

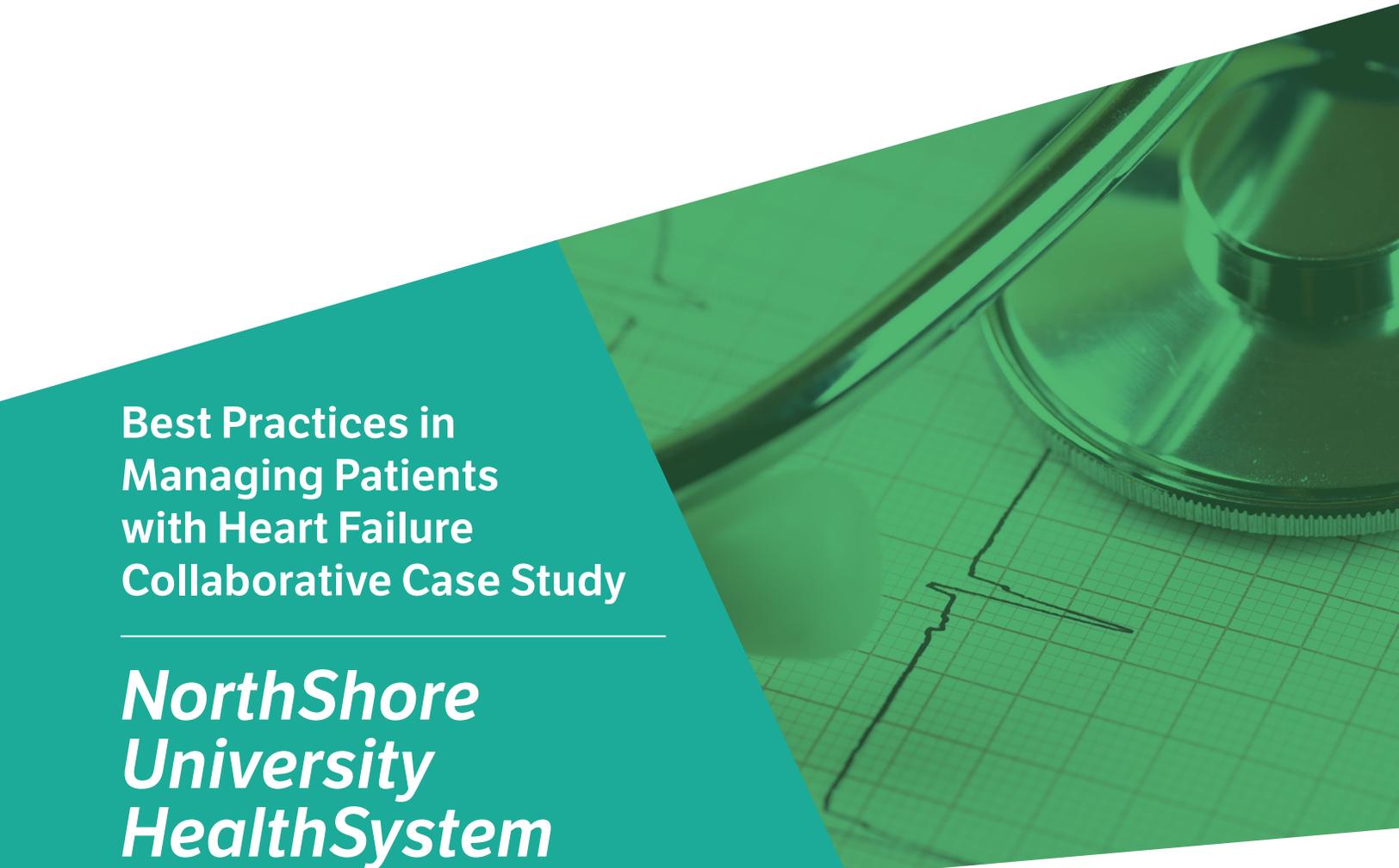


Advancing High Performance Health

AMGA Foundation

**Best Practices in
Managing Patients
with Heart Failure
Collaborative Case Study**

***NorthShore
University
HealthSystem***



Organizational Profile

Headquartered in Evanston, Illinois, the core mission of NorthShore University HealthSystem (NorthShore) is to “preserve and improve human life.” NorthShore’s mission is achieved through the provision of superior clinical care, academic excellence, and innovative research in the communities of northern Chicago.

NorthShore’s first hospital, Evanston Hospital, was established in 1891 and operates as a licensed Level I Trauma Center.

NorthShore is a nonprofit comprehensive, fully integrated health delivery system that now operates 4 hospitals and 130 outpatient office locations and serves as the principal teaching affiliate for the University of Chicago Pritzker School of Medicine. NorthShore served roughly half a million patients in the 2015 fiscal year.

NorthShore Medical Group (NMG) was established in 1993. Then in 1996, the NorthShore Research Institute was developed to serve as the focal point for its substantial and growing research activities. The NorthShore Cardiovascular Institute was launched in January 2015.

NorthShore has approximately 2,100 affiliated physicians, 900 of which are employed within NMG. Approximately 31% of these physicians are primary care providers (PCPs). NorthShore also employs 377 advanced practice providers (APPs), 6 of whom are dedicated to the cardiology department, which is comprised of 47 cardiologists.

In 2003, NorthShore was among the first in the country to successfully implement a system-wide electronic medical record (EMR) with demonstrable benefits in quality, safety, efficiency, and service to patients.

NorthShore has also been recognized as a high-performing hospital system across several specialties, according to *U.S. News and World Report*, and is ranked among the Top 10 hospitals in the State of Illinois.

NorthShore is a Joint Commission Certified organization and in 2016 received Joint Commission certification for Disease Specific Care for Ventricular Assist Devices. NorthShore has also attained Magnet Recognition for excellence in nursing and high standards in patient care.

Executive Summary

NorthShore’s strategic growth plan included the development of an Advanced Heart Failure Program building on the organization’s commitment to provide patients with leading edge cardiac care.

NorthShore hired its first fellowship trained advanced heart failure (HF) cardiologist in May of 2015. With support of NorthShore’s Cardiovascular Institute leaders, NorthShore joined the AMGA Heart Failure Collaborative (HF Collaborative) in an effort to develop a successful program rooted in best practices. Specifically with the goals to develop insights and explore options to improve HF readmission rates and transitional care management.

Top priority for NorthShore was the development of a Heart Failure Management Clinic, seen as an intervention to help reduce HF readmissions. NorthShore wanted to ensure that all patients discharged from the hospital with a HF diagnosis were seen within seven days post-discharge to provide HF-focused education and follow-up care.

NorthShore also identified the importance of a 48-hour follow-up phone call to coordinate next steps for HF treatment. It was determined that the optimal provider to engage the patient was a pharmacist who could ensure appropriate understanding of prescription medications. This intervention is still developing.

Through data analysis, it was determined that a significant source of readmissions to NorthShore were patients receiving care at a skilled nursing facility (SNF). Many of these patients were at very high risk for mortality within six months. NorthShore implemented several processes in an attempt to improve care coordination with the SNFs. A position was created for a NorthShore employed physician to work onsite at the SNFs to improve communication and care coordination with NorthShore’s HF program. A cardiology APN provided outreach, support, and education programs for the SNF staff.

Thanks to the collaborative as well as institutional support, many initiatives were put in to place across the continuum to improve care for patients with HF. Leveraging EMR technology and data analytics, systems were developed to identify patients with HF and trend hospital admissions and interventions across the care continuum. Patient data is now tracked monthly and can be reviewed on a granular level.

Interventions were developed to improve treatment, medication adherence, and communication across care transitions. NorthShore has increased efficiency with the reduction of duplicative services and wasted resources leading to a positive impact on patient care and the patient's experience.

Program Goals and Measures of Success

In joining the AMGA HF Collaborative, NorthShore had multiple goals and objectives with regard to HF patient care. Key goals included:

- Developing a multidisciplinary approach for HF patient management
- Providing state-of-the-art HF care from stage A to D category patients, to include guideline-directed medical therapy for both ambulatory and hospitalized patients, as well as interventional, electrophysiologic, and advanced surgical techniques to improve overall quality of life and longevity
- Improving quality of ambulatory and inpatient care for HF patients
- Reduce HF readmissions
- Improving transitions of care for HF patients
- Establishing and setting goals for care/treatment, especially advanced care planning for patients identified with HF

Data Collection and Measurement

NorthShore's methodology with regard to data collection in the HF Collaborative included:

- Utilizing data collected from NorthShore's highly-advanced analytical department that uses the Tableau platform to pull data from Epic, NorthShore's EMR system. This allowed NorthShore to perform a variety of quality improvement initiatives, as well as helping to identify high-risk cases.
- Utilizing a weight-based telemonitoring system in which patients call in their weights. This was also transitioned to electronic messaging over NorthShore's secure

patient/provider portal, both which are tracked by nurse practitioners.

- Utilizing a CardioMems device in those higher-risk patients identified with frequent admissions and readmissions.

Population Identification

Four outpatient offices in two counties were involved in the HF Collaborative, including the following NorthShore staff:

- One fellowship-trained Advanced HF Cardiologist
- One HF-Certified Outpatient Advanced Practice Nurse (APN)
- One Outpatient Registered Nurse (RN) providing triage and care coordination
- One pharmacist providing four hours of pharmacy support weekly at one site, hosting clinic for medication education and titration
- One Administrative Director
- One Data Coordinator

NorthShore's target HF population consisted of patients with a diagnosis of ischemic or non-ischemic cardiomyopathy. These HF patients were identified in a variety of ways, including but not limited to physician referral, CPT codes, ejection fraction, and a risk stratification tool incorporated into Epic.

NorthShore developed four clinic locations dedicated to HF patients, with plans to open other clinics in 2017.

NorthShore serves over 5,000 HF patients at 4 hospitals and numerous outpatient sites. NorthShore provides standard diagnostic and specialty testing including MRI, PET scanning, and cardiopulmonary exercise testing. NorthShore has approximately 1,500 inpatient HF discharges over a typical 12-month period, not including patients under observation status. The hospital system serves a large catchment area from North Chicago, extending close to the Wisconsin border.

Over the course of the collaborative, NorthShore's advanced heart cardiologists saw 320 inpatient consultations, 2,534 inpatient established visits, 460 outpatient consultations, and 1,841 outpatient established visits while the advanced HF APN saw 831 outpatient established visits.

Intervention

The following steps were involved in NorthShore's Action Plan for the HF Collaborative work:

- Establish HF Clinic
- Establish HF Management Clinic run by APN
- Create and implement an inpatient HF diuretic protocol to reduce inpatient length of stay
- Develop a diuretic infusion protocol for use in outpatient setting to lower readmission rates
- Develop utilization of pharmacist in outpatient clinic
- Collaboration with SNFs to improve transitions of care
- Utilize data analytics to improve identification of HF inpatients and high-risk groups to reduce readmission rates

Clinical Standards and Algorithms

NorthShore employed the following criteria for referrals to the HF clinic:

- Ejection Fraction < 30%
- Diuretic dose > 1.5mg/kg/d of furosemide equivalents
- Intolerant of ACE-I, ARB, and/or beta blocker
- Walk < one block without getting short of breath
- More than one HF admission in the last six months

Discharge providers (hospitalists) refer inpatients with HF diagnosis to HF Management Clinic to be seen within seven days.

Modifications to Existing Workflows and Staffing

Interim reports were used to monitor progress of initiatives.

NorthShore also implemented new patient care technology involving the use of CardioMems for remote PA pressure monitoring.

The following modifications were implemented in NorthShore's care process (point of care):

- Clinic staff trained to perform six-minute walk test (6MWT)

- Second cardiopulmonary exercise site built
- Established standard HF patient education tools across the care continuum (inpatient > outpatient > home health/SNF)
- Created inpatient HF education classes for patients and family members
- Hired second fellowship-trained HF cardiologist and second HF-specialty RN

The following modifications were implemented in NorthShore's care coordination/outreach:

- SNF collaboration and education
 - Improved relationship and coordinating care with area SNFs
 - APN created and provided education programs for SNFs
- Home Health Collaboration
 - Established one company to provide home inotropes
 - APN provided education and resource support for staff

The following modifications were established in NorthShore's operations:

- Developed electronic orders in EMR for HF Clinic and HF Management Clinic
- Developed structured clinical documentation tools
- Incorporated advanced care planning into routine appointments, including initial visit
- Improved access to HF providers across two counties, including online scheduling capabilities via patient portal
- Enhanced self-reporting capabilities of daily weights via the organization's secure patient/provider portal

The following modifications were implemented in NorthShore's information technology processes:

- Increased utilization of inpatient HF risk stratification tool
- Implemented identification of HF patients based on specific criteria via data analytics
- Developed daily list of patients admitted with HF with active HF diagnosis on problem list

Acute heart failure (AHF) team education was developed to include:

- AMGA conference in December 2016
- Thoratec VAD training conference in Fall 2015
- HFSA, ASAIO, ISHLT 2015 and 2016
- Northwestern Memorial Hospital HF CME event 2015 and 2016
- AAHFN CME program on preventing HF readmissions

The following education was hosted by the AHF during this timeframe:

- Inpatient RN Nursing Contact Hours education program
- Outpatient RN Nursing Contact Hours education program
- Inpatient STIR (Structured Team Interdisciplinary Rounds) at two hospitals
- Social worker and case manager inservice and education
- Delivered three educational presentations to Division of Cardiology (cardiologists)
- Weekly cath conference participation at two hospitals
- Delivered two educational presentations to hospitalists
- Presentation at CME event “Updates in Cardiology: What the Practitioner Needs to Know” hosted for Chicagoland practitioners

After noting inconsistency (different materials in different settings) and missed opportunities in patient education, NorthShore developed three new patient education initiatives.

The first was an Inpatient HF Patient and Family Education Course run by a pharmacist, staff RN, and dietitian.

The second was a HF Education Folder available in multiple languages (English, Spanish, and Russian). The folder was developed for inpatient, outpatient, and home health use, and provided at all sites. The following content was included in each folder:

- o Understanding HF
- o Weight log tracker
- o Know Your Color Zones: Signs and symptoms of HF and when to contact care team

- o HF Diet Education
- o Self-Care for Success (mental health)
- o Medication Management

The folder provides information for accessing the HF Management Clinic.

The third patient education initiative involved the use of eight HF Education Modules in EMMI (videos and articles). These electronic education modules were disseminated via patient EHR portal.

Outcomes and Results

Throughout the Collaborative, NorthShore tracked the percentage of patients who were prescribed ACE/ARB/ARNi therapy as well as the percent of patients who were prescribed beta blocker therapy for HF management. The number of patients on ACE/ARB/ARNi therapy increased from 62.3% at the beginning of the Collaborative to 74.5% at the end of the Collaborative. The number of patients on beta blocker therapy increased from 81.3% at the beginning of the Collaborative to 92.2 % at the end.

NorthShore had a HF readmission rate that hovered between 19% and 21% during the course of the Collaborative.

As an effort to reduce HF readmission rates, NorthShore utilized a pharmacy outpatient clinic to ensure medication adherence and understanding. Over a three-month period, 83 patients were seen in the pharmacy clinic. The 30-day readmission rate for these patients was 8.75%, significantly lower than the overall HF readmission rate of ~20%.

Another effort to reduce HF readmissions was the creation of a HF management clinic for patients to be seen after a hospital admission, ideally within seven days. Approximately 18% of patients discharged from a NorthShore hospital with a heart failure diagnosis were seen in the HF management clinic for follow-up treatment. These patients had a readmission rate of 11%, which is significantly lower than the overall HF readmission rate of ~20%. The nurse practitioner hosting the HF discharge clinic has seen an increase in volumes since last year at this time, but still has capacity to see more patients. Efforts are underway to fill this clinic as attendance has proven reduced readmissions for patients with HF.

Lessons Learned and Ongoing Activities

The NorthShore team learned many lessons and gained insight to HF care management through the Collaborative. In the final analysis, it was determined that a Heart Failure Management discharge clinic is beneficial, but efforts to coordinate and ensure appropriate follow-up to keep the clinic filled continue to be a challenge.

Implementation of consistent transitional management care has also been a challenge. It has been difficult to determine the appropriate and responsible parties for providing the follow-up, specifically the 48-hour phone call, and understanding how TCM reimbursement can benefit the health system and not solely an individual provider.

SNFs contribute significantly to the HF readmission rate. Understanding how to better approach advanced care planning for patients entering SNFs will be an important aspect of NorthShore's ongoing development of HF care. Utilization of risk models is helpful in identifying HF patients and should be used to ease the transition of these patients.

Standardizing orders is likely helpful, but probably does not have a large impact in and of itself. Improving communication between inpatient and outpatient, as well as with the SNF involved is imperative to improve outcomes and reduce readmissions. The diuretic infusion clinic, while a novel tool, had a limited role—though it was a nice convenience.

On a list of what NorthShore might have done differently are the following priorities which they would have liked to emphasize more:

- Ensure the HF discharge clinic was accepted as a collaboration clinic, non-threatening to the primary cardiologist relationship and follow-up

- Built tools to hardwire transitions of care communication
- Identified and found solutions to major barriers preventing patient follow-up care

The greatest challenges faced by the NorthShore team were: (1) improving communications; and (2) understanding the financial impact on the system, how actions and interventions impact individual departments, and how to reconcile the financial issues.

As the NorthShore team considered its next steps, the HF team will focus on planning with sustainability and scalability in mind. Goals include hiring an additional HF physician, APN, and RN to improve access for patients discharged with HF. NorthShore also hopes to add an inpatient APN to the HF team to help monitor HF discharges and to improve the transitions of care to the HF clinic and SNF.

To further develop transitional care efforts, the HF team wants to ensure each patient discharged with a HF diagnosis receives a phone call within 48 hours of discharge from a member of the clinical team. NorthShore will continue to increase collaboration and communication with SNFs by utilizing a standard transition of care form for all HF patients being discharged to a facility or under the care of home health services. It is a goal of the organization to have an employed cardiologist rounding at local SNFs, helping establish HF order sets and workflows.

NorthShore plans to continue to use the knowledge learned from the collaborative to further improve HF care across the care continuum.

Patient Story

An 80-year-old man was referred to the NorthShore Advanced HF Clinic from one of NorthShore's Clinical Cardiologists in July 2015. His past medical history included: coronary artery disease, ischemic cardiomyopathy, diabetes, Non-Hodgkin's lymphoma, chronic kidney disease, obstructive sleep apnea, pancreatic cancer s/p resection.

His primary complaint was lack of energy.

Based on the appearance of his echocardiogram, a right heart cath and biopsy were performed, as there was a suspicion for cardiac amyloid. This was confirmed with pathology, and mass spectrometry showed the diagnosis of wild type TTR (age-related) amyloidosis.

Over the ensuing months, the patient was admitted for pneumonia, HF, and atrial flutter, but much of his problem was related to congestion and chronic fluid overload. It was decided to implant a CardioMEMS pulmonary artery pressure sensor to help manage his fluid overload. He had recurrent pneumonia about four-to-six weeks later, for which he needed gentle fluid replacement during that admission, and we were successful in getting him back home.

After the CardioMEMS device implant, we were able to follow the patient closely and titrate therapy including the use of our outpatient diuretic infusion clinic.

He had no further HF admissions, and he was able to travel and participate in Cardiac Rehab with close follow-up in the NP Clinic.

Over the next nine months, he did well, until he was diagnosed with an obstructive uropathy related to severe prostatic hypertrophy. He underwent a transurethral resection of his prostate. With close monitoring of his pressure during the surgical procedure, we were able to get him through that safely, but he did experience multiple issues related to pain control, constipation, and urinary issues that resulted in a

suprapubic catheter post-surgery with which he went home. After that procedure, he began a rapid decline, mostly related to his disease process. His filling pressure remained stable, but his overall fatigue and lack of energy progressed. He began having a dramatic decrease in his appetite, uncontrollable back pain, and severe itching.

He had a consultation with our Integrative Medicine Team and experienced some relief of symptoms with recommendations including medical marijuana. The cardiac issues continued, and his symptoms progressed, despite ongoing efforts to maintain his euvolemic status and improve his overall energy. Consultation with hospice care was done at this time, with a focus on palliative care and relief of symptoms.

Over the timespan in caring for him, the advanced HF team had coordinated care with EP, PCP, Infusion Center, Integrative Medicine, Home Health, and Hospice to provide the highest, most comprehensive level of treatment for the patient.

The patient passed away at home in December 2016. An autopsy was done at his request, which showed widespread amyloid deposition in the heart, lungs, and his GI tract, which certainly explained the complexity of his disease and symptoms.

NorthShore's advanced HF team had established a close relationship with the patient and his family. The patient was an intelligent, lively gentleman, who was a former surgeon himself. He had a very strong desire to live, eat, drink, travel, and celebrate time with his family. While his passing was not the outcome any of them had hoped for, NorthShore's advanced HF team was satisfied that the patient and his wife were educated, knowledgeable, and actively involved in all decision-making. They were active participants at every step in determining the direction of his care, and everyone involved knew he had received the best care achievable, given his condition.

Appendix

Figure 1A: Measure 1 - ACE/ARB/ARNi (NorthShore)

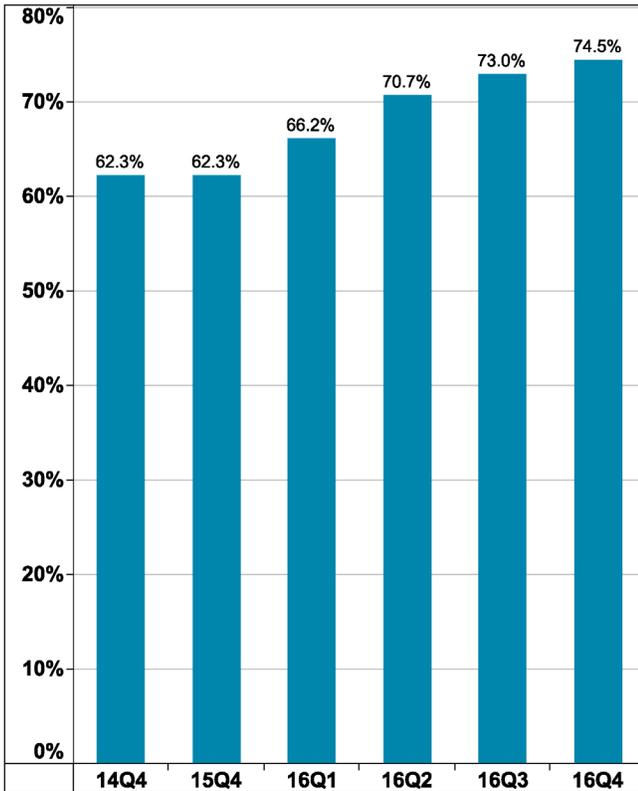


Figure 1B: Measure 2 - Beta Blocker (NorthShore)

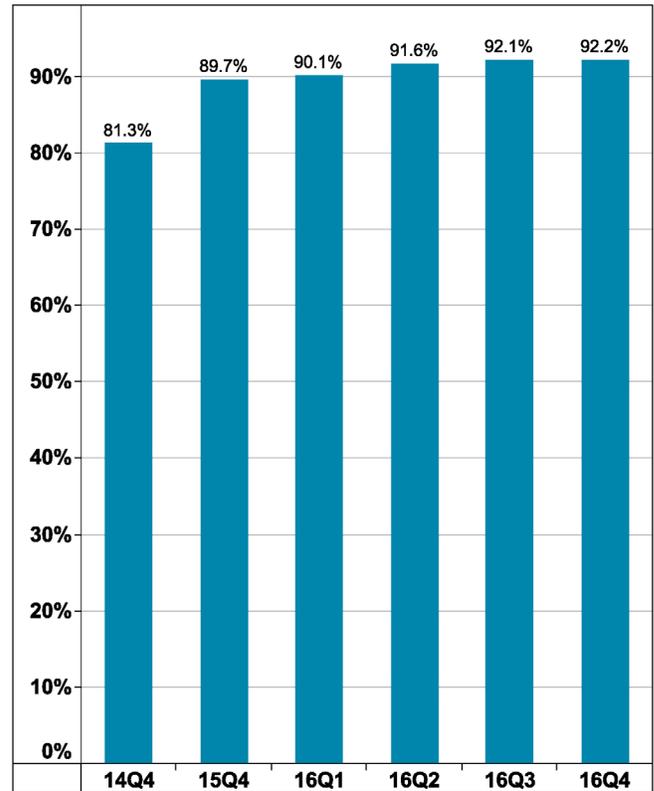


Figure 2: Measure 3 - Readmission Rate (NorthShore)

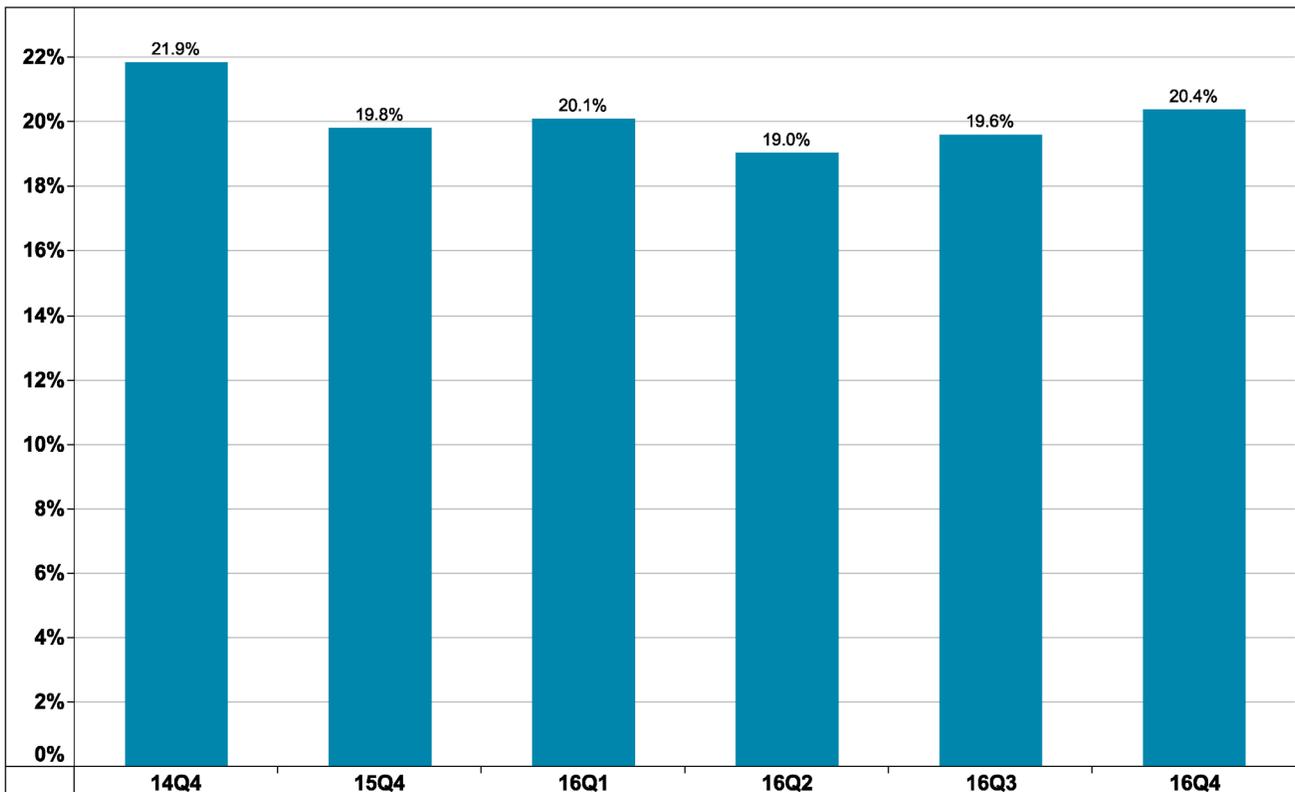


Figure 3: NorthShore Advanced Heart Failure Trends

	IP Consult	IP established	OP Consult	OP established Visits
Robert Gordon, M.D.				
FY15	35	146	92	152
FY16	149	1253	258	1024
Q1 FY17	57	596	54	295
Marcela Goldsmith, A.P.N.				
FY15	n/a	n/a	n/a	n/a
FY16	n/a	n/a	n/a	406
Q1 FY17	n/a	n/a	n/a	213

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