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## Research for Practice

# Relationship Between Heart Failure Bedside Discharge Teaching and Readmissions

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In 2020, the American Heart Association reported about 6.2 million U.S. adults have a diagnosis of heart failure (HF) (Virani et al., 2020). In 2012, the cost of HF to the nation was estimated at \$30.7 billion (Benjamin et al., 2019). Projections indicate total HF costs will be \$70 billion by 2030 (Khan et al., 2020). Hospitalizations and re-hospitalizations account for the greatest financial burden associated with HF, up to 80% in some analyses (Heidenreich et al., 2022).

The Patient Protection and Affordable Care Act (2010) has been one of the most consequential federal health policies in recent U.S. history and represents, among other things, the federal response to the readmission problem. The Hospital Readmissions Reduction Program (HRRP), one of several programs that emerged from this law, created financial incentives for reducing readmission rates for common conditions such as HF. Although the HRRP was associated quickly with significant reductions in readmission for HF generally (Khera & Krumholz, 2018), many hospitals continue to struggle to attain desired improvements in readmissions of patients with this diagnosis. Frequently, hospital leaders look at discharge teaching delivered by clinical nurses as an opportunity for improvement in preventing readmission.

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**A streamlined bedside discharge teaching program was compared to conventional discharge teaching among patients with heart failure. No significant differences were found in patient readmissions between the two teaching programs, but nurses were positive regarding time savings with the streamlined program.**

**Keywords:** heart failure, readmissions, discharge teaching, treatment fidelity, intention-to-treat analysis

**Learning Outcome:** After completing this education activity, the learner will be able to discuss the effectiveness of a streamlined bedside discharge teaching program in preventing hospital readmissions in patients with heart failure.

Although the readmissions problem is obvious, no consensus exists on possible remedies despite years of experimentation with various disease management interventions. Transitional care interventions have been thought to hold the brightest promise for reducing hospital readmissions, but the most effective are also the most intensive and expensive. Less expensive alternatives for patients being discharged to their homes, such as bedside discharge teaching and physician follow up, are the mainstay of transitional care for patients with HF in many hospitals.

## Purpose/Hypothesis

Previous qualitative research at the study site showed discharge teaching by nurses was rushed and patients with HF were dissatisfied with the large volume of poorly organized print materials they received. Patients reported concerns about being discharged before they thought they were medically ready, with clinicians ignoring patient goals and concerns, and exclusion of caregivers from teaching. Patients, typically older adults, also generally demonstrated poor recall of teaching they received during

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### Background

Despite financial incentives for reducing readmission rates for patients with heart failure (HF), many hospitals continue to struggle to obtain improvements in readmissions.

### Aims

Evaluate effects of an evidence-based streamlined discharge teaching process, informed by previous qualitative research, on readmissions for patients with HF. A secondary aim was to evaluate treatment fidelity.

### Methods

This quasi-experimental study tested the null hypothesis that implementation of a streamlined discharge teaching process incorporating evidence-based components, but untethered from lengthy printed discharge packets and videos, is not associated with changes in readmission rates for patients with HF.

### Data Analysis

Data quality was generally excellent. Descriptive statistics were used to summarize data. Chi-square tests and logistic regression were used to evaluate relationships and compare groups. Intention-to-treat analysis is reported.

### Results

No significant difference was found in readmission rates between intervention and usual care groups. Fidelity to the discharge teaching process was poor; problems tended to be clustered in the areas of including caregivers in teaching and successfully arranging physician follow up.

### Limitations and Implications

Because of problems with treatment fidelity, a per-protocol analysis to evaluate intervention effectiveness was limited. However, the intention-to-treat analysis revealed confident findings anchored in real-world practice.

### Conclusion

Incremental changes in the bedside discharge teaching protocol are likely to be useless as a means of reducing readmissions for HF. Alternative structures for delivering discharge information and other transitional care are discussed.

charge planning, coordination, and teaching; this brief review focuses narrowly on discharge teaching. The most recent Cochrane review evaluated randomized trials of discharge plans across the globe (Goncalves-Bradley et al., 2022), but did not examine discharge teaching as an independent component of the discharge plan. CINAHL, PubMed, and APA Psycinfo databases were searched for 2019-2023 using the following terms: *hospital discharge, teaching, nurse, heart failure, and chronic illness*. The review was limited to studies performed in the United States or western Europe, systematic reviews of studies, or scoping reviews. Some literature older than 5 years was included when it was considered the best or only examples of the topic under discussion. Due to relative lack of publications specifically about discharge teaching in patients with HF, literature was reviewed for medical-surgical discharges generally and, when applicable, specific chronic disorders other than HF (e.g., chronic obstructive pulmonary disease).

Bedside discharge teaching is a common target for intervention when hospitals attempt to reduce HF readmissions (Pellet et al., 2020). Pellet and coauthors' (2020) review of studies of nursing discharge teaching for older adults concluded essential components of teaching, as well as the teaching process and context, had not been described consistently. Teaching also had not been evaluated adequately for effectiveness. Most published studies of nursing discharge teaching interventions focused on specific components of the process that could be improved, including maintaining continuity of discharging staff, reducing content, tailoring content to the patient situation, personalizing discharge summaries, including caregivers in teaching, and assessing patient readiness for discharge (Bahr et al., 2020; Hahn-Goldberg et al., 2021; Harrison et al., 2020; Topham et al., 2022). Outcomes varied with a focus on length of time from medical discharge order to actual discharge, patient satisfac-

previous admissions and from physicians, which is consistent with the literature (Gatto & Newcomb, 2022).

The purpose of this study was to evaluate effects of an evidence-based streamlined discharge teaching process, informed by the previous study and the literature, on readmissions for patients with HF. Researchers tested the null hypothesis that the new teaching process would have no different impact than the usual process on readmission rates. Primary aims were to

save nurses time and ensure prompt medical follow up based on the assumption that healthcare providers in the community would participate in explaining the ongoing plan of care and patient education. A secondary aim was to evaluate fidelity to a research intervention aligned with but not mandated by hospital policy.

### Review of Literature

Transitional care consists of multiple components, including dis-

tion, patient comprehension, patient perception of teaching adequacy, patient empowerment, and patient readiness for discharge. The relationship between the bedside discharge teaching process as a whole and readmissions for HF is studied less than specific components of the process, but discharge teaching as a frequently missed or inadequately performed nursing task has been suggested for two decades (Kalisch & Xie, 2014). It was confirmed recently in a cross-sectional study from Italy (Sollami et al., 2023).

Alternatives to bedside discharge teaching on the day of discharge have been described. An older meta-analysis (Van Spall et al., 2017), included because it was the only study found comparing disease management clinics to nurse home visits and nurse case management, found these three interventions were the only ones judged more effective than discharge education with physician follow up for reducing HF readmissions. Subsequent work (Blum et al., 2020) examined the cost effectiveness of these three interventions. Blum and co-authors found nurse home visits, a component of many intensive transitional care programs offered by insurance companies and health systems in the United States, to be the most cost-effective strategy examined. Nevertheless, usual care still tends to ignore alternatives to the traditional discharge instruction formula.

Studies of fidelity to HF discharge teaching interventions were not found. A related study of implementation fidelity to a behavioral diabetes prevention intervention in primary care concluded challenges in faithfully implementing evidence-based interventions depend on the context in which the interventions are delivered (Gupta et al., 2023). Mixed conclusions regarding the role of discharge teaching as a whole and components of discharge teaching specifically in preventing readmissions of patients with HF means additional inquiry is needed. Fidelity to discharge teaching protocols by those delivering the teaching largely has been ignored.

Although abundant literature addresses discharge planning and transitional care, there is less research evidence regarding the discharge teaching component of discharge planning or transitional care. Bedside discharge teaching by nurses is an easy target for blame when readmissions are experienced, but evidence supporting the independent effect of bedside discharge teaching on readmissions is lacking. This study aimed to increase knowledge related to independent effects of discharge teaching on readmissions, effects of single components of discharge teaching, and the degree of fidelity to a discharge teaching protocol that could be expected in typical hospital environments.

### Ethics

This project was conducted in compliance with the ethical requirements outlined in the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979) and was reviewed and approved by the University of Texas Southwestern Medical Center Institutional Review Board. Verbal consent was obtained and written information about the study was provided to participants. Participants provided written authorization for the collection and use of private information for research purposes. All data were deidentified, treated as confidential, and accessible only to the research team.

### Sample Selection

This study was conducted with a sample of 400 patients admitted for HF October 2021–October 2022 at seven hospitals within Texas Health Resources, one of the largest hospital networks in north Texas. All seven hospitals were designated as Magnet® or Pathways to Excellence® facilities. A sample of at least 200 participants in the intervention group was desired to achieve 0.80 power for within-groups analysis using Chi-square tests with 2 df, a relaxed alpha of 0.10, and anticipat-

ing a small-to-medium effect size of  $W=0.2$  (PASS 2021 Power Analysis and Sample Size, 2021). The sample was doubled for between-groups analysis; 200 patients participated in the intervention and 200 patients were selected randomly from the pool of patients who were not exposed to the intervention in the study hospitals, resulting in a 1:1 ratio of treatment to control. Standard care for the control groups consisted of bedside discharge teaching by a nurse. Patients were expected to follow up with a physician after discharge. A Mini-Cog™ test (Borson et al., 2003) was administered to potential members of the intervention group. Patients with scores less than 3 were excluded to reduce bias due to impaired cognitive functioning.

Policies and procedures governing discharge teaching are standardized across the hospitals; therefore, no effort was made to stratify the sample by hospital. Patients who could not participate in discharge teaching in English, and those with an established diagnosis of dementia on admission or who were being discharged to a congregant living facility were excluded from enrollment. Sampling was purposive and convenient. A consistent cadre of clinical nurses whose responsibilities ordinarily include discharge teaching delivered the intervention after training on its structure and use of the intervention summary discharge teaching forms. These nurses also recruited and consented participants from the pool of patients with HF who were being discharged from their work units on the days they worked. Feedback was given to nurses in the early weeks of the intervention to reinforce documentation and teaching methods.

### Design and Method

This quasi-experimental project was a trial of a more structured and streamlined discharge teaching project than usually practiced in the study units.

**TABLE 1.**  
**Comparison of Discharge Teaching in Typical Usual Practice and Intervention**

Expectations in Usual Practice	Expectations in Intervention
No assessment of cognitive function	Assess cognitive function using the Mini-Cog test.
Provide 20-40 page discharge document and review all the sections, including red flags for adverse events. If time is short, sections will be omitted at nurse's discretion.	Provide a single-page discharge document and review each section, including red flags, omitting none. Attach single page summary to 20-40 page discharge document for patient's use at home.
Goals, if any, are provided by nurse.	Patients articulate their own goals and discuss with nurse. If goals are unrealistic or not relevant to disease management, nurse can gently redirect.
Patients directed to make an appointment for follow up within 2 weeks.	Follow-up appointments are routinely made by hospital staff.
Review sodium and fluid restrictions specifically.	Review sodium and fluid restrictions specifically.
Review daily weight instructions specifically.	Review daily weight instructions specifically.
Patient instructed to call physician in the community if they have questions or problems develop.	Patient provided with a safety net phone number of hospital staff they can call if they need information prior to follow up.
Caregivers included in teaching if they happen to be present.	Staff to make an effort to contact caregivers and invite them to teaching encounter. Cue to do this is in discharge document.
Teach-back recommended for teaching method.	Teach-back expected for teaching method and cue is included in discharge document.

### Usual Care

Usual care in regard to discharge teaching in the study hospitals included providing a printed after-visit summary that averaged 20-40 pages but could be longer depending on if the discharging nurse added information. The packet had no table of contents; detailed medication instructions and any individualized instructions were within the packet in different places. Delivery of teaching was unstructured, so the way information was delivered and the pieces of information delivered were the nurse's decision (see Table 1 for differences between usual care and intervention).

### Intervention

The intervention was informed by results of previous qualitative work in the study health system (Gatto & Newcomb, 2022). Among other findings, patients in that study complained about the volume of information they were expected to master. Thus, the intervention consisted of a streamlined,

structured protocol for discharge teaching using a single-page discharge sheet that cued nurses to follow the protocol and also served as a discharge tool for patients. Components of the discharge teaching protocol were evidence-based, with most taken directly from Agency for Healthcare and Quality and Centers for Medicare & Medicaid Services recommendations (Hahn-Goldberg et al., 2021; Luther et al., 2019; Topham et al., 2022). The discharge summary sheet was clipped to the traditional discharge packet for the patient to use as reference at home if desired.

Before delivering the intervention discharge teaching, nurses were expected to assess the patient's cognitive function by administering a Mini-Cog test. This was not considered a part of the intervention but was completed as a potential confounder for later analysis. Components of the intervention protocol included the following: discussing patients' goals for discharge, making follow-up appointments for patients before discharge

and documenting information on the discharge summary sheet, reviewing warning signs for adverse events after discharge, reviewing sodium and fluid restrictions and daily weight instructions, providing a safety net phone number patients could call if they had questions before follow up, including caregivers in teaching, and using teach-back throughout discharge education. The traditional 20-40-page discharge summary was not reviewed with patients in the treatment group. Other materials that were provided routinely, such as educational videos and toolkit booklets, were provided as usual but not reviewed with the patient. Patients in the control group received discharge teaching as usually practiced. Historically, methods such as teach-back are taught to nurses who may or may not use the new methods. Those who use the new methods do so with varying degrees of competence. Fidelity to teaching methods or other psychosocial procedures rarely is monitored with the same rigor as fidelity

**TABLE 2.**  
**Primary Findings (Between Groups)**

Variable	Control Group <i>n</i> =203	Intervention Group <i>n</i> =201	Association or Difference
Age (years)	Range 23-96 Mean=66.17 (SD=18.51)	Range 27-98 Mean=69.36 (SD=13.67)	Not significant MW-U=18273**, <i>p</i> =0.21
Sex	107 Female (53%) 96 Male (47%)	104 Female (52%) 97 Male (48%)	Not significant X <sup>2</sup> =0.038, <i>p</i> =0.85
Length of Stay	Range 1-27 Mean=4.6 (SD=3.7)	Range 1-29 Mean=6.3 (SD=4.5)	Significant MW-U=139867, <i>p</i> =0.0001
Readmissions within 30 days	36 (18%)	49 (25%)	Not significant*** X <sup>2</sup> =2.849, <i>p</i> =0.10
Readmissions within 60 days*	65 (32%)	67 (33%)	Not significant X <sup>2</sup> =0.079, <i>p</i> =0.78
Readmissions related to heart failure signs/symptoms within 30 days	19 (56%)	24 (50%)	Not significant X <sup>2</sup> =0.276, <i>p</i> =0.60
Readmissions related to heart failure signs/symptoms within 60 days	32 (52%)	35 (34%)	Not significant X <sup>2</sup> =0.063, <i>p</i> =0.80

\*Includes 30-day readmissions

\*\*Non-parametric test (Mann-Whitney U test) used due to substantial skew toward older ages.

\*\*\*Pearson Chi-square values used due to large sample size and high expected counts.

to physical procedures in practice, so monitoring of the intervention was unusual and could have applied some incentive to remain true to the protocol.

**Data Analysis**

Discharge summary sheets were given to patients and copied, scanned, and transferred to the principal investigator (PI) after the patient encounter. Data were organized into variables and entered into a spreadsheet, with subsequent analysis performed using SPSS software (Version 25). The primary outcome was 30- and 60-day readmission. Readmissions were measured by auditing the electronic medical record 4 months following conclusion of data collection. The health system informatics group provided raw data linking readmissions with study participants and with patients in the control group.

The secondary outcome was fidelity to the discharge protocol among the treatment group. Fidelity

to the treatment protocol was judged by the quality of documentation on the summary sheets. Blank spaces indicated components that were not completed. Other outcomes of interest included effects on readmissions of intervention fidelity, caregiver presence during teaching, cognitive deficit, staff arrangement of follow-up physician visits, and patient-generated discharge goals related to HF.

Outcomes were evaluated using Chi-square tests based on 2X2 cross-tabulations. Among the treatment group, components of the protocol were treated as covariates along with age, length of stay, and number of days to follow up, and a logistic regression was completed to control statistically for the effects of covariates. Significance level for hypothesis testing was set at 0.05. All tests were powered well enough to detect conventionally defined small effects (Cohen W=0.2) or greater, and all were 2-sided.

**Findings**

A total of 404 cases were examined, with a treatment group of 201 cases compared to a usual care or control group of 203 cases in an intention-to-treat (ITT) fashion. The null hypothesis was supported (see Table 2 for findings for the two groups).

Age was considered the major confounder due to cognitive deficits and additional chronic illnesses that may appear as individuals mature. Age distribution was evaluated by means of a Mann-Whitney U test due to substantial skew toward older ages and the groups were found to be comparable. Sex was similar across groups as well. A significant difference was found in length of stay (LOS), with the intervention group experiencing longer average index hospitalizations. A logistic regression was performed to evaluate effects of LOS adjusting for age, sex, and group, which showed a significant but small effect of LOS

**TABLE 3.**  
Secondary Objectives (Within-Groups Analysis)

Variable	Outcome: 30-Day Readmission			Outcome: 60-Day Readmission		
	X <sup>2</sup>	p-Value*	Cohen W	X <sup>2</sup>	p-Value	Cohen W
Per-protocol treatment delivery	0.001	1.000	0.003	0.987	0.435	0.07
Follow-up appointment made for patient	1.481	0.22	0.09	3.506	0.06	0.13
Caregiver present during teaching	0.048	0.83	0.02	0.597	0.44	0.06
Patient goal related to managing heart failure	1.244	0.27	0.08	0.861	0.35	0.07
Follow up with cardiologist specifically	1.179	0.28	0.08	0.207	0.65	0.03

\*Continuity correction applied to X<sup>2</sup> when expected count is <10.

on readmission within 30 days (OR=1.063,  $p=0.025$ ). Reasons for readmissions varied wildly from alcohol intoxication to vomiting and diarrhea. Readmissions were rarely for HF specifically but were often for signs and symptoms the discharge teaching highlighted as reasons to see a doctor, such as shortness of breath or chest pain. No significant associations were found between groups and 30-day readmissions, 60-day readmissions, readmissions for HF signs and symptoms within 30 days, or HF signs and symptoms within 60 days.

Further examination of the intervention group was performed to evaluate the effect of fidelity to the protocol and effects of individual components of the discharge teaching protocol. Only 29 patients (14%) in the intervention group received every component of the discharge teaching protocol, and the effect of the per-protocol delivery on readmissions within 30 days was essentially non-existent (Cohen's  $W=0.003$ ,  $X^2=0.001$ , 1 df,  $p=0.974$ ). The effect of per protocol delivery had a small but non-significant effect on readmissions at 60 days (see Table 3).

Making appointments for post-discharge follow up with a cardiologist, primary care provider, or both was an important component of the discharge protocol; 129 patients (64%) had follow-up appointments. Readmission within 30 or 60 days was not associated significantly with having a follow-up appointment among the intervention group, although a small positive effect was

noted for 60-day readmissions. Likewise, having a caregiver present during the discharge teaching was an important goal; this was achieved with 47 patients (25%), but it was not associated with readmissions at 30 or 60 days. Nurses were asked to elicit goals from patients, and these were categorized as related to managing HF or unrelated. Articulating goals related to managing HF was not related significantly to readmission at 30 or 60 days.

Days to follow up among patients who had follow-up appointments ranged from none (same day as discharge) to 32 (mean 11 days,  $SD=7$ ). Neither readmissions for any reason nor readmissions related to HF signs and symptoms were correlated with days to follow up (point biserial  $r = -0.052$  and  $0.028$  respectively).

## Discussion

Anecdotal evidence from nurses indicated they liked the intervention because it relieved them of reviewing a lengthy written discharge packet. However, the lack of difference between intervention and control groups opens the possibility that even when using the long version of discharge materials, nurses were selective and did not review all of it or did not review it effectively. Another reason for lack of effect is the acknowledged fact that discharge teaching still occurs at discharge when patients are paying more attention to leaving the hospital than learning and nurses are rushing to get the patient out of

the room in a timely manner. Finally, nurses depend to a great extent on technology and toolkits to provide the education patients need rather than face-to-face teaching encounters. Each patient in this system, typical of regional services, is assigned a teaching video to watch at the hospital or at home, and is provided with a printed booklet (toolkit) to teach the same facts addressed in the discharge teaching encounter. Despite this quantity of written and video materials, the readmission rate remains higher than desirable.

From the perspective of patients and the health system, this is a troubling picture. Given the nursing shortage and staffing constraints, workload and time pressures will not be relieved in nursing units across the nation in the foreseeable future. Readmissions will continue, which will impact health system revenue. It is critical to determine if having clinical nurses continue to deliver discharge teaching is an effective or efficient way to reduce readmissions. Data from this study suggest it is not.

As noted in the review of literature, alternatives exist for bedside discharge teaching. Some of them have been associated with reduced readmissions, including disease management clinics, nurse home visits, and nurse case management (Van Spall et al., 2017). Other newer ideas, such as virtual nurse discharge teaching and nurse-led discharge teams, are becoming popular but evidence showing their effects on readmissions is lacking.

## Limitations

ITT analysis was used in this study because questionable fidelity to discharge teaching recommendations was suspected in usual care, as well as research procedures. A primary objective was to determine if a teaching protocol could be successful under natural conditions, including usual training procedures and usual time pressures on the care units. Missing data on case report forms indicated deviation from the protocol. The primary limitation for this study was missing data, which made per-protocol analysis difficult. However, while a per-protocol analysis could demonstrate the effectiveness of the intervention better, the ITT analysis provided a real-world answer to how the intervention would work in practice.

## Recommendations for Future Research

Future research should focus on alternative structures for delivering discharge information to patients and communicating with post-discharge health providers. Currently, a movement toward more holistic transitional care models is evident in the literature. Future researchers may benefit from building on this work.

## Nursing Implications

Discharge teaching by clinical nurses, an important milestone in every hospitalization, is part of the clinic care model of transitional care. In this model of care for patients with HF, the patient follows up after discharge and at regular intervals thereafter with the provider, likely in a clinic setting. This professional completes the bulk of the education about disease management and makes necessary changes to the treatment plan. This variation of “it takes a village” has been shown to be ineffective for educating patients with HF enough to prevent readmissions. Clinics are as busy as hospital nursing units and time pressures may be even more intense.

As an alternative to the clinic care model, a transitional care model employing intensive case management has been shown to be more effective for teaching patients how to manage chronic illness generally and has been found to reduce readmissions among persons with HF (Morkisch et al., 2020). Although it is more expensive for health systems than the clinic care model, this could be offset by savings on readmission penalties. Many systems employ case managers who largely are responsible for arranging dispositions to inpatient facilities after discharge. However, an authentic case management transitional care model is broader and often uses interprofessional teams (Hewner et al., 2021).

A good example was described by Huffman and O’Neal (2023), who evaluated the effects of a transitional care program for patients with chronic obstructive pulmonary disease implemented by a nurse-led interprofessional team. The team included an advanced practice nurse, a registered nurse, a social worker, and a pharmacist. Primary components of the program involved risk factor assessment and screening, including social determinants of health, collaboration with relevant hospital providers, patient and caregiver education, discharge planning and preparation, clinical and medication management, psychosocial support, coordination of follow-up care with providers and community partners, and telephone communication with the patient and family for 30 days after discharge. The program was associated with significant reductions in all-cause readmissions and substantial savings in HRRP penalty dollars.

As described by Huffman and O’Neal (2023), use of a dedicated team for transitional care reduces the workload of clinical nurses as they are relieved of the task of discharge teaching. However, it maintains nursing control of the transitional care process, including patient education. Discharge teaching is a nursing task in need of reengineering as evidenced by the poor fidelity to the discharge proto-

col found in this study. Anecdotal evidence indicated reasons for omitting components of the protocol varied, but the two most common were time pressures and unavailability of caregivers. An interprofessional team working on transitional care from the point of admission could overcome these barriers in most cases, while increasing patient satisfaction with the discharge/transition process and reducing financial penalties related to readmissions.

## Conclusion

Current evidence-based recommendations for discharge teaching such as the Re-Engineered Discharge (RED) Toolkit (Jack et al., 2013) are reasonable expectations for discharge teaching. However, implementation of the recommendations is likely to be erratic and depends largely on time pressures. In this study, the streamlined discharge teaching program based on RED and other evidence-based activities had similar outcomes to standard teaching in regard to readmissions. Alternative structures for the management of chronic illness following hospital discharge are needed to relieve the burden of readmissions for patients and hospitals. Team-based, interprofessional transitional care is recommended strongly for older adults with HF. Anticipated benefits include task relief for clinical nurses, reduced readmissions, and reduced financial penalties for hospitals. **MSN**

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