AHA Scientific Statement

Transitions of Care in Heart Failure

A Scientific Statement From the American Heart Association

Nancy M. Albert, PhD, RN, CCNS, CHFN, CCRN, FAHA, Chair; Susan Barnason, PhD, RN, APRN-CNS, CEN, CCRN, FAHA; Anita Deswal, MD, MPH, FAHA; Adrian Hernandez, MD, MHS, FAHA; Robb Kociol, MD; Eunyoung Lee, PhD, RN, FNP, ACNP, FAHA; Sara Paul, DNP, RN, FNP, CHFN, FAHA; Catherine J. Ryan, PhD, RN, APRN-CNS, CCRN, FAHA; Connie White-Williams, PhD, RN, FAHA; on behalf of the American Heart Association Complex Cardiovascular Patient and Family Care Committee of the Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, and Council on Quality of Care and Outcomes Research

Abstract—In patients with heart failure (HF), use of 30-day rehospitalization as a healthcare metric and increased pressure to provide value-based care compel healthcare providers to improve efficiency and to use an integrated care approach. Transition programs are being used to achieve goals. Transition of care in the context of HF management refers to individual interventions and programs with multiple activities that are designed to improve shifts or transitions from one setting to the next, most often from hospital to home. As transitional care programs become the new normal for patients with chronic HF, it is important to understand the current state of the science of transitional care, as discussed in the available research literature. Of transitional care reports, there was much heterogeneity in research designs, methods, study aims, and program targets, or they were not well described. Often, programs used bundled interventions, making it difficult to discuss the efficiency and effectiveness of specific interventions. Thus, further HF transition care research is needed to ensure best practices related to economically and clinically effective and feasible transition interventions that can be broadly applicable. This statement provides an overview of the complexity of HF management and includes patient, hospital, and healthcare provider barriers to understanding end points that best reflect clinical benefits and to achieving optimal clinical outcomes. The statement describes transitional care interventions and outcomes and discusses implications and recommendations for research and clinical practice to enhance patient-centered outcomes. (Circ Heart Fail. 2015;8:000-000. DOI: 10.1161/HHF.0000000000000006.)

Key Words: AHA Scientific Statements ■ comprehensive health care ■ continuum of care ■ delivery of health care ■ heart failure ■ hospitalization ■ patient care team ■ transitional care

Transition care interventions and programs involve ≥2 activities designed to facilitate safe, smooth, and efficient quality shifts or transitions from one setting to the next setting of care. Most transitional care literature has focused on transitions from hospital to home. The objectives of this statement are to describe specific transition interventions used in programs aimed at adult patients with acute and chronic heart failure (HF), to discuss the impact of transition programs on health outcomes, and to discuss and provide specific recommendations for research and clinical practice. Before


Permissions: Multiple copies, modification, alteration, enhancement, and/or distribution of this document are not permitted without the express permission of the American Heart Association. Instructions for obtaining permission are located at http://www.heart.org/HEARTORG/General/Copyright-Permission-Guidelines_UCM_304004_Article.jsp. A link to the “Copyright Permissions Request Form” appears on the right side of the page.

© 2015 American Heart Association, Inc.

Circ Heart Fail is available at http://circheartfailure.ahajournals.org DOI: 10.1161/HHF.0000000000000006
transition programs are discussed, this introduction describes the scope of the problem.

Symptomatic HF is a complex clinical syndrome defined by characteristic symptoms of dyspnea and fatigue. Signs of circulatory congestion typically result from impairment of cardiac structure or function involving ventricular filling or ejection of blood and are associated with progressive activation of neurohormonal systems. Symptomatic HF is troublesome to patients, families, and healthcare providers because of the heavy symptom burden and frequent hospitalizations.

Heart Failure Hospitalization: Scope of the Problem

Significance of HF on Hospitalization

The elderly are a growing segment of the US population and account for a large number of HF hospitalizations. On the basis of the National Center for Health Statistics and data from patients treated in Veteran Affairs, there were no changes in HF hospitalization rates over a 1-decade period. In 2010, hospitalization rates increased significantly in people <65 and >85 years of age and decreased slightly in those 65 to 74 and 75 to 84 years of age. However, compared with 2000, there were no differences in rates of hospitalization by sex. In a report of Medicare beneficiaries, age-adjusted HF hospitalization rates declined for all age and sex categories; however, black men had the lowest rate of decline. When claims data for fee-for-service Medicare beneficiaries hospitalized with HF from 2006 to 2008 were used, the 30-day all-cause risk-standardized rehospitalization rate was 24.7%. Because hospitalization rates in the United States have not decreased consistently over time, it is important to assess and monitor rehospitalization rates locally and nationally and to determine patient populations at highest risk.

Postdischarge healthcare services are increasing, but they are not slowing the rate of rehospitalization. For those ≥65 years of age, discharge to long-term care increased significantly from 17% in 2000 to 21% in 2010. In 2005, with the use of Chronic Condition Warehouse data from the Centers for Medicare and Medicaid Services, the 30-day rehospitalization rate for patients discharged to home health services was 26%. Of patients rehospitalized from home-care services, 42% had cardiac-related diagnoses, and the authors judged many rehospitalizations to be potentially avoidable. Among Medicare beneficiaries, the use of hospice services in the last 6 months of life increased significantly from 2000 and 2008. By race, white patients had a higher hospice enrollment than nonwhite patients (31.4% versus 24.3%, respectively), and nonwhite patients were more likely to receive emergency care or hospital care, to be treated in an intensive care unit, and to disenroll from hospice. Providing more services may not be the answer to decreasing rehospitalization rates in HF. The type of service, service delivery depth and breadth, ongoing communication during the service delivery period, and quality monitoring for delivery of best practices may be more important than simply increasing available service options. Finally, among newly admitted elderly patients with HF who were followed up for 10 years, rehospitalization was more likely in the first and last deciles of the cohort survival duration, reflecting a need for added attention to patients’ healthcare needs during the transition from hospital to postdischarge care and near the end of life.

Health Care–Related Factors Contributing to HF Rehospitalization

Healthcare provider and hospital variations in services may affect optimization of the HF plan of care and increase the risk of rehospitalization. Among 59652 adults with HF who were studied over a 10-year period, 19% died or had an unplanned readmission within 30 days of discharge. In addition to age and number of hospitalizations within 6 months of the index hospitalization, 2 hospital-based variables were most important in predicting 30-day unplanned rehospitalizations: longer length of hospital stay during the index hospitalization and number of emergency care visits within 6 months of the index hospitalization. After patient characteristics were controlled for in multivariate regression analysis, 3 hospital-based factors remained important predictors of 30-day readmissions: evaluation of left ventricular function, smoking cessation counseling, and discharge summary to the patient’s primary care provider.

Given the Affordable Care Act penalties that hospitals with high 30-day readmission rates may incur, it is imperative to assessmodifiable factors that could reduce patients’ risk for unplanned HF hospitalization.

Patient Characteristics and Unmet Needs

Physiological, functional, social, cultural, and psychological patient characteristics and unmet needs may also affect HF rehospitalization. In 1 report, higher patient socioeconomic status (household income, bachelor’s degree or higher) was an important factor in 30-day outcomes among 59652 adults, and a bachelor’s degree or higher remained an important predictor of 30-day readmission in multivariate analysis. In a study of physical, psychological, social, and existential unmet needs of 132 patients enrolled in cardiac rehabilitation, most centered on psychological and social themes and included difficulty in being motivated to leave home; anxiety when short of breath; general anger and frustration; lack of control of life; depression; feeling unwell; fears of myocardial infarction or stroke; forgetting to take medications; family and friends not understanding the current situation; and coping with work around the home. Prevalent themes in a mixed-methods study aimed at understanding nonadherence in HF included clinical constraints related to low blood pressure or heart rate and renal dysfunction; uncertainty about treatments and symptom improvement; omissions and errors with drugs and drug dosing; patient factors related to comorbidities, polypharmacy, and adherence when multiple changes (increase and decrease) in drug doses were made by...
healthcare providers; and lack of collaboration from inpatient to outpatient care, especially related to medications.13 Similar themes related to physical, psychological, economic, social, and behavioral (self-care) quality of life (QoL) were brought forward when patients with symptomatic HF were interviewed to understand perceived QoL.14

Features and Outcomes of Postdischarge Programs After Hospitalization

In a Cochrane systematic review of randomized, controlled trials (RCTs) of disease management programs after hospital discharge, programs had 8 common components: telephone follow-up, education, self-management, weight monitoring, sodium restriction or dietary advice, exercise recommendations, medication review, and social and psychological support.15 Models of postdischarge care were separated into clinic care (physician office with nurses primarily managing HF medications), multidisciplinary care (multiple services by multiple care providers), and case management models (transition care programs aimed at early, intense postdischarge monitoring). Compared with usual care, clinic care models failed to reduce rehospitalization and mortality, but case management improved late mortality (≥6 months after hospital discharge), and case management and multidisciplinary care programs improved early (within 6 months) and late HF rehospitalization and all-cause rehospitalization.15 Programs that offered high- or moderate-intensity services decreased mortality, and both high- and low-intensity programs decreased HF rehospitalization.15 More important, programs that used specialty registered nurses rather than community nurses, pharmacists, or multidisciplinary care providers had improved mortality and rehospitalization outcomes.15

Thus, many factors are associated with worsening chronic HF status and unplanned hospitalization that could benefit from integrated, interdisciplinary, patient-centered transition of care programs along the continuum of care. Although historically designed to minimize early unplanned HF rehospitalization, transition of care programs may be beneficial for both short- and long-term environmental changes, for example, to and from hospital, post–acute care facility (long-term or skilled nursing facilities), emergency-care, assisted-living, and home-care settings. There are many successful models of comprehensive care for older adults with HF; and some models incorporate transitions of care as a key feature. Examples of various models are interdisciplinary primary care, care or case management, disease management, preventive home visits, outpatient comprehensive geriatric assessment and geriatric evaluation and management, pharmaceutical care, chronic disease self-management, proactive rehabilitation, caregiver support, hospital at home, nursing home, and comprehensive hospital care.16 This statement focuses on the transition component of care models. Some transition of care programs may

Figure. Prominent factors impeding transition of care in chronic heart failure care. GDMC indicates guideline-directed medical care; HCP, healthcare provider; and Pt, patient.
include in-hospital features such as delivery of disease-specific knowledge by a registered nurse, although, for the purposes of this scientific statement, that feature would be considered optimal hospital-based care rather than transition care. A transition model may have extended post–environment-of-care features such as 6-month telemonitoring services or prolonged follow-up phone calls that serve as a maintenance function rather than improving transitions from one site of care to the next site. Although comprehensive care model features might be important to overall patient clinical outcomes, they did not serve the transition point of care and were not a focus of this statement.

Ultimately, the inherent goals of this statement are to raise awareness of challenges of cost-effective transition of care interventions, to improve understanding of current HF transition of care programs in light of a shift from clinician to patient-centered outcomes, to change perceptions of clinical end points that reflect benefits of transition of care programs, and to provide clinical practice and research recommendations that promote enhanced patient outcomes. The Figure provides an overview of current concerns in HF care that could be mediated by transition of care programs.

Using a comprehensive literature search, we identified articles relevant to the topic. The databases searched included PubMed, Google Scholar, general databases (eg, MEDLINE, CINAHL, EMBASE), Cochrane reviews, British Medical Journal, Agency for Healthcare Research and Quality (www.ahrq.gov), National Guideline Clearinghouse (www.guideline.gov), Cochrane Library (both the Cochrane Database of Systematic Reviews and Database of Abstracts of Reviews of Effectiveness), and Cochrane Registry of Controlled Clinical Trials. Searches were conducted using a variety of different search combinations with key words that included transition of care programs and was not always defined. A few models used for varying time periods after hospital discharge. Details of interventions were not consistently described; however, some programs offer tools and components that are available on the Internet. In addition to the role of the person directing the intervention (usually a nurse), 8 characteristics included patient education (teaching methods, specifically teach-back to ensure understanding of content and educational materials), telephone follow-up, early follow-up after discharge, early assessment after hospital admission, medication reconciliation, inclusion of caregivers, home visits, and handoff to post-hospital providers. A brief description of each characteristic is provided below. Table 1 provides an overview of key caregivers and interventions of transition of care programs, and online-only Data Supplement Table 1 provides a summary of intervention elements from each program.

Role of the Person Directing Interventions
Nurses were the most frequently described providers, with roles as care coordinator, role model, or coach for self-care behaviors. The educational preparation of nurses varied across programs and was not always defined. A few models used advanced practice nurses (APNs) to assist and encourage

### Table 1. Caregivers and Interventions of Transition of Care Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Healthcare Providers</th>
<th>Early Admission Assessment</th>
<th>Medication Reconciliation</th>
<th>Patient Education (Including Teach-Back)</th>
<th>Caregivers</th>
<th>Telephone Follow-Up</th>
<th>Home Visits</th>
<th>Handoff</th>
<th>Early Follow-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge model</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Care Transitions18</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Care Transitions19</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>EDPP20</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>PCCHF21</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>PCCHF22</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>PDCT23</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Project BOOST24</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Project Red25</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>STAAR26</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Transitional Care model27–29</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
</tbody>
</table>

BOOST indicates Better Outcomes for Older Adults Through Safe Transitions; EDPP, Enhanced Discharge Planning Program; PCCHF, Patients in Care for Congestive Heart Failure; PDCT, Postdischarge Care Transition; and STAAR, State Action on Avoidable Readmission.
patients in making appropriate self-care decisions, to educate or guide positive lifestyle behaviors, and to provide direct communication between patients or caregivers and primary care providers. In 1 program, the educational preparation of nurse case managers who coordinated and planned the transition to home was not specified. Some programs used hospital nurses who handed off to home-care nurses, pharmacists, and social workers. In interventions that focused on unmet psychosocial patient needs, master’s-prepared social workers coordinated post-hospital care and performed discharge planning.

**Patient Education**

Patient education was included in most interventions. Education components included basic principles about HF, diet (eg, the role of dietary sodium and the importance of limiting fluid intake), signs and symptoms of HF, self-care expectations, and medication education and counseling. At hospital discharge, most programs recommended that patient education be tailored and included in a patient-centered personal health record. Some programs had unique educational components, for example, patient self-activation (engagement) and management sessions to enhance patient and caregiver skills and abilities in applying transitional care elements, a patient workbook with 7 modules of HF management, and a patient education map with an individualized learning profile based on learning styles and needs.

Educational resources varied. Printed materials were frequently provided, and in some programs, education materials were posted on a program Web site and downloadable for use by program personnel. In 1 model, patients received an audiotape of teaching sessions. The teach-back method was recommended in some interventions. Asking patients open-ended questions that require a response to healthcare educators enables nonthreatening assessment of understanding of content. In HF, teach-back methods were associated with improved learning outcomes such as knowledge retention and reduced hospital readmission. In geriatrics, teach-back was useful in overcoming potential learning barriers associated with health literacy and age.

**Telephone Follow-Up**

Postdischarge follow-up telephone calls are a long-standing clinical practice used to provide education and support, to manage symptoms, to recognize complications early after hospital discharge, and to answer patients’ questions and address concerns about self-care and recovery, particularly when patients are unlikely to initiate calls. After the first few days at home, telephone follow-up in high-risk patients may reduce rehospitalization by helping patients improve self-care and recognize changes in their clinical condition. Most transition of care programs provided a telephone follow-up intervention at some point after hospital discharge.

Telephone follow-up timing, frequency, and duration varied by program. Some programs required telephone calls to patients within 24 hours of discharge. Very early telephone calls often were referred to as bridging interventions, intended to maintain safe transition. In some programs, follow-up calls were intended to ensure or improve continuity of care transitions after hospitalization, to improve medication adherence, to increase adherence for follow-up appointments with primary care providers, and to reduce rehospitalization. In many programs, the first call was to be made within 48 to 72 hours, as per national organization guidelines, or based on performance metric recommendations. A common feature was to make regular follow-up calls for up to 30 days after discharge. In 1 program, APNs were available for telephone calls if patients had problems or questions. A standardized assessment sheet or telephone script was advocated to guide the specific purpose of the follow-up call and to ensure adequate assessment of domains at risk.

Limited information was available on outcomes of follow-up telephone calls, as the focus was on the feasibility of using telephone follow-up, improved satisfaction, and assessment of psychosocial complications. In patients with HF, programs that were the most successful in reducing rehospitalization were those that included home visits alone or in combination with telephone follow-up calls; however, the need for home visits versus telephone follow-up was not clearly distinguished in the research evidence provided. In 1 program that addressed transition of care needs solely via telephone calls, there were no differences between groups in rehospitalization at any time during the 1-year follow-up period.

**Early Follow-Up Visit After Discharge**

In most transition of care programs, follow-up appointments were made before hospital discharge. Furthermore, recommendations were that all appointments should be written down. Personnel responsible for making follow-up appointments varied from discharge advocates to physicians but were not specified in most program literature, and nuances such as out-of-state or international follow-up appointments were not discussed. In a systematic review of primary care provider–delivered interventions to reduce rehospitalization for patients with HF, a scheduled follow-up appointment at the time of hospital discharge and timely provider follow-up were included. The definition of timely follow-up varied from 1 to 4 weeks after discharge; however, current HF guideline-directed recommendations include a follow-up visit 7 to 10 days after hospital discharge. Components of follow-up visits varied or were not well described; Table 2 provides components from research literature.

**Early Assessment After Hospital Admission**

Most interventions included early assessment of patients’ needs in the home setting to begin discharge planning. Assessment of patients’ and families’ knowledge and understanding of HF informed providers about baseline understanding of HF and knowledge deficits that could be corrected before discharge. Assessment also helped in planning home-care services and identifying safety equipment such as hospital beds, walking aids, and wheelchair ramps needed after discharge. In 1 report, a biopsychosocial assessment within 2 days of hospital discharge revealed that 83% of patients had barriers to care. Of barriers, nearly 46% of patients had problems in understanding and complying with the nonpharmaceutical
TABLE 2. Components and Time Frames of Early Discharge Visits

<table>
<thead>
<tr>
<th>Components</th>
<th>Assess</th>
<th>Changes in patients’ health status27</th>
<th>Medications</th>
<th>Discharge instructions</th>
<th>Follow-up with physician(s)</th>
<th>Transportation difficulties</th>
<th>Issues obtaining medications</th>
<th>Problems with home health care and caregiver burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coach</td>
<td>Patients in18,32;</td>
<td>Medication self-management</td>
<td>Timely follow-up visit with physician (including articulating needs to physician)</td>
<td>Recognition of signs or symptoms of changes in health condition (“red flags”)</td>
<td>Using a patient-centered health record (to facilitate information transfer)</td>
<td>Subsequent follow-up focus on18,32;</td>
<td>Ensuring patient is obtaining prescribed medications</td>
<td>Assessing the presence of symptoms</td>
</tr>
<tr>
<td>Confirm</td>
<td>Postdischarge plan and adjustments since discharge20</td>
<td>Problems or issues that emerged since discharge23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliver</td>
<td>Medical management as needed for HF and comorbid conditions27</td>
<td>Coordinated care27</td>
<td>General telephone outreach to patient (components not specified)21,32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discuss</td>
<td>Answers to patient questions28</td>
<td>Issues related to transition to home21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Document</td>
<td>In patient-centered health record (to promote interdisciplinary communication)25</td>
<td>On a discharge checklist focused on critical activities (eg, medication reconciliation, patient education)25</td>
<td>Data coordination efforts and expectations21,32</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promote</td>
<td>Patient self-activation and self-management of care27</td>
<td>Physician follow-up within 7 d of discharge23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Follow-up time frames and personnel (when specified):
- Within 24 h of discharge by telephone conducted by a registered nurse27,29
- Within 24 h for home visits by an APN27
- From 24–72 h in the home setting18,32
- Within 48 h by telephone by care coordinator17 or social worker23
- Within 72 h by telephone by nurse23
- 3 Telephone calls within 24 d18,32
- Over a span of 45 d after discharge27

APN indicates advanced practice nurse; and HF, heart failure.

Medical plan of care such as diet and other medical self-care needs, 35% described caregiver burden issues, and 34.4% had issues with coping with change.20

Medication Reconciliation
Medication reconciliation was recommended at admission in most transitional care programs and immediately before discharge in some and was completed by nurses or pharmacists. Although HF medication adherence was a primary goal of reconciliation education, in a systematic review, authors felt that reconciliation and training would be more effective with improved communication between patients and pharmacists and other healthcare providers.48

Caregivers
Most program interventions stressed the importance of identifying important laypeople (caregivers and family members) who were expected to have caregiver roles in the post-hospital period. Early identification increased the likelihood of being included in pre-discharge educational sessions. In an integrated review of social support in patients with HF, adequate social support was positively associated with patient adherence to self-care maintenance skills and capability of managing symptoms of worsening condition through self-care management behaviors.49 In patients with HF who had partners, only 49% of partners provided a high level of support.50 Early assessment of caregiver availability and inclusion in education may increase caregiver support of the self-care plan. Although caregiver roles were valued in some multicomponent transition of care programs that focused on high-risk patients,71 demands placed on caregivers to monitor complex self-care and medical regimens and to deal with emotional distress, disturbed sleep, and patient rehospitalization60,84 can be daunting. Caregiver roles and outcomes during transitions of care are not well described and require more clarification. Many reports were pilot studies that had a small sample size, a narrow scope, and low strength and quality of evidence.

Home Visits
Home visits were a feature of some transition of care interventions. In most reports, the authors did not specify whether nurses were home care or transition of care trained, and the breadth and depth of HF specialty training were not described. Home visits were often recommended very soon after hospital discharge, but the number of home visits varied between and within programs, from 1 or 2 visits, to home visits up to 6 months after discharge.27,45,52 During home visits, nurses generally reinforced education information and helped patients make self-care decisions. Nurses generally did not intervene when problems arose; rather, they helped patients solve problems and either recommended when to contact healthcare providers or contacted healthcare providers directly.

Handoff to Post-Hospital Providers
Handoff communication to outpatient healthcare providers occurred in about one half of the programs and included information about hospital events, diagnostic results, procedures performed, medications ordered, and therapies implemented. To facilitate interdisciplinary care in several programs, a patient record of the hospitalization was recommended as the official handoff tool. In some programs, the hospitalization record summary listed the patient’s diagnosis, the discharge plan of care, and signs and symptoms to report to healthcare providers, and it included a place for patients to note their questions and concerns. Only 1 program provided details of handoff communication: a detailed transfer letter to home-care registered nurses that could be replicated in other programs.21,33 In a program involving
Table 3. Effectiveness of Transitions Programs on Rehospitalization

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Study Sample Characteristics</th>
<th>Length of Int After Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al,53 2005</td>
<td>6 mo rehosp in TC program vs UC</td>
<td>Q-exp</td>
<td>121 (IG, 44; UC, 77)</td>
<td>Age ≥50 y or unstable angina Confusion ≥5 Major comorbidities ESRD on dialysis Impending cardiac surgery Ongoing NYHA FC IV</td>
<td>6 wk</td>
<td>Compared with UC, IG had fewer rehosp (44.2% vs 11.4%; P=0.01)</td>
<td>Very small sample Stable patients selected for inclusion</td>
</tr>
<tr>
<td>Altfeld et al,20 2013</td>
<td>30-d rehosp in EDPP int vs UC</td>
<td>RCT</td>
<td>740 (IG, 360; UC, 380)</td>
<td>Age ≥65 y Medical and surgical hosp 1 hosp Disch home with ≥7 medications Had 1 of several risk factors for post-disch complications Unable to communicate effectively</td>
<td>Mean, 5.8±11.3 d</td>
<td>No differences in rehosp (OR, 1.11; 95% CI, 0.76–1.62)</td>
<td>Unclear which outcome was primary (studied rehosp and mortality) Mortality listed as primary but powered for rehosp</td>
</tr>
<tr>
<td>Coleman et al,32 2004</td>
<td>Rehosp rates at 30, 90, and 180 d CT vs UC</td>
<td>Q-exp; int group vs admin DB control subjects</td>
<td>1393 (IG, 158; UC, 1235)</td>
<td>Age ≥65 y Hosp with 1 of 9 chronic conditions including HF High likelihood for post-disch SNF or HHC Living in long-term care facility Elective hosp</td>
<td>24 d</td>
<td>Decrease in 30-d rehosp in IG vs UC; adjusted OR, 0.52 (95% CI, 0.25–0.96) Decrease in 90-d rehosp in IG vs UC; adjusted OR, 0.43 (95% CI, 0.25–0.72) Decrease in 180-d rehosp: adjusted OR, 0.57 (95% CI, 0.36–0.92) Time to rehosp longer in IG vs UC</td>
<td>Admin DB control subjects IG had small sample size</td>
</tr>
<tr>
<td>Coleman et al,18 2006</td>
<td>Rehosp rate at 30, 90, and 180 d for the same condition as index hosp CT vs UC</td>
<td>RCT</td>
<td>750 (IG, 375; UC, 375)</td>
<td>Age ≥65 y Had 1 of 11 conditions including HF Hosp at contract hosp for the participating system Community dwelling Residing in a predefined geographic radius Tele access</td>
<td>28 d</td>
<td>IG vs UC had decrease in all-cause rehosp at 30 d (8.3% vs 11.9%; adjusted OR, 0.59 95% CI, 0.35–1.0; P=0.048) and 90 d (16.7% vs 22.4%; adjusted OR, 0.64; 95% CI, 0.42–0.99; P=0.04) No difference in 180-d rehosp (adjusted OR, 0.80; 95% CI, 0.54–1.19) IG vs UC had lower rehosp rate for same condition at 90 and 180 d</td>
<td>Early primary benefits not sustained at 180 d</td>
</tr>
</tbody>
</table>

(Continued)
### Table 3. Continued

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Study Sample Characteristics</th>
<th>Length of Int After Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedhia et al, 2009</td>
<td>30-d rehosp in Safe STEPS int vs UC</td>
<td>O-exp Pre-post design</td>
<td>422 (IG, 185; UC, 237)</td>
<td>Age ≥65 y On general medicine hospitalist service 3 hosps; Patients disch to home</td>
<td>SNF Hosp &lt;24 h or in same weekend Previous hosp during study period</td>
<td>Before disch Compared with UC, IG had fewer rehosp (22% vs 14%; OR, 0.55; 95% CI, 0.32–0.94)</td>
<td>Pre-post design</td>
</tr>
<tr>
<td>Harrison et al, 2002</td>
<td>All-cause rehosp at 12 wk after disch; PCCHF int vs UC</td>
<td>RCT</td>
<td>192 (IG, 92; UC, 100)</td>
<td>Hosp with HF at a large teaching hosp Patients disch home Patients living in 60-km radius Cognitive impairment</td>
<td>12 wk IG, 23% vs UC, 31% (P=0.26)</td>
<td>Small sample size; not powered to evaluate rehosp Hosp RNs provided int and UC; question contamination across groups</td>
<td></td>
</tr>
<tr>
<td>Naylor et al, 1994</td>
<td>Rehosp at 2, 6, and 12 wk; TC model vs UC</td>
<td>RCT</td>
<td>276 (Medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66)</td>
<td>Age ≥70 y Medical cardiac (HF and CAD) and surgical cardiac patients</td>
<td>2 wk Medical: 10% of IG patients were rehosp vs 23% of UC (P=0.04) at 6 wk; 22% of IG were rehosp vs 33% of UC (P=0.15) at 12 wk Time to rehosp was 46 d in IG vs 31 d in UC (P=0.12) Surgical: no differences between IG and UC groups Fewer rehosp (49 vs 107; P=0.01)</td>
<td>No primary end point specified Several end points measured at various time intervals Small sample size</td>
<td></td>
</tr>
<tr>
<td>Naylor et al, 1999</td>
<td>Time to first rehosp in 24 TC vs UC wk</td>
<td>RCT</td>
<td>363 (IG, 177; UC, 186)</td>
<td>Age ≥65 y Hosp with specified medical or surgical Dx at 2 hosps Had ≥1 high-risk criteria for poor post-disch outcomes</td>
<td>4 wk Time to first rehosp was shorter in UC vs IG (HR, 1.96; 95% CI, 1.31–2.92; P&lt;0.001) IG less likely to be rehosp in 24 wk (20% vs 37%; P&lt;0.001) Fewer rehosp (49 vs 107; P&lt;0.01)</td>
<td>Small sample size</td>
<td></td>
</tr>
<tr>
<td>Naylor et al, 2004</td>
<td>Rehosp over 1-y FU; TC vs UC</td>
<td>RCT</td>
<td>239 (IG, 118; UC, 121)</td>
<td>Age ≥65 y Hosp with HF Tele Reside within 60 miles 6 hosp sites ESRD</td>
<td>3 mo Trend of less rehosp in IG vs UC (44.9% vs 55.4%; P=0.12) Fewer patients rehosp in IG vs UC (104 vs 162; P=0.047) No differences in reductions in rehosp for HF and other comorbidities</td>
<td>Results were similar in direction over all time intervals, but the int effect declined as time after int increased Small sample size</td>
<td></td>
</tr>
</tbody>
</table>

(Continued)
Medicare patients, patient engagement was enhanced by the availability of data, the coordination of data flow, and a patient-centered health record that fostered interdisciplinary communication.23

### Bundled Interventions

All transitional care programs, from an acute hospitalization for exacerbation of HF to the postdischarge setting, used multiple interventions to reach goals, essentially a bundled approach. This approach involves combining different interventions to achieve a specific outcome, which in this case is the reduction of hospital readmissions and improved outcomes for patients with heart failure. The evidence from various studies shows that bundled interventions can be effective in improving patient outcomes and reducing healthcare costs. Examples of such interventions include the implementation of care transitions programs, patient engagement strategies, and the use of electronic health records to improve communication and coordination among healthcare providers. These programs often involve collaboration between different providers and the use of data to identify high-risk patients and tailor interventions accordingly.
Table 4. Effectiveness of Transitions Programs on Emergency Department Visits and Follow-Up

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Study Sample Characteristics</th>
<th>Study Sample Characteristics</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altfeld et al,2020</td>
<td><strong>EDPP Bridge model</strong></td>
<td><strong>30-d phy FU visits</strong></td>
<td>RCT 740</td>
</tr>
<tr>
<td>Coleman et al,2004</td>
<td><strong>CT Int</strong></td>
<td><strong>30-, 90-, and 180-d ED visits in CT vs UC</strong></td>
<td>Q-exp; int group vs admin DB control subjects 1393 (IG, 158; UC, 1235)</td>
</tr>
<tr>
<td>Dedhia et al,2009</td>
<td><strong>Safe STEPS Int</strong></td>
<td><strong>30-d ED visits in Safe STEPS group vs UC</strong></td>
<td>Q-exp pre-post study 422 (IG, 165; UC, 237)</td>
</tr>
<tr>
<td>Harrison et al,2002</td>
<td><strong>PCCHF</strong></td>
<td><strong>12-wk ED visits in PCCHF vs UC</strong></td>
<td>RCT 192 (IG, 92; UC, 100)</td>
</tr>
<tr>
<td>Jack et al,2009</td>
<td><strong>Project RED</strong></td>
<td><strong>30-d combination of ED visits or rehosp in Project RED vs UC PCP FU between IG and UC</strong></td>
<td>RCT 749 (IG, 373; UC, 376)</td>
</tr>
<tr>
<td>Naylor et al,1994</td>
<td><strong>TC model</strong></td>
<td><strong>Mean number unsch acute care visits to phy or ED in TC vs UC</strong></td>
<td>RCT 276 (Medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66)</td>
</tr>
</tbody>
</table>

(Continued)
intervention approach. A bundled approach made it impossible to assess the value of individual interventions for clinical effectiveness and cost-effectiveness. Although outcomes of individual interventions were not reported, many bundled interventions demonstrated improved outcomes.

**Transition of Care Programs: Impact on Health Outcomes**

Optimal transitions can decrease rates of potentially avoidable rehospitalizations, decrease the risk of adverse clinical events from medication and other discrepancies, and promote patients’ satisfaction with care. Many models of transition care were examined for effectiveness in improving integration of care, continuity across episodes of care, care quality, and cost of care.

Most interventions of prospective RCTs focused on the transition period from hospital to home. Of outcomes reported in the literature, rehospitalization was the most common (Table 3), followed by emergency-care visits and follow-up (Table 4) and cost (Table 5). Other outcomes studied included QoL (Table 6), patient satisfaction, functional status, depression, perceptions of health, self-esteem and affect, knowledge of discharge diagnosis, rate of primary care provider follow-up, preparedness for discharge, self-management skills and abilities, and pain (Table 7). Some transitional care programs did not publish reports of their effectiveness, specifically the Patients in Care for Congestive Heart Failure (PCCHF), Better Outcomes for Older Adults Through Safe Transitions (BOOST), and State Action on Avoidable Rehospitalization (STAAAR) initiatives.

Currently, translation of transition of care interventions into clinical settings is limited. Designs and outcomes of transition of care programs were heterogeneous, and interventions were not well described, preventing replication. Most transitions were from hospital to home; only cognitively intact and English-speaking patients were enrolled; and patients gave consent to participate. Most studies were from a single center or limited to hospitals within 1 network. In some studies, care providers who delivered interventions were also data collectors, creating threats to the internal validity of findings. Some interventions and outcomes were short term, raising questions about program sustainability. As a result of bundling of interventions, the strength of individual intervention components remains unknown. In several programs, interventions were derived from other transition programs; however, the basis of evidence for selecting intervention combinations was not described. Other barriers to translating interventions were a high proportion of observational or quasi-experimental designs and varying end-point selection.43

**Rehospitalization**

In studies assessing rehospitalization, patients tended to be elderly and had high-risk characteristics; thus, results may not apply to patients with uncomplicated fluid overload as the primary reason for acute HF decompensation. Of 13 studies reviewed in Table 3, 7 studies were RCTs with sample sizes of 192 to 750 participants, 18–20,21,23,27,45,55 rehospitalization was a primary end point in 10 reports,18–20,23,32,45,53,54,56,57 and rehospitalization was measured at multiple time points, from 30 days to 1 year after the index discharge. In 6 quasi-experimental designs, postintervention and preintervention rehospitalization rates were compared, or intervention groups were compared with concurrent control subjects, and sample sizes ranged from 126 to 1393 participants.19,22,32,53,54,56,57 Only 5 trials enrolled patients with HF exclusively.21,27,53,56,57 Duration of interventions varied from a few days within discharge to 3 months after discharge. Overall, the effect of interventions on rehospitalization declined over time, except in 1 report in which there was greater benefit in rehospitalization between groups in the later time period.23 In 6 reports of non-RCT or quasi-experimental design, rehospitalization was red

---

**Table 4. Continued**

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Inclusion</th>
<th>Exclusion</th>
<th>Length of Int After Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naylor et al,45 1999</td>
<td>Unscl ED or acute care visits in TC and UC HHC visits at 24 wk</td>
<td>RCT</td>
<td>363 (IG, 177; UC, 186)</td>
<td>Age ≥65 y Hosp with specified medical or surgical Dx at 2 hosps ≥1 High-risk criteria for poor post-disch outcomes</td>
<td>4 wk</td>
<td>No differences in IG and UC in unscl visits to phy, ED visits, HHC visits</td>
<td>Small sample size</td>
<td></td>
</tr>
</tbody>
</table>

Admin DB indicates administrative database; CAD, coronary artery disease; CI, confidence interval; CT, care transitions; disch, discharge; Dx, diagnosis; ED, emergency department; EDPP, Enhanced Discharge Planning Program; ESRD, end-stage renal disease; FU, follow-up; HHC, home health care; HF, heart failure; hosp, hospital or hospitalization; IG, intervention group; int, intervention; IRR, incidence rate ratio; LTC, long-term care; OR, odds ratio; PCCHF, Partners in Care for Congestive HF; PCP, primary care provider; phy, physician; Q-exp, quazi-experimental; RCT, randomized, controlled trial; RED, reengineering discharge; rehosp, rehospitalization; RN, registered nurse; SNF, skilled nursing facility; STEPS, Successful Transition of Elderly Patients Study; TC, transition or transitional care; UC, usual care group; and unscl, unscheduled.
### Table 5. Effectiveness of Transitions Programs on Cost

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Study Sample Characteristics</th>
<th>Length of Int after Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al, 2005</td>
<td>Hosp costs</td>
<td>Q-exp</td>
<td>121 (IG, 44; UC, 77)</td>
<td>Age ≥50 y, HF hosp, and LVEF &lt;40%</td>
<td>MI in last 12 wk or unstable angina</td>
<td>Hosp cost for IG was $158 per patient</td>
<td>Small sample size, Cost savings calculated only for HHC costs; rehosp not included (would likely have resulted in higher IG savings)</td>
</tr>
<tr>
<td>Coleman et al, 2004</td>
<td>Cost savings in IG</td>
<td>Q-exp design Int group vs admin DB control subjects</td>
<td>1393 (IG, 158; UC, 1235)</td>
<td>Age ≥65 y, Hosp with 1 of 9 chronic conditions including HF</td>
<td>Patients in LTC Elective hosp</td>
<td>Over 8 mo, estimated cost saving was $47133 (n=158)</td>
<td>Did not compare groups; involved only IG</td>
</tr>
<tr>
<td>Coleman et al, 2006</td>
<td>30-, 90-, and 180-d nonelective hosp cost in IG vs UC</td>
<td>RCT</td>
<td>750 (IG, 375; UC, 375)</td>
<td>Age ≥65 y, Had 1 of 11 conditions including HF</td>
<td>Hosp for psychiatric condition Dementia Post-disch plan for hospice</td>
<td>IG vs UC had lower mean nonelective costs at 30, 90, and 180 d: $2058±5452 vs $2546±5466 (P=0.049) 180-d cost savings with int costs: $147792 among 375 IG patients Estimated 1-y savings: $354,594</td>
<td></td>
</tr>
<tr>
<td>Jack et al, 2009</td>
<td>Post-disch hosp costs of IG vs UC</td>
<td>RCT</td>
<td>738 (IG, 370; UC, 368)</td>
<td>Hosp medical and surgical patients Admitted from SNF Transferred to another service Planned hosp Blind, deaf, or suicide precautions</td>
<td>Up to 4 d after disch</td>
<td>IG vs UC had 33.9% lower observed cost or savings of $412 per patient</td>
<td>Did not include NDA and pharmacist costs</td>
</tr>
<tr>
<td>Leff et al, 2009</td>
<td>Health services costs of IG vs UC</td>
<td>Cluster RCT</td>
<td>904 (IG, 485; UC, 419) Completed/analyzed: IG, 446; UC, 404</td>
<td>Age ≥65 y, High risk of using health services (using claims-based models) Patients enrolled from 14 PCP teams in 8 comm-based OPD clinics</td>
<td>8 mo (costs were not reported for the entire study duration)</td>
<td>IG had 24% fewer hosp days (95% CI, 0.51–1.13) IG had 37% fewer SNF days (95% CI, 0.35–1.05) IG had 15% fewer ED visits (95% CI, 0.62–1.18) IG had 29% fewer HHC visits (95% CI, 0.47–1.08) IG had 9% more specialist visits (95% CI, 0.92–1.29) IG had annual net savings of $75 000 (95% CI, −$244 000 to $150 900) per RN or $1364 per patient</td>
<td>Wide CIs for reported benefits; no statistical significance</td>
</tr>
</tbody>
</table>
### Table 5. Continued

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Study Sample Characteristics</th>
<th>Length of Int after Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naylor et al, 1994 TC model</td>
<td>6- and 12-wk total cost of TC int vs UC</td>
<td>RCT</td>
<td>276 (medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66)</td>
<td>Age ≥70 yr Medical cardiac (HF and CAD) and surgical cardiac patients</td>
<td>2 wk</td>
<td>Medical groups: At 6 wk, total charges in IG for healthcare services after discharge were $295,598 less than charges in UC (P=0.02) Medical groups: At 6 wk, mean charges for IG vs UC were $2453 vs $6746 (P=0.01) Medical groups at 12 wk: no differences in cost Surgical groups: no differences in costs between groups</td>
<td>Small sample size</td>
</tr>
<tr>
<td>Naylor et al, 1999 TC model</td>
<td>24-wk total cost of TC int vs UC</td>
<td>RCT</td>
<td>363 (IG, 177; UC, 186)</td>
<td>Age ≥65 yr Hosp with specified medical or surgical Dx at 2 hosps, Had ≥1 high-risk criteria for poor post-disch outcomes</td>
<td>4 wk</td>
<td>IG vs UC Medicare cost at 24 wk: $842,595 vs $1,239,928 and $3630 vs $6661 per patient (P=0.001) IG cost savings (based on UC higher hosp reimbursements) seen for all rehosps at 24 wk No differences between groups in reimbursements for other post-disch acute care visits</td>
<td></td>
</tr>
<tr>
<td>Naylor et al, 2004 TC model</td>
<td>52-wk total cost of TC int vs UC</td>
<td>RCT</td>
<td>239 (IG, 118; UC, 121)</td>
<td>Age ≥65 yr Hosp with HF Tele Reside within 60 miles 6 hosp sites</td>
<td>3 mo</td>
<td>IG had lower mean cost than UC: $7636 vs $12,481 (P=0.002) IG had greater overall significant cost savings per patient: $6152 vs $9618</td>
<td>Small sample size</td>
</tr>
<tr>
<td>Saleh et al, 2012 PDCT Int</td>
<td>HHC visit cost/benefit ratio</td>
<td>RCT</td>
<td>333 (IG, 175 [160 analyzed]; UC, 199 [173 analyzed])</td>
<td>Age ≥65 yr Treated in hosp Dementia ESRD LTC Assisted living Dx of tumors Severe psychiatric Hx</td>
<td>45 d</td>
<td>IG had total mean savings of $1034 per patient (IG program costs, $946 per patient) Cost/benefit ratio, 1.09 (for every $1 spent on PDCT int, savings of $1.09 were realized)</td>
<td>Randomized by medical record number: even number, UC; odd number, IG</td>
</tr>
</tbody>
</table>
Table 5. Continued

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Study Sample Characteristics</th>
<th>Length of Int after Disch</th>
<th>Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stauffer et al, 2011 TC Program</td>
<td>60-d total costs for HF patients in a “real-world” hosp setting</td>
<td>Prospective pre-post design</td>
<td>Concurrent control subjects from other facilities in the health system</td>
<td>Age ≥65 y Consecutive patients hosp with HF Single-hosp system</td>
<td>3 mo</td>
<td>No difference in mean direct cost comparing pre-int and post-int groups: $5729 vs $5176</td>
<td>Not RCT (int lasted 3 mo but cost reported only at 60 d after discharge) Costs of int not recovered through decrease in index hosp costs (int did not save hosp money)</td>
</tr>
</tbody>
</table>

Admin DB indicates administrative database; CAD, coronary artery disease; Cl, confidence interval; comm, community; CT, care transitions; disch, discharge; Dx, diagnosis; ESRD, end-stage renal disease; FC, functional class; HF, heart failure; HHC, home health care; hosp, hospital or hospitalization; IG, intervention group; int, intervention; LTC, long-term care; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NDA, nurse discharge advocate; NYHA, New York Heart Association; OPD, outpatient; PCP, primary care provider; PDCT, Post Discharge Care Transition; Q-exp, quazi-experimental; RCT, randomized, controlled trial; RED, reengineering discharge; rehosp, rehospitalization; RN, registered nurse; SNF, skilled nursing facility; TC, transition or transitional care; tele, telephone; UC, usual care group; and unsch, unscheduled.

Early death. Rehospitalization for HF decompensation may be a surrogate of HF severity rather than a reflection of the quality of care provided, and some patients will die regardless of interventions offered because of nonmodifiable end-stage HF with or without comorbid diseases. Clinicians commonly consider survival the most important end point but often test interventions on the ability to reduce cause-specific mortality or the composite end points of cause-specific mortality and rehospitalization. For example, many pivotal HF drug or device trials have tested the benefit of the intervention on the primary end point of cardiovascular death and HF rehospitalization. Although few interventions are expected to substantially reduce the risk of all contributing causes of death or all reasons for rehospitalization, the net benefit needs to be considered. Interventions may improve the risk of HF rehospitalization but may have serious adverse effects that increase the risk of another safety outcome. In transition of care research, several researchers noted that the emphasis on reduction of 30-day rehospitalization rates may have adverse consequences such as worsening 30-day mortality risk. Therefore, it is important to quantify the efficacy and safety of interventions by assessing a spectrum of clinical outcomes from rehospitalization to death.

Other Outcomes

Of the 7 studies on emergency department (ED) visits and follow-up clinic visits reviewed in Table 4, outcomes included postdischarge ED visits,21,32,57 the combined outcomes of ED or acute care visits to physicians,45,55 and ED visits or rehospitalization,42 and adherence to primary physician follow-up visits.29 Results were mixed, and only 1 trial enrolled patients with HF exclusively.21 Sample sizes varied widely, and the duration of interventions varied from before discharge to 12 weeks after discharge.

Of 10 studies that estimated the impact of transition of care programs on cost (Table 5), 7 were RCT designs, and sample sizes ranged from 239 to 904.18,23,27,42,45,55,58 In 6 RCTs, cost savings were better in intervention groups than in control groups.18,23,25,27,45,53 Methods used to calculate cost savings varied, and in 2 reports with cost savings, researchers did not demonstrate intervention benefits on rehospitalization.18,23

The effects of transition of care interventions were assessed on many other outcomes. In 3 RCTs, the outcome was QoL (Table 6).21,27,9 When HF-specific QoL was assessed, intervention groups had better outcomes than control groups21,27; however, in generic QoL, not all dimensions were improved. transitioning care interventions improved patient satisfaction,27 self-management, patient health, and medication knowledge. In the Guided Care model, primary care physician satisfaction was higher at the 6-month follow-up among intervention group healthcare providers,59 and at 18 months, intervention patients rated their care higher, used home health care less frequently, and had fewer nursing facility admissions.55 When caregiver depression, strain, work productivity, and regular activity productivity were studied at 18 months63 and patient self-rated health, mortality, and several other healthcare use measures were studied at 32 months,31 no between-group differences were found. Results of miscellaneous outcomes must be interpreted with caution because blinding of groups was not feasible. Online-only Data Supplement Table 2 provides an overview of transition care programs, characteristics, and interventions discussed in this statement.

Of outcomes, survival and rehospitalization rates are easily counted, but health status and QoL are more difficult to quantify. Healthcare providers routinely make decisions about individual patient’s health status, but aggregating the routine evaluation of multiple patients’ health status in a meaningful way with validity, reproducibility, and sensitivity to interventions is challenging.66 The challenge increases given the multiple settings and providers with whom patients interact in transition of care programs.
Symptoms, functional limitation, and QoL are all components of a patient’s health status and may be measured in a variety of ways; for example, dyspnea can be measured via a visual analog scale or a 6-minute walk test. Health status instruments aggregate a range of health to include QoL. Common HF-related health status instruments include the Kansas City Cardiomyopathy Questionnaire and the Minnesota Living With Heart Failure Questionnaire. Although HF-related instruments were valid, reliable, responsive, and interpretable in characterizing the patient’s health status in chronic HF, there may be some utility for measurement in transition of care settings. For example, in a large clinical trial of hospitalized patients, the Kansas City Cardiomyopathy Questionnaire administered 1 week after discharge offered important prognostic information beyond physical examination and standard laboratories, suggesting that health status may be a key component for outpatient evaluation after hospitalization.

Table 6. Effectiveness of Transitions Programs on Quality of Life

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Inclusion</th>
<th>Exclusion</th>
<th>Length of Int After Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boyd et al.26 2009</td>
<td>Patient admin survey: patient assessment of chronic illness care</td>
<td>Cluster RCT 904 (IG, 465; UC, 419) Completed/analyzed: IG, 446; UC n, 404</td>
<td>Age ≥65 y High risk of using health services (using claims-based models) Patients enrolled from 14 PCP teams in 8 comm-based OPD clinics</td>
<td>No tele Non-English language Planning extended travel Failed cognitive screening No proxy to provide consent</td>
<td>18 mo</td>
<td>At 18 mo, IG group had twice-greater odds of rating their care as higher (P=0.003) than UC</td>
<td>Only 37.8% of eligible patients gave informed consent</td>
<td></td>
</tr>
<tr>
<td>Harrison et al.21 2002</td>
<td>PCCHF Int</td>
<td>6- and 12-wk HR-QoL using MLWHF Quest Generic QoL using MOS-SF (SF-36) in Int vs UC</td>
<td>RCT 192 (IG, 92; UC, 100) Hosp with HF at a large teaching hosp Patients disch home Patients living in 60-km radius</td>
<td>Cognitive impairment</td>
<td>12 wk</td>
<td>6 wk: IG had better HR-QoL (P=0.002) 12 wk: IG had better HR-QoL (P&lt;0.001) Better scores in emotional and physical components at both time points Compared with baseline, IG had greater improvement in HR-QoL scores at 12 wk (IG, 43% vs UC, 14%) No difference in generic QoL at 6 and 12 wk between groups Compared with baseline, IG had a trend for more improvement in generic QoL scores at 6 and 12 wk compared with UC</td>
<td>Greater improvement in HF-QoL compared with generic QoL could suggest that there are limitations to HF-specific int Hosp RNs provided both the IG int and UC; there is a possibility of contamination between groups</td>
<td></td>
</tr>
<tr>
<td>Naylor et al.27 2004</td>
<td>12-wk HR-QoL using MLWHF Quest in TC vs UC</td>
<td>RCT 239 (IG, 118; UC, 121) Age ≥65 y Hosp with HF Tele Reside within 60 miles 6 hosp sites</td>
<td>ESRD</td>
<td>3 mo</td>
<td>Compared with UC, IG had better HF-specific QoL and physical QoL (P&lt;0.05)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Admin indicates administered; comm, community; disch, discharge; ESRD, end-stage renal disease; HF, heart failure; hosp, hospital or hospitalization; HR-QoL, health-related quality of life; IG, intervention group; int, intervention; MLWHF, Minnesota Living With Heart Failure; MOS-SF (SF-36) Medical Outcomes Study Short Form; OPD, outpatient; PCCHF, Partners in Care for Congestive HF; PCP, primary care provider; Quest, questionnaire; RCT, randomized, controlled trial; TC, transition or transitional care; tele, telephone; and UC, usual care group.
### Table 7. Effectiveness of Transitions Programs on Miscellaneous Outcomes

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Study Sample Characteristics</th>
<th>Length of Int After Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altfeld et al,2013</td>
<td>Patient and CG stress, Healthcare use, Death</td>
<td>RCT</td>
<td>740 (IG, 360; UC, 380)</td>
<td>Age ≥65 y Medical and surgical hosp 1 Hosp Disch home with ≥7 medications Had 1 of several risk factors for post-disch complications Unable to effectively communicate Disch to SNF or LTC Having another TC int</td>
<td>Mean, 5.8±11.3 d</td>
<td>No differences between IG or UC groups on CG or patient stress, self-rated health, or pain No differences between IG and UC in 30-d death (OR, 1.54; 95% CI, 0.76–3.10)</td>
<td>Unclear if primary outcome was rehosp or death (death listed as primary but study powered for rehosp)</td>
</tr>
<tr>
<td>Boult et al,60 2011 Guided Care model</td>
<td>Healthcare use: HHC, ED, hosp, SNF, health service use, PCP care, and specialty care</td>
<td>Cluster RCT</td>
<td>904 (IG, 485; UC, 419) Completed/analyzed: IG, 446; UC, 404 Screened: 13 534</td>
<td>Age ≥65 y High risk of using health services (using claims-based models) Patients enrolled from 14 PCP teams in 8 comm-based OPD clinics</td>
<td>20 mo</td>
<td>Compared with UC, IG had fewer episodes of HHC (OR, 0.70; 95% CI, 0.53–0.93) Compared with UC, IG had fewer SNF admissions (OR, 0.53; 95% CI, 0.31–0.89) and days (OR, 0.48; 95% CI, 0.28–0.84) No differences in primary care, specialty care, or other healthcare use</td>
<td>Many end points and analyses but only 2 beneficial effects Benefits found mostly in Kaiser Permanente–managed subgroup Highest-risk patients did not have greater int benefits Only 37.8% gave informed consent</td>
</tr>
<tr>
<td>Boult et al,61 2013 Guided Care model</td>
<td>Self-rated health, Generic QoL, Death, Qual of long-term care, HHC Use of health services</td>
<td>Matched-pair cluster RCT</td>
<td>904 (IG, 485; UC, 419) Completed/analyzed: IG, 446; UC, 404 Screened: 13 534</td>
<td>Age ≥65 y High risk of using health services (using claims-based models) Patients enrolled from 14 PCP teams in 8 comm-based OPD clinics</td>
<td>32 mo</td>
<td>No differences in IG and UC self-rated health or MOS SF-36 mental health or physical health subscales</td>
<td>No differences in IG or UC death Compared with UC, IG adjusted aggregate qual of long-term care was higher Compared with UC, IG used HHC at a 29% lower rate (UC/IG ratio=0.71; 95% CI, 0.51–0.97) No group differences in healthcare use</td>
</tr>
</tbody>
</table>
| Coleman et al,2004 CT Int | Patient satis in CT vs UC Q-exp design with int vs admin DB control subjects | Q-exp design | 1393 (IG, 158; UC, 1235) | Age ≥65 y Hosp with 1 of 9 chronic conditions including HF High likelihood for post-disch SNF or HHC | 24 d | IG had high levels of confidence (≥75%) in obtaining essential information for manag health, communicating with the healthcare team, and understanding the medication regimen (87%–94%)

(Continued)
Dedhia et al,54 2009
Safe STEPS int
Disch factors (ie, patient health status), using a TC 15-item survey in Int vs UC
422 (IG, 185; UC, 237)
Age ≥65 y, On general medicine hospitalist service
3 hospitals, Patients disch to home
SNF Hosp <24 h or in same weekend, Previous hosp during study period
Before disch
More IG felt better after hosp than UC (84% vs 71%; OR, 1.41–3.92)
IG had better TC to home compared with UC (OR, 1.41; 95% CI, 6.83–12.84)
More IG compared with UC knew whom to call with issues after disch (99% vs 93%; 95% CI, 2.05–25.00)
More IG reported feeling better as a result of hosp (87% vs 78%; OR, 2.33; 95% CI, 1.34–4.05)
Unblinded design could partly contribute to better subjective patient outcomes in IG

Jack et al,42 2009
Project RED
Disch Dx knowledge, PCP FU visits
Prepare for disch
RCT 738 (IG, 370; UC, 368)
Hosp medical and surgical patients, Transferred to another service
Planned hosp, Blind, deaf, or suicide precautions
Up to 4 d after disch
Int reduced rehosp more often for patients with greater hosp use in the previous 6 mo
IG patients could identify their disch Dx more often than UC patients (242 [79%] vs 217 [76%]; P=0.017)
IG patients could name their PCP more often than UC patients (239 [95%] vs 275 [89%]; P=0.007)
IG patients had higher PCP FU rate than UC patients (190 [62%] vs 135 [44%]; P=0.001)
IG patients were more prepared for disch at 30-d FU
Single-center study
Not all potentially eligible patients were enrolled
Outcome assessment sometimes relied on patient report

Martseller et al,62 2010
Guided Care model
PCP views of processes of care for patient/CG
Cluster RCT
PCP, 49
PCPs of 14 teams and their chronically ill older patients
6 mo
Compared with UC, PCPs of patients in IG had higher ratings of sats of patient/family communication and knowledge of clinical characteristics of patient (P<0.05)
Only 38 PCPs participated at baseline and 1-y FU (biased analysis sample)
Table 7. Continued

<table>
<thead>
<tr>
<th>Authors, Year, Model</th>
<th>Specific Outcomes</th>
<th>Study Type</th>
<th>Study Size, n</th>
<th>Study Sample Characteristics</th>
<th>Length of Int After Disch</th>
<th>Transition of Care Findings Relevant to End Points</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naylor et al, 1994 TC model</td>
<td>Phys status Mental status Health Self-esteem Affect in TC vs UC</td>
<td>RCT</td>
<td>276 (medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66; CG, 125)</td>
<td>Age ≥70 y Medical cardiac (HF and CAD) and surgical patients</td>
<td>2 wk</td>
<td>No differences in IG and UC patient outcomes at FU for phys status, mental status, perception of health, self-esteem, and affect</td>
<td>Small sample size</td>
</tr>
<tr>
<td>Naylor et al, 1999 TC model</td>
<td>Phys status Mental status; depress Satis in TC vs UC</td>
<td>RCT</td>
<td>363 (IG, 177; UC, 186)</td>
<td>Age ≥65 y Hosp with specified medical or surgical Dx at 2 hosps Had ≥1 high-risk criteria for poor post-disch outcomes</td>
<td>4 wk</td>
<td>No differences in IG and UC patient outcomes at FU in mean phys status (P=0.33), depression (P=0.20), and satis (P=0.92)</td>
<td></td>
</tr>
<tr>
<td>Naylor et al, 2004 TC model</td>
<td>1-y time to rehosp or death Satis Phys status in TC vs UC</td>
<td>RCT</td>
<td>239 (IG, 118; UC, 121)</td>
<td>Age ≥65 y Hosp with HF Tele Reside within 60 miles 6 hosp sites</td>
<td>3 mo</td>
<td>IG had lower rehosp or death than UC (47.6% vs 61.2%; P=0.01) IG had longer time to hosp or death vs UC (P=0.023) IG had longer estimated median event-free survival than UC (241 vs 131 d; HR for CG vs IG, 1.58; 95% CI, 1.07–2.34) IG patients were more satis with care than UC patients at 2 and 6 wk (both P&lt;0.001) No differences in IG and UC phys status</td>
<td>Int effect declined as time increased</td>
</tr>
<tr>
<td>Saleh et al, 2012 PDCT int</td>
<td>Self-manag skills/abilities</td>
<td>RCT</td>
<td>333 (IG, 175 [160 analyzed]; UC, 199 [173 analyzed])</td>
<td>Age ≥65 y Treated in hosp Dementia ESRD LTC Assisted living Dx of tumors Severe psychiatric Rx</td>
<td>45 d</td>
<td>IG improved self-manag scores for health and understanding warning signs IG had better self-manag scores than UC for understanding the purpose of medications</td>
<td>Randomized by medical record number: even number, UC; odd number, IG Most self-manag improvements were within group, not between groups</td>
</tr>
</tbody>
</table>
Implications of Transition of Care for Research

A number of outcomes representing the wide-ranging perspectives of patients and society should be considered in transition of care research. Patient-centered interventions and outcomes are emphasized and, through the Patient-Centered Outcomes Research Institute, central. From a societal perspective, resources are finite. It is impossible to satisfy all societal wants. Balancing patient experiences in transition of care programs with the needs or economic resources of society is important. The different perspectives of patients and society should be considered in the design of transition of care research. A framework for considering outcomes for transition of care research is described here with potential issues for each outcome domain.

Patient-Centered Outcomes

Through the Patient-Centered Outcomes Research Institute, standards or methods for patient-centered outcomes research were launched and increased national attention on measuring the outcomes that are important to patients. These outcome themes include function, symptoms, and health-related QoL. In addition, outcomes that influence health decisions in patients with complex conditions or multiple comorbidities are clinically meaningful and patient centered. There is a wide range of outcomes to measure, and each has merit and challenges in the context of transition of care research. Below is a brief discussion of the different domains of patient-centered outcomes.

Health System Outcomes

Early recognition that rehospitalization was a problem was based on the wide variability in rehospitalization rates and the excess costs of rehospitalization. Moreover, lack of care coordination and follow-up led to rehospitalization, and because rehospitalization episodes increased hospital revenue, there were no incentives to limit events. With implementation of the Affordable Care Act, coordinated care was promoted to prevent avoidable complications of patients with chronic illness and to substantially contain growth in healthcare costs. When transition care intervention costs are considered, another dimension is added for evaluating benefit. Successful interventions can be compared with standard of care on the basis of yield of greater, equal, or reduced net costs. Positive intervention outcomes with reduced net costs should be implemented. However, positive intervention outcomes with higher net costs require discussion of scarce resources because transition of care research emphasizes improving patient experiences and reducing societal costs.

Interventions

Research aimed at improving transition of care among patients with HF will fundamentally build on prior intervention studies. To build on prior research, key components of effective transition of care programs should be established, interventions should be tested in multicenter RCT designs to establish generalizability, and key outcomes should be selected across multiple stakeholders, including patients, providers, health-care systems, and payers.

The Right Population

Given the heterogeneity inherent in a diagnosis of HF, defining the population to study is problematic. Considering the potential cost of transition of care interventions, perhaps research should be restricted to patients ≥65 years of age or those at highest risk for rehospitalization such as those with...
multiple prior rehospitalizations, increased frailty, or multiple comorbidities. In previous research, non–English-speaking adults or those with cognitive deficits, arguably a population at even greater need for transition care, were often excluded. Even among studies that represent the real world, only 40% to 50% of patients agreed to participate, likely biasing outcomes. Moving forward, standardization of the HF population enrolled in transition of care trials and inclusion of a wide geographic region and socioeconomic strata will improve consistency in the interpretation of results and enhance generalizability. Minimizing exclusion criteria enables results to be interpreted in a real-world context.

The Right Intervention

Of transition of care interventions previously described, many included multiple components. Understanding components that were most effective may lead to the testing of a single, promising transition of care program in a robust prospective RCT. In interventions, most transition of care programs used a single clinical leader, usually an APN, a nurse, or a social worker. The distinction is potentially important when we consider intervention cost-effectiveness and resource use. In addition to the credentials of the transition of care clinical leader, caseload and hours of availability per leader must be considered. Some programs described 16 to 18 patients per leader. Hours of availability by telephone varied, as did the primary means of patient contact, that is, home visits or telephone calls. Medication reconciliation and management was another key component of many programs, because there are many opportunities for medication errors. Best practices in managing medications during the transition period are unknown. Programs describe nurse-led medication teaching and a robust patient-centered, patient-owned medical record to facilitate medication management across the continuum of postdischarge care environments, as well as pharmacist-led patient-centered discharge instructions. Finally, we must consider the best interventions in terms of patient education, including self-care maintenance and management. Attention should be given to the least costly, most effective interventions.

Hansen and colleagues published a systematic review of discrete and bundled interventions to reduce 30-day rehospitalizations, some of which involved transition of care programs. No single intervention or bundle was reliable in reducing rehospitalization, but patient-centered discharge instructions and follow-up telephone calls were promising interventions needing further investigation. In another systematic review by Naylor and colleagues, comprehensive discharge planning and follow-up home visits were key elements of the success of transition of care programs. A decreased focus on interventions with evidence of short-term (30 day) effectiveness and increased focus on those that demonstrated longer-term (6–12 month) reductions in morbidity and mortality may maximize program value.

The Right Study Design

Transition of care interventions were studied mostly in small observational or quasi-experimental designs with mixed results. Most RCTs were single-centered or involved a few centers in the same geographic region. Exclusion criteria (eg, living >60 miles away from the hospital, not speaking English, and having end-stage renal disease) limited the generalizability of results. Robust study designs will provide evidence of the true impact of a given intervention. In the real world, patients at the highest risk for adverse postdischarge outcomes should be included. When only 30% of patients screened are actually enrolled in a trial because of patient or caregiver refusal, results may be biased toward a population motivated to participate in their own health care. In quasi-experimental designs, even when researchers validated the effectiveness of the transition of care intervention in a real-world setting, study design problems that include unmeasured confounding variables and the likelihood that less motivated patients refused participation create bias in favor of the intervention.

The most robust study design might be a large, pragmatic RCT across many hospital types and geographic regions using site-level randomization to minimize the effects of contamination. Inclusion and exclusion criteria should be as liberal as possible to truly explore the clinical effectiveness of an intervention in real-world settings.

The Right Outcomes

Choosing the correct research outcomes of transition of care programs is critical. Outcomes will vary by stakeholders. Patient-centered outcomes include symptoms, general or HF-related functional status, and QoL. Payers and hospitals may focus on publicly reported metrics with financial penalties such as 30-day rehospitalization and mortality rates and overall program cost-effectiveness or cost savings. As the environment changes to a global payment system using accountable care organizations, 30-day rehospitalization rates will be less important, and overall inpatient days or days alive and out of the hospital will increase in importance.

Recommendations for Research

• Determine the most effective, economically sound transition of care interventions that are broadly applicable to hospitalized patients with HF.
• Implement small observational studies and RCTs as proof of concept and evolve into large-scale multicenter RCTs.
• Minimize site contamination by using site-level randomization.
• Use pragmatic study designs, minimizing exclusion criteria to best approximate real-world settings.
• Include cost-effective or cost-saving analyses in assessments of interventions.
• Choose outcomes carefully after discussion among multiple key stakeholders, including patients.

Implications of Transition of Care for Clinical Practice

Operationalization of transition of care programs in HF requires optimizing communication among stakeholders, identifying patients at high risk, assessing health-related QoL, and ensuring accurate and adequate nurse or other clinical leader knowledge. Nine recommendations for clinical practice based on current evidence of transition of care programs are provided in Table 8.
Hospital Environment of Care

Patient experiences during transitions of care can be stressful, particularly when post-hospitalization care is poorly executed as a result of inadequate coordination of resources or follow-up. Healthcare leaders must facilitate and ensure follow-through of transition interventions, continuity of services, and continuous quality improvement monitoring to ensure high-quality intervention implementation and minimization of gaps and disparities. Fragmentation of patient care was characterized by ineffective communication among providers and across healthcare agencies, insufficient patient and caregiver education, poor continuity of care, including medication reconciliation, and limited access to services, which contributed to negative quality and cost outcomes. Therefore, transition of care planning must be mindfully operationalized.

Although many transition of care interventions used nurses, including APNs, as clinical leaders, in an integrative review of transition of care programs for patients with HF (n=20), 75% of programs used a collaborative, multidisciplinary team that included nurses, dieticians, physical therapists, pharmacists, physicians, and social workers to carry out interventions. In the hospital, nurses were often communicators, coordinators, case managers, and liaisons for patient transitions, and APNs trained in coaching supported patients and families before and for 30 days after discharge. Ultimately, care provider credentials may not be as important as formal training in managing HF and the ability to coordinate care among and between multiple care providers and family members and within the structures and systems of the discharging hospital and the next point in care, some of which may be fragmented.

### Table 8. Transition of Care Recommendations for Clinical Practice

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Considerations for Implementation of Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematically implement principles of transition of care programs in high-risk patients with chronic HF.</td>
<td>Include&lt;br&gt;Medication reconciliation&lt;br&gt;V ery early postdischarge contact and communication with patient and/or care provider&lt;br&gt;E arly office follow-up within first week of discharge&lt;br&gt;P atient education on chronic HF self-care, including skills for recognizing early warning signs of worsening HF and independently completing HF self-care behaviors&lt;br&gt;C ommunication of patient health record with patient and postdischarge healthcare providers&lt;br&gt;I ntegrated, interdisciplinary collaboration and coordination&lt;br&gt;A framework that ensures that education is initiated in the hospital before the day of discharge and continues during initial community-based care</td>
</tr>
<tr>
<td>Routinely assess patients for high-risk characteristics that may be associated with poor post-discharge clinical outcomes.</td>
<td>Exemplars include cognitive difficulties, impaired learning capabilities, non-English speaking, and long travel time to healthcare providers</td>
</tr>
<tr>
<td>Ensure that qualified and trained HF nurse or other healthcare providers of clinical HF provide care services.</td>
<td>A ssess healthcare provider knowledge and comfort in delivering patient education and interdisciplinary care coordination services</td>
</tr>
<tr>
<td>Allot adequate time in the hospital and postacute setting to deliver complex chronic HF interventions and to assess patient and caregiver responsiveness.</td>
<td>I ncorporate time to complete high-level interventions into care plans, including patients’ ability to understand HF self-management interventions and to complete skills and expectations independently</td>
</tr>
<tr>
<td>Implement handoff procedures at hospital or post-acute care discharge.</td>
<td>P rovide patient health records with key details of the hospital/postacute experience (medications used, discharge medications, procedures, treatments, postdischarge care expectations, planned rehospitalization and/or follow-up services, known psychosocial issues, and medication reconciliation)</td>
</tr>
<tr>
<td>Develop, monitor, and ensure transparency of results of quality measures using a structure, process, and outcome framework.</td>
<td>E nsure that handoff documents are transmitted to postdischarge care providers in a timely manner</td>
</tr>
<tr>
<td>Consider patients’ perceptions of QoL as a surrogate for physical, psychological, and social concerns that require support during the transition of care process.</td>
<td>I nclude&lt;br&gt;H andoff performance&lt;br&gt;P atient adherence to 7-d healthcare provider follow-up office visit&lt;br&gt;H ealthcare providers capability of completing early postdischarge (48–72 h) contact with patient and/or primary lay caregiver in areas in which transitions of care occur (ED and short-stay units, long-term care, home) &lt;br&gt;L eadership and administrative support for sustaining quality of transition of care program</td>
</tr>
<tr>
<td>Ensure availability of transition of care component details in writing (eg, a training manual)</td>
<td>P rovide bridging for specific patient support needs</td>
</tr>
<tr>
<td>Use health informatics technology to assist with program sustainability. Informatics should be patient and healthcare provider centric.</td>
<td>P romote fidelity of the program and consistent application by healthcare providers &lt;br&gt;E nsure leadership and administrative support, including clinical leaders (navigators, advocates, etc) &lt;br&gt;E valuate data for applicability and completeness in facilitating patient communication and care coordination, quality metrics, research, and financial analyses</td>
</tr>
</tbody>
</table>

ED indicates emergency department; HF, heart failure; and QoL, quality of life.
and require innovative strategies. Designation of a pivotal clinical leader is crucial for program success.

High-Risk Patient Identification With Risk Models

Patients hospitalized for HF were vulnerable, had complex care management needs, and were at high risk for rehospitalization and mortality, especially if they had 1 or more of the following: renal insufficiency; low-cardiac-output states; diabetes mellitus; chronic obstructive pulmonary disease; New York Heart Association functional class III or IV; persistent symptoms; frequent hospitalization for any cause; multiple active comorbidities; a history of depression; impaired cognition; inadequate social support; poor health literacy; or persistent nonadherence to therapeutic regimens. Although risk models are available to predict HF mortality after hospitalization, models used to predict HF rehospitalization are not validated. Care providers must apply expert opinion and best evidence on transition of care systems and processes to promote successful and seamless transitions based on environmental resources and patient needs. Inadequacies in key transition of care components were associated with barriers to implementing effective hospital-to-home transition of care.

Comprehensive transition of care planning includes a determination of needs and resources in high-risk patients such as home health, palliative, or hospice care. Although the 3 assessment tools discussed below were not designed to predict rehospitalization and were not fully validated for their impact, safety, and generalizability, they may be used as an adjunct in decision making. First, the acute HF index can be used to identify low risk of early life-threatening events after presentation to the ED. The acute HF index is calculated from 21 prognostic indicators (eg, demographics, past medical history, vital signs, laboratory data, and ECG and radiology findings). An algorithm dichotomizes patients into subgroups of low or high risk for mortality, serious medical complications, and rehospitalization within 30 days. Second, the Evaluation Study of Congestive HF and Pulmonary Artery Catheterization Effectiveness risk model and discharge score extend previous research of patient risk factors at discharge. Researchers provided discharge factors predictive of 6-month mortality by including clinical, laboratory, physiological, and functional status data. Third, in patients with HF who are ≥75 years of age, a comprehensive geriatric assessment predicts mortality. Components include dependency of activities of daily living, mobility dependence, Charlson comorbidity score, previous cognitive impairment, and number of medications on hospital admission. These and other risk score instruments and algorithms may promote comprehensive transition and postdischarge care planning and optimize resource use.

Health-Related QOL in Clinical Practice

Health-related QoL measures may guide psychological and psychosocial support during transitions of care and identify patients at high risk for adverse events, including rehospitalization. The Chronic HF Assessment Tool is a patient-centered tool with factors similar to those of the Minnesota Living With Heart Failure Questionnaire and Kansas City Cardiomyopathy Questionnaire, and it includes psychosocial concerns that contribute to QoL. Specifically, the Chronic HF Assessment Tool includes medications, impaired concentration, sleeping habits, and others worrying about the patient.

Nurses as Educators of HF Self-Care: Delivering What Patients Need

In research studies, patients who participated more fully in chronic HF self-care maintenance and management activities had improved clinical outcomes compared with patients who did not adhere to self-care behavior expectations. Registered nurses are leaders in delivering patient self-care education; however, the level of nurse understanding of chronic HF self-care principles must match patient needs. In multiple studies, hospital-based, community, and home-care nurses did not score adequately in a test of chronic HF self-care principles. Furthermore, in qualitative research, patients stated that they knew what to do, but they needed assistance in learning how to do it. When nurses deliver superficial education messages or do not focus on how to carry out important behaviors, patients may not perform self-care expectations optimally. Thus, transition of care program leaders must ensure that nurses recognize their knowledge gaps and receive ongoing education.

Recommendations for Clinical Practice

Ideally, transition of care programs in HF should span the care continuum. In addition to implementing evidence-based interventions, quality improvement strategies are needed to ensure that transition systems and processes produce desired outcomes (Table 8).
Disclosures

Writing Group Disclosures

<table>
<thead>
<tr>
<th>Writing Group Member</th>
<th>Employment</th>
<th>Research Grant</th>
<th>Other Research Support</th>
<th>Speaker’s Bureau/Honoraria</th>
<th>Expert Witness</th>
<th>Ownership Interest</th>
<th>Consultant/Advisory Board</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nancy M. Albert</td>
<td>Cleveland Clinic</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Susan Barnason</td>
<td>University of Nebraska Medical Center College of Nursing</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Anita Deswal</td>
<td>Houston VA Medical Center/Baylor College of Medicine</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Adrian Hernandez</td>
<td>Duke University</td>
<td>AHA†</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Robb Kociol</td>
<td>Tufts Medical Center</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Eunyoung Lee</td>
<td>Radford University</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Sara Paul</td>
<td>Western Piedmont Heart Centers</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Catherine J. Ryan</td>
<td>University of Illinois at Chicago</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Connie White-Williams</td>
<td>University of Alabama at Birmingham</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Heart Failure Consultants*</td>
</tr>
</tbody>
</table>

This table represents the relationships of writing group members that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all members of the writing group are required to complete and submit. A relationship is considered to be “significant” if (a) the person receives $10,000 or more during any 12-month period, or 5% or more of the person’s gross income; or (b) the person owns 5% or more of the voting stock or share of the entity, or owns $10,000 or more of the fair market value of the entity. A relationship is considered to be “modest” if it is less than “significant” under the preceding definition.

†Significant.

Reviewer Disclosures

<table>
<thead>
<tr>
<th>Reviewer</th>
<th>Employment</th>
<th>Research Grant</th>
<th>Other Research Support</th>
<th>Speakers’ Bureau/Honoraria</th>
<th>Expert Witness</th>
<th>Ownership Interest</th>
<th>Consultant/Advisory Board</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luke J Burchill</td>
<td>Oregon Health Science University</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Rebecca Gary</td>
<td>Emory University</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Jason Aaron Gluck</td>
<td>Hartford Hospital</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Kinya Otsu</td>
<td>King’s College, London (UK)</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

This table represents the relationships of reviewers that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all reviewers are required to complete and submit. A relationship is considered to be “significant” if (a) the person receives $10,000 or more during any 12-month period, or 5% or more of the person’s gross income; or (b) the person owns 5% or more of the voting stock or share of the entity, or owns $10,000 or more of the fair market value of the entity. A relationship is considered to be “modest” if it is less than “significant” under the preceding definition.

References


31. 30. 29. 28. 27. 26. 25. 24. 23. 22. 21. 20. 19. 18. 17. 16. 15. 14. 13. 12. 11. 10. 9. 8. 7. 6. 5. 4. 3. 2. 1. 


Transitions of Care in Heart Failure: A Scientific Statement From the American Heart Association
Nancy M. Albert, Susan Barnason, Anita Deswal, Adrian Hernandez, Robb Kociol, Eunyoung Lee, Sara Paul, Catherine J. Ryan and Connie White-Williams

Circ Heart Fail. published online January 20, 2015;
Circulation: Heart Failure is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2015 American Heart Association, Inc. All rights reserved.
Print ISSN: 1941-3289. Online ISSN: 1941-3297

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circheartfailure.ahajournals.org/content/early/2015/01/20/HHF.0000000000000006

Data Supplement (unedited) at:
http://circheartfailure.ahajournals.org/content/suppl/2015/01/20/HHF.0000000000000006.DC1

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Circulation: Heart Failure can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Circulation: Heart Failure is online at:
http://circheartfailure.ahajournals.org//subscriptions/
## Supplemental Table 1. Evidence on Transition of Care Interventions

<table>
<thead>
<tr>
<th>Program, name; Citation #</th>
<th>Interventions (Int)</th>
<th>Is delivered by…</th>
<th>Patients and Setting(s) where Int completed</th>
<th>Length of Int or # Times Repeated</th>
<th>Int Timing (when delivered)</th>
<th>Findings relevant to Int</th>
<th>Limitations (Int description or findings)</th>
</tr>
</thead>
</table>
| Better Outcomes for Older Adults through Safe Transitions (Project BOOST)                                                                                                                   | - QI mentoring program  
  - Experienced sites serve as mentor to sites just beginning the program  
  - Comprehensive int  
  - General assessment of pt preparedness for disch; med reconciliation; pt/caregiver education using teach-back method; disch communication to post- hosp care providers  
  - Tele contact within 72 hours of disch  
  - Implementation guide and project mgmt tools  
  - Technical assistance and mentoring  
  - Collaboration and communication with other Project BOOST sites  
  - Online resource center to store and benchmark data                                                                                                                                        | - Inter-disciplinary                       | - Over 60 mentor sites in 26 states in the U.S.                                                                                                                                                 | - During hosp stay  
  - FU call 72 hours after disch  
  - During hosp stay and FU call 72 hours after disch                                                                                                                                       | - No published results  
  - Anecdotal reduction in hosp LOS, decreased 30-day rehosp, lower mortality and increased pt satisfaction                                                                 | - Tools online (fee to use with mentor sites and benchmark with other sites)  
  - Multiple ints delivered; difficult to determine individual int effects  
  - Lack of published research results                                                                                                                                                |
| Bridge Model°                                                      | Bridge Care Coordinators (BCC):  
  - Identifies unmet needs and sets up services pre-disch  
  - Conducts a secondary assessment via tele and intervenes on identified needs 2 days post disch that includes:  
    - Understanding of disch instructions; transportation issues;  
    - Physician FU; burdened caregivers; problems with home health care; difficulty obtaining and understanding meds  
  At 30 days post-disch, tracks progress                                                                                                                                                    | - BCCs – Master’s prepared social workers     | - Academic and comm hosps in Illinois  
  - At-risk pts and caregivers                                                                                                                                                                   | - Pre-disch to 30 days post disch  
  - Initial visit during hosp  
  - Tele call 2 and 30 days post disch                                                                                                                                                    | - No published research findings  
  - BCC may not have expertise in HF or clinical assessment  
  - Multiple int delivered; difficult to determine individual int effects                                                                                                                                 |
<table>
<thead>
<tr>
<th>Care Transitions Intervention (CTI)</th>
<th>Transitions coach performs:</th>
<th>Coach performs:</th>
<th>-Geriatric APN transition coach</th>
<th>-Integrated health system in western state; -Pts disch to SNF and home included</th>
<th>-Int lasts 24–28 days post disch</th>
<th>-In hosp visits -Home visit within 24–72 hrs post disch -Phone or home visit wkly</th>
<th>-Decreased rehosp. at 30, 90 &amp; 180 days -Int pts had high levels of confidence in obtaining essential info for mgmt of HF, communicating with the health care team, and understanding the med regimen</th>
<th>-Multiple Int delivered; -Difficult to determine individual Int effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 hosp visit before disch</td>
<td>1 hosp visit before discharge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>First home visit with pt and caregiver 24-72 hours after disch to assess meds</td>
<td>1 home visit within 3 days of disch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pts given personal health record containing active problem list, meds and allergies, list of red flags, transfer checklist, space to record questions and concerns</td>
<td>2 tele calls after disch within 7-10 days of disch and by day 30 post disch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coach encourages self-mgmt and communication between the pt or caregiver and PCP</td>
<td>Pts given booklet to record personal health record, meds, and questions for PCP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coach assists in formulating questions that pt wants to ask the PCP and role-playing of questions and helps recognize red flags</td>
<td>-Trained transitions coaches (nursing or social work training; receive training in int)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Geriatric APN transition coach</td>
<td>-Medicare beneficiaries admitted with AMI, HF or pulmonary problem; -Excluded pts disch to SNF, long term care or hospice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-6 Northeast hosp, non-integrated health care system: -2 comm hosp -3 teaching hosp -1 tertiary care center/teaching hosp</td>
<td>-During hosp stay and at home after disch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Only 13.6% of pts who were eligible for int completed the home visit -Recruitment and retention of pts was challenging, with 55% acceptance rate to be in the study and 75% attrition rate</td>
<td>-Pilot project in 14 states to demonstrate effectiveness in real-world setting -Concomitant int to improve provider communicatio may have affected results -Coach made 3 attempts to contact pt before categorizing as unable to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced Discharge Planning Program (EDDP)</td>
<td>Masters prepared social workers</td>
<td>- ≥ 65 yrs, disch home on 7 or more meds and met ≥ 1 of the following: lives alone - Lacks support system for post disch care - 1 previous hosp in the last 12 months - Lacks emotional support - Has psychosocial needs</td>
<td>- Within 2 days of disch, received tele contact int until needs met</td>
<td>- Int involve d 1 tele contact post disch - FU at 30-days post disch</td>
<td>- Int pts: more likely to schedule and complete 30-day post-disch phy office visits; phy communication scores were higher in Int gp - No differences in caregiver stress or rehosp</td>
<td>contact - End of life pts not included</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------</td>
<td>--------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced Discharge Planning Program (EDDP)</td>
<td>Enhanced Disch Planning Program (EDDP):</td>
<td>- Review of pts medical record for medical and psychosocial info - 10 standardized questions asked to assess domains of risk - Confirmation of:  - The plan for FU medical care; transportation plans; med issues and adherence; knowledge of issues requiring FU; receipt of home health ordered at disch</td>
<td>- Nurs case mgrs with card and PCP</td>
<td>- Hosp pts with HF  - NYHA FC II-IV  - Age ≥ 65 yrs  - Disch to home or retirement comm  - 1 univ and 1 large comm medical ctr in Eastern US</td>
<td>- Monthly tele calls up to 6 months after disch - Home visits (frequency not specified)</td>
<td>- Early in hosp: - Throug hout hosp and up to 6 months after hosp</td>
<td>- Results of program not reported in the literature</td>
<td>- Social workers completing the int also collected baseline data - Single center</td>
</tr>
<tr>
<td>Patients in Care for Congestive Heart Failure (PCCHF)</td>
<td>- Enhanced disch planning - Pt specific printed material regarding:  - Med plan; diet; activity program; self-mgmt parameters (daily weights, med regimen, dietary guidelines) - Tele calls - Home visits - Nurse referral to phy if problems</td>
<td>- Nurs case mgrs with card and PCP</td>
<td>- Hosp pts with HF  - NYHA FC II-IV  - Age ≥ 65 yrs  - Disch to home or retirement comm  - 1 univ and 1 large comm medical ctr in Eastern US</td>
<td>- Monthly tele calls up to 6 months after disch - Home visits (frequency not specified)</td>
<td>- Early in hosp: - Throug hout hosp and up to 6 months after hosp</td>
<td>- Results of program not reported in the literature</td>
<td>- Bundled int - Difficult to determine individual int effects - No published research results</td>
<td></td>
</tr>
</tbody>
</table>
### Patients in Care for Congestive Heart Failure (PCCHF)\(^{2,3}\)

- Standard discharge planning and care plus enhanced discharge planning
- Patient workbook (7 modules: Heart as Pump; Your Specific HF experience; Management of HF with Diet; Management of HF with Exercise, Rest, and Energy Conservation; Management of Stress in HF; Management of HF with Community Resources & Support Systems)
- Education map
- Patient documentation tool including a learning profile.
- Detailed transfer letter to homecare RN and tele outreach from hosp RN within 24 hours of discharge

### Postdischarge Care Transition (PDCT) Interventions\(^{2,3}\)

#### Postdischarge Care Transition Int (PDCT):  
- Develop a patient-centered health record to promote interdisciplinary communication
- Use a structured discharge checklist of critical activities related to patient education and empowerment; including:
  - Med reconciliation; med mgmt education; pt and caregiver expectations of social and support needs; ambulatory FU; general pt education
  - Self-activation and mgmt sessions
  - Schedule a FU appt with a physician within 7 days post discharge
  - Coordinate data flow Home visits

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Hosp RN</th>
<th>Home Care RN</th>
<th>From hosp to 2 weeks post- discharge</th>
<th>During hosp -10–14 days after discharge</th>
<th>MLHFQ physical dimension &amp; HR-QoL in int gp: improved scores at 2, 6, &amp; 12 months</th>
<th>MLHFQ emotional dimension: improved scores at 6 and 12 weeks, and decreased Emer visits and rehos in int gp</th>
<th>RN background and credentials were not described</th>
<th>Need for specific HRQL measure for HF</th>
</tr>
</thead>
</table>
| Postdisch Care Transition int (PDCT):  
- Develop a pt-centered health record to promote interdisciplinary communication  
- Use a structured disch checklist of critical activities related to pt education and empowerment; including:  
  - Med reconciliation; med mgmt education; pt and caregiver expectations of social and support needs; ambulatory FU; general pt education  
  - Self-activation and mgmt sessions  
  - Schedule a Fu appt with a physician within 7 days post disch  
  - Coordinate data flow Home visits | -Elderly Medicare pts treated at a hosp in upstate New York.  
-Exclusions included history of dementia without a caregiver, severe psychiatric conditions, severe renal dysfunction, planned rehos, primary tumor diagnosis, and residence in a SNF or assisted living | -In 45 days from disch | -10% reduced trend in rehos 
\(p=0.08\); most differences in Int gp occurred between 91-365 days. -Enhanced self-mgmt skills  
-Average reduction in costs by $1293/pt or a savings of $1.09 for every $1.00 spent | -Approached during hosp but int delivere d during 3 home visits | -10% reduced trend in rehos \(p=0.08\); most differences in Int gp occurred between 91-365 days. | -Enhanced self-mgmt skills  
-Average reduction in costs by $1293/pt or a savings of $1.09 for every $1.00 spent | RN background and credentials were not described | Need for specific HRQL measure for HF |
| Reengineered Discharge (Project RED) | - Educate pt about diagnosis during hosp care plan:  
  - Phy contact; appt dates; appt calendar; color-coded med schedule; list of pending results at disch; illustrated description of disch diagnosis; info on what to do if problems arise  
  - Make appts for FU and post-disch testing with input from pt about time and date  
  - Discuss with pt tests not completed in the hosp  
  - Organize post-disch services  
  - Confirm the med plan  
  - Reconcile the disch plan with national guidelines and critical pathways  
  - Pt review of appropriate steps when problems arise  
  - Expedite transmission of disch summary to clinicians accepting pt care  
  - Pts receive written disch plan  
  - Assess pts’ understanding of disch plan.  
  - Acute care hosp plan and disch summary faxed to provider at disch  
  - Pharmacist call pts 2-3 days after disch to reinforce the disch plan and help with problem solving | -RN disch advocate (DA)  
  -Pharm | -Urban referral hosp in Northeast US | -DA time: ~ 43 min plus 45 min to review medical record with pt  
  -Pharmacist time: ~ 14 min plus 10 min preparation | -During hosp; 2-4 days after disch | -Lower hosp utilization  
  -Best results in pts with hosp event 6 months prior to current hosp  
  -Int pts were more likely to be able to identify their diagnosis and name of their PCP  
  -Int pts had a higher follow up rate, and reported being more prepared for disch. | -Adverse events not assessed.  
  -Single-center study  
  -Not all potentially eligible pts enrolled  
  -Multiple int performed  
  -Could not determine the individual effects of each program component.
<table>
<thead>
<tr>
<th>State Action on Avoidable Re-hospitalization (STAAR) Initiative</th>
<th>Enhanced admission assessment for post-hosp needs that:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Provide effective teaching and learning</td>
<td>- Involve family caregivers and comm providers; med reconciliation; and customized disch plan</td>
</tr>
<tr>
<td>- Real-time pt and family-centered handoff communication, included:</td>
<td>- Customized education materials; identified learners at hosp; used teach back to assess pt and family understanding of instructions</td>
</tr>
<tr>
<td>- Timely post-hosp care FU</td>
<td>- Reconciliation of meds at disch; critical information to next provider; giving pt a disch plan; and for high-risk pts: discussed plan of care with emer contact</td>
</tr>
</tbody>
</table>

- Multi-disciplinary teams
- Institute of Healthcare Initiative partners with STARR states (Massachusetts, Michigan, Ohio, and Washington)
- Not specified
- Begins at hosp admission Continued through disch
- No research data available on outcomes
- Only IHI supported in certain states, but could be applied in any setting. Numerous int; cannot determine priorities and greatest effects. Effectiveness of bundled and individual int not available
### Transitional Care Model

- Daily visits to pts during HF hosp and assessment of:
  - pt and caregiver goals; nature, duration, and severity of HF and co-morbid conditions; physical, cognitive, and emotional health status; general health behaviors and skills; availability and adequacy of social support.

- Pt teaching sessions audiotaped and available for review throughout int

- Pt participates in disch planning

- APN assessments to identify changes in health status and collaborates with phy to adjust meds/other therapies

- APN available by tele for problem-solving issues

| -APN; had a 2 month training and orient to program | -Hosp and home 6 academic and comm hosp in Northeastern US | -Daily during hosp -Weekly for 1 month post-disch (began 24 hours post disch) -Bimonthly during the second and third months post disch. | -Index hosp to 3 months post disch | -Decreased rehosp or deaths at 52 weeks -Time intervals to rehosp or death were longer in int gp -Greater overall QoL at 12 wks. | -Multiple int delivered; difficult to determine individual int effects |

Abbreviations: AMI, acute myocardial infarction; APN, advanced practice nurse; appt, appointment; Card, cardiologists; comm, community; disch, discharge; emer, emergency; gp, group; FU, follow-up; HF, heart failure; hosp, hospital or hospitalization; hrs, hours; HR-QoL, health related-quality of life; FC, functional class; info, information; int, intervention; LOS, length of stay; med, medication; mgmt, management; mgr, manager; MLWHFQ, Minnesota Living with HF questionnaire; NYHA, New York Heart Association; PCP, primary care physician; pharm, pharmacist; phy, physician; pt, patient; QI, quality improvement; RN, registered nurse; SNF, skilled nursing facility; UC, usual care; univ, university; tele, telephone; US, United States; wk, week; yrs, years.
## Supplemental Table 2. Transitional Care Programs

<table>
<thead>
<tr>
<th>Transitional Program</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital-to-Community Cross-Sites Transitional Home Care</strong></td>
<td></td>
</tr>
</tbody>
</table>
| The Care Transitions Intervention Care Transitions ™ [www.caretransitions.org](http://www.caretransitions.org) | CTI [Care Transition Intervention]: Uses a coaching intervention to assist patients in resuming self-care following a change in health status (4 week program); APN serves as the “transitions coach.” Coach begins in hospital and continues 30 days after discharge. Designed to assist patients and family caregivers to learn self-management skills that will ensure their needs are met during the transition from hospital to home. Focus:  
- Medication Self-Management  
- Use of a dynamic patient-centered record, the Personal Health Record  
- Timely primary care/specialty care follow-up  
- Knowledge of red flags that indicate a worsening in their condition and of how to respond |
| The Care Transitions Program is based in the Division of Health Care Policy and Research at the University of Colorado Denver, School of Medicine | |
| Led by Coleman E. MD, since 2003 | |
| **Transitional Care** | Nurse – Led Multidisciplinary Transitional Care Model: Hospital-to-Home Health Focus  
Uses alternative nursing staffing model: APN only, Registered nurses working in consultation with APNs, or RNs only (hired by Kaiser)  
Designed to provide comprehensive in-hospital planning and home follow-up for chronically ill high-risk older adults hospitalized for common medical and surgical conditions.  
The heart of the model is the **Transitional Care Nurse (TCN)**, who follows patients from the hospital into their homes and provides services designed to streamline plans of care, interrupt patterns of frequent acute hospital and emergency department use, and prevent health status decline. |
| New Courtland Center for Transitions & Health, Univ. of Pennsylvania, School of Nursing: [www.transitionalcare.info](http://www.transitionalcare.info) | |
| Led by Naylor, M., PhD, FAAN, RN since 1989 | |
| **National, State-Wide, Hospital-to-Community Cross-Sites, All Settings, Transitional Care Initiatives** | |
| National Transitions of Care Coalition [NTOCC] [www.NTOCC.org](http://www.NTOCC.org) | A national effort to provide tools and resources to patients, caregivers, health care professionals and policy makers who seek to address challenges in meeting the needs of patients transitioning between care settings.  
Using a Quality Improvement (QI) framework, defines the major components of structure, process, and outcomes to improve quality of transitional care. |
| Founded in 2006 by the Case Management Society of America (CMSA) and Sanofi U.S. | |
| **State Action on Avoidable Rehospitalization [STAAR] Initiative** [www.ihi.org](http://www.ihi.org) | Uses a multi-state, multi-stakeholder approach to dramatically improve delivery of effective care on a regional scale. Currently, three states (MA, MI, WA) are participating in this initiative.  
The STAAR initiative aims to reduce rehospitalizations by working across organizational boundaries and by engaging payers, stakeholders at the state, regional and national level, patients and families, and caregivers at multiple care sites and clinical interfaces.  
IHI partners with STAAR states to provide strategic guidance, support and technical assistance to hospitals as well as cross-continuum teams to improve transitions in care and reduce avoidable rehospitalizations. Currently, this website provide guidelines and resources to improve transitions from the hospital to (a) skilled nursing facilities, (b) community settings, (c) home health care, and (d) the clinical office practice, to reduce avoidable re-hospitalization. |
| Institute for Healthcare Improvement [IHI] Received a Grant from the Commonwealth Fund | |
| Since May, 2009 | |
| **Hospital-Based Transitional Care** | In-hospital Based Transitional Care, Focused on Discharge Care Process with Follow-up Phone Call  
Project RED is a research group at Boston University Medical Center that develops and tests strategies to improve the hospital discharge process in a way that promotes patient safety and reduces re-hospitalization rates. |
| Project RED [Re-Engineered Discharge] [www.bu.edu/fammed/projected](http://www.bu.edu/fammed/projected) | |
| Boston University School of Medicine & Boston University Medical Center; | |
The RED intervention is founded on 11 discrete, mutually-reinforcing components and has been proven to reduce re-hospitalizations and to yield high rates of patient satisfaction.

**Focus:** In-hospital discharge planning/coordination/education and phone follow-up within 72 hours of discharge.

<table>
<thead>
<tr>
<th>Funded by the Agency for Healthcare Research and Quality [AHRQ] and National Heart, Lung, and Blood Institute.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOOSTing Care Transitions</strong></td>
</tr>
</tbody>
</table>
| **Project BOOST** [Better Outcomes for Older Adults through Safe Transitions]  
[www.hospitalmedicine.org](http://www.hospitalmedicine.org)  
Initiated by Society of Hospital Medicine |
| **In-hospital Based Transitional Care, Focused on Discharge Care Process with Follow-up Phone Call** |
| Designed to improve transitional care and prevent readmission by optimizing the discharge process with telephone follow up within 72 hours of discharge; Provides resources and tools to improve transitional care and interventions/guidelines to implement the best care based on evidences and research findings.  
Risk assessment tool is used to identify the patients who have a high risk of developing problems with care transition such as adverse medical events and readmission.  
Interventions include general assessment of preparedness, medication reconciliation, patient / caregiver education on medications and side effects requiring notification of physician, medication safety information, discharge communication with receiving agencies including medical records, and telephone follow-up with patient within 72 hours |
| **The Bridge Model**  
By Illinois Transitional Consortium: |
| **Social Work Led Transitional Care**  
Designed for older adults discharged to home from an inpatient hospital stay.  
Masters-prepared social workers, Bridge Care Coordinators (BCCs), coordinate post-discharge older adult care and integrate Aging Resource Centers (ARC) inside hospitals.  
Three Phase Interventions: pre-discharge, post-discharge, follow-up |
| **Community-Based Transitional Care** |
| **Guided Care**  
Developed by the Roger C. Lipitz Center for Integrated Health Care at the Johns Hopkins Bloomberg School of Public Health |
| **Guided Care Nurse-Partners with Physicians or other providers: Outpatient Setting Home-Based Transitional Care** |
| Aims: proven solution to the growing challenge of caring for older adults with chronic conditions and complex health needs.  
The Guided Care Nurse partners with physicians and others in a primary care practice to provide coordinated, patient-centered, cost-effective care to patients with multiple chronic conditions.  
The nurse conducts in-home assessments, facilitates care planning, promotes patient self-management, monitors conditions, coordinates the efforts of all care professionals, smooth transitions between sites of care, educates and supports family caregivers, and facilitates access to community resources. |