AHA Scientific Statement

Transitions of Care in Heart Failure

A Scientific Statement From the American Heart Association

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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 ≥1 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

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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.[1] 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[2] and data from patients treated in Veteran Affairs,[3] 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.[2] 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.[4] 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%.[5] 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 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.[2] 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.[6] Among Medicare beneficiaries, the use of hospice services in the last 6 months of life increased between 2000 and 2008.[7] 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.[7] 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,[8] 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.[9] Among 59 652 adults with HF who were studied over a 10-year period, 19% died or had an unplanned readmission within 30 days of discharge.[10] 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.[10] 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 performance measures, and HF admissions per year.[10] In another report, when 537 hospitals participating in a transition program from hospital to home were asked to report specific practices used to reduce rehospitalization, most had written objectives to reduce hospitalization and quality improvement teams in place, but fewer than half of the hospitals carried out specific services or programs associated with transitional care such as partnering with community physicians, linking hospital and outpatient prescription records, and sending the discharge summary to the patient's primary care provider.[11] Given the Affordable Care Act penalties that hospitals with high 30-day readmission rates may incur, it is imperative to assess modifiable 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.[9] In 1 report, higher patient socioeconomic status (household income, bachelor's degree or higher) was an important factor in 30-day outcomes among 59 652 adults, and a bachelor's degree or higher remained an important predictor of 30-day readmission in multivariate analysis.[10] In 1 study of physical, psychological, social, and existential unmet needs of 132 patients enrolled in cardiac rehabilitation,[12] most centered on psychological and social themes and included difficulty in being motivated to leave home; anxiousness 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.[12] 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

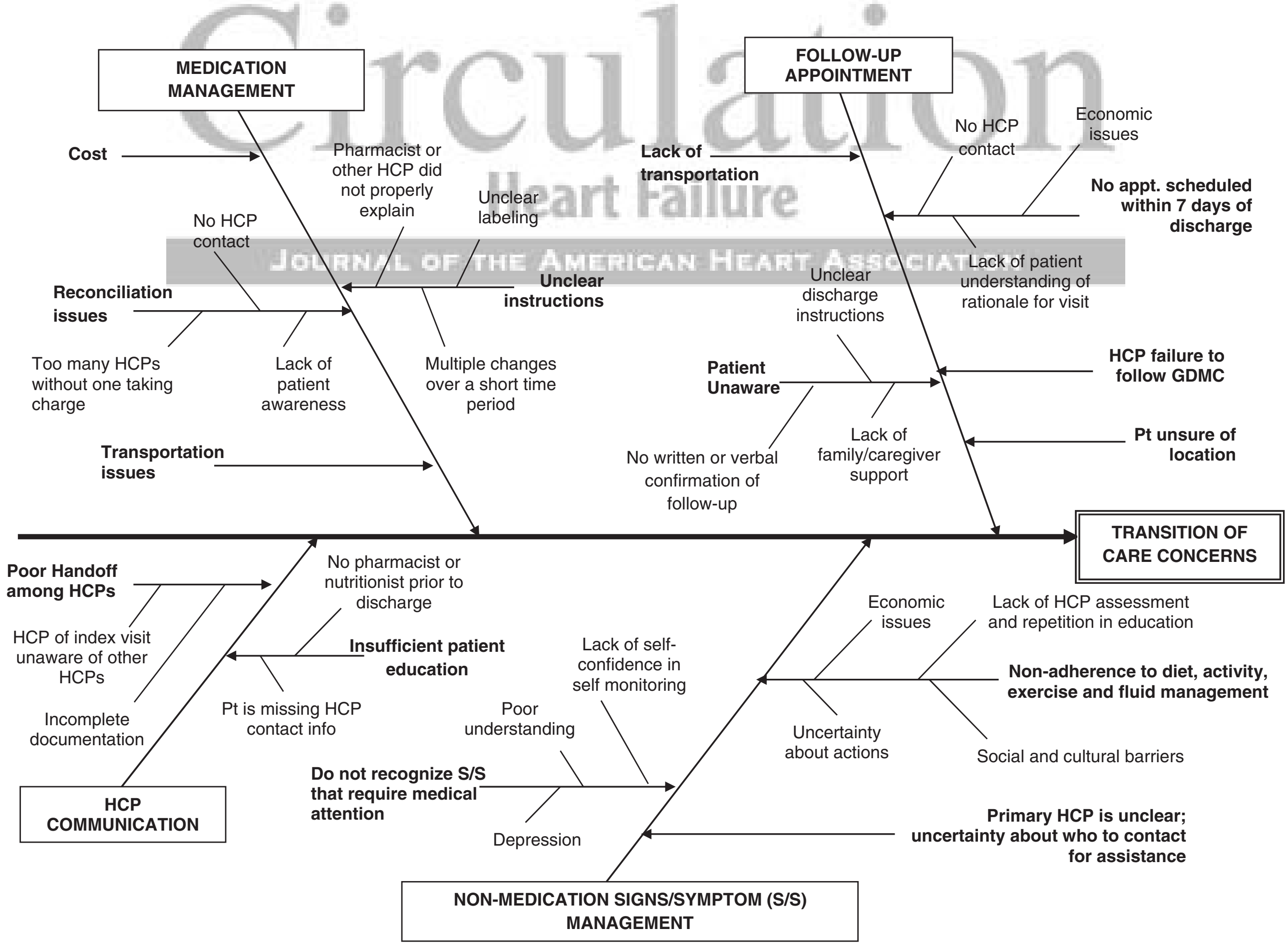

Figure. Prominent factors impeding transition of care in chronic heart failure care. GDMC indicates guideline-directed medical care; HCP, healthcare provider; and Pt, patient.

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, care transition, transition after hospitalization, transition for HF patients, care continuum transition, transition interventions, and outcomes of transition of care. Initial searches were limited to English language articles from 1990 through 2012. We concentrated on reports that had at least some patients with HF, had at least 1 transition component from one healthcare setting to another, and evaluated interventions in North America. In addition, the reference lists in the selected articles were manually searched for additional pertinent references. In this scientific statement, available evidence on care transition intervention components and care transition outcomes is summarized in evidence tables.

Overview of Transition of Care Interventions

Among transition of care interventions to prevent hospital readmissions, common themes emerged. Most interventions began immediately after admission to the hospital and continued 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 posthospital 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[21,27] used advanced practice nurses (APNs) to assist and encourage

Table 1. Caregivers and Interventions of Transition of Care Programs

	Healthcare Providers			Intervention Themes							
Program	Nurse	Social Worker	Interdisciplinary	Early Admission Assessment	Medication Reconciliation	Patient Education (Including Teach-Back)	Caregivers	Telephone Follow-Up	Home Visits	Handoff	Early Follow-Up
Bridge model[17]		•		•				•			
Care Transitions[18]	•			•		•	•	•	•	•	•
Care Transitions[19]			•			•		•	•		•
EDPP[20]		•					•	•			•
PCCHF[21]	•					•		•		•	•
PCCHF[22]	•		•	•		•		•	•		
PDCT[23]	•				•	•	•		•	•	•
Project BOOST[24]			•		•	•	•	•			
Project Red[25]	•		•	•	•	•		•		•	•
STAAR[26]			•	•	•	•	•				
Transitional Care model[27–29]	•			•		•	•	•	•		•

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 Rehospitalization.

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,[21,22] 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.[17,20]

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.[30,31] At hospital discharge, most programs recommended that patient education be tailored and included in a patient-centered personal health record.[23,32] 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,[23] 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.[21,33]

Educational resources varied. Printed materials were frequently provided, and in some programs, education materials were posted on a program Web site[18,24,34] and were downloadable for use by program personnel. In 1 model,[27] 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.[35] In geriatrics, teach-back was useful in overcoming potential learning barriers associated with health literacy and age.[36]

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,[37] and to answer patients' questions and address concerns about self-care and recovery, particularly when patients are unlikely to initiate calls.[38] 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[21,22,33] 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.[25,37–39] 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,[40] and to reduce rehospitalization.[18,41] In many programs, the first call was to be made within 48 to 72 hours,[17,20,28,34,42] as per national organization guidelines,[1] or based on performance metric recommendations.[43,44] 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.[27,45] A standardized assessment sheet or telephone script was advocated to guide the specific purpose of the follow-up call[34] and to ensure adequate assessment of domains at risk.[20]

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,[37] and assessment of psychosocial complications.[20] 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[46]; 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.[20]

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[29] 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.[39] The definition of timely follow-up varied from 1 to 4 weeks after discharge[39,40,47]; however, current HF guideline-directed recommendations include a follow-up visit 7 to 10 days after hospital discharge.[1] 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.[20] Of barriers, nearly 46% of patients had problems in understanding and complying with the nonpharmacological

Table 2. Components and Time Frames of Early Discharge Visits

Components	
Assess	Changes in patients' health status[27]
	Patients' understanding of[17]:
	Medications
	Discharge instructions
	Follow-up with physician(s)
	Transportation difficulties
	Issues obtaining medications
	Problems with home health care and caregiver burden
Coach	Patients in[18,32]:
	Medication self-management
	Timely follow-up visit with physician (including articulating needs to physician)
	Recognition of signs or symptoms of changes in health condition ("red flags")
	Using a patient-centered health record (to facilitate information transfer)
	Subsequent follow-up focus on[18,32]:
	Ensuring patient is obtaining prescribed medications
	Assessing the presence of symptoms
	Assessing the outcome of appointment with physician
	Delivering chronic illness self-management
Confirm	Postdischarge plan and adjustments since discharge[20]
	Problems or issues that emerged since discharge[20]
Deliver	Medical management as needed for HF and comorbid conditions[27]
	Coordinated care[27]
	General telephone outreach to patient (components not specified)[21,33]
Discuss	Answers to patient questions[28]
	Issues related to transition to home[28]
Document	In patient-centered health record (to promote interdisciplinary communication)[23]
	On a discharge checklist focused on critical activities (eg, medication reconciliation, patient education)[23]
	Data coordination efforts and expectations[23]
Promote	Patient self-activation and self-management of care[23]
	Physician follow-up within 7 d of discharge[23]
Follow-up time frames and personnel (when specified)	
Within 24 h of discharge by telephone conducted by a registered nurse[21,33]	
Within 24 h for home visits by an APN[27]	
From 24–72 h in the home setting[18,32]	
Within 48 h by telephone by care coordinator[17] or social worker[20]	
Within 72 h by telephone by nurse[28]	
3 Telephone calls within 24 d[18,32]	
Over a span of 45 d after discharge[23]	

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 predischarge 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,[51] demands placed on caregivers to monitor complex self-care and medical regimens and to deal with emotional distress, disturbed sleep, and patient rehospitalization[40,41] 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

				Study Sample Characteristics				
Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Inclusion	Exclusion	Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
Anderson et al,[53] 2005	6 mo rehosp in TC program vs UC	Q-exp	121 (IG, 44; UC, 77)	Age ≥50 y HF hosp and LVEF <40% Single hosp Disch home	MI in last 12 wk or unstable angina Confusion ≥5 Major comorbidities ESRD on dialysis Impending cardiac surgery Ongoing NYHA FC IV	6 wk	Compared with UC, IG had fewer rehosp (44.2% vs 11.4%; *P*=0.01)	Very small sample Stable patients selected for inclusion
Altfeld et al,[20] 2013 EDPP (part of Bridge model)	30-d rehosp in EDPP int vs UC	RCT	740 (IG, 360; UC, 380)	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 Disch to SNF or LTC Having another TC int	Mean, 5.8±11.3 d	No differences in rehosp (OR, 1.11; 95% CI, 0.76–1.62)	Unclear which outcome was primary (studied rehosp and mortality) Mortality listed as primary but powered for rehosp
Coleman et al,[32] 2004 CT Int	Rehosp rates at 30, 90, and 180 d CT vs UC	Q-exp; int group vs admin DB control subjects	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	Living in long-term care facility Elective hosp	24 d	Decrease in 30-d rehosp in IG vs UC; adjusted OR, 0.52 (95% CI, 0.28–0.96) 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: 225 vs 217 d (*P*=0.003)	Admin DB control subjects IG had small sample size
Coleman et al,[18] 2006 CT Int	Rehosp rate at 30, 90, and 180 d Rehosp rate for the same condition as index hosp CT vs UC	RCT	750 (IG, 375; UC, 375)	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	Hosp for psychiatric condition Dementia Post-disch plan for hospice	28 d	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 22.5%; 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	Early primary benefits not sustained at 180 d

(*Continued*)

Table 3. Continued

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Dedhia et al,[54] 2009 Safe STEPS (part of Project Boost)[16]	30-d rehosp in Safe STEPS int vs UC	Q-exp Pre-post design	422 (IG, 185; UC, 237)	Age ≥65 y On general medicine hospitalist service 3 hosps; Patients disch to home	SNF Hosp <24 h or in same weekend Previous hosp during study period	Before disch	Compared with UC, IG had fewer rehosp (22% vs 14%; OR, 0.55; 95% CI, 0.32–0.94)	Pre-post design
Harrison et al,[21] 2002 PCCHF	All-cause rehosp at 12 wk after disch; PCCHF int vs UC	RCT	192 (IG, 92; UC, 100)	Hosp with HF at a large teaching hosp Patients disch home Patients living in 60-km radius	Cognitive impairment	12 wk	IG, 23% vs UC, 31% (*P*=0.26)	Small sample size; not powered to evaluate rehosp Hosp RNs provided int and UC; question contamination across groups
Naylor et al,[55] 1994 TC model	Rehosp at 2, 6, and 12 wk; TC vs UC	RCT	276 (Medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66)	Age ≥70 y Medical cardiac (HF and CAD) and surgical cardiac patients		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	No primary end point specified Several end points measured at various time intervals Small sample size
Naylor et al,[45] 1999 TC model	Time to first rehosp in 24 TC vs UC wk	RCT	363 (IG, 177; UC, 186)	Age ≥65 y Hosp with specified medical or surgical Dx at 2 hosps Had ≥1 high-risk criteria for poor post-disch outcomes		4 wk	Time to first rehosp was shorter in UC vs IG (HR, 1.96; 95% CI, 1.31–2.92; *P*<0.001) IG less likely to be rehosp in 24 wk (20% vs 37%; *P*<0.001) Fewer rehosp (49 vs 107; *P*<0.01)	Small sample size
Naylor et al,[27] 2004 TC model	Rehosp over 1-y FU; TC vs UC	RCT	239 (IG, 118; UC, 121)	Age ≥65 y Hosp with HF Tele Reside within 60 miles 6 hosp sites	ESRD	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	Results were similar in direction over all time intervals, but the int effect declined as time after int increased Small sample size

(*Continued*)

Table 3. Continued

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Russell et al,[56] 2011	30-d rehosp in HF TC vs UC	Retrospective	447 (IG, 223; UC, 224)	Hosp and certified HHC Agency partnership Patients hosp with HF Single hosp Patients had many comorbidities Mean age, 79 y		30 d	IG had lower 30-d rehosp rate than UC group (OR, 0.58; 95% CI, 0.38–0.88; $P=0.01$)	Patients in IG and UC were hospitalized during different time periods Characteristics were not balanced between the 2 groups (IG had greater number of comorbidities and received more physical therapy than UC)
Saleh et al,[23] 2012 PDCT int	30-, 90-, and 365-d rehosp in PDCT vs UC	RCT	333 (IG, 175 [160 analyzed]; UC, 199 [173 analyzed])	Age ≥65 y Treated in hosp	Dementia ESRD LTC Assisted living Dx of tumors Severe psychiatric Hx	45 d	No differences in rehosp but trend toward improvement ($P=0.08$) 30-d rehosp rate in IG trended to be higher than in UC Trends reversed in the 31–90-d study period and beyond	Randomized by medical record number: even number, UC odd number, IG
Stauffer et al,[57] 2011 TC Int	30-d rehosp; TC vs UC in a real-world hosp setting	Prospective pre-post design Concurrent control subjects from other facilities in the health system	140 (IG, 56; UC, 84)	Age ≥65 y Consecutive patients hosp with HF Single-hosp system		3 mo	Compared with pre-int, adjusted 30-d rehosp rates decreased by 48% (pre, 25.2% vs post, 12.6%; $P<0.05$)	Not RCT Small sample size Int lasted 3 mo but rehosp reported only at 30 d after disch Int did not apply to ≈25% of Medicare patients (disch to SNF or LTC)
Voss et al,[19] 2011 CT Int	30-d all-cause rehosp; CT vs UC	Q-exp with concurrent control subjects	15 507 (IG, 257; UC, 15 250)	6 hosp Patients with fee-for-service Medicare in urban healthcare delivery systems	Patients disch to LTC, SNF, or hospice	30 d	≈36% decrease in rehosp in IG vs UC (OR, 0.61; 95% CI, 0.42–0.88)	Not RCT; UC group was made up of concurrent control subjects and was not fully representative of IG A small proportion of eligible patients approached for IG Convenience sampling; small IG

Admin DB indicates administrative database; APN, advanced practice nurse; CAD, coronary artery disease; CI, confidence interval; CT, care transitions; disch, discharge; Dx, diagnosis; EDPP, Enhanced Discharge Planning Program; ESRD, end-stage renal disease; FC, functional class; FU, follow-up; HF, heart failure; HHC, home health care; hosp, hospital or hospitalization; HR, hazard ratio; Hx, history; IG, intervention group; int, intervention; LTC, long-term care; LVEF, left ventricular ejection fraction; MI, myocardial infarction; NYHA, New York Heart Association; OR, odds ratio; PCCHF, Partners in Care for Congestive HF; PDCT, Post Discharge Care Transition; Q-exp, quazi-experimental; RCT, randomized, controlled trial; rehosp, rehospitalization; RN, registered nurse; SNF, skilled nursing facility; STEPS, Successful Transition of Elderly Patients Study; TC, transition or transitional care; tele, telephone; and UC, usual care group.

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

Table 4. Effectiveness of Transitions Programs on Emergency Department Visits and Follow-Up

				Study Sample Characteristics				
Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Inclusion	Exclusion	Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
Altfeld et al,[20] EDPP Bridge model	30-d phy FU visits	RCT	740 (IG, 360; UC, 380)	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	Mean 5.8±11.3 d	IG more likely than UC to communicate with their phy (90.3% vs 81.9%) IG more likely than UC to schedule (92.5% vs 81.4%; $P<0.001$) and complete (74.9% vs 57.4%, $P<0.001$) FU phy visits	
Coleman et al,[32] 2004 CT Int	30-, 90-, and 180-d ED visits in CT vs UC	Q-exp; int group vs admin DB control subjects	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	Patients in LTC Elective hosp	24 d	Fewer ED visits at 90 d, not at 30 or 180 d OR for IG vs UC: At 30 d, 0.76 (95% CI, 0.44–1.30) At 90 d, 0.61 (95% CI, 0.39–0.95) At 180 d, 1.16 (95% CI, 0.78–1.72)	
Dedhia et al,[54] 2009 Safe STEPS Int	30-d ED visits in Safe STEPS group vs UC	Q-exp pre-post study	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	IG had fewer ED visits than UC in the pre-int period (14% vs 21%; OR, 0.58; 95% CI, 0.34–0.99)	
Harrison et al,[21] 2002 PCCHF	12-wk ED visits in PCCHF vs UC	RCT	192 (IG, 92; UC, 100)	Hosp with HF at a large teaching hosp Patients disch home Patients living in 60-km radius	Cognitive impairment	12 wk	IG had fewer "first" ED visits than UC (29% vs 46%; $P=0.03$) Of patients with >1 ED visit, IG had a 32% rate and UC had 50%	Hosp RNs provided IG int and UC; possible contamination across groups
Jack et al,[42] 2009 Project RED	30-d combination of ED visits or rehosp in Project RED vs UC PCP FU between IG and UC	RCT	749 (IG, 373; UC, 376)	Hosp medical and surgical patients	Admitted from SNF Transferred to another service Planned hosp Blind, deaf, or suicide precautions	Up to 4 d after disch	Compared with UC, IG had fewer ED visits or rehosp (0.314 vs 0.451 per person per month; IRR, 0.70; 95% CI, 0.52–0.94; $P=0.009$) IG had more PCP FU (62% vs 44%; $P\leq0.001$)	
Naylor et al,[55] 1994 TC model	Mean number unsch acute care visits to phy or ED in TC vs UC	RCT	276 (Medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66)	Age ≥70 y Medical cardiac (HF and CAD) and surgical cardiac patients		2 wk	No differences in IG and UC	Small sample size

(*Continued*)

Table 4. Continued

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

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 unsch, unscheduled.

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 (STAAR) 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.[19,32,53,54,56,57] 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 uced,[19,32,53,54,56,57] and in 2 RCTs, no reduction in rehospitalization was observed between groups.[20,21]

Although mortality was not commonly reported, rehospitalization and mortality may be competing outcomes. Low rates of HF rehospitalization may reflect excellence in providing guideline-directed medical therapies or inadequate treatment during the acute HF hospitalization, leading to

Table 5. Effectiveness of Transitions Programs on Cost

				Study Sample Characteristics				
Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Inclusion	Exclusion	Length of Int after Disch	Transition of Care Findings Relevant to End Points	Limitations
Anderson et al,[53] 2005	Hosp costs Costs for 6 wk of HHC services	Q-exp	121 (IG, 44; UC, 77)	Age ≥50 y HF hosp and LVEF <40% Single hosp Disch home	MI in last 12 wk or unstable angina Confusion Had ≥5 Major comorbidities ESRD on dialysis Impending cardiac surgery Ongoing NYHA FC IV	6 wk	Hosp cost for IG was $158 per patient Mean 6-wk HHC cost savings per IG patient was $1541 Total cost saving for all IG patients (n=44) was $67 804	Small sample size Cost savings calculated only for HHC costs; rehosp not included (would likely have resulted in higher IG savings)
Coleman et al,[32] 2004 CT Int	Cost savings in IG	Q-exp design Int group vs admin DB control subjects	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	Patients in LTC Elective hosp	24 d	Over 8 mo, estimated cost saving was $47 133 (n=158)	Did not compare groups; involved only IG
Coleman et al,[18] 2006 CT Int	30-, 90-, and 180-d nonelective hosp cost in IG vs UC	RCT	750 (IG, 375; UC, 375)	Age ≥65 y Had 1 of 11 conditions including HF Hosp at contract hosp of the participating system Comm dwelling Residing in a predefined geographic radius Tele access	Hosp for psychiatric condition Dementia Post-disch plan for hospice	28 d	IG vs UC had lower mean nonelective costs at 30, 90, and 180 d 180 d: $2058±5452 vs $2546±5466 (*P*=0.049) 180-d cost savings with int costs: $147 797 among 375 IG patients Estimated 1-y savings: $295 594	
Jack et al,[42] 2009 Project RED	Post-disch hosp costs of IG vs UC	RCT	738 (IG, 370; UC, 368)	Hosp medical and surgical patients	Admitted from SNF Transferred to another service Planned hosp Blind, deaf, or suicide precautions	Up to 4 d after disch	IG vs UC had 33.9% lower observed cost or savings of $412 per patient	Did not include NDA and pharmacist costs
Leff et al,[58] 2009 Guided Care	Health services costs of IG vs UC	Cluster RCT	904 (IG, 485; UC, 419) Completed/analyzed: IG, 446; UC, 404	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		8 mo (costs were not reported for the entire study duration)	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	Wide CIs for reported benefits; no statistical significance

(*Continued*)

Table 5. Continued

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int after Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Naylor et al,[55] 1994 TC model	6- and 12-wk total cost of TC int vs UC	RCT	276 (medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66)	Age ≥70 y Medical cardiac (HF and CAD) and surgical cardiac patients		2 wk	Medical groups: At 6 wk, total charges in IG for healthcare services after disch 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	Small sample size
Naylor et al,[45] 1999 TC model	24-wk total cost of TC int vs UC	RCT	363 (IG, 177; UC, 186)	Age ≥65 y Hosp with specified medical or surgical Dx at 2 hosps Had ≥1 high-risk criteria for poor post-disch outcomes		4 wk	IG vs UC Medicare cost at 24 wk, \$642 595 vs \$1 238 928 and \$3630 vs \$6661 per patient (P<0.001) IG cost savings (based on UC higher hosp reimbursements) seen for all rehosp at 24 wk No differences between groups in reimbursements for other post-disch acute care visits	
Naylor et al,[27] 2004 TC model	52-wk total cost of TC int vs UC	RCT	239 (IG, 118; UC, 121)	Age ≥65 y Hosp with HF Tele Reside within 60 miles 6 hosp sites	ESRD	3 mo	IG had lower mean cost than UC: \$7636 vs \$12 481 (P=0.002) IC had greater overall significant cost savings per patient: \$6152 vs \$9618	Small sample size
Saleh et al,[23] 2012 PDCT Int	HHC visit cost/benefit ratio	RCT	333 (IG, 175 [160 analyzed]; UC, 199 [173 analyzed])	Age ≥65 y Treated in hosp	Dementia ESRD LTC Assisted living Dx of tumors Severe psychiatric Hx	45 d	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)	Randomized by medical record number: even number, UC; odd number, IG

(*Continued*)

Table 5. Continued

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int after Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Stauffer et al,[57] 2011 TC Program	60-d total costs for HF patients in a "real-world" hosp setting	Prospective pre-post design Concurrent control subjects from other facilities in the health system	140 (IG, 56; UC, 84)	Age ≥65 y Consecutive patients hosp with HF Single-hosp system		3 mo	No difference in mean direct cost comparing pre-int and post-int groups: \$5729 vs \$5176	Not RCT Small sample Int lasted 3 mo but cost reported only at 60 d after disch Costs of int not recovered through decrease in index hosp costs (int did not save hosp money)

Admin DB indicates administrative database; CAD, coronary artery disease; CI, 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.[64,65] 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.[20] 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).[21,27,59] When HF-specific QoL was assessed, intervention groups had better outcomes than control groups[21,27]; however, in generic QoL, not all dimensions were improved.[21,59] Table 7 provides results of other outcomes measured. Transition of care programs did not lead to improved functional status and perceptions of health and self-esteem.[27,45,55] However, transition of 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.[61] When caregiver depression, strain, work productivity, and regular activity productivity were studied at 18 months[63] and patient self-rated health, mortality, and several other healthcare use measures were studied at 32 months,[61] 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 with HF interact in transition of care programs.

Table 6. Effectiveness of Transitions Programs on Quality of Life

				Study Sample Characteristics				
Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Inclusion	Exclusion	Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
Boyd et al,[59] 2009 Guided Care Int	Patient admin survey: patient assessment of chronic illness care	Cluster RCT	904 (IG, 485; UC, 419) Completed/ analyzed: IG, 446; UC n, 404	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	No tele Non-English language Planning extended travel Failed cognitive screening No proxy to provide consent	18 mo	At 18 mo, IG group had twice-greater odds of rating their care as higher ($P \leq 0.003$) than UC	Only 37.8% of eligible patients gave informed consent
Harrison et al,[21] 2002 PCCHF Int	6- and 12-wk HR-QoL using MLWHF Quest Generic QoL using MOS-SF (SF-36) in Int vs UC	RCT	192 (IG, 92; UC, 100)	Hosp with HF at a large teaching hosp Patients disch home Patients living in 60-km radius	Cognitive impairment	12 wk	6 wk: IG had better HR-QoL ($P=0.002$) 12 wk: IG had better HR-QoL ($P<0.001$) 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	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
Naylor et al,[27] 2004 TC model	12-wk HR-QoL using MLWHF Quest in TC vs UC	RCT	239 (IG, 118; UC, 121)	Age ≥65 y Hosp with HF Tele Reside within 60 miles 6 hosp sites	ESRD	3 mo	Compared with UC, IG had better HF-specific QoL and physical QoL ($P<0.05$)	

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.

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.[67,68] 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.[69]

Table 7. Effectiveness of Transitions Programs on Miscellaneous Outcomes

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Altfeld et al,[20] 2013 EDPP Bridge model	Patient and CG stress Healthcare use Death	RCT	740 (IG, 360; UC, 380)	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	Mean, 5.8±11.3 d	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)	Unclear if primary outcome was rehosp or death (death listed as primary but study powered for rehosp)
Boult et al,[60] 2011 Guided Care model	Healthcare use: HHC, ED, hosp, SNF, health service use, PCP care, and specialty care	Cluster RCT	904 (IG, 485; UC, 419) Completed/ analyzed: IG, 446; UC, 404 Screened: 13 534	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	No tele Non-English language Planning extended travel Failed cognitive screening No proxy to provide consent	20 mo	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	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
Boult et al,[61] 2013 Guided Care model	Self-rated health Generic QoL Death Qual of long-term care HHC Use of health services	Matched-pair cluster RCT	904 (IG, 485; UC, 419) Completed/ analyzed: IG, 446; UC, 404 Screened: 13 534	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	No tele Non-English language Planning extended travel Failed cognitive screening No proxy to provide consent	32 mo	No differences in IG and UC self-rated health or MOS SF-36 mental health or physical health subscales 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	Broad range of measures and some reported positive
Coleman et al,[32] 2004 CT Int	Patient satis in CT vs UC	Q-exp design with int vs admin DB control subjects	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	Patients in LTC Elective hosp	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*)

Table 7. Continued

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Dedhia et al,[54] 2009 Safe STEPS int	Disch factors (ie, patient health status), using a TC 15-item survey in Int vs UC	Q-exp pre-post study	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, 2.36; 95% CI, 1.41–3.92) IG had better TC to home compared with UC (OR, 6.83; 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	Admitted from SNF 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 [70%]; $P=0.017$) IG patients could name their PCP more often than UC patients (292 [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 satis 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)

(*Continued*)

Table 7. Continued

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Naylor et al,[55] 1994 TC model	Funct status Mental status Health Self-esteem Affect in TC vs UC	RCT	276 (medical IG, 72; medical UC, 70; surgical IG, 68; surgical UC, 66; CG, 125)	Age ≥70 y Medical cardiac (HF and CAD) and surgical cardiac patients		2 wk	No differences in IG and UC patient outcomes at FU for funct status, mental status, perception of health, self-esteem, and affect	Small sample size
Naylor et al,[45] 1999 TC model	Funct status Mental status; depress Satis in TC vs UC	RCT	363 (IG, 177; UC, 186)	Age ≥65 y Hosp with specified medical or surgical Dx at 2 hosps Had ≥1 high-risk criteria for poor post-disch outcomes		4 wk	No differences in IG and UC patient outcomes at FU in mean funct status (P=0.33), depression (P=0.20), and satis (P=0.92)	
Naylor et al,[27] 2004 TC model	1-y time to rehosp or death Satis Funct status in TC vs UC	RCT	239 (IG, 118; UC, 121)	Age ≥65 y Hosp with HF Tele Reside within 60 miles 6 hosp sites	ESRD	3 mo	IG had lower rehosp or death than UC (47.5% vs 61.2%; P=0.01) IG had longer time to hosp or death vs UC (P=0.026) 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<0.001) No differences in IG and UC funct status	Int effect declined as time increased
Saleh et al,[23] 2012 PDCT int	Self-manag skills/ abilities	RCT	333 (IG, 175 [160 analyzed]; UC, 199 [173 analyzed])	Age ≥65 y Treated in hosp	Dementia ESRD LTC Assisted living Dx of tumors Severe psychiatric Hx	45 d	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	Randomized by medical record number: even number, UC; odd number, IG Most self-manag improvements were within group, not between groups

(*Continued*)

Table 7. Continued

Authors, Year, Model	Specific Outcomes	Study Type	Study Size, n	Study Sample Characteristics		Length of Int After Disch	Transition of Care Findings Relevant to End Points	Limitations
				Inclusion	Exclusion			
Wolff et al,[63] 2010 Guided Care model	Patient depress CG depress Strain Work productivity Activity productivity Views of care Qual of care	Cluster RCT	CG, 196	Primary CG who completed baseline and FU surveys and whose care recipients remained alive and enrolled for 18 mo		18 mo	Compared with UC, IG CG reported higher overall quality of care (adjusted β=0.40; 95% CI, 0.14–0.67) No differences in IG vs UC CG depression, strain, work productivity, and regular activity productivity	

Admin DB indicates administrative database; CAD, coronary artery disease; CG, caregiver; CI, confidence interval; comm, community; CT, care transitions; depress, depressive symptoms; disch, discharge; Dx, diagnosis; ED, emergency department; EDPP, Enhanced Discharge Planning Program; ESRD, end-stage renal disease; FC, functional class; FU, follow up; funct, functional; HHC, home health care; HF, heart failure; hosp, hospital or hospitalization; HR, hazard ratio; Hx, history; IG, intervention group; int, intervention; LTC, long-term care; manag, managing or management; MOS-SF (SF-36) Medical Outcomes Study Short Form; OPD, outpatient; OR, odds ratio; PCP, primary care provider; PDCT, Post Discharge Care Transition; prepare, preparedness; Q-exp, quazi-experimental; Qual, quality; QoL, quality of life; RCT, randomized, controlled trial; RED, reengineering discharge; rehosp, rehospitalization; satis, satisfaction; SNF, skilled nursing facility; STEPS, Successful Transition of Elderly Patients Study; TC, transition or transitional care; tele, telephone; and UC, usual care group.

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,[70] are central. From a societal perspective, resources are finite. It is impossible to satisfy all societal wants.[71] 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[72] 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.[73] Moreover, lack of care coordination and follow-up led to rehospitalization,[74] 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.[75] 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, healthcare 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.[76] In previous research, non–English-speaking adults or those with cognitive deficits, arguably a population at even greater need for transition care,[19,27] were often excluded. Even among studies that represent the real world, only 40% to 50% of patients agreed to participate,[19,57] 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,[18,27,42,57,77] or a social worker.[20,78] 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,[18] as well as pharmacist-led patient-centered discharge instructions.[42] 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[39] 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,[52] 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.[39,52] 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,[19,57] 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.[19] 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.[79] 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),[46] 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,[80–82] and APNs trained in coaching supported patients and families before and for 30 days after discharge.[18] 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

Recommendations	Considerations for Implementation of Recommendations
Systematically implement principles of transition of care programs in high-risk patients with chronic HF.	Include Medication reconciliation Very early postdischarge contact and communication with patient and/or care provider Early office follow-up within first week of discharge Patient education on chronic HF self-care, including skills for recognizing early warning signs of worsening HF and independently completing HF self-care behaviors Communication of patient health record with patient and postdischarge healthcare providers Integrated, interdisciplinary collaboration and coordination A framework that ensures that education is initiated in the hospital before the day of discharge and continues during initial community-based care
Routinely assess patients for high-risk characteristics that may be associated with poor post-discharge clinical outcomes.	Exemplars include cognitive difficulties, impaired learning capabilities, non–English speaking, and long travel time to healthcare providers
Ensure that qualified and trained HF nurse or other healthcare providers of clinical HF provide care services.	Assess healthcare provider knowledge and comfort in delivering patient education and interdisciplinary care coordination services
Allot adequate time in the hospital and postacute setting to deliver complex chronic HF interventions and to assess patient and caregiver responsiveness.	Incorporate 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
Implement handoff procedures at hospital or post–acute care discharge.	Provide 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) Ensure that handoff documents are transmitted to postdischarge care providers in a timely manner
Develop, monitor, and ensure transparency of results of quality measures using a structure, process, and outcome framework.	Include Handoff performance Patient adherence to 7-d healthcare provider follow-up office visit Healthcare 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) Leadership and administrative support for sustaining quality of transition of care program
Consider patients' perceptions of QoL as a surrogate for physical, psychological, and social concerns that require support during the transition of care process.	Provide bridging for specific patient support needs
Ensure availability of transition of care component details in writing (eg, a training manual)	Promote fidelity of the program and consistent application by healthcare providers Ensure leadership and administrative support, including clinical leaders (navigators, advocates, etc)
Use health informatics technology to assist with program sustainability. Informatics should be patient and healthcare provider centric.	Evaluate data for applicability and completeness in facilitating patient communication and care coordination, quality metrics, research, and financial analyses

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,[83] 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.[83] Although risk models are available to predict HF mortality after hospitalization,[1] 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.[84]

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).[85] 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[86] extend previous research of patient risk factors at discharge.[87,88] 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.[89] 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.[90–95] 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.[96] 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.[97,98] 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.[99–102] Furthermore, in qualitative research, patients stated that they knew what to do, but they needed assistance in learning how to do it.[103] 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

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Adrian Hernandez	Duke University	AHA†	None	None	None	None	None	None
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Sara Paul	Western Piedmont Heart Centers	None	None	None	None	None	None	None
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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.

*Modest.

†Significant.

Reviewer Disclosures

Reviewer	Employment	Research Grant	Other Research Support	Speakers' Bureau/ Honoraria	Expert Witness	Ownership Interest	Consultant/ Advisory Board	Other
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Rebecca Gary	Emory University	None	None	None	None	None	None	None
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References

1. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey DE Jr, Drazner MH, Fonarow GC, Geraci SA, Horwich T, Januzzi JL, Johnson MR, Kasper EK, Levy WC, Masoudi FA, McBride PE, McMurray JJ, Mitchell JE, Peterson PN, Riegel B, Sam F, Stevenson LW, Tang WH, Tsai EJ, Wilkoff BL. 2013 ACCF/AHA guideline for the management of heart failure: executive summary: a report of the American College of Cardiology Foundation/American Heart Association Task Force on practice guidelines. *Circulation*. 2013;128:1810–1852. doi: 10.1161/CIR.0b013e31829e8807.
2. Hall MJ, Levant S, DeFrances CJ. Hospitalization for congestive heart failure: United States, 2000–2010. *NCHS Data Brief*. 2012;108:1–8.
3. Shah RU, Tsai V, Klein L, Heidenreich PA. Characteristics and outcomes of very elderly patients after first hospitalization for heart failure. *Circ Heart Fail*. 2011;4:301–307. doi: 10.1161/CIRCHEARTFAILURE.110.959114.
4. Chen J, Normand SL, Wang Y, Krumholz H. National and regional trends in heart failure hospitalization and mortality rates for Medicare beneficiaries, 1998-2008. *JAMA*. 2011;306:1669–1678. doi: 10.1001/jama.2011.1474.
5. Chen J, Ross J, Carlson M, Lin Z, Normand SL, Bernheim SM, Drye EE, Ling SM, Han LF, Rapp MT, Krumholz HM. Skilled nursing facility referral and hospital readmission rates after heart failure or myocardial infarction. *Am J Med*. 2012;125:100.e101-100.e109. doi: 10.1016/j.amjmed.2011.06.011.
6. Madigan EA, Gordon NH, Fortinsky RH, Koroukian SM, Piña I, Riggs JS. Rehospitalization in a national population of home health care patients with heart failure. *Health Serv Res*. 2012;47:2316–2338. doi: 10.1111/j.1475-6773.2012.01416.x.
7. Unroe KT, Greiner MA, Johnson KS, Curtis LH, Setoguchi S. Racial differences in hospice use and patterns of care after enrollment in hospice among Medicare beneficiaries with heart failure. *Am Heart J*. 2012;163:987–993.e3. doi: 10.1016/j.ahj.2012.03.006.
8. Chun S, Tu JV, Wijeysundera HC, Austin PC, Wang X, Levy D, Lee DS. Lifetime analysis of hospitalizations and survival of patients newly admitted with heart failure. *Circ Heart Fail*. 2012;5:414–421. doi: 10.1161/CIRCHEARTFAILURE.111.964791.
9. Albert NM, Paul S, Murray M. Complexities of care for patients and families living with advanced cardiovascular diseases: overview. *J Cardiovasc Nurs*. 2012;27:103–113. doi: 10.1097/JCN.0b013e318239f4dd.
10. Au AG, McAlister FA, Bakal JA, Ezekowitz J, Kaul P, van Walraven C. Predicting the risk of unplanned readmission or death within 30 days of discharge after a heart failure hospitalization. *Am Heart J*. 2012;164:365–372. doi: 10.1016/j.ahj.2012.06.010.

11. Bradley EH, Curry L, Horwitz LI, Sipsma H, Thompson JW, Elma M, Walsh MN, Krumholz HM. Contemporary evidence about hospital strategies for reducing 30-day readmissions: a national study. *J Am Coll Cardiol*. 2012;60:607–614. doi: 10.1016/j.jacc.2012.03.067.
12. Davidson PM, Cockburn J, Newton PJ. Unmet needs following hospitalization with heart failure: implications for clinical assessment and program planning. *J Cardiovasc Nurs*. 2008;23:541–546. doi: 10.1097/01.JCN.0000338927.43469.35.
13. Oertle M, Bal R. Understanding non-adherence in chronic heart failure: a mixed-method case study. *Qual Saf Health Care*. 2010;19:e37. doi: 10.1136/qshc.2009.033563.
14. Heo S, Lennie TA, Okoli C, Moser DK. Quality of life in patients with heart failure: ask the patients. *Heart Lung*. 2009;38:100–108. doi: 10.1016/j.hrtlng.2008.04.002.
15. Takeda A, Taylor SJ, Taylor RS, Khan F, Krum H, Underwood M. Clinical service organisation for heart failure. *Cochrane Database Syst Rev*. 2012;9:CD002752. doi: 10.1002/14651858.CD002752.pub3.
16. Boult C, Green AF, Boult LB, Pacala JT, Snyder C, Leff B. Successful models of comprehensive care for older adults with chronic conditions: evidence for the Institute of Medicine's "retooling for an aging America" report. *J Am Geriatr Soc*. 2009;57:2328–2337. doi: 10.1111/j.1532-5415.2009.02571.x.
17. The Bridge Model. 2012. http://www.transitionalcare.org/the-bridge-model/. Accessed August 21, 2012.
18. Coleman EA, Parry C, Chalmers S, Min SJ. The care transitions intervention: results of a randomized controlled trial. *Arch Intern Med*. 2006;166:1822–1828. doi: 10.1001/archinte.166.17.1822.
19. Voss R, Gardner R, Baier R, Butterfield K, Lehrman S, Gravenstein S. The care transitions intervention: translating from efficacy to effectiveness. *Arch Intern Med*. 2011;171:1232–1237. doi: 10.1001/archinternmed.2011.278.
20. Altfeld SJ, Shier GE, Rooney M, Johnson TJ, Golden RL, Karavolos K, Avery E, Nandi V, Perry AJ. Effects of an enhanced discharge planning intervention for hospitalized older adults: a randomized trial. *Gerontologist*. 2013;53:430–440. doi: 10.1093/geront/gns109.
21. Harrison MB, Browne GB, Roberts J, Tugwell P, Gafni A, Graham ID. Quality of life of individuals with heart failure: a randomized trial of the effectiveness of two models of hospital-to-home transition. *Med Care*. 2002;40:271–282.
22. Pugh LC, Tringali RA, Boehmer J, Blaha C, Kruger NR, Capauna TA, Bryan Y, Robinson J, Belmont D, Young M, Xie S. Partners in care: a model of collaboration. *Holist Nurs Pract*. 1999;13:61–65.
23. Saleh SS, Freire C, Morris-Dickinson G, Shannon T. An effectiveness and cost-benefit analysis of a hospital-based discharge transition program for elderly Medicare recipients. *J Am Geriatr Soc*. 2012;60:1051–1056. doi: 10.1111/j.1532-5415.2012.03992.x.
24. Society of Hospital Medicine. Quality Initiatives/Project Boost. 2012. www.hospitalmedicine.org. Accessed August 21, 2012.
25. Savage LS, Grap MJ. Telephone monitoring after early discharge for cardiac surgery patients. *Am J Crit Care*. 1999;8:154–159.
26. Rutherford P, Nielsen GA, Taylor J, Bradke P, Coleman E. *How-to Guide: Improving Transitions from the Hospital to Community Settings to Reduce Avoidable Rehospitalizations*. Cambridge, MA: Institute for Healthcare Improvement; June 2013. www.IHI.org. Accessed September 2, 2013.
27. Naylor MD, Brooten DA, Campbell RL, Maislin G, McCauley KM, Schwartz JS. Transitional care of older adults hospitalized with heart failure: a randomized, controlled trial. *J Am Geriatr Soc*. 2004;52:675–684. doi: 10.1111/j.1532-5415.2004.52202.x.
28. Williams MV, Li J, Hansen LO, Forth V, Budnitz T, Greenwald JL, Howell E, Halasyamani L, Vidyarthi A, Coleman EA. Project BOOST implementation: lessons learned. *South Med J*. 2014;107:455–465.
29. Jack B, Bickmore AT. The re-engineered hospital discharge program to decrease rehospitalization. *Care Management*. 2011;16:12–17.
30. Kommuri NV, Johnson ML, Koelling TM. Relationship between improvements in heart failure patient disease specific knowledge and clinical events as part of a randomized controlled trial. *Patient Educ Couns*. 2012;86:233–238. doi: 10.1016/j.pec.2011.05.019.
31. Wiggins BS, Rodgers JE, DiDomenico RJ, Cook AM, Page RL 2nd. Discharge counseling for patients with heart failure or myocardial infarction: a best practices model developed by members of the American College of Clinical Pharmacy's Cardiology Practice and Research Network based on the Hospital to Home (H2H) Initiative. *Pharmacotherapy*. 2013;33:558–580. doi: 10.1002/phar.1231.
32. Coleman EA, Smith JD, Frank JC, Min SJ, Parry C, Kramer AM. Preparing patients and caregivers to participate in care delivered across settings: the Care Transitions Intervention. *J Am Geriatr Soc*. 2004;52:1817–1825. doi: 10.1111/j.1532-5415.2004.52504.x.
33. Toman C, Harrison MB, Logan J. Clinical practice guidelines: necessary but not sufficient for evidence-based patient education and counseling. *Patient Educ Couns*. 2001;42:279–287.
34. Johnson MB, Laderman M, Coleman EA. Enhancing the effectiveness of follow-up phone calls to improve transitions in care: three decision points. *Jt Comm J Qual Patient Saf*. 2013;39:221–227.
35. White M, Garbez R, Carroll M, Brinker E, Howie-Esquivel J. Is "teach-back" associated with knowledge retention and hospital readmission in hospitalized heart failure patients? *J Cardiovasc Nurs*. 2013;28:137–146. doi: 10.1097/JCN.0b013e31824987bd.
36. Cutilli CC, Schaefer CT. Case studies in geriatric health literacy. *Orthop Nurs*. 2011;30:281–285; quiz 286–287. doi: 10.1097/NOR.0b013e3182247c8f.
37. Mistiaen P, Poot E. Telephone follow-up, initiated by a hospital-based health professional, for postdischarge problems in patients discharged from hospital to home. *Cochrane Database Syst Rev* 2006;18:CD004510.
38. Bostrom J, Caldwell J, McGuire K, Everson D. Telephone follow-up after discharge from the hospital: does it make a difference? *Appl Nurs Res*. 1996;9:47–52.
39. Hansen LO, Young RS, Hinami K, Leung A, Williams MV. Interventions to reduce 30-day rehospitalization: a systematic review. *Ann Intern Med*. 2011;155:520–528. doi: 10.7326/0003-4819-155-8-201110180-00008.
40. Misky GJ, Wald HL, Coleman EA. Post-hospitalization transitions: examining the effects of timing of primary care provider follow-up. *J Hosp Med*. 2010;5:392–397. doi: 10.1002/jhm.666.
41. Preen DB, Bailey BE, Wright A, Kendall P, Phillips M, Hung J, Hendriks R, Mather A, Williams E. Effects of a multidisciplinary, post-discharge continuance of care intervention on quality of life, discharge satisfaction, and hospital length of stay: a randomized controlled trial. *Int J Qual Health Care*. 2005;17:43–51. doi: 10.1093/intqhc/mzi002.
42. Jack BW, Chetty VK, Anthony D, Greenwald JL, Sanchez GM, Johnson AE, Forsythe SR, O'Donnell JK, Paasche-Orlow MK, Manasseh C, Martin S, Culpepper L. A reengineered hospital discharge program to decrease rehospitalization: a randomized trial. *Ann Intern Med*. 2009;150:178–187.
43. Bonow RO, Ganiats TG, Beam CT, Blake K, Casey DE Jr, Goodlin SJ, Grady KL, Hundley RF, Jessup M, Lynn TE, Masoudi FA, Nilasena D, Piña IL, Rockswold PD, Sadwin LB, Sikkema JD, Sincak CA, Spertus J, Torcson PJ, Torres E, Williams MV, Wong JB; American College of Cardiology Foundation; American Heart Association Task Force on Performance Measures; American Medical Association-Physician Consortium for Performance Improvement. ACCF/AHA/AMA-PCPI 2011 performance measures for adults with heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Performance Measures and the American Medical Association-Physician Consortium for Performance Improvement. *Circulation*. 2012;125:2382–2401. doi: 10.1161/CIR.0b013e3182507bec.
44. The Joint Commission. Disease-Specific Care Certification Program: Advanced Certification Heart Failure Performance Measurement Implementation Guide. http://www.jointcommission.org/assets/1/6/2014_ACHF_Manual_6_required_measures.pdf. Accessed May 29, 2013.
45. Naylor MD, Brooten D, Campbell R, Jacobsen BS, Mezey MD, Pauly MV, Schwartz JS. Comprehensive discharge planning and home follow-up of hospitalized elders: a randomized clinical trial. *JAMA*. 1999;281:613–620.
46. Stamp KD, Machado MA, Allen NA. Transitional care programs improve outcomes for heart failure patients: an integrative review. *J Cardiovasc Nurs*. 2014;29:140–154. doi: 10.1097/JCN.0b013e31827db560.
47. Hernandez AF, Greiner MA, Fonarow GC, Hammill BG, Heidenreich PA, Yancy CW, Peterson ED, Curtis LH. Relationship between early physician follow-up and 30-day readmission among Medicare beneficiaries hospitalized for heart failure. *JAMA*. 2010;303:1716–1722. doi: 10.1001/jama.2010.533.
48. Molloy GJ, O'Carroll RE, Witham MD, McMurdo ME. Interventions to enhance adherence to medications in patients with heart failure: a systematic review. *Circ Heart Fail*. 2012;5:126–133. doi: 10.1161/CIRCHEARTFAILURE.111.964569.
49. Graven LJ, Grant JS. Social support and self-care behaviors in individuals with heart failure: an integrative review. *Int J Nurs Stud*. 2014;51:320–333. doi: 10.1016/j.ijnurstu.2013.06.013.
50. Gallagher R, Luttik ML, Jaarsma T. Social support and self-care in heart failure. *J Cardiovasc Nurs*. 2011;26:439–445. doi: 10.1097/JCN.0b013e31820984e1.

51. Scott IA. Preventing the rebound: improving care transition in hospital discharge processes. *Aust Health Rev*. 2010;34:445–451. doi: 10.1071/AH09777.
52. Naylor MD, Aiken LH, Kurtzman ET, Olds DM, Hirschman KB. The care span: the importance of transitional care in achieving health reform. *Health Aff (Millwood)*. 2011;30:746–754. doi: 10.1377/hlthaff.2011.0041.
53. Anderson C, Deepak BV, Amoateng-Adjepong Y, Zarich S. Benefits of comprehensive inpatient education and discharge planning combined with outpatient support in elderly patients with congestive heart failure. *Congest Heart Fail*. 2005;11:315–321.
54. Dedhia P, Kravet S, Bulger J, Hinson T, Sridharan A, Kolodner K, Wright S, Howell E. A quality improvement intervention to facilitate the transition of older adults from three hospitals back to their homes. *J Am Geriatr Soc*. 2009;57:1540–1546. doi: 10.1111/j.1532-5415.2009.02430.x.
55. Naylor M, Brooten D, Jones R, Lavizzo-Mourey R, Mezey M, Pauly M. Comprehensive discharge planning for the hospitalized elderly: a randomized clinical trial. *Ann Intern Med*. 1994;120:999–1006.
56. Russell D, Rosati RJ, Sobolewski S, Marren J, Rosenfeld P. Implementing a transitional care program for high-risk heart failure patients: findings from a community-based partnership between a certified home healthcare agency and regional hospital. *J Healthc Qual*. 2011;33:17–23; quiz 23–24. doi: 10.1111/j.1945-1474.2011.00167.x.
57. Stauffer BD, Fullerton C, Fleming N, Ogola G, Herrin J, Stafford PM, Ballard DJ. Effectiveness and cost of a transitional care program for heart failure: a prospective study with concurrent controls. *Arch Intern Med*. 2011;171:1238–1243. doi: 10.1001/archinternmed.2011.274.
58. Leff B, Reider L, Frick KD, Scharfstein DO, Boyd CM, Frey K, Karm L, Boult C. Guided care and the cost of complex healthcare: a preliminary report. *Am J Manag Care*. 2009;15:555–559.
59. Boyd CM, Reider L, Frey K, Scharfstein D, Leff B, Wolff J, Groves C, Karm L, Wegener S, Marsteller J, Boult C. The effects of guided care on the perceived quality of health care for multi-morbid older persons: 18-month outcomes from a cluster-randomized controlled trial. *J Gen Intern Med*. 2010;25:235–242. doi: 10.1007/s11606-009-1192-5.
60. Boult C, Reider L, Leff B, Frick KD, Boyd CM, Wolff JL, Frey K, Karm L, Wegener ST, Mroz T, Scharfstein DO. The effect of guided care teams on the use of health services: results from a cluster-randomized controlled trial. *Arch Intern Med*. 2011;171:460–466. doi: 10.1001/archinternmed.2010.540.
61. Boult C, Leff B, Boyd CM, Wolff JL, Marsteller JA, Frick KD, Wegener S, Reider L, Frey K, Mroz TM, Karm L, Scharfstein DO. A matched-pair cluster-randomized trial of guided care for high-risk older patients. *J Gen Intern Med*. 2013;28:612–621. doi: 10.1007/s11606-012-2287-y.
62. Marsteller JA, Hsu YJ, Reider L, Frey K, Wolff J, Boyd C, Leff B, Karm L, Scharfstein D, Boult C. Physician satisfaction with chronic care processes: a cluster-randomized trial of guided care. *Ann Fam Med*. 2010;8:308–315. doi: 10.1370/afm.1134.
63. Wolff JL, Giovannetti ER, Boyd CM, Reider L, Palmer S, Scharfstein D, Marsteller J, Wegener ST, Frey K, Leff B, Frick KD, Boult C. Effects of guided care on family caregivers. *Gerontologist*. 2010;50:459–470. doi: 10.1093/geront/gnp124.
64. Hernandez AF, Curtis LH. Minding the gap between efforts to reduce readmissions and disparities. *JAMA*. 2011;305:715–716. doi: 10.1001/jama.2011.167.
65. Gorodeski EZ, Starling RC, Blackstone EH. Are all readmissions bad readmissions? *N Engl J Med*. 2010;363:297–298. doi: 10.1056/NEJMc1001882.
66. Spertus JA. Evolving applications for patient-centered health status measures. *Circulation*. 2008;118:2103–2110. doi: 10.1161/CIRCULATIONAHA.107.747568.
67. Green CP, Porter CB, Bresnahan DR, Spertus JA. Development and evaluation of the Kansas City Cardiomyopathy Questionnaire: a new health status measure for heart failure. *J Am Coll Cardiol*. 2000;35:1245–1255.
68. Rector TS, Kubo SH, Cohn JN. Validity of the Minnesota Living With Heart Failure questionnaire as a measure of therapeutic response to enalapril or placebo. *Am J Cardiol*. 1993;71:1106–1107.
69. Dunlay SM, Gheorghiade M, Reid KJ, Allen LA, Chan PS, Hauptman PJ, Zannad F, Maggioni AP, Swedberg K, Konstam MA, Spertus JA. Critical elements of clinical follow-up after hospital discharge for heart failure: insights from the EVEREST trial. *Eur J Heart Fail*. 2010;12:367–374. doi: 10.1093/eurjhf/hfq019.
70. Selby JV, Beal AC, Frank L. The Patient-Centered Outcomes Research Institute (PCORI) national priorities for research and initial research agenda. *JAMA*. 2012;307:1583–1584. doi: 10.1001/jama.2012.500.
71. Mark DB, Hlatky MA. Medical economics and the assessment of value in cardiovascular medicine: part I. *Circulation*. 2002;106:516–520.
72. Methodology Committee of the Patient-Centered Outcomes Research Institute (PCORI). Methodological standards and patient-centeredness in comparative effectiveness research: the PCORI perspective. *JAMA*. 2012;307:1636–40. doi:10.1001/jama.2012.466.
73. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med*. 2009;360:1418–1428. doi: 10.1056/NEJMsa0803563.
74. Epstein AM. Revisiting readmissions: changing the incentives for shared accountability. *N Engl J Med*. 2009;360:1457–1459. doi: 10.1056/NEJMe0901006.
75. Orszag PR, Emanuel EJ. Health care reform and cost control. *N Engl J Med*. 2010;363:601–603. doi: 10.1056/NEJMp1006571.
76. Allen LA, Smoyer Tomic KE, Smith DM, Wilson KL, Agodoa I. Rates and predictors of 30-day readmission among commercially insured and Medicaid-enrolled patients hospitalized with systolic heart failure. *Circ Heart Fail*. 2012;5:672–679. doi: 10.1161/CIRCHEARTFAILURE.112.967356.
77. Blue L, Lang E, McMurray JJ, Davie AP, McDonagh TA, Murdoch DR, Petrie MC, Connolly E, Norrie J, Round CE, Ford I, Morrison CE. Randomised controlled trial of specialist nurse intervention in heart failure. *BMJ*. 2001;323:715–718.
78. US Department of Health and Human Services, Administration on Aging. Care transitions in action: from hospital to home in two communities. http://www.aoa.gov/Aging_Statistics/docs/AoA_ACA_CT_slides_033011.pdf. Accessed February 1, 2013.
79. Coleman EA, Smith JD, Raha D, Min SJ. Posthospital medication discrepancies: prevalence and contributing factors. *Arch Intern Med*. 2005;165:1842–1847. doi: 10.1001/archinte.165.16.1842.
80. Chaboyer W. Intensive care and beyond: improving the transitional experiences for critically ill patients and their families. *Intensive Crit Care Nurs*. 2006;22:187–193. doi: 10.1016/j.iccn.2006.05.001.
81. Chaboyer W, Gillespie B, Foster M, Kendall M. The impact of an ICU liaison nurse: a case study of ward nurses' perceptions. *J Clin Nurs*. 2005;14:766–775. doi: 10.1111/j.1365-2702.2005.01141.x.
82. Chow SK, Wong FK. Health-related quality of life in patients undergoing peritoneal dialysis: effects of a nurse-led case management programme. *J Adv Nurs*. 2010;66:1780–1792. doi: 10.1111/j.1365-2648.2010.05324.x.
83. Heart Failure Society of America, Lindenfeld J, Albert NM, Boehmer JP, Collins SP, Ezekowitz JA, Givertz MM, Katz SD, Klapholz M, Moser DK, Rogers JG, Starling RC, Stevenson WG, Tang WH, Teerlink JR, Walsh MN. HFSA 2010 comprehensive heart failure practice guideline. *J Card Fail*. 2010;16:e1–e194.
84. Nosbusch JM, Weiss ME, Bobay KL. An integrated review of the literature on challenges confronting the acute care staff nurse in discharge planning. *J Clin Nurs*. 2011;20:754–774. doi: 10.1111/j.1365-2702.2010.03257.x.
85. Hsiao J, Motta M, Wyer P. Validating the acute heart failure index for patients presenting to the emergency department with decompensated heart failure. *Emerg Med J*. 2012;29:e5. doi: 10.1136/emermed-2011-200610.
86. O'Connor CM, Hasselblad V, Mehta RH, Tasissa G, Califf RM, Fiuzat M, Rogers JG, Leier CV, Stevenson LW. Triage after hospitalization with advanced heart failure: the ESCAPE (Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness) risk model and discharge score. *J Am Coll Cardiol*. 2010;55:872–878. doi: 10.1016/j.jacc.2009.08.083.
87. Fonarow GC, Adams KF Jr, Abraham WT, Yancy CW, Boscardin WJ; ADHERE Scientific Advisory Committee, Study Group, and Investigators. Risk stratification for in-hospital mortality in acutely decompensated heart failure: classification and regression tree analysis. *JAMA*. 2005;293:572–580. doi: 10.1001/jama.293.5.572.
88. Lee DS, Austin PC, Rouleau JL, Liu PP, Naimark D, Tu JV. Predicting mortality among patients hospitalized for heart failure: derivation and validation of a clinical model. *JAMA*. 2003;290:2581–2587. doi: 10.1001/jama.290.19.2581.
89. Rodriguez-Pascual C, Paredes-Galan E, Vilches-Moraga A, Ferrero-Martinez AI, Torrente-Carballido M, Rodriguez-Artalejo F. Comprehensive geriatric assessment and 2-year mortality in elderly patients hospitalized for heart failure. *Circ Cardiovasc Qual Outcomes*. 2014;7:251–258. doi: 10.1161/CIRCOUTCOMES.113.000551.
90. Carson P, Tam SW, Ghali JK, Archambault WT, Taylor A, Cohn JN, Braman VM, Worcel M, Anand IS. Relationship of quality of life scores with baseline characteristics and outcomes in the African-American Heart Failure Trial. *J Card Fail*. 2009;15:835–842. doi: 10.1016/j.cardfail.2009.05.016.
91. Heidenreich PA, Spertus JA, Jones PG, Weintraub WS, Rumsfeld JS, Rathore SS, Peterson ED, Masoudi FA, Krumholz HM, Havranek EP, Conard MW, Williams RE; Cardiovascular Outcomes Research Consortium.

Health status identifies heart failure outpatients at risk for hospitalization or death. *J Am Coll Cardiol*. 2006;47:752–756. doi: 10.1016/j.jacc.2005.11.021.

92. Iqbal J, Francis L, Reid J, Murray S, Denvir M. Quality of life in patients with chronic heart failure and their carers: a 3-year follow-up study assessing hospitalization and mortality. *Eur J Heart Fail*. 2010;12:1002–1008. doi: 10.1093/eurjhf/hfq114.
93. Konstam V, Salem D, Pouleur H, Kostis J, Gorkin L, Shumaker S, Mottard I, Woods P, Konstam MA, Yusuf S. Baseline quality of life as a predictor of mortality and hospitalization in 5,025 patients with congestive heart failure: SOLVD Investigations: Studies of Left Ventricular Dysfunction Investigators. *Am J Cardiol*. 1996;78:890–895.
94. Kosiborod M, Soto GE, Jones PG, Krumholz HM, Weintraub WS, Deedwania P, Spertus JA. Identifying heart failure patients at high risk for near-term cardiovascular events with serial health status assessments. *Circulation*. 2007;115:1975–1981. doi: 10.1161/CIRCULATIONAHA.106.670901.
95. O'Loughlin C, Murphy NF, Conlon C, O'Donovan A, Ledwidge M, McDonald K. Quality of life predicts outcome in a heart failure disease management program. *Int J Cardiol*. 2010;139:60–67. doi: 10.1016/j.ijcard.2008.09.003.
96. Dunderdale K, Thompson DR, Beer SF, Furze G, Miles JN. Development and validation of a patient-centered health-related quality-of-life measure: the Chronic Heart Failure Assessment Tool. *J Cardiovasc Nurs*. 2008;23:364–370. doi: 10.1097/01.JCN.0000317439.82704.e8.
97. Lee CS, Moser DK, Lennie TA, Riegel B. Event-free survival in adults with heart failure who engage in self-care management. *Heart Lung*. 2011;40:12–20. doi: 10.1016/j.hrtlng.2009.12.003.
98. van der Wal MH, van Veldhuisen DJ, Veeger NJ, Rutten FH, Jaarsma T. Compliance with non-pharmacological recommendations and outcome in heart failure patients. *Eur Heart J*. 2010;31:1486–1493. doi: 10.1093/eurheartj/ehq091.
99. Albert NM, Collier S, Sumodi V, Wilkinson S, Hammel JP, Vopat L, Willis C, Bittel B. Nurses's knowledge of heart failure education principles. *Heart Lung*. 2002;31:102–112.
100. Fowler S. Improving community health nurses' knowledge of heart failure education principles: a descriptive study. *Home Healthc Nurse*. 2012;30:91–99; quiz 100–101. doi: 10.1097/NHH.0b013e318242c5c7.
101. Kalogirou F, Lambrinou E, Middleton N, Sourtzi P. Cypriot nurses' knowledge of heart failure self-management principles. *Eur J Cardiovasc Nurs*. 2013;12:159–166. doi: 10.1177/1474515112440367.
102. Mahramus TL, Penoyer DA, Sole ML, Wilson D, Chamberlain L, Warrington W. Clinical nurse specialist assessment of nurses' knowledge of heart failure. *Clin Nurse Spec*. 2013;27:198–204. doi: 10.1097/NUR.0b013e3182955735.
103. Granger BB, Sandelowski M, Tahshjain H, Swedberg K, Ekman I. A qualitative descriptive study of the work of adherence to a chronic heart failure regimen: patient and physician perspectives. *J Cardiovasc Nurs*. 2009;24:308–315. doi: 10.1097/JCN.0b013e3181a4be30.