



Advancing High Performance Health

AMGA Foundation

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

TriHealth



Organizational Profile

TriHealth is an integrated healthcare system that formed as a partnership between Good Samaritan Hospital and Bethesda Hospital, Inc. It is a full-service, not-for-profit health system that provides a wide range of clinical, educational, preventative, and social programs. Currently, TriHealth is composed of 7 owned or affiliated hospitals, 2,000 physicians at more than 140 sites, a research center, Hospice of Cincinnati, and multiple medical education programs.

TriHealth Heart Institute is comprised of 9 outpatient sites and 4 hospitals served by 35 cardiologists, vascular and CV surgeons, and 11 cardiology-based APRNs. The TriHealth Heart Institute has more than 60,000 active patients.

TriHealth Heart Institute's Heart Failure Clinic was established in January 2015. Since that time, it has served more than 1,100 patients in 2 locations serving Southern Ohio, Northern Kentucky, and Eastern Indiana.

Executive Summary

Heart failure (HF) affects an estimated 5.8 million Americans with significant mortality. Americans over age 65 are hospitalized for HF more than for any other diagnosis. As part of the AMGA HF Learning Collaborative, TriHealth Heart Institute (THI) targeted practices within the organization to reduce the 30-day all cause readmission for HF patients.

The THI HF team consisted of 4 HF MD champions, 4 nurse practitioners, 2 RN coordinators, and leadership from the two clinic sites.

The THI HF team reviewed current practices and outcomes for 30-day readmissions at both hospitals. This included collaboration with care coordinators, high-risk navigators, home health care, clinical nurse leaders, palliative care team, population health members, IT team, and advanced care planning team. The THI HF team had monthly operational meetings linking both sites and ongoing informal collaboration between members.

Program Goals and Measures of Success

The goals for Phase I (January, 2015-present) are to reduce the 30-day readmission rate, reduce the length of stay, and improve the management of acute HF. Phase II (present-2017) includes the expansion of the current clinic from a 30-day post discharge format to an ongoing, system-wide one. Phase III (2018) will look to the development of a left ventricular assist device (LVAD) program. Data outlining current admission of patients with the diagnosis of HF is disseminated monthly for the system. Clinic data is still manually generated and reviewed at monthly operational meetings.

Population Identification

Organization Size/Scale:

TriHealth Heart Institute

35 cardiologists, vascular/CV surgeons

11 cardiology-based APRNs

9 cardiology outpatient sites and 4 hospitals

60,000 active cardiology patients

Target HF population is identified by Epic-generated admission reporting and referrals by providers. Clinical outcome nursing staff, who serve each of the hospital units, generate referrals as well as provide more informal modes of communicating potential HF admissions. Home health representatives also can be a source of referrals to the HF program.

Data used to compile Figures 1A and 1B reflects the ordering history only, not extraction from a medication profile.

Outcomes and Results

At the end of the AMGA HF Collaborative, THI HF team reported:

- Completion of a HF order set
- Collaboration with Transitions of Care Program
- Substantial increase in referrals to palliative care
- An increase in participation with cardiac rehab
- A chronic disease registry ready for trial
- Grant awards for supplies for indigent patients and iPads for teaching

- Significant increase in advanced care planning (ACP) during outpatient visits

While the hospital readmissions for the patients consulted by THI cardiologists decreased by 1.5% in 2016, the readmission rates for patients active with the HF clinics was consistently <15%. Challenges continue with obtaining timely referrals and consistent patient follow-up.

Lessons Learned and Ongoing Activities

Breaking down silos between hospital-based, PCP-based, and specialty-based services remains a challenge.

Consistent use of the HF order set remains a challenge.

The HF clinic EMR-based data collection system remains undeveloped, but would greatly improve benchmarking.

Expansion of the program from 30-day post discharge to 24/7 chronic disease management program is the goal. Currently, the organization is establishing a population health, system-wide program, which should better meet this need.

References

1. Callihan, T. and Baranowski, B. Managing newly diagnosed atrial fibrillation: rate, rhythm, and risk. *Cleve Clin J Med.* 2011; 78: 258-264.
2. Katz, S. D. and R. R. Baliga. *Heart Failure: A Practical Guide for Diagnosis and Management.* Oxford University Press, 2013.
3. Roy, D. Talajic, M. Nattel, S. et al. Rhythm control versus rate control for atrial fibrillation and heart failure. *N. Eng. J. Med.* 2008; 358: 2667-2677.

Patient Story

The patient is a 52-year-old white male who presented to our Bethesda Arrow Springs Emergency Department with a two-week complaint of chest pain and shortness of breath. He finally decided to seek treatment because he was unable to lie flat in bed. He also reported increased pain with inspiration. He had no history of any cardiac disease or irregular heartbeat. He had trace dependent edema. Patient was afebrile and denied any chills.

His past medical history includes the following:

- Adrenal abnormality (a 2-cm nodule which was negative for pheochromocytoma)
- Asthma
- Back pain
- Diverticulitis
- Unspecified essential hypertension

He denies any surgical history.

His medications at the time of presentation included:

- Naproxen sodium 220 mg 1 tablet BID
- Acetaminophen-codeine 1-2 tablets q6h
- Cyclobenzaprine 10 mg 1 tablet TID as needed
- Ibuprofen 200 mg 1 tablet q6H
- Hydrocodone acetaminophen 1 tablet q6h 5-325 mg

Social history:

The patient reported that he had a serious alcohol addiction, but stopped drinking six months ago. He reports regularly attending Alcoholics Anonymous (AA) meetings. He denies any active drinking. He is a current smoker, half a pack a day for 30 years. He is not married and denies having any children. The patient does not have a primary care physician (PCP) and has not been followed by one in many years.

Vital signs on presentation:

BP	142/73
Pulse	117 and irregular
Temp	98.7 F
Respiration	31
Weight	220 lbs. (99.38 kg)
BMI	29.43 kg/m ²

EKG:

Patient was found to be in atrial fibrillation with rapid ventricular response (RVR). No evidence of any previous myocardial infarction (MI).

T waves: No acute changes

Q waves: Nonspecific

RR Interval: 444 ms

HR: 35 ms

Lab Values:

Wbc	8.8 THOU/mcL
RBC	5.14 MIL/mcL
Hgb	15.6 g/dL
Hct	46%
Platlet	156 THOU/mcL
BUN	19 mg/dL
NA	137 mEq/L
K	4.1 mEq/L
CL	107 mEq/L
Glucose	108 mg/dL
Cr	0.76 mg/dL
Ca	9.0 mg/dL

It was determined that this was a new onset of atrial fibrillation. He was given a bolus of diltiazem 15 mg and a diltiazem infusion was begun at 10 mg/hr. A heparin bolus of 5,000 units was given followed by an infusion of 1,000 units/hour. He was also given a single injection of furosemide 40 mg.

Thyroid studies were ordered. Thyroid abnormalities are considered a correctible exacerbating factor.¹ TSH was found to be 9.04 mIU/L.

A decision was made to transfer the patient to the Bethesda North Hospital (BN) for a transesophageal echocardiogram (TEE) and possible external cardioversion (CV).² Since this was a new onset of atrial fibrillation, "rate control with medical strategy is a reasonable initial strategy."³

Transthoracic Echocardiogram

- Completed on 1/24/17 demonstrated an ejection fraction (EF) of 20-25%.
- Global hypokinesis of the left ventricle.
- Patient was still in atrial fibrillation; a diastolic parameter could not be completed.
- No ventricular thrombus was detected.
- No pericardial effusion.

Day 2

Transesophageal Echocardiogram (TEE)/Cardioversion

- On 1/25/17, the patient taken to the BN Cardiac Catheterization Laboratory for a TEE and possible external cardioversion. The TEE confirmed no left atrial appendage (LAA) clot. Cardioversion at 200 J and 360 J was unsuccessful.
- The patient was then loaded with Amiodarone 400 mg BID. Carvedilol 6.25 mg BID was started, and Spironolactone 25 mg daily was added. Heparin drip restarted. Diltiazem drip discontinued.
- Due to a blood pressure of 91/67, an ACE inhibitor was not started.

Day 3

Left/Right Heart Catheterization

- Performed on 1/26/17.
- RHC results demonstrate and RA mean of 12 mmHg, RV 32/8, PA 40.21 (32), Wedge mean of 24 mmHg, Cardiac output 4.1 l/min (Fick), and Cardiac index of 1.8.

The LHC reveals no coronary artery disease (CAD)

Nonischemic cardiomyopathy

The LHC revealed an EF of 10% which differed from the transthoracic echocardiogram of 20-25%

Atorvastatin 40 mg every evening started

Day 4

- Poor rate control continued.
- Cardiovascular surgery was consulted to evaluate for possible need for mechanical support, LVAD.
- A cardiologist calls the University of Cincinnati Advanced Heart Failure clinic to refer the patient once he is discharged.
- The patient is changed from Lasix to Torsemide 20 mg BID.
- Cardiology orders a Zoll LifeVest for the patient, since he is at increased risk for ventricular arrhythmias.
- Patient is started on Eliquis.
- Blood pressure remains too low to start an ACE inhibitor.

Day 5

- Klonopin 0.5 mg started BID for his increasing anxiety.
- BNP is down to 539.
- No additional testing at this time.
- Amiodarone to 200 mg daily.
- Lisinopril is started today at 2.5 mg daily. Blood pressure was finally acceptable to begin an ACE inhibitor.
- Carvedilol increased to 12.5 mg BID.

Day 6

- Home health care (HHC) has been ordered for the patient.
- Patient is ready for discharge.
- We continue to wait for approval of the Zoll LifeVest.

Day 7

- The Zoll LifeVest is denied by his insurer.
- Patient is discharged to home.
- He will be seen in the cardiology office by an NP 4/13/17.

Appendix

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

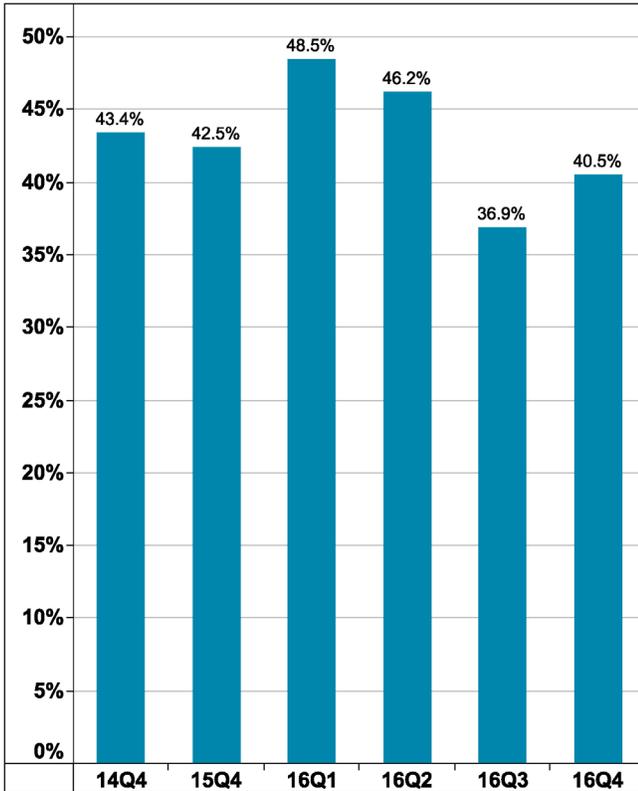


Figure 1B: Measure 2 - Beta Blocker (TriHealth)

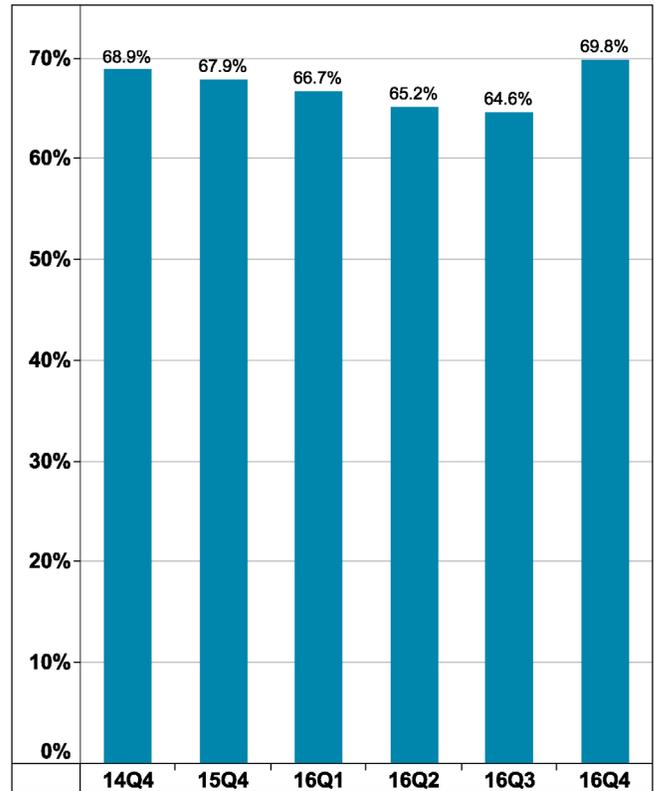
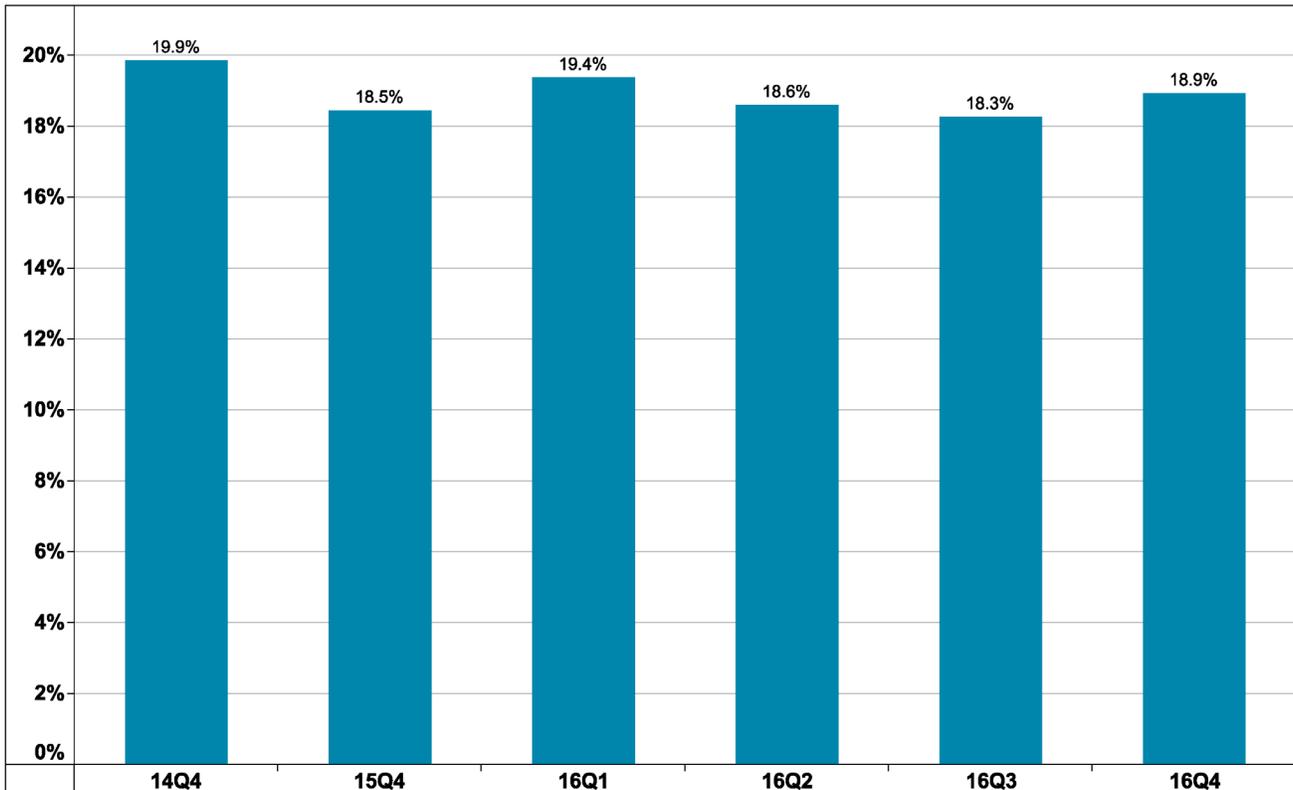


Figure 2: Measure 3 - Readmission Rate (TriHealth)



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