Heart Failure Disease Management Improves Outcomes and Reduces Costs

Snapshot

Summary
The St. Mary's Duluth Clinic Heart Center restructured outpatient care for heart failure patients by incorporating a combination of chronic care and disease management principles and providing home telemonitoring for high-risk patients. The program, which coordinates care for nearly 1,000 patients in Northern Minnesota and Northern Wisconsin, has increased use of appropriate medications, improved outcomes and functional status, and reduced readmission rates, length of stay, and overall costs of care for the health system.

Evidence Rating (What is this?)
Moderate: The evidence consists of comparisons of key indicators before and after implementation of the program.

Developing Organizations
St. Mary's Duluth Clinic

Date First Implemented
1998

Patient Population
Geographic Location > Region; Vulnerable Populations > Medically or socially complex

What They Did

Problem Addressed
Congestive heart failure (CHF) is a highly prevalent, costly condition that imposes a significant burden on those it affects; however, conventional CHF care tends to focus on acute rather than chronic management strategies, which has negative implications for both costs and
quality of care.

- **Highly prevalent and expensive**: More than 5 million Americans have CHF, and approximately 550,000 new cases are diagnosed annually.\(^1\) The total annual costs of caring for CHF in the United States are more than $25 billion, with 60 percent of these costs being associated with hospitalization.\(^2\) The costs of CHF hospitalizations typically exceed reimbursement, as the expenses associated with long length of stay quickly overwhelm the $6,000 average reimbursement provided by Medicare.\(^3\)

- **Current care is inadequate**: Traditional care processes are not well structured to prevent acute episodes in those with CHF. Patients often fail to recognize the early signs of decompensation and neglect to seek timely help; at the same time, office-based primary care is typically incomplete with regard to CHF patient needs. As a result, patients frequently decompensate and require costly emergency department (ED) and/or inpatient care. Once hospitalized, the lack of thorough patient education before discharge increases the patient's odds of early readmission.\(^4\)

**Description of the Innovative Activity**

The Saint Mary's Duluth Clinic Heart Failure Program monitors the health status of, and coordinates care for, ambulatory CHF patients using several protocols and systems that are designed to prevent decompensation, with the goal of averting ED visits and hospital admissions. The program, which currently coordinates care for over 1,100 CHF patients, targets resources toward those at greatest risk, including the elderly and those with more severe (designated as class III or IV) CHF. Key elements of the program are as follows:

- **Physician referral**: The majority of patients are referred by the system's cardiologists, who recommend patients who have been hospitalized as a result of decompensated CHF. Primary care physicians (PCPs) also refer a significant number of patients. Some patients self-refer after hearing about the program by word-of-mouth.

- **Program introduction**: Program staff, including both nurse practitioners (NPs) and physician assistants (PAs), often introduce themselves and explain the program to inpatients who are referred by their physicians during the hospitalization. In cases in which such an in-person introduction is not possible, staff members send an introductory letter to patients.

- **Initial program visit**: An NP or PA meets with every patient for about 2 hours within 7 to 10 days of discharge (when risk of readmission is greatest). During this visit, the staff member describes the program, educates the patient about CHF, and determines whether the patient is receiving appropriate care, including guideline-directed medications at appropriate dosages and a recent evaluation of left ventricular function.

- **Specialist care**: If a referred patient has never seen a cardiologist, the NP or PA provides a referral to a cardiologist for an evaluation.

- **Periodic office visits guided by established protocols**: Patients come to the office within 7 to 10 days of hospital discharge. A protocol specifies that for the first year, patients are seen every 2 weeks for 8 weeks, and then every 3 months; patients continue to be seen every 3 months unless their
condition warrants closer observation. Each full-time NP and half-time registered nurse (RN) can manage roughly 250 CHF patients. At each visit, protocols are used to ensure that all evaluations and treatment are consistent with established national guidelines. During each visit, RNs provide formal education and counseling on appropriate diet, lifestyle, and medications, while NPs and PAs prescribe medications (e.g., beta blockers, angiotensin-converting enzyme [ACE] inhibitors) and conduct medication titration according to evidence-based clinical guidelines. Patients see a cardiologist at least once a year, and more often if necessary.

- **Between-visit telephone access:** RNs are available to field phone calls from patients experiencing problems, thus facilitating prompt symptom assessment and resolution.

- **Between-visit home telemonitoring for high-risk patients:** Between office visits, a home telemonitoring scale monitors both weight and important symptoms for selected patients who are considered to be at high risk of decompensation. The program added the home telemonitoring component in early 1999 after nurses realized that telephone-based weight checks were time-consuming and often inaccurate (because patients self-reported their weight). Patients weigh themselves every morning and respond to simple questions (stated audibly and shown visually on an electronic console screen in large print) related to symptom exacerbation. Weight data and responses are transmitted through the phone line to the program’s computers, which track the responses and provide graphical trend data on weight. The computer program triages the information and flags patients who are above or below their personalized weight alarm settings and/or whose responses indicate symptom exacerbation. RNs can contact these patients and decide on further action, such as implementing a diuretic protocol.

- **Group support and education:** These sessions, which were designed based on the recommendations of a focus group of CHF patients, provide periodic clinical presentations to patients. Support groups are held four times per year at the main campus and twice a year at the satellite clinics. The support groups are lead by CHF program staff. Topics covered include managing medications (taught by a pharmacist), grief support (led by a grief counselor), managing diet (led by a dietician), and living with the disease (led by a life coach).

- **Quarterly newsletter:** Saint Mary’s Duluth Clinic produces a quarterly CHF newsletter that is sent to patients and PCPs.

**Contact the Innovator**

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Did It Work?

Results

The heart failure program has resulted in markedly better adherence to appropriate use of medications; improved outcomes and functionality; lower readmission rates, length of stay, and costs; and incremental revenues. This success has prompted the opening of several additional satellite programs, including in Ashland (WI), Hayward (WI), Spooner (WI), and Virginia (MN).

- **Better medication usage:** ACE inhibitors, angiotensin receptor blockers, and beta blockers (which collectively represent the mainstay of high-quality CHF treatment) are appropriately used on 95 to 98 percent of patients in the program, up significantly from 50- to 60-percent appropriate usage before the program.

- **Improvements in ejection fraction rates:** About 55 percent of program participants have seen a significant improvement in their ejection fraction rate (the percent of the total amount of blood in the left ventricle that the ventricle pumps out with each heartbeat) since entering the program.

- **Improvements in 6-minute walk test:** Between 50 and 60 percent of program participants improved their 6-minute walk score after 6 months of participating in the program.

- **Reduced readmissions:** Since the start of the program, the 6-month readmission rate has consistently been 3 to 4 percent, down from 20 to 25 percent before the program began (this latter figure is roughly in line with Minnesota state averages). The national average readmission rate is roughly 40 to 50 percent. Six-month readmission rates are even lower for the 200 patients who are monitored at home, with rates of 2 percent in fiscal year (FY) 2005, 0 percent in FY 2006, and 1.5 percent in FY 2007.

- **Reduced length of stay:** Length of stay is slightly lower for program participants than for nonparticipants (3.9 days versus 4.2 days in FY 2007). Length of stay has been declining over time for both groups.

- **Cost savings:** A pilot study conducted in 2000 in conjunction with Blue Cross/Blue Shield of Minnesota found that the program saved $1.25 million on the care of 29 CHF patients over a 6-month period; savings stemmed from reduced hospital admissions (approximately $1 million) and ED visits (approximately $250,000).

- **Revenue generation:** The program contributes approximately $1 million in net outpatient revenues annually to Saint Mary's Duluth Clinic; revenue stems from billable laboratory tests, echocardiograms, electrocardiograms, 6-minute walk tests, and other services.

- **Better use of cardiologist skill set:** Because NPs, PAs, and RNs now handle most outpatient care for CHF patients, cardiologists have more time to provide consultations and/or perform cardiac catheterizations, allowing them to use their skills more appropriately and generate additional revenue for the system.
Evidence Rating *(What is this?)*

**Moderate:** The evidence consists of comparisons of key indicators before and after implementation of the program.

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**How They Did It**

**Context of the Innovation**

Saint Mary's Duluth Clinic is an integrated health system with 4 hospitals, 17 clinics, and 7,000 physicians and employees managing more than 400,000 patient visits each year. The heart failure program was started in 1999 by two interventional cardiologists at Saint Mary's Duluth Clinic. These cardiologists wanted to improve care for CHF patients but recognized that the traditional medical model was inefficient and did not permit sufficient time to adequately coordinate care for this complicated patient population. As a result, these cardiologists found that many CHF patients ended up being hospitalized for exacerbations that likely could have been avoided with more timely outpatient care. In addition, St. Mary's Duluth Clinic ended up absorbing the costs of many of these admissions, especially those involving Medicare patients; the average hospitalization for CHF costs Saint Mary's Duluth Clinic between $11,000 and $15,000, whereas Medicare reimbursement is only a little more than $6,000.

**Planning and Development Process**

**Key steps in the planning and development process include the following:**

- **Preparation and planning:** A Saint Mary's Duluth Clinic project manager gathered data and analyzed costs for 6 months. Saint Mary's Duluth Clinic then hired an NP, who, in collaboration with cardiologists, spent 1 year reviewing literature, training staff, developing internal processes, and "selling" the idea internally.

- **Identification of initial CHF population:** NPs completed a chart review to estimate how many CHF patients were currently being cared for by the health system. The NPs then asked the appropriate cardiologists for permission to contact their patients about participating in the program.

- **Database development:** The information technology (IT) department developed a database that could be used to track patient care and outcomes.

- **Protocol development:** Protocols relating to the referral process, office-based care, and follow up care were developed by the nurse practitioner during the preparation and planning process.

- **Staff training:** Nurses were trained on how to conduct in-person and telephone-based patient consultations. RNs received on-the-job training from experienced RNs. Saint Mary's Duluth Clinic also enlisted the services of a life coach, who held training sessions on how to coach people.

- **Obtaining PCP support:** A cardiologist "champion" contacted PCPs to explain the program and encourage referrals to it, emphasizing the program's potential to improve clinical quality and assuring physicians that the initiative would not undermine their control over patient care.
**Resources Used and Skills Needed**

- **Staffing:** Ongoing staffing includes a medical director (cardiologist) to provide clinical leadership and program oversight; cardiologists to ensure accurate diagnoses and treatment plans; NPs and PAs to provide disease management, medication management, referral for device therapy, and oversight of tele-scale data; RNs to provide patient education, manage tele-scale data, perform phone triage, and track test and laboratory data; and administrative support staff. As noted earlier, one full-time NP and one half-time RN can manage roughly 250 CHF patients. Initially, the St. Mary's Duluth Clinic program included one NP, one MD, one RN, and one certified medical assistant; current staff members include six NPs/PAs, two MDs (directors), six RNs, and three medical assistants. In addition to this ongoing staffing, the initial development of the database took about 100 hours of IT staff time.

- **Equipment and other costs:** The annual costs for the rental and fees associated with each home-monitoring device is $2,820 per patient. Other costs, such as production of the quarterly newsletter, are fairly minimal.

**Funding Sources**

St. Mary's Duluth Clinic

The hospital foundation provided funding to cover the costs of the telemonitoring scales for the first year. Once the program demonstrated improved outcomes for patients with scales, the cardiology section of Saint Mary's Duluth Clinic assumed the cost of the scales along with other ongoing operational expenses.

**Tools and Other Resources**

*Clinical Practice Guidelines for Heart Failure*

- Heart Failure Society of America (outpatient):

- Institute for Clinical Systems Improvement (inpatient and outpatient):

**Adoption Considerations**

**Getting Started with This Innovation**

- Assess the costs of CHF to the organization, including whether current reimbursement levels are adequate to cover costs. As noted, St. Mary's Duluth Clinic was losing money on hospitalized CHF patients, largely because they were admitted in a highly decompensated state that required lengthy, costly stays.

- Consider both direct and indirect opportunities for revenue generation, as it may take time for the
program to generate revenues on its own. Indirect opportunities include greater use of appropriate
testing and more flexibility in cardiologists' schedules, which allows them to handle more complex
cases.

- Recognize that achieving a positive financial performance may take time.
- Set clear and specific goals for the program, with an initial focus on improving the provision of
guideline-directed care. If this goal is achieved, other benefits will follow, such as decreased admission
rates and ED visits. Additional goals can be added over time.
- Consider creating the program within the cardiology division/department; the creation of a separate
entity may cause confusion about referral patterns and program ownership.
- Develop strategies for applying existing, accepted CHF guidelines, such as protocols for medication
usage and titration.
- Consider starting the program on a small scale with a limited number of patients. Because patient
counseling and education, particularly phone consultations, can be time-consuming, it is important to
ensure that staff can handle the initial number of program participants without becoming overwhelmed.
Program size can be increased as existing staff prove their ability to handle larger caseloads and/or as
more trained staff are added.
- Address PCP concerns about patient referral by assuring them that the program will improve care but
not take control over the care of their patients.

**Sustaining This Innovation**

- Continually track outcomes to highlight the value of the program.
- Ensure that RNs are available to field phone calls from patients who need ongoing education and/or
quick access to help when they are experiencing symptoms.
- Conduct periodic group support and educational sessions for patients, and provide ongoing education
via a quarterly newsletter or other means.
- Conduct ongoing internal marketing to medical/allied health staff.
- Reconsider cost of telescale. The cardiology department has covered the costs ($55.00/month/per
patient on scale). In the economic environment of 2009, we will start passing that cost on to the
individual patients, as Medicare does not reimburse for the cost of the telescale.

**Use By Other Organizations**

- Similar models have been established in Billings. Groups in Fort Wayne, Indiana, and New York and
Pennsylvania expressed information in obtaining further information and interest in hiring Saint Mary's
Duluth Clinic as consultants to establish a similar model.

*Comment on this innovation/Read other comments.*
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1 Heart Failure. American Heart Association, December 6, 2007. Available at: http://www.americanheart.org/presenter.jhtml?identifier=1486


3 Data provided by Linda Wick, Saint Mary’s Duluth Clinic.


Innovation Profile Classification

Disease/Clinical Category: Congestive heart failure

Patient Population: Geographic Location > Region; Vulnerable Populations > Medically or socially complex

Stage of Care: Acute on chronic care (i.e. an acute condition resulting from underlying chronic disease); Chronic care

Setting of Care: Ambulatory Setting > Hospital outpatient facility, Telehealth > Telemedicine, Patient use of electronic communication (telephone, email, web); Home > Patient self-management

Patient Care Process: Active Care Processes: Diagnosis and Treatment > Chronic-disease management; After Care Processes > Follow-up care; Monitoring; Care Management Processes > Coordination of care; Patient-Focused Processes/Psychosocial Care > Improving patient self-management; Patient education; Provider-patient communication

IOM Domains of Quality: Effectiveness; Timeliness

Organizational Processes: Medical record keeping; Process improvement; Referrals; Staffing; Team building; Technology - Other; Workflow redesign

Developer: St. Mary’s Duluth Clinic

Funder: St. Mary’s Duluth Clinic