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#### Comparison of Patients with Congestive Heart Failure With and Without a Primary Care Provider: A Retrospective Cohort Study

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# **Comparison of Patients with Congestive Heart Failure With and** Without a Primary Care Provider: A Retrospective Cohort Study

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# Background

Cardiovascular disease is among the leading causes of death in the United States, with congestive heart failure (CHF) affecting 2.4% of the United States

### Results

Patient discharged from hospita Admitting diagnosis of CHI Admitted between 11/1/2017 and 10/31/2018

(n=3111)

## Discussion

According to claims data obtained before the start of this study, the network estimated that 15.4% of patients discharged from the hospital with a CHF diagnosis did not have a PCP. However, when compared to the clinical data collected in this study, that percentage was found to be 5.6%. When comparing these two apparently discrepant numbers, the hospital administration places a greater emphasis on the clinical data. As important as it is to ensure that all patients have a PCP with whom they can receive follow-up care, this issue is not quite as urgent as previously estimated.

Ambulatory population<sup>1</sup>. management has significantly improved the prognosis of CHF patients with the emergence of medical and pharmacological therapies<sup>2</sup>. Primary Care Physicians (PCPs) are uniquely qualified to manage chronic diseases such as CHF because they improve health in three ways: overall health is better in areas with more primary care physicians, individuals who receive care from their PCPs are healthier, and characteristics of primary care (as opposed to care by multiple specialists) are associated with better health.<sup>3</sup> Last year, the Department of Quality and Patient Safety at Lehigh Valley Health Network (LVHN) implemented a network-wide pathway to manage ambulatory care for CHF patients discharged from the hospital. By comparing and contrasting metrics among CHF patients who have a PCP and those who do not, LVHN can revise this pathway to better target future interventions for CHF patients, improve care, and reduce cost.

# **Problem Statement**

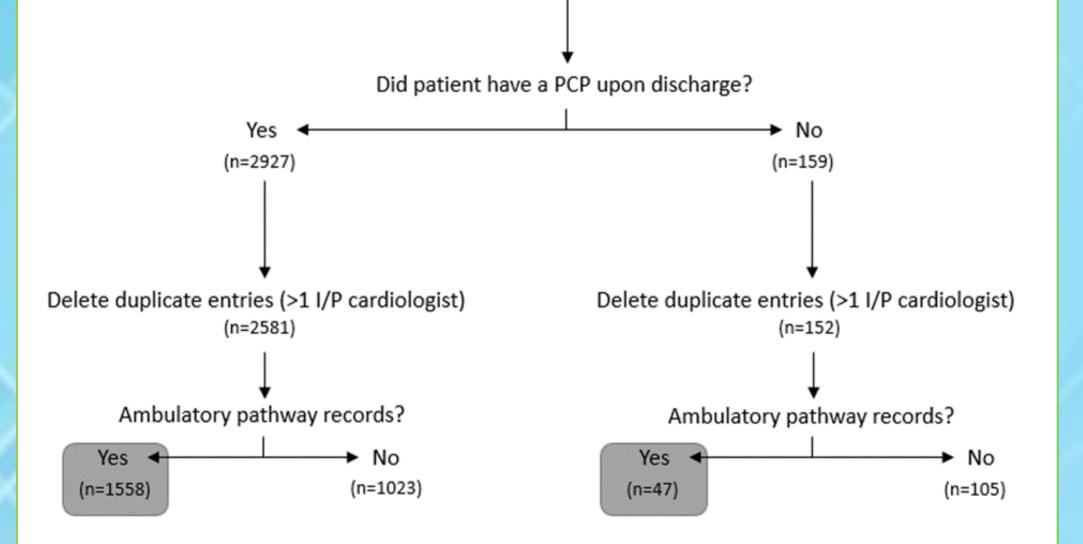


Figure 2: data collection, exclusion of duplicates, final cohorts

Before this study began, the number of patients discharged from the hospital with a diagnosis of CHF who did not have a PCP was estimated to be 15.4% based on financial claims data (see Figure 1). Over the 12-month period of this study, there were 3,111 encounters (see Figure 2). Some encounters needed to be removed due to an artifact of the data compilation process, reducing the number of encounters. At this point, the percentage of patients discharged without a PCP according to clinical data is 5.6% (152/2733) as shown in Figure 4. After excluding patients who were not found in the CHF Ambulatory Dashboard, the Yes PCP cohort contained 1,558 encounters and the No PCP encounters contained 47 encounters. Lastly, various real-time prognostic indicators were collected such as ejection fraction, medication use, most recent laboratory values, hospital and emergency department visits, referrals, and end-stage CHF indicators, as shown in Table 1. Due to the small sample size in the No PCP cohort, no p-values could be calculated for these metrics. Demographics of the 2 cohorts can be found in Figure 3.

One limitation of this study however is that a significant number of patients discharged from the hospital could not be found in the CHF Ambulatory dashboard, and were therefore excluded from this study. Further endeavors would include manual chart review of these patients, especially for those in the "No PCP" cohort.

The SELECT curriculum places a large emphasis on health systems and quality improvement. This project represents a piece of a much larger, network-wide initiative to provide evidence-based care at a lower cost by implementing standardized treatment pathways.

What are the differences and similarities in prognostic indicators between patients discharged from the hospital after a CHF-related inpatient encounter who have a PCP and those who do not have a PCP?

# Methods

This retrospective cohort study utilized chart reviews to aggregate data. Prior to the start of this study, LVHN developed 2 dashboards using Tableau to aggregate real-time data from the Electronic Health Record: one to track all CHF inpatient encounters (Inpatient Pathway) and the other for ambulatory metrics (Ambulatory Pathway). In this internally designated quality improvement study, patient encounters were queried from the Inpatient dashboard, and then cross-referenced to the corresponding patient information in the Ambulatory dashboard. The inclusion criteria were all CHFrelated inpatient encounters (by ICD-10 code) between 11/1/2017 and 10/31/2018 admitted (n=3,111). Encounters were divided into two cohorts based on whether or not the patients had a PCP upon discharge (Yes PCP, or No PCP).

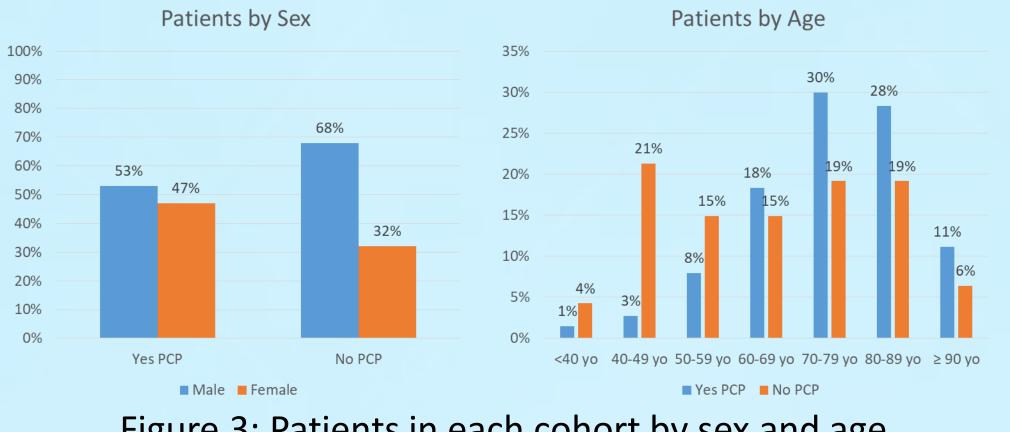


Figure 3: Patients in each cohort by sex and age



| Reduced EF (<50)  |         |            |  |         |      |        |      |
|---|---------|------------|--|---------|------|--------|------|
| Preserved EF (>=50)91659%23445Reduced EF (<50)60439%2244No Result38 $2%$ 244Medication Use38 $2%$ 244ARNI102 $7%$ 512ACE/ARB1192 $77\%$ 3777Beta blocker142391%4392Most Recent Labs014%36Last Sodium <130614%36Last Sodium <130614%36Last Sodium <130614%36Last Sodium <130614%36Last Sodium <130614%36Last Creatinine >1.845629%1328HgA1c >=8.0 or no result51633%2043Referrals0014%36Outpatient cardiology99664%2346Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care  |         |            |  | Yes PCP |      | Νο ΡϹΡ |      |
| Preserved EF (>=50)91659%23445Reduced EF (<50)60439%2244No Result38 $2%$ 244Medication Use38 $2%$ 244ARNI102 $7%$ 512ACE/ARB1192 $77\%$ 3777Beta blocker142391%4392Most Recent Labs014%36Last Sodium <130614%36Last Sodium <130614%36Last Sodium <130614%36Last Sodium <130614%36Last Sodium <130614%36Last Creatinine >1.845629%1328HgA1c >=8.0 or no result51633%2043Referrals0014%36Outpatient cardiology99664%2346Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care171%00Paliaictive Care  | No PCP. |            |  | Num     | %age | Num    | %age |
| Preserved EF (>=50)91659%23445Reduced EF (<50)  | E COV   |            | Total                                    | 1558    |      | 47     |      |
| PCP, 94.4%         Figure 4: Percentage of patients in each cohort  | 5.6%    |            | Ejection Fraction                        |         |      |        |      |
| No Result382%24Medication Use $I$ $I$ $I$ $I$ $I$ ARNI1027%5 $I$ $I$ ARNI1027%5 $I$ $I$ ACE/ARB119277% $37$ $75$ Beta blocker1423 $91\%$ $43$ $92$ Spirololactone $534$ $34\%$ $26$ $55$ Most Recent Labs $I$ $I$ $I$ $I$ Last Sodium <130  |         |            | Preserved EF (>=50)                      | 916     | 59%  | 23     | 49%  |
| Medication Use         Image: Control of the system           ARNI         102         7%         5         12           ACE/ARB         1192         7%         37         75           Beta blocker         1423         91%         43         90           Spirololactone         534         34%         26         55           Most Recent Labs         Image: Control of the system         10         10         10           Last Sodium <130   |         |            | Reduced EF (<50)                         | 604     | 39%  | 22     | 47%  |
| ARNI       102       7%       5       11         ACE/ARB       1192       7%       37       77         Beta blocker       1423       91%       43       99         Spirololactone       534       34%       26       55         Most Recent Labs       0       0       0       0       0         Last Sodium <130   |         |            | No Result                                | 38      | 2%   | 2      | 4%   |
| ACE/ARB       1192       77%       37       78         Beta blocker       1423       91%       43       99         Spirololactone       534       34%       26       55         Most Recent Labs       1       1       1       1       1         Last Sodium <130   |         |            | Medication Use                           |         |      |        |      |
| Beta blocker       1423       91%       43       92         Spirololactone       534       34%       26       55         Most Recent Labs       Image: Constraint of the state of t  |         |            | ARNI                                     | 102     | 7%   | 5      | 11%  |
| Spirololactone         534         34%         26         55           Most Recent Labs         1         4%         3         6           Last Sodium <130   |         |            | ACE/ARB                                  | 1192    | 77%  | 37     | 79%  |
| Most Recent LabsImage: Control of the systemLast Sodium <130  |         |            | Beta blocker                             | 1423    | 91%  | 43     | 91%  |
| Image: Description of the system of the s |         |            | Spirololactone                           | 534     | 34%  | 26     | 55%  |
| Last Creatinine >1.845629%1328HgA1c >=8.0 or no result51633%2043ReadmissionsTo Hospital within 30 days of discharge?27117%613To Hospital within 30 days of discharge?27117%613Referrals01328Outpatient cardiology99664%2345Palliative Care171%00Hospice413%245Cardiac cachexia513%128   |         |            | Most Recent Labs                         |         |      |        |      |
| HgA1c >=8.0 or no result51633%2043ReadmissionsIITo Hospital within 30 days of discharge?27117%613To Hospital within 30 days of discharge?87256%2755ReferralsIIIIIOutpatient cardiology99664%2345Palliative Care171%0IIPalliative Care171%0IICardiac cachexia513%1II   |         |            | Last Sodium <130                         | 61      | 4%   | 3      | 6%   |
| PCP, 94.4%ReadmissionsIFigure 4: Percentage of<br>patients in each cohortOutpatient cardiology99664%2349Cardiac cachexia513%00  |         |            | Last Creatinine >1.8                     | 456     | 29%  | 13     | 28%  |
| PCP, 94.4%To Hospital within 30 days of discharge?27117%613Figure 4: Percentage of<br>patients in each cohortOutpatient cardiology99664%2345Palliative Care171%000Cardiac cachexia513%12  |         |            | HgA1c >=8.0 or no result                 | 516     | 33%  | 20     | 43%  |
| PCP, 94.4%ER visit in past 24 months?87256%2757Referrals<   |         |            | Readmissions                             |         |      |        |      |
| PCP, 94.4%ReferralsImage: constraint of the second s    |         |            | To Hospital within 30 days of discharge? | 271     | 17%  | 6      | 13%  |
| Outpatient cardiology99664%2349Cardiac Care Team82953%2453Palliative Care171%00Palliative Care413%24Hospice413%24End-Stage Indicators513%12   | PC      | DCD 04 40/ | ER visit in past 24 months?              | 872     | 56%  | 27     | 57%  |
| Figure 4: Percentage of<br>patients in each cohortCardiac Care Team82953%2453Cardiac Care Team82953%245364Palliative Care171%0064Hospice413%264End-Stage Indicators513%164  |         | PCP, 94.4% | Referrals                                |         |      |        |      |
| Figure 4: Percentage of<br>patients in each cohortPalliative Care171%00Palliative Care413%24Hospice413%24End-Stage Indicators513%12   |         |            | Outpatient cardiology                    | 996     | 64%  | 23     | 49%  |
| patients in each cohortEnd-Stage Indicators415%22Cardiac cachexia513%12   |         |            | Cardiac Care Team                        | 829     | 53%  | 24     | 51%  |
| patients in each cohortEnd-Stage Indicators415%22Cardiac cachexia513%12   |         |            | Palliative Care                          | 17      | 1%   | 0      | 0%   |
| Cardiac cachexia 51 3% 1  |         |            | Hospice                                  | 41      | 3%   | 2      | 4%   |
| Cardiac cachexia 51 3% 1  |         |            | End-Stage Indicators                     |         |      |        |      |
| Pacemaker defibrillator etherdevice //29 210/ 7 10  |         |            |  | 51      | 3%   | 1      | 2%   |
| racemaker, denormator, other device 400 51% / 1   |         |            | Pacemaker, defibrillator, other device   | 488     | 31%  | 7      | 15%  |

# Conclusions

Having patients with CHF regularly see a PCP is of utmost importance when managing them in an outpatient setting. LVHN is standardizing the way that they manage these patients by developing a networkwide ambulatory management pathway. As a result, administrative data suggested that as many as 15.4% of patients discharged from the hospital after a CHFrelated encounter did not receive adequate follow-up with a PCP. However, the clinical data of this project showed that that number is much closer to 5.6%. Other interesting trends can be observed from the additional data collected in each cohort, but since the total number of patients without a PCP is so low, no p-values can be assigned.

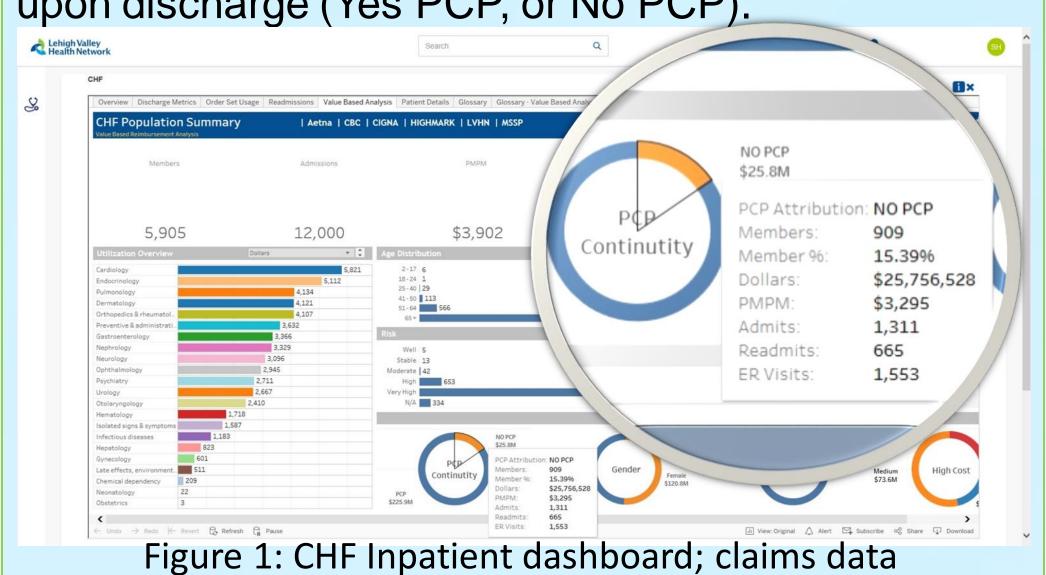


 Table 1: Prognostic indicators

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