Carolina[9,10]

Community Care North Carolina (CCNC) is a community-based care management program for Medicaid recipients, operating by developing local networks of primary care providers to coordinate prevention, treatment, referral, and institutional services. There are currently 14 networks of more than 3,000 physicians across North Carolina, managing the care of 970,544 individuals.

CCNC operates in the following manner:

- Works directly with providers experienced in caring for North Carolina's low-income residents;
- Creates private/public partnerships to cooperatively meet patient needs and allocate resources;
- Makes care deliverers responsible for performance and improvement;
- Ensures all funds are kept local and used for providing care; and
- Establishes local networks for managing Medicaid patients and other community health issues.

CCNC currently has six initiatives, including disease management for asthma, heart failure, and diabetes, ED, and pharmacy initiatives, and case management for high-risk/high-cost patients.

Results:

- In 2002, pediatric asthma admissions decreased 21%; adult asthma admissions decreased 25%.
- In 2002, diabetes admissions decreased 9%.
- In 2007, CCNC achieved savings of $27 per member per month (PMPM) for asthma patients
- For diabetes patients, CCNC saved $21 PMPM, resulting in $306,432 annual savings.

2. Commonwealth Care Alliance Brightwood Clinic[11]

Located in Springfield, MA, the Brightwood Clinic developed a capitated care management model for low-income Latinos with disabilities and chronic illnesses. The Brightwood intervention sought to identify all Medicaid members with special health care needs and provide enhanced primary care, on-site mental health and addiction advocacy services, care coordination, and support services. Nurses, nurse practitioners, mental health and addiction counselors, and support service staff worked collaboratively with the health center's primary care providers.

The key components of the intervention included:

- Enhanced primary care and behavioral health and care coordination;
- Reminder calls for preventive care;
- Multidisciplinary clinical team model, with all care authorization done by team;
- PCP as a core team member;
- Behavioral health and physical health integration;
- Physician identification of an adverse selection group;
- Follow up on emergency room, hospital, and detox admissions;
- Support groups;
- Health education and promotion;
- Nonclinician team members, nonclinician home visits and
- Bilingual staff and clinicians.

Results:

- Cost savings of $204 PMPM when compared to fee-for-service expenditures; all the reductions in cost were due to decreased utilization of hospital-based services.
- Among a subgroup of enrollees with costs greater than $2,000 PMPM, costs decreased from $9,400 to $2,500, due to decreased utilization of hospital-based services.
- Among a subgroup with lower PMPM costs in FFS (<$500), costs increased from $162 to $775, reflecting improved access to needed outpatient services.
- ER utilization decreased from 0.109 visits PMPM to 0.097 visits PMPM.

3. Heart Failure Resource Center[12,13]

Located at Piedmont Hospital, a 481-bed, not-for-profit, acute care hospital in Atlanta, the Heart Failure Resource Center (HFRC) uses three key elements to improve outpatient care for chronically ill patients with heart failure:

- Use of nurse practitioners as care managers;
- Evidence-based clinical care protocols; and
- Remote patient telemonitoring.

Advanced practice nurses (APNs) function as outpatient clinical case managers. They monitor and respond to test results, adjust and optimize medications, and institute intravenous diuretic therapy when necessary to avoid ER visits or hospitalizations. Physicians are available for consultation if needed.

The APNs participate in weekly multidisciplinary team rounds, consisting of a clinical nurse specialist, staff nurses, a clinical pharmacist, a cardiac rehab specialist, a clinical case manager, the program manager, and medical directors discusses each new patient's case and care plan. The APNs implement care via evidence-based protocols that are approved by the medical directors.

For complex cases, the HFRC uses telemonitoring. Patients are provided with a touch-screen computer, scale, and blood-pressure cuff that plug into their home phone line. Daily readings of heart failure symptoms, weight, blood pressure, and heart rate are transmitted to the HFRC staff.

The considers the HFRC a cost-neutral benefit for patients. The program uses a cost avoidance model, taking into consideration the cost reductions due to fewer heart failure hospitalizations to help cover the cost of the program.

Results:

- The 30-day rehospitalization rate decreased from 4.6% to 1.6% for patients who were treated at the HFRC for fiscal year 2007—a reduction of 75%.
- The 90-day rehospitalization rate decreased from 10.4% to 2.9% for patients in the program, compared patients who did not receive the intervention.

4. Home Healthcare Telemedicine[14]

The Home Healthcare Telemedicine model originated at Presbyterian Home Healthcare, a home care agency in New Mexico. The program serves patients recently discharged with congestive heart failure or COPD. The intervention relies on two key elements:

- Nurses specializing in providing telehealth care; and
- Telemonitoring technologies.

At program initiation, a home health nurse conducts two in-home visits during the patient's first week at home. A technician installs the necessary hardware for the telehealth system. Subsequently, a telemedicine nurse provides an introductory video encounter during first week after discharge and visits the patient remotely via video feed one to three times per week. The traditional home health nurse visits the telehealth patient once a week.

As part of the intervention, a computer terminal and a high resolution video unit are placed in the patient's home. The device also includes a high-resolution stethoscope, blood pressure monitor, scale, and pulse oximeter. Measurements are transmitted to the telehealth nurse. In addition, units without video capability are used to monitor patients after discharge from home care. Data are fed directly into Presbyterian's IT system; abnormal parameters trigger an alert to the nurse, who can reinitiate home care in an effort to prevent hospitalization.

Results:

- The rehospitalization rate for patients with congestive heart failure decreased from 6% before the program to about 1% after program initiation.
- The organization has calculated that the productivity of the telehealth nurses is almost double that of the traditional home health nurses (8 visits vs. 5 visits per 8 hours).
- In addition, nurse travel time was reduced with implementation of the telemedicine program.
- The cost of the telemedicine units (approximately $5,500) is less than one hospital admission, demonstrating the return on investment for the organization.

5. Novant Physician Group Practice Demonstration Project[15]

As one of 10 participants in the three-year CMS Physician Group Practice Demonstration Project, which began in 2005, staff at Forsyth Medical Group focused on improving care transitions as one component of the project. The demonstration project provides physician group practices with performance-based payments for improving the quality and cost efficiency of health care delivered to Medicare fee-for-service beneficiaries.

Staff and administrators at Forsyth Medical Group implemented a chronic care model called Comprehensive Organized Medicine Provided Across a Seamless System (COMPASS) to improve management of care and patient adherence. The core components of the intervention are the following:

For providers:

- Evidence-based practice standards protocols/practice tools;
- Education; and
- Inpatient to outpatient systems.

For patients:

- Chronic and preventive care guidelines;
- Education; and
- Population and disease management services.

Results:

- Data from the first year of the demonstration project showed that use of the model resulted in lower costs per beneficiary and improved quality metrics for patients with diabetes treated in the group practice.
- Preliminary claims data suggest that the intervention improves transitions for chronically ill patients. The group documented 20% fewer ED visits and 44% fewer hospital admissions for patients with CHF and COPD. Rehospitalization data were not provided.

6. Kaiser Permanente Chronic Care Coordination[16]

The Kaiser Permanente health system has piloted a program called Chronic Care Coordination. There are three main components to the intervention:

- Multidisciplinary chronic care team;
- Needs-based care plans; and
- Seamless communication with patients.

A multidisciplinary team, consisting of 17 specially trained nurses with experience in chronic disease management or geriatrics and two licensed clinical social workers, facilitates smooth transitions from acute care and long-term care settings for patients with chronic conditions. The team uses phone contact to communicate with patients on a regular basis and provides a number of services to facilitate care coordination, including medication reconciliation, review of discharge plans and recommendations, education and support, and coordination of services.

Eligible patients have at least one of the following characteristics:

- Four or more chronic illnesses;
- Recent hospitalization;
- High utilization of the emergency department; and
- Recently discharged from a skilled nursing facility (SNF).

Results:

- Of 100 patients transitioning from SNF to home, 2.4% in the intervention were rehospitalized, compared to 14% who received usual care.
- The intervention patients also had fewer ED visits than usual care patients (7% vs. 16%) and a lower rate of readmission to a SNF within 60 days (0 vs. 13%).
- The costs of services and care for patients who received the intervention were $1,900 less per patient per year, due to fewer hospitalizations, SNF admissions, and ED visits.

7. IHI Transitions Home for Patients with Heart Failure: St. Luke's Hospital[17]

Launched in 2003, Transforming Care at the Bedside (TCAB) is a national program of the Robert Wood Johnson Foundation (RWJF) and IHI. One of the most promising changes developed within TCAB is "creating an ideal transition home" for patients discharged from medical and surgical units within hospitals. The initial focus of the intervention was improving transitions home for patients with congestive heart failure.

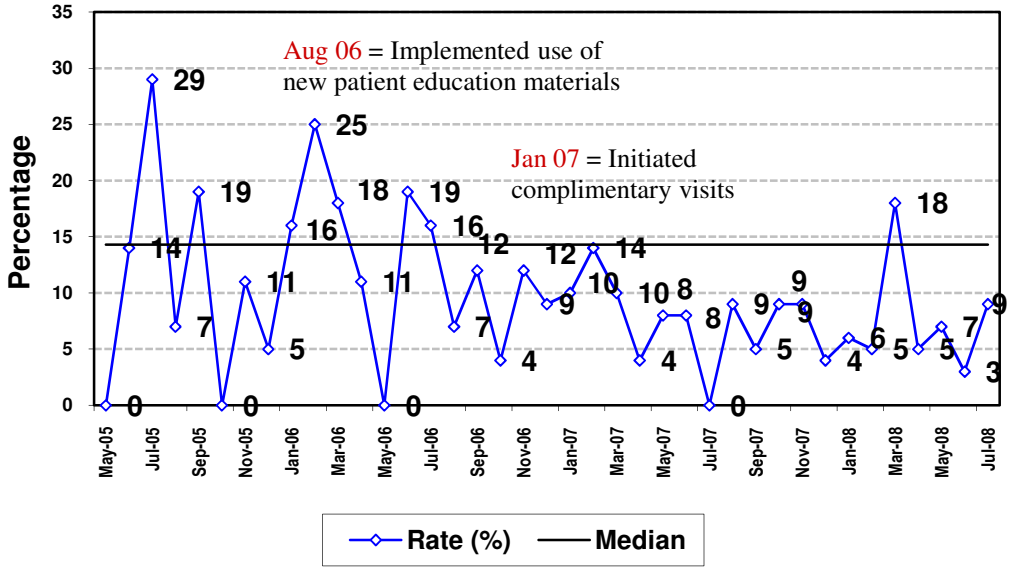
The four core elements of the intervention are:

- Enhanced admission assessment for post-discharge needs;
- Enhanced teaching and learning;
- Patient and family-centered handoff communication; and
- Early post-acute care follow-up.

Results:

- Staff at St. Luke's Hospital in Cedar Rapids, Iowa, documented a 50% reduction in rehospitalizations, from an average of 14% to a current average of 7%. (Figure 1)
- Process measures, such as successful teach-back and patient satisfaction with discharge processes, are 90-100%.

Figure 1: Readmissions of Patients with HF within 30 Days as a Percentage of Patients Discharged



Promising Interventions Requiring Additional Data

The following four interventions are very promising approaches to improving transitions of care and/or reducing avoidable hospitalizations; however, convincing data regarding their effect on reducing rehospitalizations are not currently available. The programs include INTERACT, Project BOOST, Guided Care, and Hospital at Home.

1. INTERACT[18]

Joseph Ouslander, MD, Director of Boca Institute for Quality Aging at Boca Raton Community Hospital in Florida, and colleagues have created a program aimed at reducing the number of hospital admissions from nursing homes. The intervention, referred to as INTERACT (Interventions to Reduce Acute Care Transfers), includes three key tools for providers:

- Care paths;
- Communication tools; and
- Advance Care Planning tools.

Results:

- The group evaluated the number of potentially avoidable hospitalizations from three nursing homes, as determined by the ratings of an expert panel.
- The results suggest that the proportion of avoidable hospitalizations dropped due to the intervention from 23 of 30 (77%) avoidable admissions to 32 of 65 (49%) avoidable admissions after the 6-month intervention.

2. Project BOOST[19]

The Society of Hospital Medicine created Project BOOST (Better Outcomes for Older adults through Safe Transitions) to optimize care transitions from the hospital to home. Supported by a grant from the John A. Hartford Foundation, the Society of Hospital Medicine provided training and coaching support to an initial group of 6 hospitals and recently announced a second wave of 24 hospitals across the US.

By improving discharge processes, Project BOOST aims to:

- Reduce 30-day readmission rates for general medicine patients;
- Improve facility patient satisfaction scores and H-CAHPS scores related to discharge;
- Improve flow of information between hospital and outpatient physicians;
- Identify high risk patients and offers specific interventions to mitigate their risk; and
- Improve patient and family education practices to encourage use of teach-back .

BOOST recommends the following as elements of a universal discharge checklist:

- General Assessment of Preparedness (GAP) assessment, completed with issues addressed;
- Medications reconciled with preadmission list;
- Medication use/side effects reviewed using teach-back with patients/caregivers;
- Teach-back used to confirm patient/caregiver understanding of diagnosis, prognosis, self-care requirements, and symptoms of complications requiring immediate medical attention;
- Action plan for management of symptoms/side effects/complications requiring medical attention established and shared with patient/caregiver using Teach-back;
- Discharge education plan completed, taught, provided to patient/caregiver at discharge;
- Discharge communication provided to post-hospitalization care providers;
- Documented receipt of discharge information from principal care providers;
- Direct communication with principal outpatient provider at discharge; and
- Telephone contact arranged within 72 hours of discharge in order to assess the patient's condition and adherence and to reinforce follow-up.

Results:

- No publicly available results are reported at this time.

3. Guided Care[20,21]

Chad Boult, MD, MPH, MBA, and other researchers at the Johns Hopkins Bloomberg School of Public Health have created a program referred to as Guided Care. The core elements of the intervention are:

- Nurse-physician teams;
- Patient self-management; and
- Coordination of care services.

Patients are eligible if age 65 or older and deemed to be at high risk for requiring hospitalization or other cost-intensive care (i.e., patients with the 25% highest costs, based on previous year's claims data).

The intervention involves the placement of specially trained nurses within primary care offices. Working with the physician, they do the following:

- Assess needs and preferences;
- Create an evidence-based "care guide" and an "action plan";
- Monitor patients proactively;
- Support chronic disease self-management;
- Communicate with providers in EDs, hospitals, specialty clinics, rehab facilities, home care agencies, hospice programs, and social service agencies in the community;
- Smooth transitions between care sites;
- Educate and support caregivers; and
- Facilitate access to community services.

Results:

- A randomized trial is underway. Early analysis demonstrates a higher rating of care among intervention participants than controls, and higher ratings for satisfaction with interactions with patients and family members among participating physicians.
- Preliminary analysis also demonstrates a trend toward reduced frequency of early readmissions with Guided Care compared to usual care.
- Financial analysis from the first year found decreased costs, by $1,300 per patient and $75,000 per nurse.

4. Hospital at Home[22,23]

The Hospital at Home model was developed by Johns Hopkins School of Medicine investigators at Bayview Medical Center, a 700-bed, not-for-profit hospital located in Baltimore, Maryland. The central premise of the program is the provision of acute care services by a multidisciplinary team as an alternative to inpatient hospital care. The core components of the intervention include:

- Daily physician visits; and
- Care and patient education coordinated by a registered nurse.

Eligible patients are over age 65 and require acute hospital admission for exacerbation of COPD, CHF, cellulitis, or community-acquired pneumonia.

Results:

- Patients who received the intervention had a significantly shorter length of stay (3.2 vs. 4.9 days; $P = 0.004$).
- Mean cost was lower for the patients treated in the Hospital at Home program than for controls ($5,081 vs. $7,480; $P < 0.001$).
- At 8 weeks after admission, there were no differences in utilization of health services (e.g., ED visits, inpatient hospital readmissions, mean number of admissions to SNFs, and mean number of home health visits).

Discussion

The programs briefly summarized in this document include many promising ideas: improved execution of discharge processes, enhanced care at times of transitions, coaching for self-efficacy, support for patient self-management, coordination of care services after discharge, remote monitoring, and others.

This collection of programs is an early compilation of promising efforts to reduce avoidable rehospitalizations. There are many other efforts underway across the US to improve care at times of transitions and reduce avoidable hospitalizations and rehospitalizations for a variety of patient populations across a range of settings. The inclusion of programs in this compendium was based on available outcome data (i.e., rehospitalization rates) in peer-reviewed literature, presentations or written reports in the public domain, or well-detailed program descriptions. Publicly available reporting on the outcomes of programs (i.e., with respect to rehospitalizations) is lacking for many of the numerous effective programs currently underway across the country. To that end, IHI encourages publically sharing local successes to facilitate the adoption and adaptation of successful initiatives.

Based on the evidence highlighted in this document and IHI's experience with partnering organizations, IHI recommends that clinical leaders interested in reducing avoidable rehospitalizations consider the following high-leverage opportunities:

1. Improve existing processes of transition out of the hospital.
2. Improve the "reception" of the patient into the new setting of care.
3. Enhance services at times of transition for patients at high risk of recurrent rehospitalizations.
4. Engage patients/families as active participants in their care and facilitating patient self-management and/or remote monitoring.

The following pages contain a case study of a successful discharge process improvement initiative at Cedars Sinai Medical Center, Los Angeles, California, and a quick-reference table of the 15 programs discussed previously.

Case Study: Cedars Sinai Medical Center, Los Angeles, California

The following is a brief case study of a successful intervention in a medical unit to reduce avoidable rehospitalizations.

Aim

Short-term: Reduce readmission rate by 50%.

Long-term: Target readmission rate at 5%.

Methods

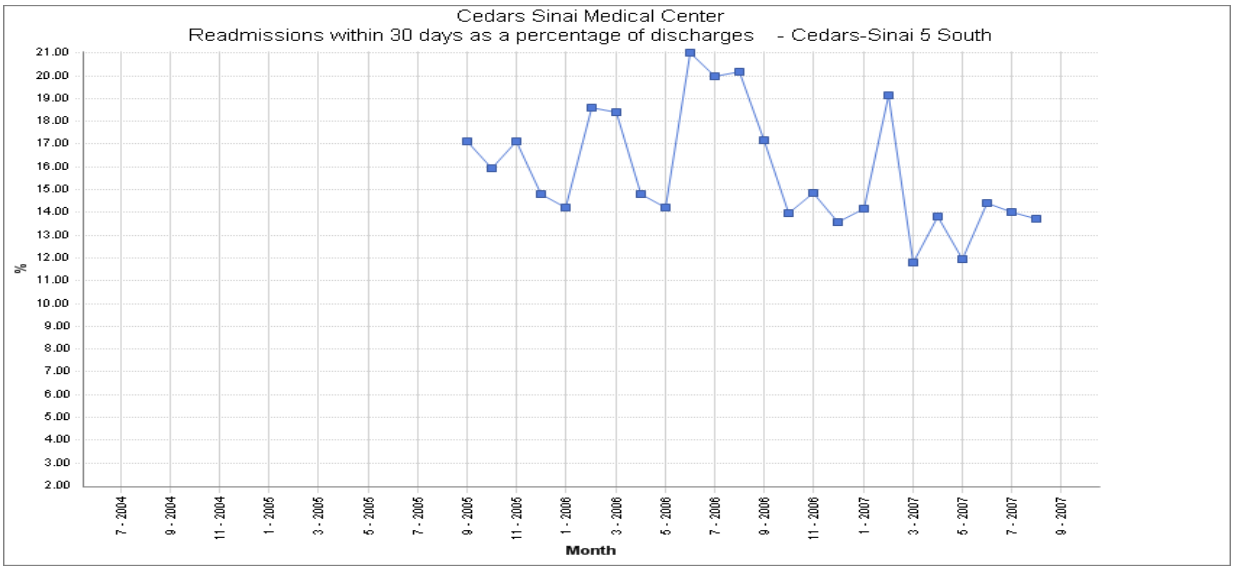
1) Improve patient understanding of medical and self care issues;

2) Increase referrals to palliative care for patients with advanced stage HF;

3) Improve reliability of completion and accuracy to medication reconciliation; and

4) Partner with patients and families in the redesign of care.

Results



Changes Tested and Implemented

1. Partnered with patients and family members to understand patient needs when leaving the hospital:
    - Designed a letter given to patients on admission which suggests how to make going home easier, including bringing keys to the house and clothing for the trip;

- Developed a Journey Home communication board; and
- Began testing use of Teach Back around patient self-care.

2. Collaboration with physicians on how to improve the discharge process resulted in outlining suggestions for physicians on how to make the process smoother. Recommendations include:
    - The physician should speak with the nurse during each round regarding care and discharge plans.
    - Identify specific direct communication between physicians and nurses on rounds or by phone regarding orders for discharge.

3. Roles and responsibilities of nurses and clinical partners are explicitly described in discharge guidelines.
    - The discharge action plan is completed within 24 hours of patient admission; in March 2007 the completion rate was 93%.

4. Creatively adapted the "agenda-setting cards" to improve discharge communication.
    - Each card in the deck has a question frequently asked by patients with HF. Questions were gathered from patients by HF nurses. The agenda-setting cards reduce patients' hesitation to ask questions and assist them with driving the learning agenda.
    - Patients are given the card deck to keep and are encouraged to choose 2-3 cards for discussion at each learning opportunity across care settings. To date the cards have been very successful in the hospital settings and the team has plans to move them into the ambulatory setting next.[24]

5. Nurses identify the patient's family caregivers during multidisciplinary rounds and ask who will be helping with care in the home.

6. Improved medication reconciliation upon discharge.
    - Integrated into the larger hospital-wide medication reconciliation initiative. On discharge, the staff members print the most recent medication list from the electronic health record and then indicate next to each medication whether it is to be stopped or continued. Instructions for

how medications should be taken must be clearly stated. Concurrently, intravenous medications are converted to oral medications.

- Small tests of change were used to improve admission and discharge reconciliation. Intake reconciliation form accuracy and completeness was initially improved to 85% and was subsequently improved to 95% for the last three quarters. The electronic discharge reconciliation form accuracy and completeness was initially improved to 90% and subsequently improved to 100% for the last three quarters.

7. Revamped the interdisciplinary team rounds (where patients are typically discussed on hospital Day Two). For each patient, the team must answer four questions:
    - Where will the patient likely go after discharge?
    - Who will be providing the care—is this likely to be adequate or does the patient require a higher intensity of care?
    - What are the patient's needs after discharge?
    - What are the potential discharge barriers?

8. Began giving patients a business card with the contact name and phone number of the discharging unit, and encourage patients and families to call the unit should questions arise after returning home.
    - Nurses recognized that collecting and tracking these questions would provide insight on how their discharge efforts might be improved. Over half of the calls have been related to medications and, as a result, the discharge team is now enhancing education in this area. Data gathered from calls received from patients and families:

Call-Backs from Unit Business Cards (N=13)	
Seeking medication clarification	83%
Directed to call the physician	8%
Directed to seek ER care	9%

9. Partnered with a skilled nursing facility (SNF) that receives the largest proportion of the hospital's discharges to develop a standard transfer form. Developed a discharge algorithm for discharge to the SNF or home.

10. Increased palliative care referrals from seven to ten per month between December 2006 and February 2007.

11. Reinforced the use of the SBAR critical communication tool in the discharge planning process.

SBAR Rollout (Scale of 1-5, 5 being very satisfied)	
Has the SBAR rollout been successful?	4.73
Has SBAR improved communication?	4.40
I always use SBAR in patient handoffs.	4.53

Summary Table of Interventions to Reduce Rehospitalizations

INTERVENTION	Rehospitalization Results	Complexity	Cost Benefit	Other Comments
A: STRONG EVIDENCE OF REDUCTION IN REHOSPITALIZATIONS				
A1. RED: Re-Engineered Discharge (Jack)	• 30% decrease in hospital utilization (ED or hospitalization) in 30-day follow up • Intervention most effective in patients with history of high utilization	• Minimal – Discharge Advocate coordination role and follow-up phone calls	• $386,759 lower cost in RED group due to 32% lower use of hospital	• Decreased combined endpoints of ED and hospitalization
A2. Transition Coach (Coleman)	• Decreased rehospitalization overall: 30 days = 8% (vs. 12% control) 90 days = 17% (vs. 23%) 180 days = 26% (vs. 31%) • Decreased rehospitalization for same diagnosis 30 days = 3% (vs. 5%) 90 days = 5% (vs. 10%) 180 days = 9% (vs. 14%)	• Medium – RN or NP as transition coach	• Anticipated cost savings: $296k for 350 chronically ill adults	• Longer time to next rehospitalization (225 days vs. 217 days, p<0.001)
A3. Transitional Care Model (Naylor)	• 17% fewer 180-day rehospitalizations in intervention group (37% vs. 20%) • Significantly fewer rehospitalizations in intervention group at 1 year (p<0.05)	• Medium – Advanced Practice Nurses provide transition support for high-risk elderly patients	• 50% reduction in total health care costs ($3k vs. $6k) at 6 months • $5k cost savings per patient at 1 year ($7,600 vs. $12,400)	
A4. Evercare™ Care Model	• Reduced hospitalizations by 45% with no change in mortality (2.4 per 100 vs. 4.6) • Reduced ED visits by 50%	• High - NPs and social workers, phone & visits in LTC or home to coordinate services, facilitate communication, integrate personal care plans. 4 levels of care acuity.	• Hospital cost savings per nurse practitioner per year of $103,000	

INTERVENTION	Rehospitalization Results	Complexity	Cost Benefit	Other Comments
B: VERY GOOD DATA SHOWING DECREASED (RE)HOSPITALIZATIONS				
B1: Community Care North Carolina	• Pediatric asthma hospitalizations decreased by 21-23% • Adult asthma hospitalizations decreased by 25% • Diabetes hospitalizations decreased by 9%	• High – highly coordinated network of providers and community-based supports	• Asthma cohort costs decreased $27 PMPM, accrued $1.5M in annual savings to Medicaid • Diabetes cohort costs decreased $21 PMPM	
B2: Commonwealth Care Alliance-Brightwood Clinic	• Unspecified (re)hospitalization rates; savings accrued via reduced hospital utilization	• High – highly coordinated outpatient multidisciplinary teams with close individual outreach and follow up	• Cost savings $204 PMPM compared to FFS • Among subgroup with >$2000 PMPM in FFS, savings greatest ($9,400 monthly average to $2,500 monthly average) • Among lower-cost patients (<$500 PMPM), costs increased ($162 to $775)	• Very high resource-intensive patient population • ED utilization decreased from 0.109 visits PMPM to 0.097 visits PMPM
B3. Heart Failure Resource Center	• 2007 30-day rehospitalization rates decreased from 4.6% to 1.6% • 75% lower than HF patients not in program • 2007 90-day rehospitalization rates decreased from 10.4% to 2.9%	• Medium – APNs managing outpatients		• Used a cost-avoidance financial model to assess return on investment
B4: Home Healthcare Telemedicine	• Low baseline CHF rehospitalization rate (6%) decreased to approximately 1%	• High – RN monitoring using in-home phone, video & computer equipment	• Cost of 1 telemedicine unit ($5,500) less than 1 hospitalization	• RN productivity higher for telemedicine (8 visits vs. 5 visits daily)
B5: Novant Physician Group Practice Demonstration Project	• 44% fewer hospital admissions for patients with CHF and COPD • No rehospitalization data available	• Low – Chronic Care Model, population management, link outpatient and inpatient communication	• Lower costs in participating practices (no specifics)	• 20% fewer ED visits for patients with CHF and COPD

INTERVENTION	Rehospitalization Results	Complexity	Cost Benefit	Other Comments
B6: Kaiser Permanente Chronic Care Coordination	• Hospitalization rates for patients transitioning from SNF to home decreased from 14% to 2.4%	• Medium – RNs & LCSWs, various levels of care	• $1,900 savings per patient per year due to decreased hospitalizations, SNF admissions, and ED visits • $3M in annual savings for patients transitioning from SNF to home due to reduced utilization	• ED visits decreased from 16% to 7% • SNF 60-day readmissions decreased from 13% to 0
B7: Creating an Ideal Transition Home for Patients with Heart Failure (IHI)	• All-cause 30-day rehospitalizations decreased from 14% to 7% at St. Luke's Hospital in Iowa	• Low to medium – depends on changes implemented		• 100% patient satisfaction with discharge process • >90% successful "Teach Back"
C: PROMISING INTERVENTIONS REQUIRING ADDITIONAL DATA				
C1: INTERACT (Ouslander)	• Preliminary data suggests reduced avoidable hospitalizations from 77% to 49% after 6-month intervention	• Minimal – toolkit for nursing homes to prevent avoidable transfers		• Expanding to sites in 3 states in June 2009
C2: Project BOOST (SHM)	• None available at this time	• Low to medium- depends on changes implemented		• Expanding to 24 additional hospitals in spring 2009
C3: Guided Care (Boult)	• Preliminary 6-month data suggests 15- and 45-day rehospitalization may be 3% lower than control group • No difference at 30 days	• Minimal – use of RNs integrated with primary care	• Net savings: $130k per year per 55 beneficiaries	• RCT underway for patients at high risk
C4: Hospital at Home (Leff)	• At 8 weeks, no difference in utilization of ED, rehospitalizations, admissions to SNFs, home health visits	• High – RNs and acute care services in home setting	• Mean cost for hospital-at-home episode = $5,000 vs. hospital stay of $7,500	

REFERENCES

[1] Jack BW, Veerappa KC, Anthony D, et al. A reengineered hospital discharge program to decrease rehospitalization. *Ann Intern Med.*. 2009;150:178-187.
[2] Naylor MD, Brooten DA, Campell RL, Maislin G, McCauley KM, Schwartz JS. Transitional care of older adults hospitalized with heart failure: a randomized, controlled trial. *J Am Geriatr Soc.* 2004;52:675-684.
[3] Naylor MD, Brooten D, Campbell R, et al. Comprehensive discharge planning and home follow-up of hospitalized elders: a randomized clinical trial. *JAMA.* 1999; 281:613-620.
[4] Coleman EA, Smith JD, Frank JC, Min S, Parry C, Kramer AM. Preparing patients and caregivers to participate in care delivered across settings: the care transitions intervention. *J Am Geriatr Soc.* 2004;52(11):1817-1825.
[5] Coleman EA. CMS Learning Session: The Care Transitions Intervention. December 20, 2007 [presentation]. Available at: www.cfmc.org/caretransitions/learning_sessions.htm.
[6] http://www.innovativecaremodels.com/care_models/12
[7] Kane RL, Keckhafer G, Flood S, Bershadsky B, Siadaty MS. The effect of Evercare on hospital use. *J Am Geriatr Soc.* 2003 Oct;51(10):1427-34.
[8] http://www.innovativecaremodels.com/care_models/17/results
[9] http://www.communitycarenc.com/PDFDocs/CCNC%20AT%20A%20GLANCE.pdf
[10] Ricketts TC, Greene S, Silberman P, Howard HA, Poley S. *Evaluation of Community Care North Carolina Asthma and Diabetes Management Initiatives: January 2000-December 2002*. North Carolina Rural Health Research and Policy Analysis Program. Chapel Hill, North Carolina; 2004.
[11] Bachman SS, Tobias C, Master RJ, Scavron J, Tierney K. A managed care model for Latino adults with chronic illness and disability. Results of the Brightwood Center intervention. *Journal of Disability Policy Studies*. 2008;18(4):197-204.
[12] http://www.innovativecaremodels.com/care_models/15
[13] http://www.healthleadersmedia.com/content/90114/topic/WS_HLM2_HOM/How-Piedmont-Hospital-Cut-Heart-Failure-Patient-Readmissions-by-75-Percent.html
[14] Home healthcare telemedicine. Available at: http://www.innovativecaremodels.com/care_models/18.
[15] Novant Medical Group: Forsyth. PGP Demonstration Project. *Factors Influencing Performance Year: Quality & Efficiency Results*. February 28, 2008. [presentation]. Available at: http://www.cfmc.org/caretransitions/files/Care%20Transitions%20presentation%202%2008b.pdf .
[16] Chronic care coordination. Available at: http://www.innovativecaremodels.com/care_models/13/overview.
[17] Nielsen GA, Bartley A, Coleman E, Resar R, Rutherford P, Souw D, Taylor J. *Transforming Care at the Bedside How-to Guide: Creating an Ideal Transition Home for Patients with Heart Failure*. Cambridge, MA: Institute for Healthcare Improvement; 2008. Available at http://www.ihi.org.
[18] Ouslander J. *Improving Nursing Home Care by Reducing Avoidable Acute Care Hospitalizations Presentation*. Available at: http://www.cfmc.org/caretransitions/files/Ouslander%20Care%20Transitions%20Call%20Presentation%20030308.pdf.
[19] Project BOOST Team. The Society of Hospital Medicine Care Transitions Implementation Guide: Project BOOST: **B**etter **O**utcomes for **O**lder adults through **S**afe **T**ransitions. Society of Hospital Medicine website, Care Transitions Quality Improvement Resource Room http://www.hospitalmedicine.org.
[20] Boult C, Reider L, Frey K, et al. Early effects of "Guided Care" on the quality of health care for multimorbid older persons: a cluster-randomized controlled trial. *J Gerontol A Biol Sci Med Sci.* 2008;63:321-327.
[21] Boult C. The Guided Care "Medical Home" for High-Risk Beneficiaries [presentation]. March 13, 2008. Available at: http://www.cfmc.org/caretransitions/files/TC%20Learning%20Session_031308.pdf.
[22] Leff B, Burton L, Mader SL, et al. Hospital at home: feasibility and outcomes of a program to provide hospital-level care at home for acutely ill older patients. *Ann Intern Med.* 2005;143(11):798-808.
[23] Hospital at Home. Available at: http://www.innovativecaremodels.com/care_models/20.
[24] http://www.ihi.org/ihi/files/TCAB/Transitions_Home/CHF Cards_July 2007revision.doc