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A Resident-driven Quality Improvement Project to Increase Primary Care Follow-up after Congestive Heart Failure Exacerbation: Use of a Quality and Safety Award

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Abstract

Objectives: Congestive heart failure (CHF) is the most common cause of 30-day inpatient readmission. Studies have found that early follow-up with primary care physicians (PCP) within 7 days of discharge may improve 30-day readmission rates; however, many have used a multidisciplinary discharge coordination team, which is not a resource at all centers. Here, the authors present a resident-driven quality improvement initiative using a monthly quality and safety award to increase early PCP follow-up for veterans discharged following admissions due to a CHF exacerbation. Primary outcomes were percentage of PCP follow-up within 7 days and median time to PCP follow-up. Secondary outcomes included percentage of patients attending a PCP visit within 7 days, 30-day readmission, and 30-day mortality.

Methods: This prepost quasi-experimental cohort study evaluated 3 concurrent quality improvement interventions to increase PCP follow-up after CHF exacerbation. Process maps and Ishikawa diagrams examined the discharge process. Interventions included a standardized discharge scheduling order, monthly education on the process, and monthly aggregated performance feedback for each medical resident. A patient safety and quality award was given to the team with the highest rate of PCP appointments scheduled within 7 days. Patient characteristics and outcomes were gathered for a 6-month historic period and 6-month intervention period. Test of proportions and Wilcoxon Rank-Sum test were used to compare groups.

Results: A total of 294 patients were discharged (161 in historic group and 133 in intervention group). Appointments scheduled within 7 days of discharge increased from 43% to 79% ($P < 0.001$). Median time to PCP follow-up decreased from 8 to 6 days ($P < 0.001$). Patients who completed (showed up to) a PCP appointment within 7 days increased from 16% to 41% ($P < 0.001$). There was no impact on 30-day readmission or mortality; however, the number of study subjects was too small to rule out an effect.

Conclusions: A standardized discharge scheduling order, more robust resident education, and a monthly patient safety and quality award resulted in a significant increase in the rate of primary care follow-up within 7 days of CHF exacerbation.

Keywords

congestive heart failure exacerbation, quality improvement, resident driven

Congestive heart failure (CHF) contributes to over $17 billion in Medicare expenditures and over a million annual hospital admissions in the United States.[1] The American Heart Association projects that the costs associated with CHF care will more than double from $307 billion annually to $697 billion by the year 2030.[2] Efforts to reduce costs and prevent morbidity associated with CHF have focused on reducing the 30-day readmission rates, which remain above 20%.[2–4] In 2012, the Hospital Readmission Reduction Program was passed as an effort to reduce 30-day CHF readmissions in addition to other diagnoses with high prevalence among Medicare beneficiaries. Under this program, if a hospital's readmission rate for CHF is above the national average by a predetermined percentage, the hospital suffers reductions in reimbursement by the Centers for Medicare and Medicaid Services.[5,6] Transition of care services such as timely outpatient follow-up with primary care physicians (PCP) within 1 week after discharge for CHF have been proposed as a mechanism to reduce readmissions and thus avoid such penalties while improving the quality of patient care.[7–9]

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Within the Veterans health administration (VA) system, PCP follow-up within 7 days of discharge is tracked nationally as a CHF quality metric. The arrangement of postdischarge appointments within a short-time frame often poses a scheduling and logistical challenge. Prior published quality improvement (QI) efforts to increase PCP follow-up after CHF exacerbation have been successful; however, many have used a multidisciplinary team including physicians, nurses, and clinical pharmacists.[9–14] In centers without robust clinical pharmacy services or nurses dedicated to placing orders on behalf of physicians to assist in transition of care coordination, the timing, and logistics of follow-up after discharge falls on the discharging physician. The primary outcomes of this project were the percentage of PCP follow-up appointments arranged within 7 days of discharge and median time to PCP follow-up for patients discharged due to CHF exacerbation. The primary QI aim was to increase the percentage of patients with PCP appointments within 7 days by 20% from baseline within 6 months. Secondary outcomes included the percentage of 7-day follow-up completion rate, 30-day all-cause readmission rate, and 30-day mortality rate.

Methods

Setting

The John D. Dingell Veterans Affairs Medical Center is a 267-bed acute-care teaching hospital in Detroit, Michigan. Heart failure readmission rates at the John D. Dingell VA Medical Center were higher than the national average. The 30-day all-cause readmission rate for CHF exacerbation at the start of this project in 2018 was 27% (compared with the national average around that time period of 21%–23%).[5,15]

Process Evaluation

This quasi-experimental cohort study was designed to increase the proportion of primary care follow-up within 7 days for patients discharged with CHF exacerbation using a resident-driven model and monthly quality and safety award. A historic 6-month cohort of patients discharged for CHF exacerbation from September 1, 2018, to February 28, 2019, was compared with an intervention cohort of patients discharged for the same reason between September 1, 2019, and February 29, 2020. Before the intervention, the local practice was for chief residents to instruct all medical residents to request PCP appointments within 7 days of discharge for CHF exacerbation patients; however, no instruction on how to do so was provided. The intervention started with a process evaluation conducted by the Chief Resident in Quality and Safety (CRQS), a medical doctor graduate in internal medicine pursuing an additional postdoctoral year with a focus on quality and safety education. During the process evaluation, the CRQS conducted informal focus groups with residents on the wards who were placing discharge orders and also met with ward scheduling clerks who were responsible for making follow-up appointments. A process map of the series of steps from discharge to primary care follow-up was then developed. The process map revealed numerous issues in the discharge process. First, whether the patient was scheduled to see a PCP, a cardiologist, or both after discharge varied widely. Second, the decision on when to request outpatient follow-up was not standardized, with some teams making the requests shortly after admission to try to stream-line the process, while others waited until the day of discharge to ensure that the patient would not still being in the hospital during their future appointment time. Third, despite basic instruction that appointments should be within 7 days of discharge, the requested time to follow-up varied among different teams (eg, 1–2 weeks for some, or simply no timeframe requested for others). Fourth, residents were using a variety of strategies to obtain follow-up for their patients, including direct calls to nurse discharge coordinators who stated they were unable to place orders, placing "scheduling" orders for a floor clerk to call and make the appointment, and placing outpatient consult orders directly to various clinics including some which were incorrect. If a patient was discharged during a holiday, weekend, or evening, the process was even less clear. Finally, an Ishikawa (fishbone) diagram, constructed using the previously found difficulties, also revealed multiple system-based issues in the discharge process, including limited appointment availability and lack of a standardized mechanism for scheduling clerks to know when a discharge was related to CHF and thus time sensitive.

Intervention Description

After meetings and discussion with ward clerks and medical residents, a standardized workflow process and scheduling order for requesting PCP follow-up visits was created. The first step was educating medical residents on this ordering process during their monthly education, including step-by-step screen shots of how to enter the orders and instruction to do so early, ideally within 24 hours of admission. Residents were also given contingency plans for nights, weekends, or situations in which an

appointment was requested later than ideal such as on the day of discharge. The CRQS educated all residents rotating on and off the wards each month to orient them to this process. In addition, the CRQS in conjunction with the hospital Chief of Staff initiated a monthly "Patient Safety and Quality Award" for the internal medicine team with the highest rate of PCP follow-up appointments scheduled within 7 days of discharge for their CHF patients. The award was printed on cardstock and given during noon lecture at the end of each month as an incentive and motivational tool. After Plan, Do, Study, Act (PDSA) cycle 1, data showed an increase in the percentage of CHF patients for whom a PCP follow-up had been ordered; however, there were numerous instances where the appointment had not been scheduled within 7 days as requested (Figure 1). During PDSA cycle 2, other stake holders such as scheduling clerk supervisors and the ambulatory physician section chief were involved and asked for more input on the process. Additional training was provided to ward clerks on how to prioritize scheduling for CHF patients, and a contingency plan was adopted that included immediate escalation to the chief scheduling nurse and ambulatory physician section chief via email if no appointments within 7 days were available.

Data Collection and Analysis

Data on time to PCP follow-up, follow-up completion, and all-cause 30-day readmission rates were assessed via retrospective chart review of patients with CHF exacerbation who were discharged during the historic and intervention periods. Age and other clinical characteristics relating to degree of illness and comorbidities pertinent to CHF were also collected and compared between groups. Data on discharged patients were extracted from a VA Regional Data Warehouse for manual analysis. The primary outcomes were the percentage of PCP follow-up appointments scheduled within 7 days of discharge and the median time to PCP follow-up. Secondary outcomes included the percentage of 7-day follow-up appointments completed by patients (defined as the patient being scheduled and showing up for the appointment), 30-day all-cause readmission, and 30-day mortality rate. Categorical and continuous nonparametric data in the 2 groups were compared with a test of difference in proportions, or Wilcoxon Rank-Sum test as appropriate. Data were analyzed using STATA Version 16.1. The project was deemed to represent QI and exempt from institutional board review approval.

Results

A total of 294 patients were included in the study (161 in the historic group, and 133 in the intervention group). Median (interquartile [IQR]) age was 70 (63.3–76) years and primarily (98%) male with high rates of cardiopulmonary comorbidities and hospitalization within the preceding year (Table 1). Demographic data and clinical characteristics were similar between groups (Table 1). The primary outcome of percentage of PCP follow-up appointments arranged within 7 days increased from 42.9% in the historic group to 78.9% in the intervention group ($P < 0.001$). The median (IQR) time to follow-up decreased from 8 (5–15) to 6 (4–7) days ($P < 0.001$) (Table 2). A control chart of median time to follow-up with split control limits before and after the QI intervention is shown in Figure 2. The percentage of patients who completed a PCP appointment within 7 days also increased from 16.1% to 40.6% ($P < 0.001$). All-cause 30-day readmissions did not differ between the groups, at 27.3% in the historic group, and 21.8% in the intervention group. However, using an alpha of 0.05 and power of 80%, the required sample size would have had to have been around 1920 patients to reach a statistically significant difference in readmissions at these incidence rates. Similarly, 30-day mortality was underpowered to an even greater extent. In a subgroup analysis of patients in the intervention group, those who received an appointment within 7 days had similar rates of readmission to those who did not ($P = 0.616$). Additionally, those who attended their 7-day PCP appointment had similar rates of readmission to those who did not ($P = 0.136$).

Discussion

The primary aim of this project was to achieve a 20% increase from baseline in the percentage of patients discharged due to CHF exacerbation who had PCP follow-up within 7 days. This primary aim was met, and the authors were able to significantly reduce median time to follow-up. In addition, the percentage of patients who actually attended their 7-day follow-up appointments also increased. The process evaluation helped engage system stakeholders and gain further insight into the complexity and shortcomings of the discharge appointment scheduling process. Unfortunately, 30-day readmission and mortality were not ultimately reduced; however, the number of patients in the study was too small for it to have a reasonable chance of reaching a statistically significant difference in readmissions or mortality. Other
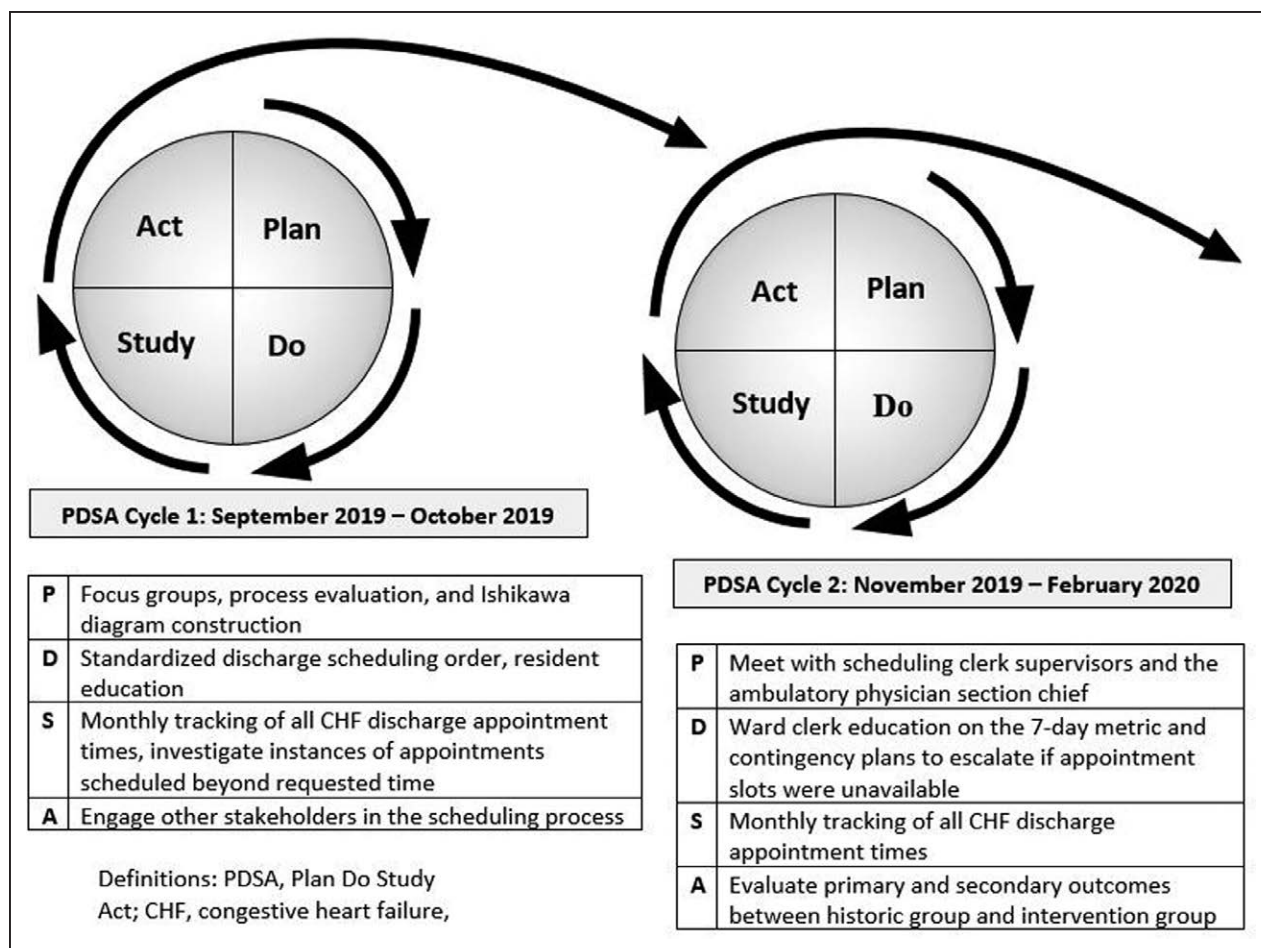
Figure 1. Rolling Deming (PDSA) cycle design used during 6-month intervention period.

studies have conducted similar interventions among discharging medical residents to increase primary care follow-up; however, none were without utilization of some type of multidisciplinary team including clinical pharmacists or nurse discharge coordinators.[11-14] To date, no other QI studies have been conducted among medical residents using creation of an award as a motivational tool and reward strategy. Strengths of this project include this unique aspect as well as its relative simplicity. Once the process evaluation was completed and a plan was in place, the intervention itself involved more robust resident education and a monthly patient safety and quality award; neither of which had any monetary cost to the institution. Although education is considered a weak intervention in the QI community, the monthly orientation of house staff starting their rotation at the VA was already a standardized process, which made this

Table 1. Demographic and Clinical Characteristics of Patients Discharged Due to Congestive Heart Failure Exacerbation

Characteristic	Total, n = 294	Historic group, n = 161	Intervention group, n = 133	P
Age median (IQR), years	70 (63.3–76)	70 (63–76)	70 (64–75.8)	0.562
Male, n (%)	288 (98.0)	156 (96.9)	132 (99.2)	0.155
EF%, median (IQR)	35 (20–55)	35 (20–55)	37 (20–55)	0.522
EF <30%, n (%)	108 (36.7)	63 (39.1)	45 (33.8)	0.349
Atrial fibrillation, n (%)	117 (39.8)	62 (38.5)	55 (41.4)	0.815
Coronary artery disease, n (%)	147 (50.0)	79 (49.1)	68 (51.1)	0.725
COPD, n (%)	122 (41.5)	62 (38.5)	60 (45.1)	0.253
Chronic kidney disease, n (%)	118 (40.1)	68 (42.2)	50 (37.6)	0.483
Diabetes, n (%)	139 (47.3)	73 (45.3)	66 (49.6)	0.464
Hospitalizations in last 1 year, median (IQR)	2 (1–4)	2 (1–4)	2 (1–4)	0.621

Abbreviations: COPD, chronic obstructive pulmonary disease; EF, ejection fraction; IQR, interquartile range.

Table 2. Primary Care Follow-up and Other Outcomes for Patient Discharged Due to Congestive Heart Failure Exacerbation

	Total n = 294	Historic Group n = 161	Intervention Group n = 133	*P*
Primary outcomes				
PCP appointment scheduled within 7 days of DC, n (%)	174 (59.2)	69 (42.9)	105 (78.9)	<0.001
Time to PCP Follow-up, median (IQR), days	7 (4–11)	8 (5–15)	6 (4–7)	<0.001
Secondary outcomes				
Patient attended PCP appointment within 7 days of DC, n (%)	80 (27.2)	26 (16.1)	54 (40.6)	< 0.001
30-day readmission, n (%)	73 (24.8)	44 (27.3)	29 (21.8)	0.275
30-day mortality, n (%)	1 (1.4)	3 (1.9)	1 (0.8)	0.413

DC, discharge; IQR, interquartile range; PCP, primary care physician;.

easy to adapt and maintain. Use of a scheduling order through the electronic medical record standardized the process and removed the extra work for residents such as phone calls or face-to-face meetings with clerks. Most importantly, this intervention did not require any additional discharge coordination staff such as clinical pharmacists, nurses, or mid-level providers and would be feasible to adopt in settings without those extra staff resources. Limitations of this project include the almost exclusively male patient population, which may be hard to generalize to other centers caring for a mix of male and female CHF patients. As trainees, medical residents may have been more influenced by an award from an upper-level hospital administrator and thus this intervention may be less successful in nonacademic settings. If applied to centers where discharging physicians are fully credentialed employed hospitalists or internists, a similar reward from a leader in the medical division may still be a successful intervention strategy, especially if tied to financial bonus. Finally, the monthly tracking of discharge appointment metrics down to the level of individual physician data was performed by the CRQS and may not be possible in a system utilizing less detailed manual data abstraction techniques. It is notable that although 78.9% of patients in the intervention period left the hospital with a primary care appointment within 7 days, only 40.1% were physically seen by their PCP within 7 days. All discharged patients receive a paper copy of their discharge summary containing the dates, times, and location of scheduled future appointments. In
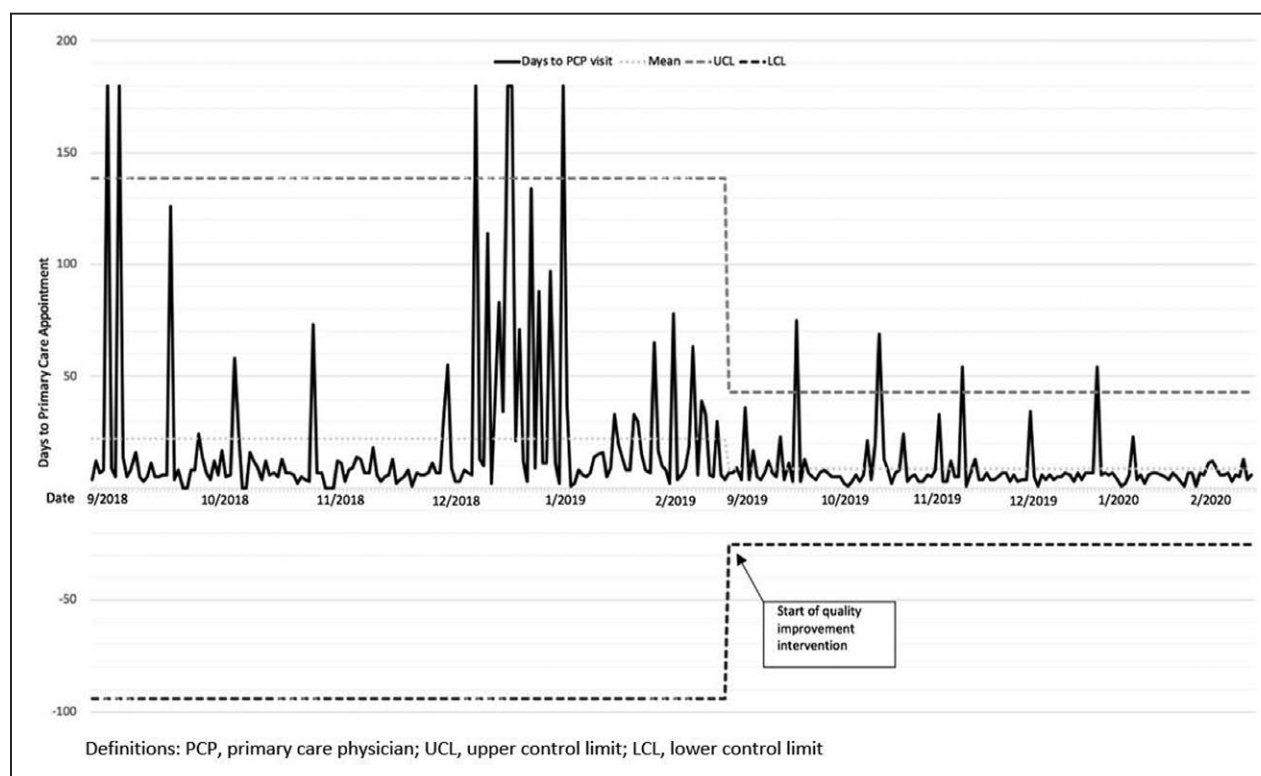
Figure 2. Control chart for time to primary care follow-up before and after a quality improvement intervention

addition, clinic staff provide a reminder call in the 24–48 hours before the visit. The study population was comprised of elderly men of color who were hospitalized in inner city Detroit, so there may have been transportation or other social determinants of health which impeded appointment attendance. Although veterans without reliable transportation have access to vouchers, low health literacy may limit patient ability to navigate and obtain such resources. This study was for QI purposes and did not involve direct contact with individual patients to see why they did not attend their appointment, therefore the exact cause of these missed appointments are not clear. Overall, increasing the attendance at PCP visits after discharge for CHF exacerbation did not reduce readmissions, even in a subgroup analysis of intervention patients who came to their appointments. Other studies have found that close follow-up after discharge is beneficial. For example, in nearly 12,000 adults hospitalized with heart failure, Lee and colleagues found that early initial outpatient visits with a cardiologist or general internist within 7 days after discharge was associated with a 19% lower odds of readmission [(OR) = 0.81; 95% CI, 0.70–0.94].[16] It is possible that the number of patients is too small to have shown a statistically significant difference in the secondary outcomes. Physicians and health systems may be asked to dedicate administrative and cost resources in order to meet similar discharge metrics, without knowing if these metrics positively impact the readmission rates in their centers. Further real-world studies are needed to see if improvements in such metrics impact readmissions and patient outcomes. In the meantime, clinicians should continue to strategize on low-cost pragmatic interventions to increase patient follow-up.

Conclusions

Ultimately, a standardized discharge scheduling order, more robust resident education, and a monthly patient safety and quality award resulted in a significant increase in the rate of primary care follow-up within 7 days of CHF exacerbation. These results were achieved without a multidisciplinary team involved in the discharge ordering or counseling process. Despite significantly more PCP follow-up scheduled and completed within 1 week of discharge, there was no difference in the rate of 30-day readmission or mortality. Based on the results of this study, the authors believe that this protocol is easily applicable to other teaching institutions without robust clinical pharmacy and transition of care nursing services who are asked to meet similar quality metrics for PCP

follow-up after discharge in CHF exacerbation patients.

Conflicts of Interest

The authors have no conflicts of interest to disclose.

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