A SYSTEMS APPROACH TO HEART FAILURE: CRITICAL FOR SUCCESS

Lessons from the Partners Healthcare Disease Management Program

G. William Dec, MD
Heart Failure and Transplantation Unit
Massachusetts General Hospital

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RATIONALE FOR OUTPATIENT HEART FAILURE MANAGEMENT PROGRAM

6-MONTH READMISSION RATES


N= 17,448 Medicare patients
OVERVIEW OF THE CONTINUUM OF HEART FAILURE DISEASE MANAGEMENT

HF Critical Pathway [Inpatient]
   (identification, enrollment)
   ↓
Transitional Home-Care
   (stabilization, education)
   ↓
Longitudinal Care
   (optimization, education)
   ↓
Patient “Telemanagement” Care
   (maintenance, education, discharge)
   ↓
End-of-life Care
HOME BASED HEART FAILURE INTERVENTION TRIAL

TRIAL DESIGN

Purpose: To evaluate the effect of a multidisciplinary home-based intervention (HMI) on long-term event-free survival and readmission rates following hospital discharge for CHF

Study Population: 297 non-consecutive patients were randomized to HMI (n=149) or usual care (n=148). All patients were ≥ 55 years old, LVEF < 55%, ≥ 1 hospitalization for CHF

Intervention: Structured home visit by nurse and pharmacist or cardiac nurse was provided within 7-14 days of hospital discharge to review medications and knowledge about heart failure symptoms/signs, assess compliance and report back to referring physician. Few patients received any subsequent home follow-up visits

Patient Characteristics:
- age (years): 75 ± 8
- LVEF (mean %): 38 ± 11
- NYHA class II/III/IV (%): 46:45:9

Medications:
- diuretics: 98%
- ACE-inhibitor: 76%
- β-blocker: 22%
- Digoxin: 66%

Mean number of medications: 7.3

HOME BASED INTERVENTION IN HEART FAILURE

CUMULATIVE READMISSIONS


![Graph showing the comparison between usual care and home-based intervention in cumulative readmissions over time. The graph includes a logarithmic scale for the y-axis and a timeline for the x-axis from 0 to 72 months. The inset graph indicates the number of re-admissions per patient at risk for each month of follow-up.]

**Independent predictors:**

- **HBI** - RR 0.72 (0.54 - 0.97) *
- **LVEF** - RR 2.00 (1.29 - 3.11) *****
- **Hypoalbuminaemia** - RR 1.65 (1.09 - 2.69) *
- **Charlson index** - RR 1.79 (1.13 - 2.85) *
- **Pulmonary oedema** - RR 1.46 (1.08 - 1.98) *

* p < 0.05; ** *** p < 0.001
### MULTIDISCIPLINARY HEART FAILURE DISEASE MANAGEMENT PROGRAMS

**META-ANALYSIS OF RANDOMIZED TRIALS: HEART FAILURE REHOSPITALIZATION RATES**

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Sample Size</th>
<th>Duration</th>
<th>Risk Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multidisciplinary HF Clinic</td>
<td>778</td>
<td>7.8 months (3-12)</td>
<td><strong>0.76</strong> (0.58-0.99)</td>
</tr>
<tr>
<td>Multidisciplinary Outpatient HF Team (Non-clinic based)</td>
<td>652</td>
<td>9 months (6-12)</td>
<td><strong>0.72</strong> (0.59-0.87)</td>
</tr>
<tr>
<td>Telephone Programs</td>
<td>824</td>
<td>6.5 months (3-12)</td>
<td><strong>0.75</strong> (0.57-0.99)</td>
</tr>
<tr>
<td>Enhanced Patient Self-Care Activities</td>
<td>563</td>
<td>8 months (5-12)</td>
<td><strong>0.66</strong> (0.52-0.83)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>0.73</strong> (0.66-0.82)</td>
</tr>
</tbody>
</table>

HEART FAILURE DISEASE MANAGEMENT

CRITICAL COMPONENTS OF SUCCESS

PRINCIPLES

• Target inpatient, not outpatient costs
• Avoid admissions, not hospital days
• Frontload attention on the clinical timeline
• Educate, monitor patients toward self-empowerment
• Provide more specialized care, not less

• Crisis avoidance: optimization of pharmacologic/device-based therapy, patient-specific “action plans” for new or worsening symptoms, easy access to HF clinics, home-care, “telemanagement” as required
• Crisis management: home/clinic therapy, ED observation unit, hospital HF care units, critical pathways
• Crisis resolution: home monitoring, education, surveillance
1998

- 1st disease management program within Partners to apply an integrated systems approach to care
- 6 hospital sites (BWH/Faulkner/MGH/NWH/NSMC/Union)
- Adoption of standard pharmacological management protocols for worsening heart failure
- Adoption of standard patient educational materials
- Nurse-practitioner model (n=4)
- Lack of common electronic medical records platform
- Paper data collection tools for patient entry and outcomes assessment
PARTNERS HEALTHCARE DISEASE MANAGEMENT PROGRAM
EARLY OUTCOME MEASURES (2000)

Hospital admissions     EW Visits

N=355

Events per member per month

Core Measures

Percent

LVEF
ACE-I
β-blocker

Target
Actual Performance
PARTNERS HEART FAILURE PROGRAM EVOLUTION

• **Nurse Practitioner Program** (1998)
  – 4 NPs at each of 4 sites, focus on the most acutely ill
  – Number of current active patients ~450
  – Cumulative enrollment since inception ~3,700

• **Partners Home Care Program** (2004)
  – Integration of field staff (400 RNs) who serve 1,200 HF pts/yr
  – Cumulative enrollment since inception ~4,000

• **Identify and Connect Program** (2005)
  – Assure >90% discharged patients at high risk of readmission are connected to longitudinal services

  – Quarterly measurement of readmission rates, mortality

• **System-wide HF Registry** (2006)
  – Collaboration with Partners IS, MGH Lab of Comp Science

• **Telemonitoring Program** (2006)
  – Collaboration with Partners Center for Connected Health
PARTNERS HEART FAILURE POPULATION

~100,000
Estimated Heart Failure Prevalence, Partners Service Area

~30,000
Unique Heart Failure Patients in Partners Specialty Clinics

~10,000
Unique Heart Failure Patients in Partners Primary Care Clinics

~2,700
Annual Inpatient Discharges, DRG 127
EW/F, MGH, NSMC, NWH
MGH LOCATION OF HEART FAILURE ADMISSIONS
JANUARY 2009

N=72

Heart Failure Service
Other Services

Patients / Day (Mean)

Location

Blake 8
Ellison 8
Blake 6
Phillips 20
White 8
Phillips 21
Gray 11
Ellison 16
White 11
White 9
White 10
CICU
Ellison 11
Ellison 10
AUTOMATED PATIENT IDENTIFICATION AND WORKFLOW PATTERN

Identify

Capture

Connect

Monitor and Reconnect

Track Outcomes

Inpatients with acute CHF with a high degree of sensitivity and specificity (using automated screening methodologies at larger Partners institutions)

Patient attributes, pathophysiologic features pertinent to readmission and mortality

To appropriate HF services to reduce readmission and mortality

To appropriate HF services over time so that patients are not lost to follow-up
AUTOMATED IDENTIFICATION OF HOSPITALIZED HEART FAILURE PATIENTS

- Discriminant function
  - 9 variable categories
  - Incorporates text string queries of H&P/consult notes
  - Variable weights can be modified through application interface
- 99% sensitive, 85% specific for heart failure detection
HEART FAILURE INTERVENTION DELIVERY

- Data System
- Care Manager
- Electronic Home Links
- Nurse Practitioner
- Home Health
- Patient
- Physician

- Face-to-face
- Telephone/Telemonitoring
- Data Links
PARTNERS DISEASE MANAGEMENT PROGRAM

PATIENT TRIAGE

Clinical/Functional Status
- Recent Hospitalization
- Non-compliance
- Recurrent admissions
- Major co-morbidities
- Able to travel to NP site

Exclusion Criteria
- Renal failure/dialysis
- Terminal illness
- Psychiatric illness
- Unable to travel

Intervention
- Formulate/reinforce teaching
- Independent medication titration
- Assessment in AMC

Recent Hospitalization
- New diagnosis of CHF
- Compliant, admission due to non-preventable cause
- ED visit & discharge home

Recent D/C
- From NP or home care
- Education & Maintenance

Not homebound
- Home assessment within 48 hrs
  - Teaching
  - Med titration with collaboration of MD

Unable to Communicate
- By phone
  - Teaching per algorithm
  - Assessment of symptoms
Heart Failure 90-Day Readmissions back to the discharge hospital and to another Partners hospital; by Partners hospital, Year Ending June 2007

The proportion of heart failure admissions with a subsequent readmission for heart failure within 90 days post discharge.

Note: Denominator = HF discharges from a particular hospital in the specified time period, excluding discharges with dispositions of in-hospital death or transfer to another acute care hospital; Numerator = number of hospitalizations for HF to the same (purple bar) and to a different (red bar) Partners hospital that occur within 90 days

Annual Results (July 2006-June 2007)

UHC tracks readmits back to the discharge hospital only. By including readmits back to another Partners hospital, we set a higher bar.
HEART FAILURE OUTCOMES

INPATIENT LENGTH OF STAY OVER TIME

Average Length of Stay DRG 127

Days

FH

Linear (Avg)

FY03 FY04 FY05 FY06 FY07

GMOS=4.1 days
TELEMONITORING: COORDINATED AND TARGETED PROGRAMS

- 2,700 Discharges
- 2,100 Patients

Triage

Home Care Remote Monitoring
~60 days

Continuing Cardiac Care
~4 months

Step Down Monitoring
~1 year wt, symptoms

Health Coaching

Under Development
INITIAL TELEMONITORING RESULTS
180-DAY HOSPITAL READMISSIONS

Mean 180 days readmissions

- Control
- Intervention
- Refused

All-cause

CHF

N=300
SUMMARY

• Heart failure disease management programs improve functional capacity, quality of life and JACHO core measures for most heart failure patients.

• Outpatient programs are unequivocally effective in decreasing hospital readmissions and emergency room visits for decompensated heart failure.

• Multiple care delivery models (NP, pharmacist, phone center, mailings) appear to be efficacious.

• Short-term, early interventions pay longer-term dividends.

• Effect on survival remains controversial.

• Cost effectiveness of programs remains marginal.