HIMSS

Davies Award of Excellence Case Study
Program Year 2023

Comprehensive and Standardized Cardiovascular Care Leads to Decreased Readmissions
Northern Light Health

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Executive Summary

Northern Light Health is the most expansive integrated health care system in Maine. Northern Light Health are comprised of 10 member hospitals with 987 licensed beds, a single physician-led medical group, eight nursing homes with 585 long-term beds, five emergency transport members, 37 primary care locations, and employ more than 12,000 people.

Preventing the occurrence of hospital readmissions is a key factor in improving outcomes, quality of care, and population health across the continuum of care. Hospitals are held accountable for improving transitions of care to avoid unnecessary readmissions as outlined by CMS guidelines.[1]

On June 15, 2020, Northern Light Health went live with a 30-day readmission prevention risk predictor. The predictor assists the care team in identifying patients who are at risk for readmission and to mitigate those risks through coordinated discharge and transition planning. The solution integrates relevant clinical Electronic Health Record (EHR) data into a single tool for managing and prioritizing at-risk populations of patients.

After implementing the readmission prevention prediction tool, other actions were also recognized as key elements of a comprehensive readmission reduction plan. These actions include providing patient education, completing care management (CM) assessment documentation and interventions, improving medication reconciliation, and collaborating with other interdisciplinary team members. In this case study, we will focus on hospital-wide readmission data from June 2021-November 2022 with a concentration on the specific clinical example of heart failure (HF) during the same time. Northern Light Health decreased overall readmissions from 9.8% to 9.1% and decreased HF readmissions from 17% to 14.5%, with a national average noted to be 21.9% .[2] Two key factors impacted the improved readmission rates: 1) the increase in care manager engagements; and 2) an improvement in PowerPlan utilization to increase the standardization of care practice. Care management engagement improved from 108 enrolled patients to 188 enrolled patients within an 18-month period, and PowerPlan utilization increased from the utilization of 32 at its lowest point to 90 at its highest point during a 41-month review. The utilization of the Readmission Risk Predictor provided additional insight to the care teams and flagged patients at a high risk for readmission.

Challenges/Lessons Learned

The success of our Cardiovascular Service Line (CVSL) is largely due to the focus on people, process, and technology. We began by focusing on the right people and phased in technology over time with the development of guidelines to standardize the process.

- Standardization of care must be a priority.
- Heart failure is a team approach, and our multidisciplinary team is critical to the outcomes of our patients.
- Adoption of standardized care is a journey that must be driven by data.
- The care manger provides a critical role in decreasing HF readmissions. Their ability to drive communication and patient follow-up is a key element for success.
- Follow-up appointments are crucial to help prevent HF readmissions. Ensuring follow-up appointments are scheduled is part of the CM workflow.

- Northern Light Health uses findhelp to work through social determinates of health (SDoH) issues – this tool is a service-based platform, embedded within the EHR to assist with resources for patients upon discharge.
- Northern Light Health implemented the CardioMEMS™ HF System in March 2022 for remote heart failure management. The system provides pulmonary artery (PA) pressure remote monitoring using a small sensor and assists in identifying patients prior to deterioration and subsequent readmission that may follow.

Define the Clinical Problem and Pre-Implementation Performance

Heart disease is the second leading cause of death in Maine, and our population is the oldest in the country. Recognizing the impact of heart disease on both the population of Maine and the healthcare system, Northern Light Health established a systemwide CVSL in 2013. Service lines are organized around a disease entity, such as heart disease, and create a structure to focus efforts on process and outcomes. The goal is to develop an organized approach to treating the disease across an entire system (i.e., inpatient care, outpatient care, homecare, emergency care, long-term care, and virtual care). The CVSL continues to be the core decision-making body for cardiovascular care across NLH and champions the continuous improvement projects for this population.

Over the years, the cardiovascular teams have built a continuous improvement program to advance the healthcare experience and quality of life for cardiac patients. Overall, one of the most challenging aspects of caring for this population is the readmission rate experienced in the HF population. Heart failure is a clinically complex chronic condition requiring multiple aspects of care and collaboration of people, process, and technology. Because Maine has the oldest population in the country, the residents tend to have more comorbidities that exacerbate chronic conditions such as HF. Additionally, the COVID-19 pandemic created unique challenges with routine access to care (primary care/health maintenance) negatively impacting patients with chronic health conditions.

Historically, HF readmissions have been difficult to manage as nearly one in four heart failure patients are readmitted within 30 days of discharge and approximately half are readmitted within six months.[3] After implementation of the Readmission Prevention All-cause Prediction Tool and taking other actions, such as providing patient education, completing care management assessment documentation and engagement, conducting medication reconciliation, and improving the utilization of standardized PowerPlans, our HF readmission rate improved from 17% to 14.5% with the national average noted to be 21.9%.

Northern Light Health uses a multidisciplinary approach within the hospital and ambulatory settings to guide patients living with HF. The service line follows guidelines

from the American College of Cardiology and the American Heart Association, helping to integrate best practices into Northern Light Health. We have established an organized interdisciplinary team, a standardized education program, and a fine-tuned communication system. After discharge, patients are followed using mechanisms such as home care, virtual care, and implantable devices, and work through obstacles identified through Social Determinants of Health (SDoH).

A key component of the HF program is the ambulatory nurse care manager (CM) or nurse navigator. This role ensures patients are receiving needed education and proper follow-up. The CM serves as the link between the patient, their family and/or support system, their practitioners, homecare nurses, inpatient nurses, and others associated with their HF care. CMs make regular patient calls and do chart surveillance to ensure questions are answered and symptoms are monitored. These care managers also visit any patient admitted to the hospital.

As the program grew, so did the need for additional staffing. The number of care managers caring for this population grew from two (2) with a panel size of sixty patients to four, plus one who is cross trained for coverage.

The hospital-wide decreased readmission rate is defined by numerator and denominator:

- Numerator: all unplanned, any cause, readmission within 30 days from discharge
- Denominator: All hospital discharges

The exclusions are:

- Discharged against medical advice
- Admitted for primary psychiatric diagnoses
- Admitted for rehabilitation
- Admitted for medical treatment of cancer

The HF specific data includes:

- Numerator: all unplanned HF readmissions within 30 days of discharge
- Denominator: all heart failure discharges

The exclusions are:

- Discharged against medical advice
- Admitted with principal dx of COVID-19 or secondary dx code of COVID-19 for AMI, COPD, and HF
- Admitted with procedure code for left ventricular assist device implantation or heart transplantation

The organizational target for HF readmissions is 15.3%. The target for CM engagement is 190-220, and the target for the PowerPlan utilization is to continue the upward trend and work to improve adoption.

Design and Implementation Model Practices and Governance

The cardiovascular service line is governed by an executive leadership council including cardiac and vascular physicians and cardiovascular administrators from across the system. The council meets once every three months, and a clinical team meets two out of the three months. This council develops treatment and performance standards and quality measures that are reviewed during the standard meetings and on an as-needed basis based on literature and changes in the data. Those measures are updated regularly and monitored through a quality dashboard, which is a web-based application for quality reporting that is integrated into our electronic health record (EHR). We have leveraged the power of our entire system to develop a set of standards for treatment that spans the continuum of care. In addition, we have identified and track 14 quality measures to determine standards of care for everything from statin treatments for cardiovascular disease to readmission rates for heart failure patients. Our clinical effectiveness workgroup is also focused on HF LOS and palliative care referrals.

Below is the quality wheel indicating the Quality Core Committee at the center of the process (Figure 1). The cardiovascular service line has aligned key performance indicators (KPIs) with NLH Annual System Goals (noted in the first ring around the core committee). Each KPI has a lead and team members who monitor progress and intervene as necessary.

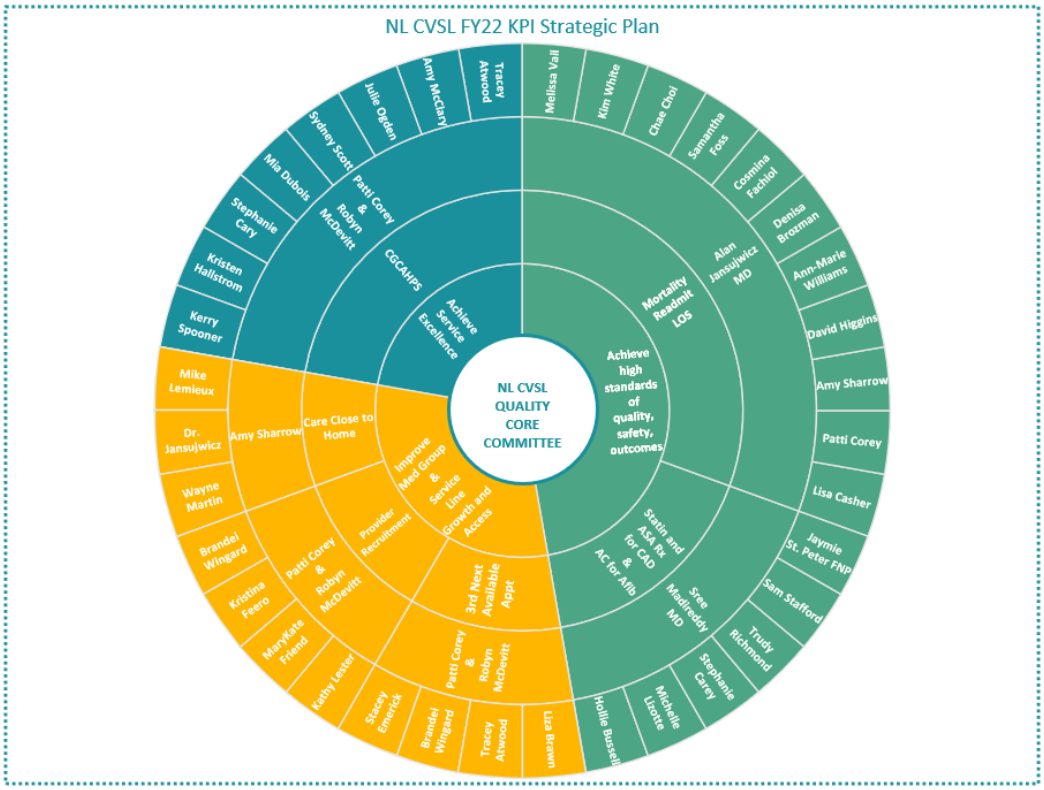


Figure 1

The sub committees report to the Core Committee and the Core Committee reports to the CVSL Leadership Committee which meets quarterly.

While the CLVS governs the operationalization of this initiative, the EHR and technology components follows a mature structure of governance and oversight. As the relationship between information systems (IS), Clinical Informatics (CI), clinical leadership, and business/operational leaders strengthened, the need to achieve a clinically led, IS supported, patient focused, data driven structure, governance emerged. Northern Light Health moved from a siloed approach with limited communication and collaboration, to an integrated process supported by shared strategic goals and a desire to improve quality outcomes.

This clinically led, IS supported structure is founded in a top-down/bottom-up approach (Figure 2). The leaders responsible for the top-down tasks focus on establishing the strategic vision, identifying the core EHR and business vendor functionality, and selecting new or niche clinical and business vendors. The bottom-up methodology uses a multi-disciplinary clinical (front-line) team and concentrate their efforts on EHR and digital optimization and core business enhancements that promote workflow efficiencies.

Clinical staff play an important role in the Northern Light Health EHR/technology committee structure. Bedside nurses and practicing physicians participate as clinical champions and stakeholders on teams that support EHR optimization and projects. Their experience and input ensure all teams follow a clinically led process. Their active engagement has proven to be key to adoption and mastery of all EHR and technology solutions.

While Northern Light Health is comprised of 10 hospitals with many resources and governance layers, this structure is applicable to organizations of any size. The critical components are 1) a clinical leader with informatics knowledge, 2) IS collaboration, 3) front line staff (e.g., practitioners, nurses, ancillary/support staff) interested is serving as EHR champions and 4) an organized structure for reviewing, approving, and prioritizing requests. Building a governance structure with these basic elements ensure the establishment of a successful EHR/technology governance process.

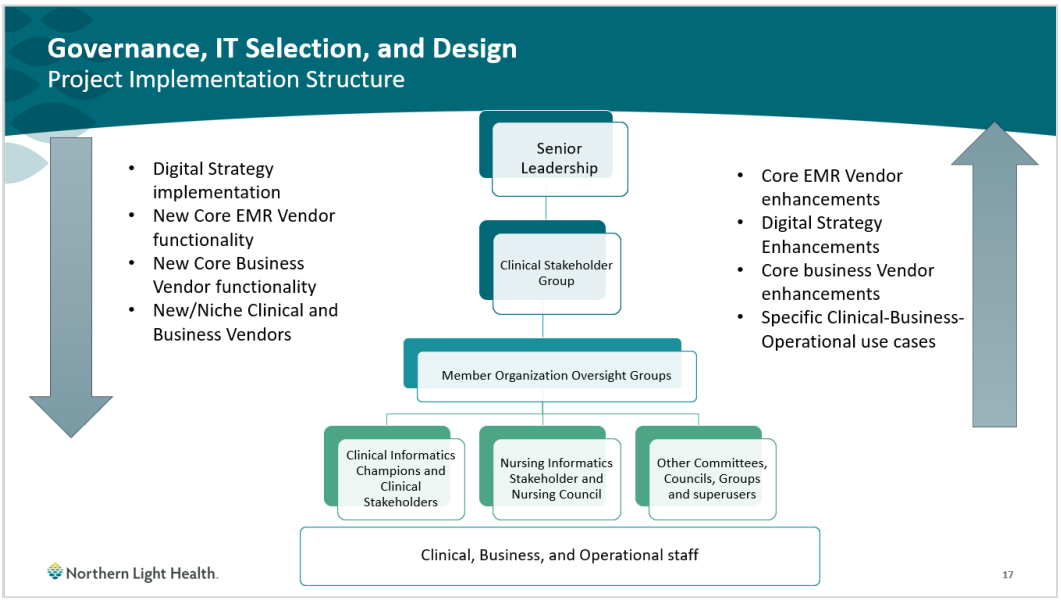


Figure 2

Educational rollouts follow a well-defined process and care teams have access to the Northern Light Clinical Informatics educational portal (Figure 3). The site contains job aids and educational content for all clinical informatics initiatives. Projects are defined with added benefits, and workflows are outlined with step-by-step instructions for use of the tools.

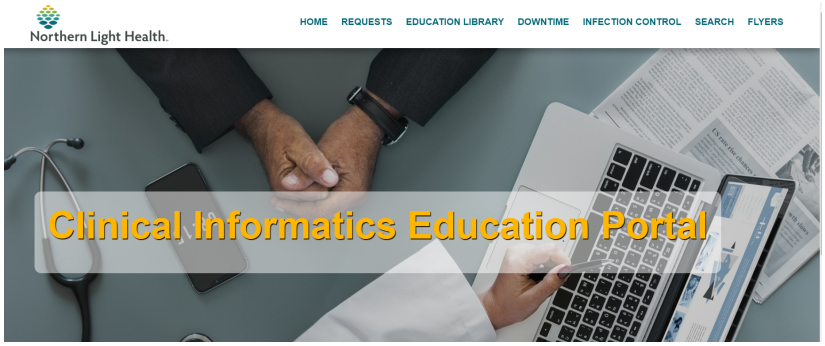


Figure 3

In conjunction with the multidisciplinary approach and standardization of care driven by Northern Light Health PowerPlans, the increased utilization of CMs and the workflows associated with the readmission prediction tool have played a key role in decreasing readmissions for the HF population.

As an example, the CMs follow a workflow for identification of the HF patients that improves adoption since the workflow can be measured using informatics tools. A process is in place for communication and patient interventions including patient and family education regarding HF management with a goal of hospitalization prevention.

Key stakeholders in the care process for HF include the inpatient acute care teams, inpatient care managers, ambulatory care managers, outpatient primary care teams, home health, and telehealth services. The teams have access to community support avenues and tools are in place to target SDoH to ensure equity of care.

Clinical Transformation enabled through Information and Technology

Standardized processes are more easily achieved with the hub and spoke model used at Northern Light Health. Regardless of where you receive care within Northern Light Health, our core philosophy is to standardize operations, care, and quality. Technology improvements such as the integrated EHR make it easier for Northern Light Health to compile and share data across the continuum of care including acute care, ambulatory care, and virtual care.

The HealtheIntent platform is the common foundation for the longitudinal record and data management (figure 4). A longitudinal record is a way of organizing data for each patient from numerous clinical sources, including encounter-based and claims data, into one location that can be used to drive analytics and inform workflows. HealtheIntent is a cloud-based software platform that aggregates health data across the continuum of care. The data comes from disparate systems, then is transformed, and standardized, creating a longitudinal patient record that enables decision support, quality measurement, and analytics for population management.

Figure 4

The care teams use data from HealtheIntent, which powers solutions that predict readmission risk. The Readmission Prevention solution assists in identifying patients who are at-risk for readmission and allows the healthcare team to mitigate those risks through coordinated discharge and transition planning. The solution integrates relevant clinical documentation into a single tool for managing and prioritizing at-risk populations of patients such as the HF population.

The All-Cause Algorithm, which runs in the background, is a predictive admission model and scores are based upon documentation within the EHR. The algorithm uses approximately 60 readmission risk factors and produces risk scores that are normalized and range from 0-100. Risk score thresholds are determined for each organization, and patients are stratified into high, moderate, and low risk categories.

The algorithm scores patients who are 18 years of age and older. Patients receiving the following medical service are excluded from the calculation and do not receive a risk score:

- Psychiatry
- Hospice
- Inpatient rehabilitation
- Skilled nursing
- Maternity

During the research and development phase, more than 700 patient specific factors were initially analyzed to determine which were most predictive of readmission. Of these, 60 were ultimately incorporated into the calculation that drives the algorithm.

Some of top contributing risk factors include:

- Patient with an inpatient visit in the past 6 months
- Comorbidity index (problems, diagnoses, and procedures in the past 12 months)
- Age
- Current use of diuretics
- Medical conditions (problems and diagnoses)
- High risk procedures
- Acuity

Included in the solution is the BOOST screening tool. BOOST is an acronym for Better Outcomes by Optimizing Safe Transitions (previously known as Better Outcomes for Older Adults Through Safe Transitions). This solution was developed by the Society of Hospital Medicine and is a comprehensive program that allows clinicians to assess potential factors that prevent a successful post-discharge outcome and implement appropriate interventions to mitigate the risk.

Embedded within the solution are certain rules that identify:

1. Polypharmacy – patients who have 10 or more medications
2. Problems with Medications – patients who are taking high risk meds such as insulin, anticoagulant, digoxin, antiplatelet, and narcotics
3. Psychological – patients that are screened positive for depression or have a history of depression
4. Physical limitations – patients that are deconditioned, frail, malnourished or unable to participate in their activities of daily living
5. Principal Diagnosis – patients that have cancer, stroke, DM, COPD, and HF
6. Poor Health Literacy – patients that have inability to do teach back
7. Patient Support – patients that are in social isolation, absence of support to assist daily care, insufficient or absent of connection with primary care
8. Prior hospitalization – non-elective encounters in the last 6 months
9. Palliative care – patient has an advanced or progressive serious illness

Key components of the readmission risk predictor include the dashboard, the worklist, plans of care, PowerForms, and mPages. The solution dashboard captures the entire population of qualified patients with documented readmission risks (Figure 5). The dashboard allows the end-user to filter patients based on location, encounter type, and/or medical service risk, and then view the number of patients that fall into specific risk thresholds, diagnoses/procedures, and pay source categories. The dashboard also reflects the number follow-up phone calls to be completed and patients who have been pre-admitted for high-risk procedures.

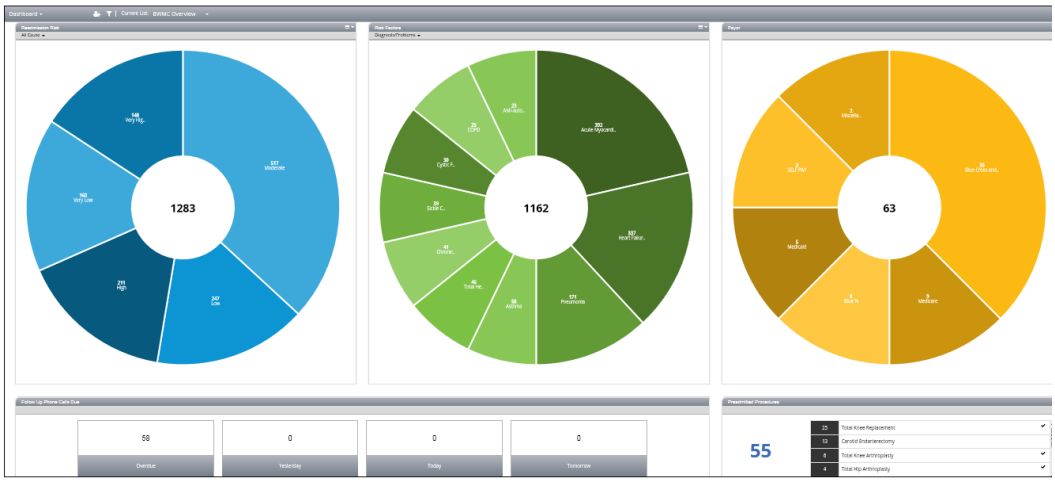


Figure 5

The worklist generates a list of patients who meet filtering criteria and allows access to clinically relevant information from a single view (Figure 6). Reviews include individual patient documentation that has been completed (blue tiles) and quickly identify outstanding items that still require attention (red tiles).

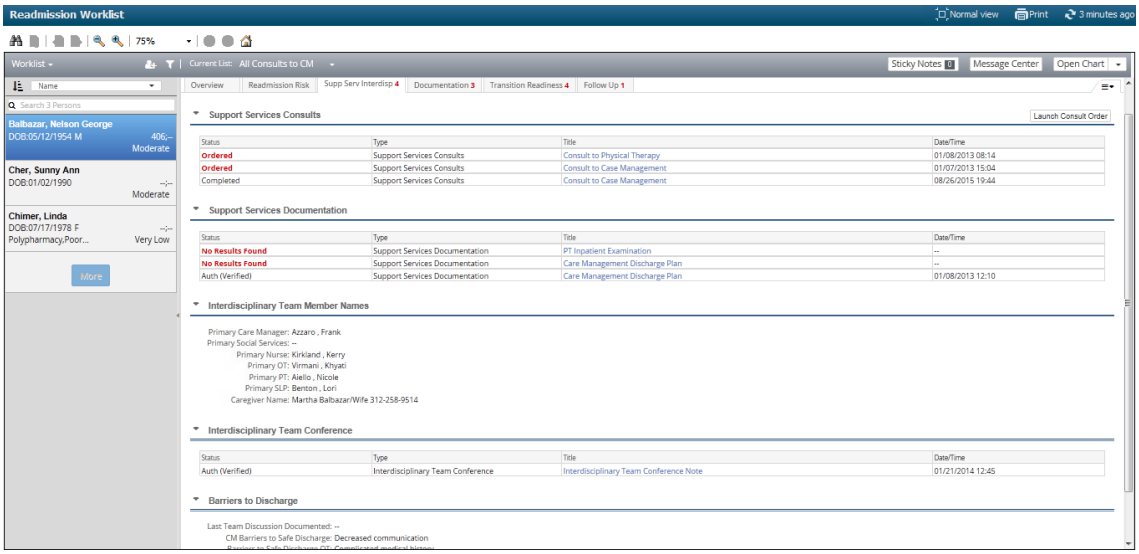


Figure 6

PowerForms are used to capture documentation regarding pre-procedure preparedness, care transition, discharge planning, and transition readiness (Figure 7).

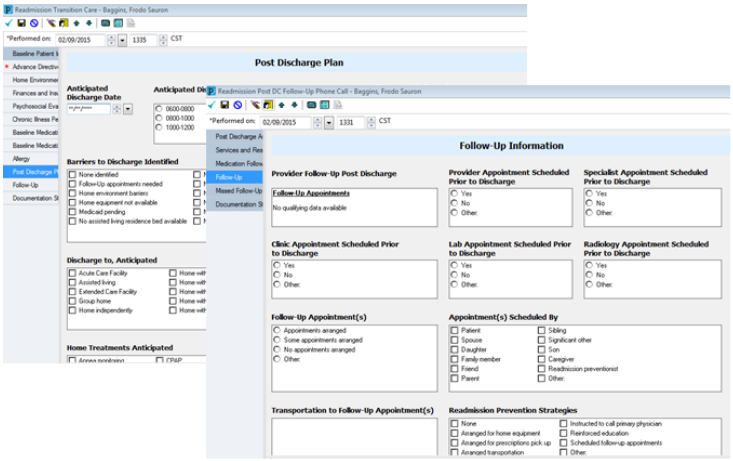


Figure 7

The mPage is a solution accessed from the EHR allowing the creation of custom workflows and data groups by selecting components to be displayed together on a page (Figure 8). mPages are used in association with the EHR solution components. In the case of readmission prevention, the mPage is used for interdisciplinary rounding, communication, and collaborative discharge and transition of care planning. With relevant components in view, the mPage serves as a single-source of patient-specific readmission prevention information such as the readmission risk score (Figure 9). Care managers use these tools to improve planning for discharge needs and minimize the possibility of a readmission.

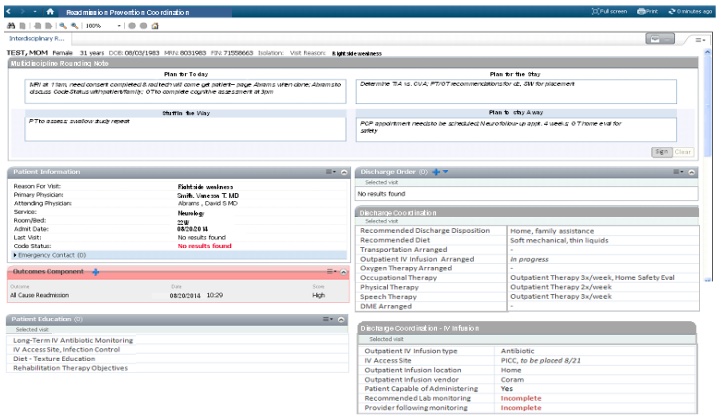


Figure 8

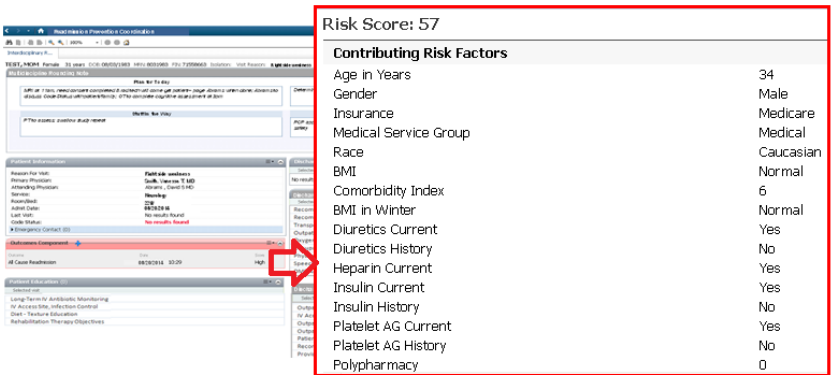


Figure 9

Ambulatory care managers use workflows that motivate the patient to become a proactive partner in the development of and adherence to their treatment plan striving to promote patient independence. Their initial assessment (Figure 10) focuses on evaluating the patient as a whole, with particular attention to their diagnosis or chronic disease process.

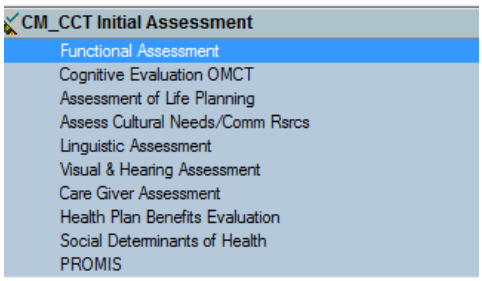


Figure 10

At admission, and again on discharge, a PROMIS (Patient Reported Outcome Measurement Information System) is completed. This tool is comprised of person-centric measures that evaluates and monitors the patient's physical, mental, and social health. (Figure 11)

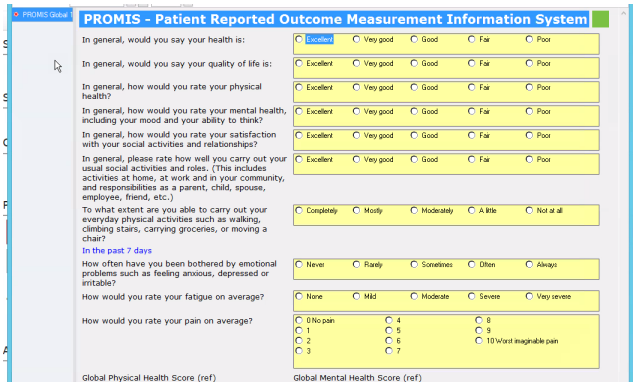


Figure 11

Over time, the outreach assessments completed on the HF population transitioned from the general care management workflow to one focused specifically on heart failure. A HF specific assessment is completed with every outreach, including a review of any co-morbidities (e.g., depression). (Figure 12)

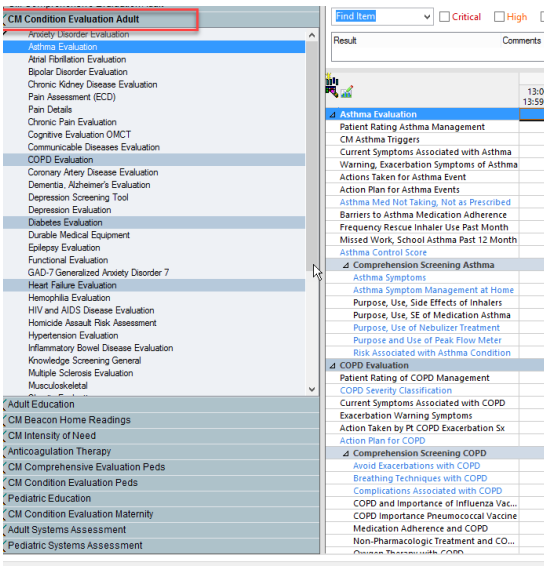


Figure 12

Recognizing the role SDoH factors have on patient outcomes, inpatient and ambulatory care managers assess the patient for SDoH barriers and focus on minimizing any negative impact. Staff have access to "findhelp," a service-based platform embedded within the EHR to address SDoH needs within the community (Figure 13). The tool connects patients with free or reduced-cost programs from local partners and national support services. Resources have been vetted and confirmed to meet the needs of the patient population.

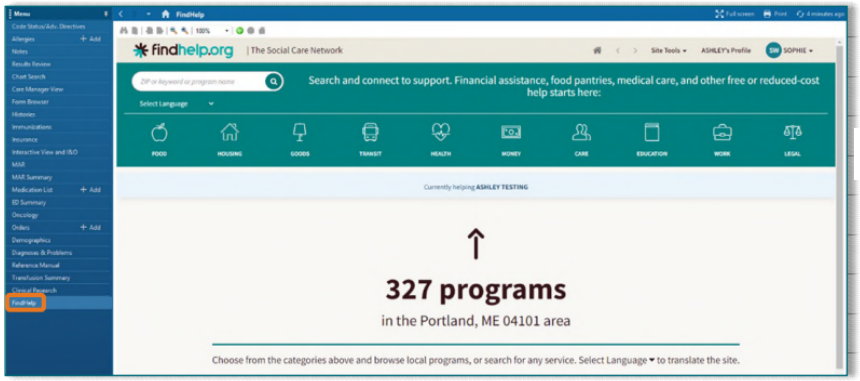
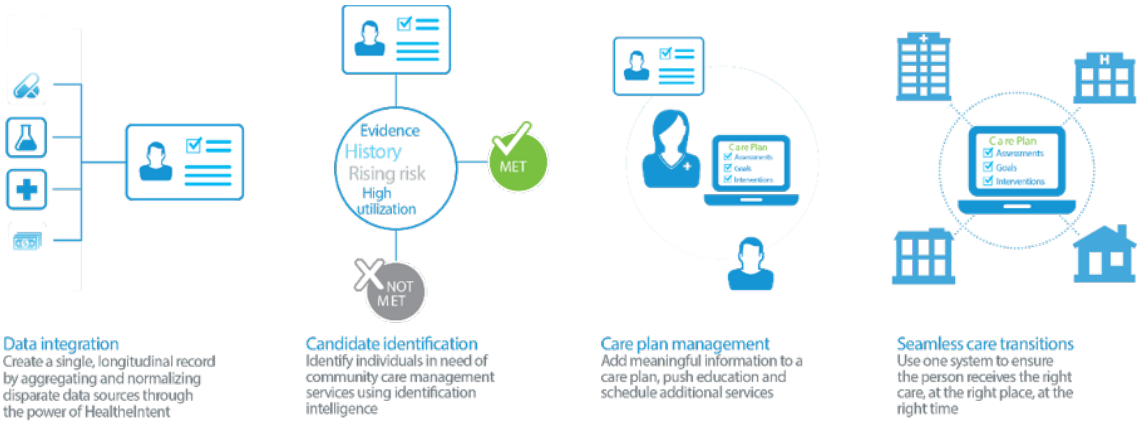


Figure 13

Northern Light Health drives this person-centric approach of proactive surveillance, coordination, and personalized engagement to assist consumers in managing their health and care to achieve optimal health status, quality, and cost outcomes (Figure 14). The below infographic depicts a high-level workflow used by the care management team to ensure the right patient receives the right care along the continuum of care.

Figure 14



Additional technologies include at home device management and care delivered via home health and virtual care modalities. Northern Light Health implemented the CardioMEMS™ HF System in March 2022 for remote heart failure management (Figure 15). The system provides pulmonary artery (PA) pressure remote monitoring using a small sensor. The sensor, permanently implanted in the distal pulmonary artery via a safe right heart catheterization procedure, measures change in pulmonary artery pressure. These changes are a surrogate measure for fluid retention in the lungs caused by worsening heart failure. Patient-initiated sensor readings are wirelessly transmitted and made available for clinicians to access and review. Directly monitoring PA pressure alerts the Northern Light Health team if a patient's heart failure is worsening and allows for early intervention by adjusting medications or making other treatment changes, often before a patient experiences any symptoms.

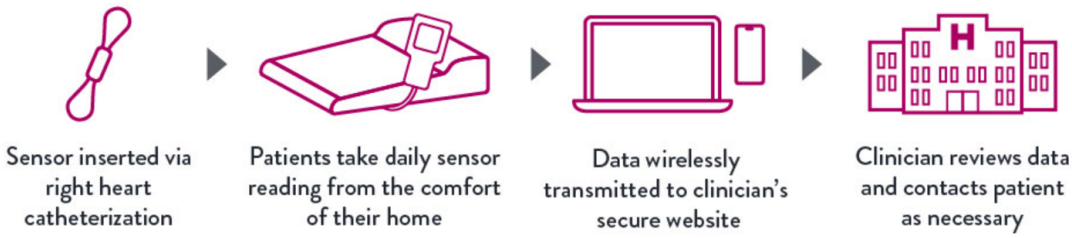


Figure 15

Standardized care is another key component of improved quality outcomes. In February 2022, four new ambulatory heart failure PowerPlans were released (Figure 16). The PowerPlans were created through the systemwide Innovative Clinical Effectiveness (ICE) HF Project and are designed to be the go-to order sets when caring for patients with HF in the ambulatory setting. The new PowerPlans feature embedded clinical decision support tools that follow heart failure treatment guidelines from the American College of Cardiology and the American Heart Foundation (Figure 17).[4] The information assists practitioners with selecting the most appropriate orders and clinical pathway for each patient.

A five-minute video and job aid was provided via the education portal on how/when to use the tool. To make it easier to find and use the new plans, the Primary Care Quick Orders page was updated to include a new Power Plans component. This component contains two folders: (1) Heart Failure and (2) Adult Well Exam. This component and its contents are shown below.

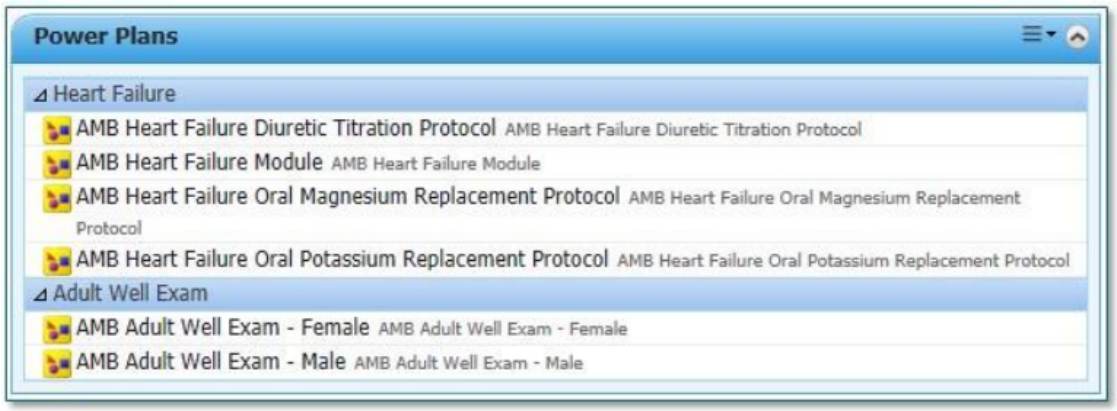


Figure 16

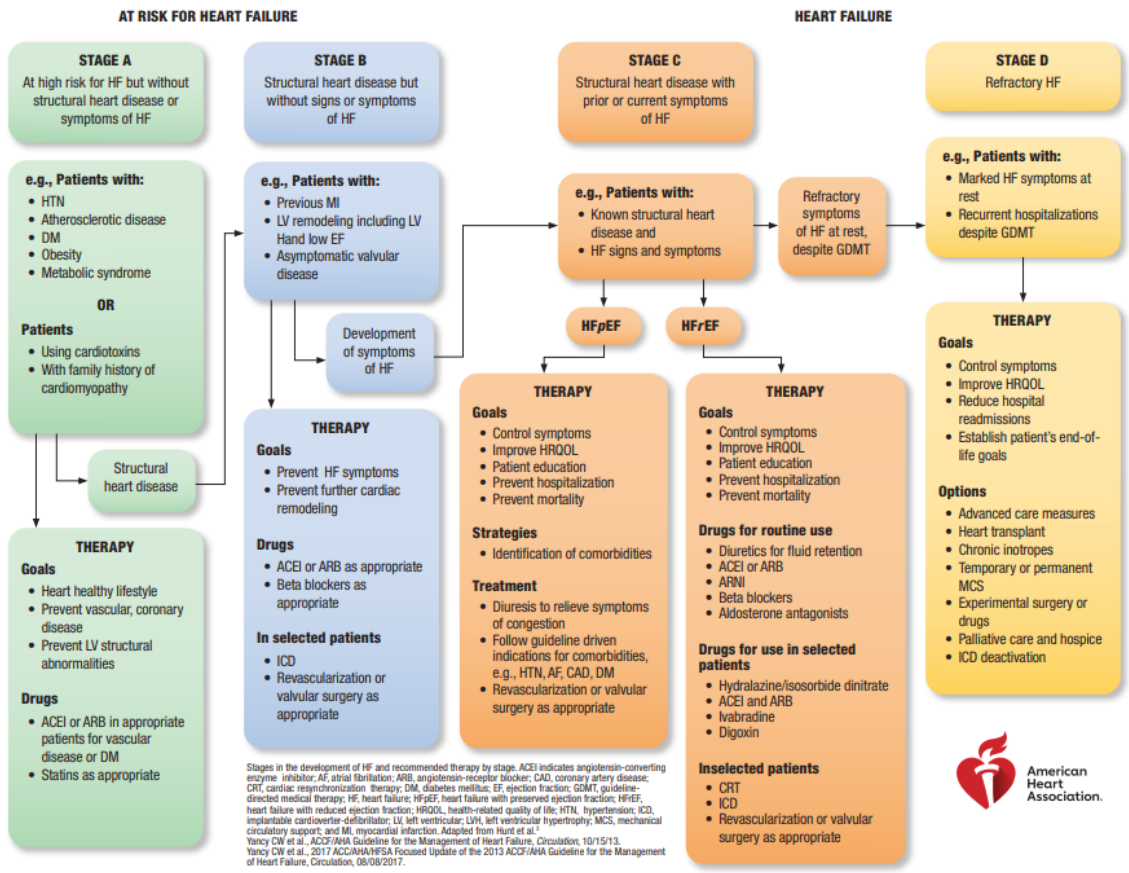


Figure 17

Heart failure is a clinically complex, chronic condition. Multiple aspects of care require extensive collaboration of people, processes, and technologies. The governance-led cardiac care service line which is supported by the right technology, along with care teams and care managers focused on readmission prevention is key to the success of the heart failure program at Northern Light Health.

When quality of life and benefit versus burden of care becomes an appropriate conversation, the Northern Light Health team can access palliative care workflows. These workflows provide care teams with better coordination of care and communication. Palliative care practitioners can view trending scores from specific assessments, implement goals and plan of care, optimize symptom management, and perform timely completion of advance care planning and other treatment plans.

The inpatient palliative care workflow starts with an algorithm identifying patients who meet criteria for an INP palliative/supportive care consult (Figure 18). A SmartZone alert is fired to emergency department and admitting practitioners assisting with clinical decision making. If the INP palliative/supportive care consult order is entered, the patient will populate onto a palliative care worklist allowing palliative care practitioners to efficiently triage patients and quickly review important information related to their care.

Palliative care practitioners can navigate the patient chart using the Palliative Care Workflow MPage, which provides quick access to commonly used PowerForms and note types such as ECOG, PPS, palliative care consult, and progress notes. Two alerts will fire to the inpatient palliative care team's message center pool to notify them that a patient is admitted that meets high utilization criteria and has been consulted by palliative care or has had a previous palliative care consult within the last six months.

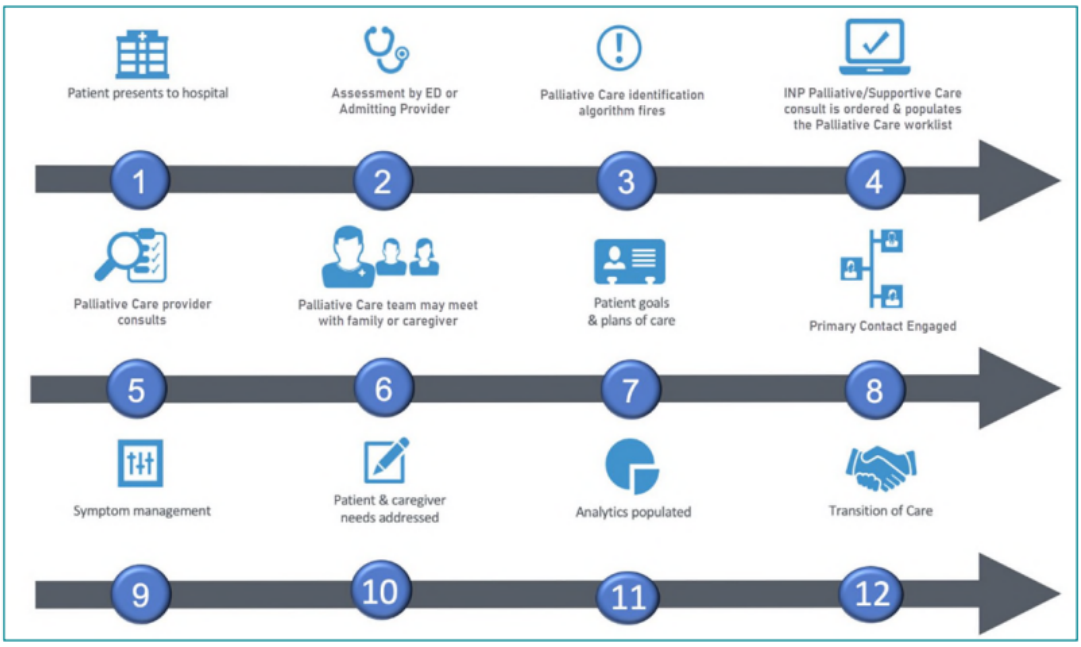

Patient presents to hospital
Assessment by ED or Admitting Provider
Palliative Care identification algorithm fires
INP Palliative/Supportive Care consult is ordered & populates the Palliative Care worklist
1
2
3
4
Palliative Care provider consults
Palliative Care team may meet with family or caregiver
Patient goals & plans of care
Primary Contact Engaged
5
6
7
8
Symptom management
Patient & caregiver needs addressed
Analytics populated
Transition of Care
9
10
11
12

Figure 18

Improving Adherence to the Standard of Care

Two key factors impacting the improved readmission rates were the increase in care manager engagement and an improvement in PowerPlan utilization to increase the standardization of care (Figures 19 and 20). Care management engagements improved from 108 enrolled patients to 188 enrolled patients within an 18-month period, and PowerPlan utilization increased from the utilization of 32 at its lowest point to 90 at its highest point during a 41-month review.

The HF PowerPlan order-set was originally created in 2019; However, in 2020 utilization showed a downward trend. Team leadership used a multidisciplinary approach to review the PowerPlan and incorporated additional clinical decision support with a goal of increasing utilization of the HF PowerPlan and CM team referrals to improve the care and coordination for high-risk HF patients. The data below represents the increased CM engagement and system wide utilization of the inpatient **Northern Light Health** heart failure PowerPlan. The adherence to the standard of care data is a combination of information from the EHR and HealtheIntent being displayed on Tableau dashboards.

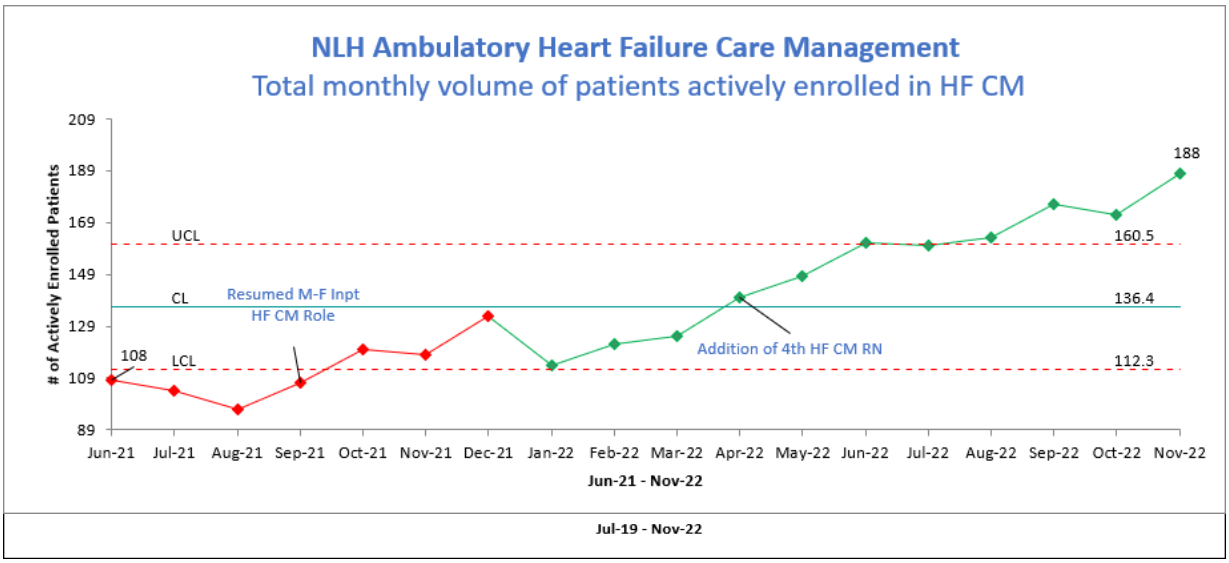


Figure 19

Figure 20

Improving Patient Outcomes

Northern Light Health decreased hospital-wide readmission rates from 9.8% to 9.1% and decreased HF readmissions from 17% to 14.5% — the noted national average for HF readmission is 21.9% (Figures 21 and 22).

The hospital-wide decreased readmission rate is defined by numerator and denominator:

- Numerator: all unplanned, any cause, readmission within 30 days from discharge.
- Denominator: All hospital discharges

The exclusions are:

- Discharged against medical advice
- Admitted for primary psychiatric diagnoses
- Admitted for rehabilitation
- Admitted for medical treatment of cancer

The HF specific data includes:

- Numerator: all unplanned HF readmissions within 30 days of discharge
- Denominator: all heart failure discharges

The exclusions are:

- Discharged against medical advice
- Admitted with principal dx of COVID-19 or secondary dx code of COVID-19 for AMI, COPD, and HF
- Admitted with procedure code for left ventricular assist device implantation or heart transplantation

The target for overall 30-day readmissions for Northern Light Health is 9%.

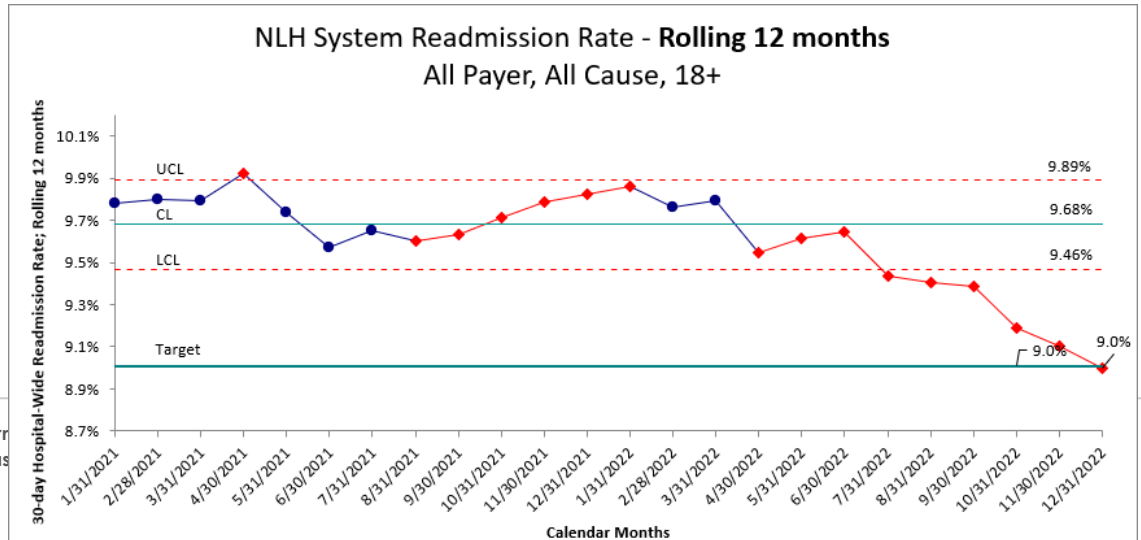


Figure 21

The target for HF readmission is 15.3%

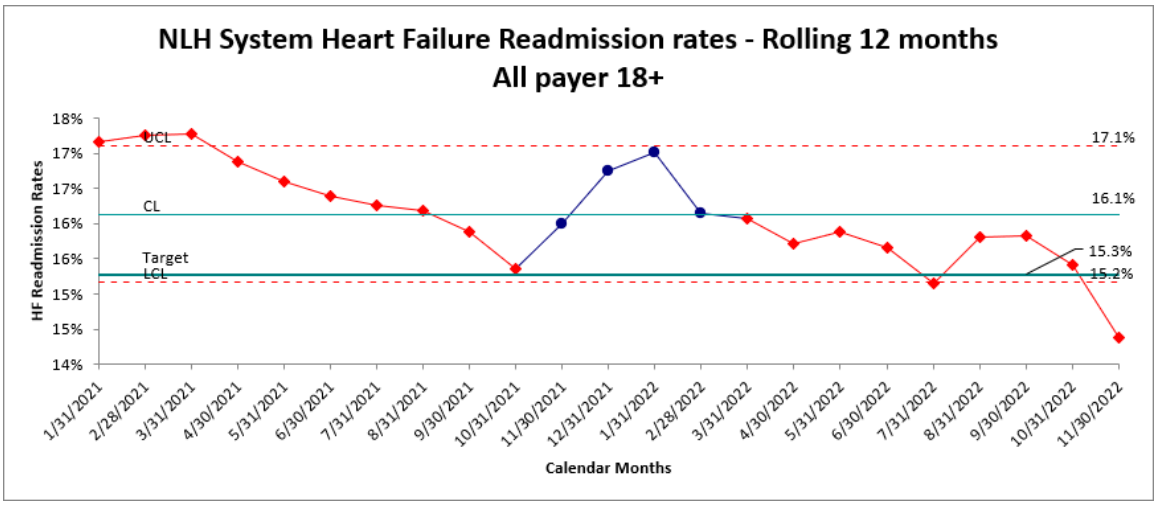


Figure 22

Accountability and Driving Resilient Care Redesign

Accountability and care redesign is data driven and managed through the CVSL governance structure. Northern Light Health uses several dashboards and quality indicators to increase adoption and utilization of the people, process, and technology tools which are in place to better manage the HF population and minimize readmissions. Examples of a change in process and care delivery include the replacement of the LACE index for HF readmissions with the Readmission Prevention Tool, and the inclusion of additional clinical decision support within the PowerPlan to help standardize the plan of care. Below are examples of dashboards currently in use to help focus on decreasing HF readmissions (Figures 23-25).

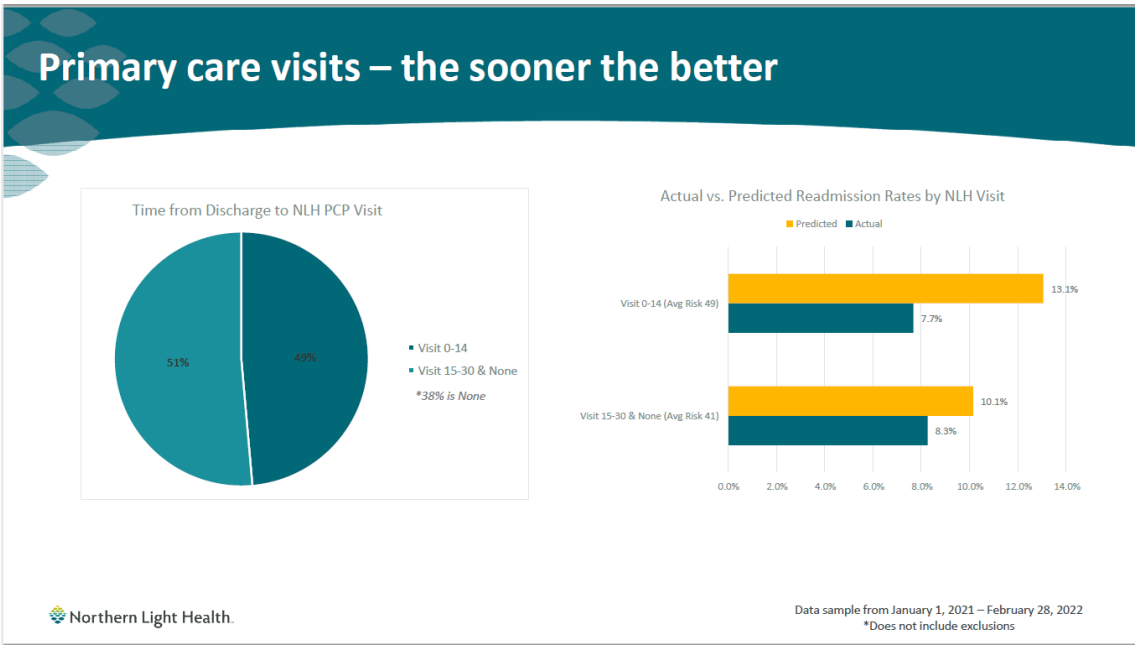


Figure 23

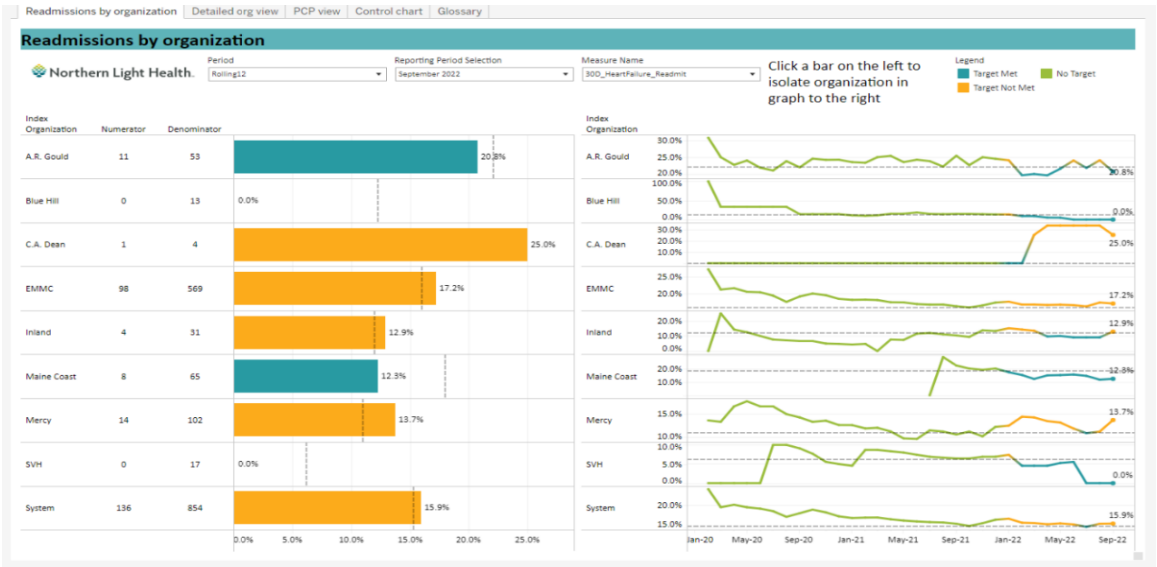


Figure 24

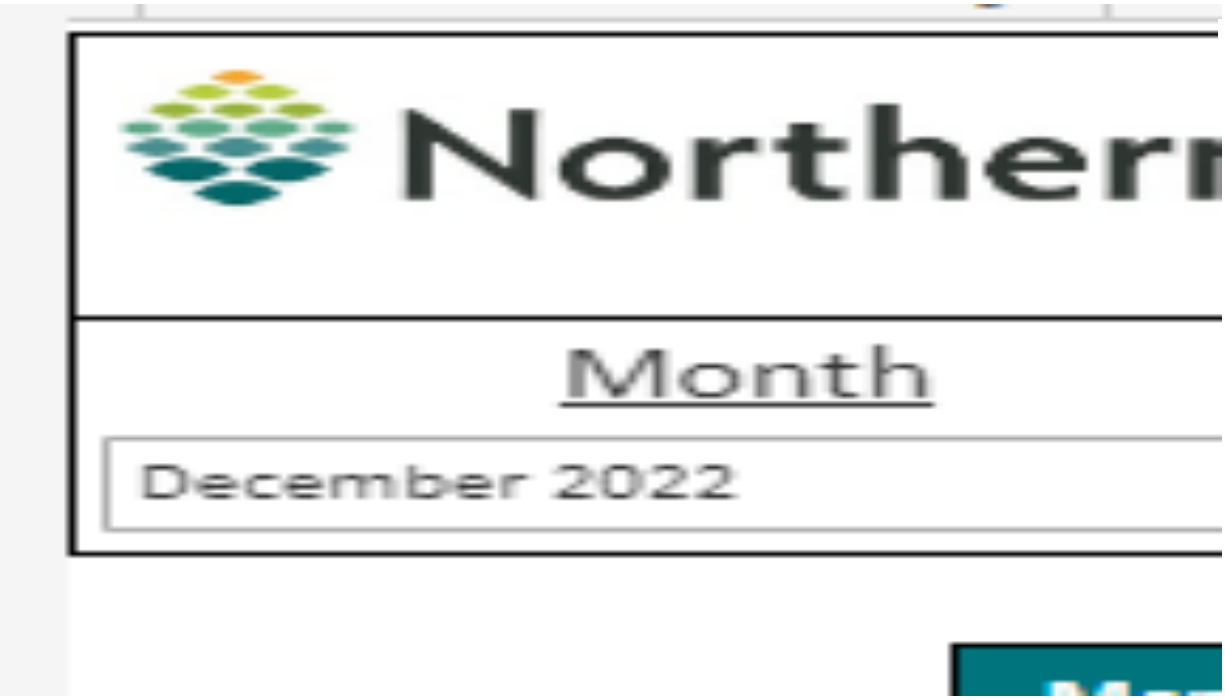


Figure 25

Resources

1. Readmission Measures Overview (cms.gov)
2. 45 hospitals with the lowest 30-day readmission rates from heart failure (beckershospitalreview.com)
3. Trends in 30- and 90-Day Readmission Rates for Heart Failure (ahajournals.org)
4. 2022 AHA/ACC/HFSA Heart Failure Guideline: Key Perspectives - American College of Cardiology