Sick at Heart
A clinical quality improvement case study on the impact of a standardized heart failure order set at Baylor Scott & White Health

by David J. Ballard, M.D.

Heart failure (HF), which occurs when the heart cannot pump enough blood and oxygen to support other organs, is a serious and growing problem in the United States. The Centers for Disease Control and Prevention estimate that at least 5.1 million adults in the United States have HF, and about half who develop HF die within five years of diagnosis. HF costs the nation an estimated $32 billion each year in healthcare services, medications and missed days of work, in addition to the costs absorbed by patients.¹

About Baylor Scott & White Health

Baylor Scott & White Health (BSWH), an integrated healthcare delivery system in north Texas, was formed in 2013 when Baylor Health Care System (BHCS) and Scott & White Healthcare joined. Its vision is to be the most trusted name in giving and receiving safe, quality and compassionate healthcare, and its mission is to serve all people by providing personalized health and wellness through exemplary care, education and research as a Christian ministry of healing. BSWH includes:

- 46 hospitals.
- More than 36,000 employees.
More than 6,000 affiliated physicians.

More than 500 patient care sites.

5.3 million patient encounters annually.

$5.8 billion in total net operating revenue.

**Standardized HF order set**

In 2007, to improve care for patients with HF, BHCS (now part of BSWH) undertook a study to determine the impact of a standardized HF order set on mortality, readmission rates, quality and costs of care. Participants in the study were adult patients who were discharged from a BHCS hospital between December 2007 and March 2009 with a HF diagnosis. Participants who have not received a heart transplant or a left ventricular assistive device and had a length of stay of less than 120 days were eligible.

BHCS leaders and subject matter experts developed a standardized HF order set—a standardized list of orders for a specific diagnosis—based on American College of Cardiology and American Heart Association clinical practice guidelines. The order set was deployed across the organization via an intranet physician portal. To facilitate tracking of order set use, an order set use field was a required field in the integrated outcomes, resource and case management system used at all BHCS hospitals for HF patients.

**Outcome measures**

The following were compared for HF patients treated with and without the order set:
• In-hospital mortality.

• 30-day mortality.

• 30-day readmission rates.

• Compliance with all-or-none bundle of process of care measures. [Compliance of the all-or-none bundle was calculated as the proportion of HF patients eligible for four HF measures—discharge instructions, evaluation of left ventricular function, angiotensin-converting-enzyme inhibitor (ACEI) or angiotensin II receptor blockers (ARB) for left ventricular systolic dysfunction, and smoking cessation counseling—who received all the measures for which they were eligible.]

• Length of stay.

• Direct cost of treatment.

Study results

Order set use reached 73.1% in March 2009 and has since climbed to more than 90%. Order set use led to:

• Significantly increased compliance with HF core measures [odds ratio (95% confidence interval)] = 1.51(1.08; 2.12)].

• Significantly reduced inpatient mortality [0.49(0.28; 0.88)].

• Reductions in 30-day mortality [0.81(0.58; 1.13)] and readmissions [0.91 (0.73; 1.14)] that approached significance.
• Significantly lower direct costs for initial admissions alone [-685 (-1287; -87)] and in combination with readmissions [-1350 (-2804; -396)].

Study conclusions

Results indicate that an evidence-based, standardized order set can help improve outcomes, reduce costs of care and increase adherence to evidence-based care processes. This conclusion supports the idea that narrowing treatment choices to reduce variation in care through the use of evidence-based medicine supports smooth workflow and safe practices, and reduces risk of errors, thereby increasing both patient safety and efficiency. The study’s results also are consistent with the observation that collecting performance data and providing feedback to physicians and other decision-makers is an essential component of healthcare quality improvement.

Extrapolated nationally, the impact of the standardized order set on HF care would translate into potential annual savings of 15,147 in-hospital deaths and $1.9 billion dollars nationally, making it a crucial tool for improving patient outcomes and making healthcare more efficient.

Achieving hospital and physician alignment

BSWH learned several lessons about operationalizing a standardized HF order set that may be applicable to other healthcare delivery organizations seeking to implement similar quality improvement initiatives. First, to achieve widespread HF order set adoption, a healthcare
delivery organization must encourage alignment of physicians’ strong professional belief in personal responsibility for quality with the quality priorities faced by the organization.

Alignment exists when there are:

- Common values.
- A shared vision.
- Active engagement of physicians in leadership roles.
- Physician compensation based on productivity and achievement of shared hospital and physician economic and quality goals.

Achieving alignment entails:\(^5\)

- Creating and articulating a clear vision for the hospital and physician relationship.
- Developing an understanding of the physicians’ groups and their motivations—engaging in intense interaction during this process.
- Ensuring that physicians have a seat at the table in making decisions that affect them by creating physician leadership roles on operating committees, quality initiatives, and the board.
- Showing that the hospital is concerned about physicians by making it easier to practice medicine in the community.
- Engineering opportunities for interaction among physicians, management and the board to create a strong social environment to build trust.
Value-based purchasing and the financial need for improved standardization of care

Another way to achieve alignment between hospitals and physicians is to emphasize the need for improved standardization of care. Value-based purchasing (depicted in Figure 1) offers an example of the financial need for improved standardization and enhanced care quality.

In federal fiscal year 2013, the Centers for Medicare and Medicaid (CMS) tied reimbursement to performance in clinical care processes and patient experience. The clinical measures included, for example, the rates of healthcare-associated infections. Patient satisfaction is measured by the Hospital Consumer Assessment of Healthcare Providers and Systems, which measures patients’ perceptions of how well their healthcare needs were met.

In 2014, CMS added a third domain for patient outcome measures. This includes 30-day mortality rates for deaths that occur among heart attack, HF and pneumonia patients within 30 days after their release from the hospital.

In 2015, a healthcare research and quality composite measure, patient safety, will be added to the program. CMS also will add a fourth domain for efficiency, which will measure Medicare spending per beneficiary.
Process improvement tools

A variety of process improvement tools can facilitate the operationalization of healthcare quality improvement initiatives such as the HF order set. A fishbone diagram, for example, can help stakeholders identify specific reasons for a lack of alignment between physicians and hospitals in the care of patients with HF. An example fishbone diagram is depicted in Figure 2.
Figure 2. Example fishbone diagram
ID = identify, HF = heart failure, PT = patient, MD = doctor

In addition, a process improvement tool that can help reduce a high number of issues to a manageable size is a diagraph. Diagraphs are useful when identifying the root cause of a problem; the issue with the highest number of outward arrows is usually the issue that may cause the others to occur. An example diagraph is displayed in Figure 3.

**Figure 3. Example diagraph to identify the root cause of a problem**
Summary

There is a pressing need to improve care for patients with HF. BSHW created a standardized HF order set based on American College of Cardiology and American Heart Association clinical practice guidelines and examined the impact of the order set on mortality, readmission rates, quality and costs of care. The standardized order set helped improve patient outcomes, reduce care costs and increase adherence to evidence-based processes of care. From this study, BSWH learned about the need for hospital and physician alignment in creating standardized care pathways, the financial need for improved care standardization, and the ability of process improvement tools to drive the operationalization of quality improvement initiatives. Healthcare delivery systems can use the example of this case study to create and implement their own HF order sets and related quality improvement initiatives.

References

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About the author
David J. Ballard, M.D., Ph.D., is chief quality officer for Baylor Scott & White Health. Prior to the
merging of Baylor Health Care System (BHCS) and Scott & White Healthcare, Ballard joined
Baylor Health Care System (BHCS) in 1999 as its first chief quality officer and was responsible
for designing, implementing and evaluating initiatives related to clinical effectiveness, patient
safety and other dimensions of systemwide healthcare quality improvement. Under his
leadership, BHCS earned several awards for its healthcare quality improvement
accomplishments, including the 2010 Medical Group Preeminence Award of the American
Medical Group Association, the 2008 National Quality Healthcare Award of the National Quality
Forum and the 2007 Leapfrog Patient-Centered Care Award. Ballard also is president and
founder of the STEEEP Global Institute, which is dedicated to helping other organizations
deliver safe, timely, effective, efficient, equitable and patient-centered healthcare. He authored
Achieving STEEEP Healthcare (Productivity Press, 2013), which documents the BHCS healthcare
quality improvement journey. His book was awarded the Shingo Research and Professional
Publication Award in January 2014 for contributing new knowledge to the understanding of operational excellence.

A board-certified internist, Ballard trained at the Mayo Clinic after earning degrees in chemistry, economics, epidemiology and medicine at the University of North Carolina (UNC) in Chapel Hill where he was a Morehead-Cain scholar, a fellow and junior year Phi Beta Kappa inductee. Prior to joining BHCS, he held progressive academic appointments as assistant and associate professor at the Mayo Medical School in Rochester, MN, associate professor with tenure at the University of Virginia School of Medicine in Charlottesville, and professor of medicine with tenure in the Emory University (EU) School of Medicine in Atlanta and professor of epidemiology in the Rollins School of Public Health of EU.

Among several national and international leadership roles, he Ballard served as president of the International Society for Quality in Healthcare from 2001-2003, and is the 2013-2014 chair of the Steering Committee for the Centers on Education and Research in Therapeutics for the U.S. Agency for Healthcare Quality and Research. Ballard has published more than 200 peer-reviewed manuscripts and serves on several editorial boards, including Health Services Research, the Journal of Comparative Effectiveness Research and the Mayo Clinic Proceedings (health policy section editor). He is a 1995 recipient of the Academy Health New Investigator Award and a 2012 recipient of the John M. Eisenberg Article-of-the-Year Award in Health Services Research. He received the Distinguished Alumnus Award of the UNC School of Medicine in 2008.