WELCOME

Trends & Improvement in Heart Failure Care

A dinner presentation brought to you by the American Heart Association & The Joint Commission

2014 Scientific Sessions

Robert Suter, DO, MHA, CPE
Vice President, Quality and Health IT
American Heart Association
Speaker Panel

- **Javed Butler, MD, MPH, FACC, FAHA** Chief of Cardiology and Co-Director at Stony Brook Heart Institute

- **Lee Goldberg, MD, MPH** Associate Professor of Medicine at University and Pennsylvania and Medical Director, Heart Failure and Cardiac Transplant Program at Perelman Center for Advanced Medicine

- **Clyde Yancy, MD, MSc, FACC, FAHA, MACP**, Magerstadt Professor and Chief of Division of Cardiology at Northwestern University Feinberg School of Medicine

- **Hal Skopicki, MD, PhD, FACC**, Assistant Professor of Internal Medicine, Director Heart Failure and Cardiomyopathy Program, and Co-Director Ventricular Assist Device Program at Stony Brook University Hospital, a Get With The Guidelines-Heart Failure award winning hospital who has also achieved Advanced Certification in Heart Failure
Topics

- Overview of Heart Failure Guidelines
- Benefit(s) of Guidelines Implementation
- QI Paradigm Shift & Vision Moving Forward
- Quality Improvement Journey of Stony Brook University Hospital’s Heart Failure Program
  - Get With The Guidelines-Heart Failure Award
  - Advanced Certification in Heart Failure
Puja Patel, MS, MBA
Senior Manager, Hospital Accreditation
American Heart Association - National Center
Advocacy & Health Quality
Phone: 214-706-1038
puja.patel@heart.org

www.heart.org/myhospital
www.heart.org/certification

MJ Hampel, MPH, MHA
Senior Associate Director
The Joint Commission
Disease Specific Certification
Phone: 630-792-5720
mhampel@jointcommission.org

www.jointcommission.org
Advanced Certification in Heart Failure

MJ Hampel
The Joint Commission
Benefits of Certification

- Builds the structure required for a systematic approach to clinical care
- Reduces variability and improves the quality of patient care
- Pushes you to look at yourself more closely
- Creates a loyal, cohesive clinical team
- Provides an objective assessment of clinical excellence
- Differentiates clinical care in the marketplace
- Promotes achievement to referral sources
Accreditation vs. Certification

• **Accreditation Surveys**
  – Organization-wide evaluation of care processes and functions

• **Certification Reviews**
  – Product or service-specific evaluation of care and outcomes
Advanced Certification in Heart Failure:
53 Currently Certified Programs
Who is Eligible for Advanced Certification in Heart Failure?

• Accredited hospitals with an established inpatient heart failure clinical treatment program

• Provide ambulatory care services through a hospital-based and hospital-owned heart failure clinic OR a collaborative relationship with one or more cardiology practices

• At least a Bronze performance award from Get With The Guidelines-HF
Advanced Certification in Heart Failure

**Structure**
Standards + program specific requirements

**Process**
Get With the Guidelines – Heart Failure

**Quality & Safety of Care for Patients**

**Outcome**
Standardized Performance Measures
(required inpatient measures plus optional outpatient measures)
Disease-Specific Care Standards

• Program Management
  7 standards

• Delivering or Facilitating Clinical Care
  6 standards

• Supporting Self-Management
  3 standards

• Clinical Information Management
  5 standards

• Performance Improvement and Measurement
  6 standards
Standard Highlights (1 of 2)

• Program scope includes inpatient and outpatient, transitions and care coordination

• Care coordination is provided across inpatient and outpatient settings

• Patients re-evaluated within 72 hours after discharge (via phone call, home visit or scheduled office visit)

• Prior to discharge, a follow up appt. is scheduled to occur within 7 days
Standard Highlights (2 of 2)

- Functional capacity is assessed

- Comprehensive plan of care developed

- Heart Failure team implements interventions (addressing assistance with self-management activities, fluid management, symptom management, nutrition, medications, exercise, stress and risk reduction, coping, immunizations, palliative care)

- Data collection includes functional capacity, symptom stability, and 30-day readmissions for heart failure symptoms
ACC/AHA Guidelines Required

- The program must follow the current American College of Cardiology/American Heart Association heart failure guidelines, *2009 Focused Update Incorporated Into the ACC/AHA 2005 Guidelines for the Diagnosis and Management of Heart Failure in Adults.*
## Heart Failure Performance Measure Sets

<table>
<thead>
<tr>
<th>Mandatory as of January 1, 2015</th>
<th>Encouraged but not Required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACHF Measures</strong></td>
<td><strong>ACHFOP Measures</strong></td>
</tr>
<tr>
<td>ACHF–01: Beta-Blocker Therapy Prescribed at Discharge</td>
<td>ACHFOP–01: Hospital Outpatient Beta-Blocker Therapy Prescribed for LVSD</td>
</tr>
<tr>
<td>ACHF–02: Post-Discharge Appointment for Heart Failure Patients</td>
<td>ACHFOP–02: Hospital Outpatient ACEI or ARB Prescribed for LVSD</td>
</tr>
<tr>
<td>ACHF–03: Care Transition Record Transmitted</td>
<td>ACHFOP–03: Hospital Outpatient Aldosterone Receptor Antagonist for LVSD</td>
</tr>
<tr>
<td>ACHF–04: Discussion of Advance Directives/Advanced Care Planning</td>
<td>ACHFOP–04: Hospital Outpatient NYHA Classification Assessment</td>
</tr>
<tr>
<td>ACHF–05: Advance Directive Executed</td>
<td>ACHFOP–05: Hospital Outpatient Activity Recommendations</td>
</tr>
<tr>
<td>ACHF–06: Post Discharge Evaluation for Heart Failure Patients</td>
<td>ACHFOP–07: Advance Directive Executed</td>
</tr>
</tbody>
</table>
Measure Specifications Manuals

Advanced Certification Heart Failure
PERFORMANCE MEASUREMENT IMPLEMENTATION GUIDE
January 2014

Advanced Certification Heart Failure Outpatient
PERFORMANCE MEASUREMENT IMPLEMENTATION GUIDE
January 2014

http://www.jointcommission.org/certification/heart_failure.aspx
Contact Information

MJ Hampel, MPH, MBA
Director, Clinical Services Certification
The Joint Commission
630-792-5720
mhampel@jointcommission.org
2013 ACCF/AHA Guideline for the Management of Heart Failure

Developed in Collaboration With AAFP, ACCP, HRS, and ISHLT.
Endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation

© American College of Cardiology Foundation and American Heart Association, Inc.

Presented by

Javed Butler, MD MPH
Professor of Medicine
Chief of Cardiology
Stony Brook University
### Classification of Recommendations and Levels of Evidence

#### Size of Treatment Effect

<table>
<thead>
<tr>
<th>CLASS I</th>
<th>Benefit &gt;&gt; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure/Treatment SHOULD be performed/administered</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS IIa</th>
<th>Benefit &gt;&gt; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional studies with focused objectives needed</td>
<td></td>
</tr>
<tr>
<td>IT IS REASONABLE to perform procedure/administer treatment</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS IIb</th>
<th>Benefit &gt;&gt; Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional studies with broad objectives needed; additional registry data would be helpful</td>
<td></td>
</tr>
<tr>
<td>Procedure/Treatment MAY BE CONSIDERED</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS III or CLASS III Harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure/Text</td>
</tr>
<tr>
<td>Treatment</td>
</tr>
<tr>
<td>COR III:</td>
</tr>
<tr>
<td>No Benefit</td>
</tr>
<tr>
<td>Not Helpful</td>
</tr>
<tr>
<td>No Proven Benefit</td>
</tr>
</tbody>
</table>

#### Level A

- Multiple populations evaluated
- Data derived from multiple randomized clinical trials or meta-analyses

### Suggested Phrases for Writing Recommendations

<table>
<thead>
<tr>
<th>Suggested phrases for writing recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>should</td>
</tr>
<tr>
<td>is recommended</td>
</tr>
<tr>
<td>is indicated</td>
</tr>
<tr>
<td>is useful/effective/beneficial</td>
</tr>
</tbody>
</table>

### Comparative effectiveness phrases

<table>
<thead>
<tr>
<th>Comparative effectiveness phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>treatment/strategy A is recommended/indicated in preference to treatment B</td>
</tr>
<tr>
<td>treatment A should be chosen over treatment B</td>
</tr>
<tr>
<td>treatment/strategy A is probably recommended/indicated in preference to treatment B</td>
</tr>
<tr>
<td>it is reasonable to choose treatment A over treatment B</td>
</tr>
</tbody>
</table>

### Notes

- A recommendation with Level of Evidence B or C does not imply that the recommendation is weak. Many important clinical questions addressed in the guidelines do not lend themselves to clinical trials. Although randomized trials are unavailable, there may be a very clear clinical consensus that a particular test or therapy is useful or effective.

- *Data available from clinical trials or registries about the usefulness/efficacy in different subpopulations, such as sex, age, history of diabetes, history of prior myocardial infarction, history of heart failure, and prior aspirin use.*

- †For comparative effectiveness recommendations (Class I and IIa; Level of Evidence A and B only), studies that support the use of comparator verbs should involve direct comparisons of the treatments or strategies being evaluated.
Stages, Phenotypes and Treatment of HF

**STAGE A**
At high risk for HF but without structural heart disease or symptoms of HF

- Patients with:
  - HTN
  - Atherosclerotic disease
  - DM
  - Obesity
  - Metabolic syndrome or
  - Using cardiotoxins
  - With family history of cardiomyopathy

**THERAPY**
- Goals
  - Heart healthy lifestyle
  - Prevent vascular, coronary disease
  - Prevent LV structural abnormalities
- Drugs
  - ACEI or ARB in appropriate patients for vascular disease or DM
  - Statins as appropriate

**STAGE B**
Structural heart disease but without signs or symptoms of HF

- Patients with:
  - Previous MI
  - LV remodeling including LVH and low EF
  - Asymptomatic valvular disease

**THERAPY**
- Goals
  - Prevent HF symptoms
  - Prevent further cardiac remodeling
- Drugs
  - ACEI or ARB as appropriate
  - Beta blockers as appropriate
- In selected patients
  - ICD
  - Revascularization or valvular surgery as appropriate

**STAGE C**
Structural heart disease with prior or current symptoms of HF

- Patients with:
  - Known structural heart disease and
  - HF signs and symptoms

**THERAPY**
- Goals
  - Control symptoms
  - Patient education
  - Prevent hospitalization
  - Prevent mortality
- Drugs for routine use
  - Diuretics for fluid retention
  - ACEI or ARB
  - Beta blockers
  - Aldosterone antagonists
- Drugs for use in selected patients
  - Hydralazine/isosorbide dinitrate
  - ACEI and ARB
  - Digoxin
- In selected patients
  - CRT
  - ICD
  - Revascularization or valvular surgery as appropriate

**STAGE D**
Refractory HF

- Patients with:
  - Marked HF symptoms at rest
  - Recurrent hospitalizations despite GDMT

**THERAPY**
- Goals
  - Control symptoms
  - Improve HRQOL
  - Reduce hospital readmissions
  - Establish patient’s end-of-life goals
- Options
  - Advanced care measures
  - Heart transplant
  - Chronic inotropes
  - Temporary or permanent MCS
  - Experimental surgery or drugs
  - Palliative care and hospice
  - ICD deactivation

**Heart Failure**

- Refractory symptoms of HF at rest, despite GDMT

**HFpEF**

- Development of symptoms of HF

**HFrEF**

- e.g., Patients with:
  - Previous MI
  - LV remodeling including LVH and low EF
  - Asymptomatic valvular disease

**At Risk for Heart Failure**

- e.g., Patients with:
  - Marked HF symptoms at rest
  - Recurrent hospitalizations despite GDMT

- Patients with:
  - Previous MI
  - LV remodeling including LVH and low EF
  - Asymptomatic valvular disease

- Patients with:
  - HTN
  - Atherosclerotic disease
  - DM
  - Obesity
  - Metabolic syndrome or
  - Using cardiotoxins
  - With family history of cardiomyopathy

- Patients with:
  - HTN
  - Atherosclerotic disease
  - DM
  - Obesity
  - Metabolic syndrome or
  - Using cardiotoxins
  - With family history of cardiomyopathy
## Classification of Heart Failure

<table>
<thead>
<tr>
<th>ACCF/AHA Stages of HF</th>
<th>NYHA Functional Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> At high risk for HF but without structural heart disease or symptoms of HF.</td>
<td>None</td>
</tr>
<tr>
<td><strong>B</strong> Structural heart disease but without signs or symptoms of HF.</td>
<td>I No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.</td>
</tr>
</tbody>
</table>
| **C** Structural heart disease with prior or current symptoms of HF. | I No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.  
II Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in symptoms of HF.  
III Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms of HF.  
IV Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.  
D Refractory HF requiring specialized interventions. |
Stage C: Nonpharmacological Interventions

**I IIa IIb III**

Patients with HF should receive specific education to facilitate HF self-care.

**I IIa IIb III**

Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate to improve functional status.

**I IIa IIb III**

Sodium restriction is reasonable for patients with symptomatic HF to reduce congestive symptoms.
Continuous positive airway pressure (CPAP) can be beneficial to increase LVEF and improve functional status in patients with HF and sleep apnea.

Cardiac rehabilitation can be useful in clinically stable patients with HF to improve functional capacity, exercise duration, HRQOL, and mortality.
Pharmacologic Treatment for Stage C HFrEF

**HFrEF Stage C**
**NYHA Class I – IV**

**Treatment:**

- For NYHA class II-IV patients. Provided estimated creatinine >30 mL/min and K+ <5.0 mEq/dL.

- For persistently symptomatic African Americans, NYHA class III-IV:
  - **Class I, LOE A**
  - ACEI or ARB **AND**
  - Beta Blocker

- For all volume overload, NYHA class II-IV patients:
  - **Class I, LOE C**
  - Loop Diuretics

- **Add**

- **Class I, LOE A**
  - Hydral-Nitrates

- **Add**

- **Class I, LOE A**
  - Aldosterone Antagonist

- **Add**
Pharmacological Therapy for Management of Stage C HFrEF

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diuretics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diuretics are recommended in patients with HFrEF with fluid retention</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td><strong>ACE Inhibitors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACE inhibitors are recommended for all patients with HFrEF</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td><strong>ARBs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARBs are recommended in patients with HFrEF who are ACE inhibitor intolerant</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>ARBs are reasonable as alternatives to ACE inhibitor as first line therapy in HFrEF</td>
<td>IIa</td>
<td>A</td>
</tr>
<tr>
<td>The addition of an ARB may be considered in persistently symptomatic patients with HFrEF on GDMT</td>
<td>IIb</td>
<td>A</td>
</tr>
<tr>
<td>Routine <em>combined</em> use of an ACE inhibitor, ARB, and aldosterone antagonist is potentially harmful</td>
<td>III: Harm</td>
<td>C</td>
</tr>
</tbody>
</table>
Pharmacological Therapy for Management of Stage C HFrEF (cont.)

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beta Blockers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of 1 of the 3 beta blockers proven to reduce mortality is recommended for all stable patients</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td><strong>Aldosterone Antagonists</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aldosterone receptor antagonists are recommended in patients with NYHA class II-IV HF who have LVEF ≤35%</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>Aldosterone receptor antagonists are recommended in patients following an acute MI who have LVEF ≤40% with symptoms of HF or DM</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Inappropriate use of aldosterone receptor antagonists may be harmful</td>
<td>III: Harm</td>
<td>B</td>
</tr>
<tr>
<td><strong>Hydralazine and Isosorbide Dinitrate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The combination of hydralazine and isosorbide dinitrate is recommended for African-Americans, with NYHA class III–IV HFrEF on GDMT</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>A combination of hydralazine and isosorbide dinitrate can be useful in patients with HFrEF who cannot be given ACE inhibitors or ARBs</td>
<td>IIa</td>
<td>B</td>
</tr>
</tbody>
</table>
### Pharmacologic Therapy for Management of Stage C HFrEF (cont.)

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Digoxin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digoxin can be beneficial in patients with HFrEF</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td><strong>Anticoagulation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patients with chronic HF with permanent/persistent/paroxysmal AF and an additional risk factor for cardioembolic stroke should receive chronic anticoagulant therapy*</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>The selection of an anticoagulant agent should be individualized</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Chronic anticoagulation is reasonable for patients with chronic HF who have permanent/persistent/paroxysmal AF but without an additional risk factor for cardioembolic stroke*</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>Anticoagulation is not recommended in patients with chronic HFrEF without AF, prior thromboembolic event, or a cardioembolic source</td>
<td>III: No Benefit</td>
<td>B</td>
</tr>
<tr>
<td><strong>Statins</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statins are not beneficial as adjunctive therapy when prescribed solely for HF</td>
<td>III: No Benefit</td>
<td>A</td>
</tr>
<tr>
<td><strong>Omega-3 Fatty Acids</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omega-3 PUFA supplementation is reasonable to use as adjunctive therapy in HFrEF or HFpEF patients</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>Recommendations</td>
<td>COR</td>
<td>LOE</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>-----</td>
</tr>
<tr>
<td><strong>Other Drugs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutritional supplements as treatment for HF are not recommended in HFrEF</td>
<td>III: No Benefit</td>
<td>B</td>
</tr>
<tr>
<td>Hormonal therapies other than to replete deficiencies are not recommended in HFrEF</td>
<td>III: No Benefit</td>
<td>C</td>
</tr>
<tr>
<td>Drugs known to adversely affect the clinical status of patients with HFrEF are potentially harmful and should be avoided or withdrawn</td>
<td>III: Harm</td>
<td>B</td>
</tr>
<tr>
<td>Long-term use of an infusion of a positive inotropic drug is not recommended and may be harmful except as palliation</td>
<td>III: Harm</td>
<td>C</td>
</tr>
<tr>
<td><strong>Calcium Channel Blockers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium channel blocking drugs are not recommended as routine in HFrEF</td>
<td>III: No Benefit</td>
<td>A</td>
</tr>
</tbody>
</table>
# Treatment of HFPpEF

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic and diastolic blood pressure should be controlled according to published clinical practice guidelines</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Diuretics should be used for relief of symptoms due to volume overload</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Coronary revascularization for patients with CAD in whom angina or demonstrable myocardial ischemia is present despite GDMT</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>Management of AF according to published clinical practice guidelines for HFPpEF to improve symptomatic HF</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>Use of beta-blocking agents, ACE inhibitors, and ARBs for hypertension in HFPpEF</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>ARBs might be considered to decrease hospitalizations in HFPpEF</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>Nutritional supplementation is not recommended in HFPpEF</td>
<td>III: No Benefit</td>
<td>C</td>
</tr>
</tbody>
</table>
Indications for CRT Therapy

Patient with cardiomyopathy on GDMT for >3 mo or on GDMT and >40 d after MI, or with implantation of pacing or defibrillation device for special indications

LVEF ≤35%
Evaluate general health status
Comorbidities and/or frailty limit survival with good functional capacity to <1 y
Continue GDMT without implanted device
Acceptable noncardiac health
Evaluate NYHA clinical status

NYHA class I
- LVEF ≤30%
- QRS ≥150 ms
- LBBB pattern
- Ischemic cardiomyopathy
- QRS ≤150 ms
- Non-LBBB pattern

NYHA class II
- LVEF ≤35%
- QRS ≥150 ms
- LBBB pattern
- Sinus rhythm
- LVEF ≤35%
- QRS 120-149 ms
- LBBB pattern
- Sinus rhythm
- LVEF ≤35%
- QRS ≥150 ms
- Non-LBBB pattern
- Sinus rhythm
- QRS ≤150 ms
- Non-LBBB pattern

NYHA class III & Ambulatory class IV
- LVEF ≤35%
- QRS ≥150 ms
- LBBB pattern
- Sinus rhythm
- LVEF ≤35%
- QRS ≥150 ms
- LBBB pattern
- Sinus rhythm
- LVEF ≤35%
- QRS 120-149 ms
- Non-LBBB pattern
- Sinus rhythm
- LVEF ≤35%
- QRS ≥150 ms
- Non-LBBB pattern
- Sinus rhythm
- Anticipated to require frequent ventricular pacing (>40%)
- Atrial fibrillation, if ventricular pacing is required and rate control will result in near 100% ventricular pacing with CRT

Colors correspond to the class of recommendations in the ACCF/AHA Table 1.

Benefit for NYHA class I and II patients has only been shown in CRT-D trials, and while patients may not experience immediate symptomatic benefit, late remodeling may be avoided along with long-term HF consequences. There are no trials that support CRT-pacing (without ICD) in NYHA class I and II patients. Thus, it is anticipated these patients would receive CRT-D unless clinical reasons or personal wishes make CRT-pacing more appropriate. In patients who are NYHA class III and ambulatory class IV, CRT-D may be chosen but clinical reasons and personal wishes may make CRT-pacing appropriate to improve symptoms and quality of life when an ICD is not expected to produce meaningful benefit in survival.
**Device Therapy for Stage C HFrEF (cont.)**

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICD therapy is recommended for primary prevention of SCD in selected patients with HFrEF at least 40 days post-MI with LVEF ≤35%, and NYHA class II or III symptoms on chronic GDMT, who are expected to live ≥1 year*</td>
<td>I</td>
<td>A</td>
</tr>
<tr>
<td>CRT is indicated for patients who have LVEF ≤35%, sinus rhythm, LBBB with a QRS ≥150 ms</td>
<td>I</td>
<td>A (NYHA class III/IV) B (NYHA class II)</td>
</tr>
<tr>
<td>ICD therapy is recommended for primary prevention of SCD in selected patients with HFrEF at least 40 days post-MI with LVEF ≤30%, and NYHA class I symptoms while receiving GDMT, who are expected to live ≥1 year*</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>CRT can be useful for patients who have LVEF ≤35%, sinus rhythm, a non-LBBB pattern with a QRS ≥150 ms, and NYHA class III/ambulatory class IV symptoms on GDMT.</td>
<td>IIa</td>
<td>A</td>
</tr>
<tr>
<td>CRT can be useful for patients who have LVEF ≤35%, sinus rhythm, LBBB with a QRS 120 to 149 ms, and NYHA class II, III or ambulatory IV symptoms on GDMT</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>CRT can be useful in patients with AF and LVEF ≤35% on GDMT if a) the patient requires ventricular pacing or otherwise meets CRT criteria and b) AV nodal ablation or rate control allows near 100% ventricular pacing with CRT</td>
<td>IIa</td>
<td>B</td>
</tr>
</tbody>
</table>
### Device Therapy for Stage C HF and EF (cont.)

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT can be useful for patients on GDMT who have LVEF ≤35%, and are undergoing new or replacement device with anticipated (&gt;40%) ventricular pacing</td>
<td>IIa</td>
<td>C</td>
</tr>
<tr>
<td>An ICD is of uncertain benefit to prolong meaningful survival in patients with high risk of nonsudden death such as frequent hospitalizations, frailty, or severe comorbidities*</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>CRT may be considered for patients who have LVEF ≤35%, sinus rhythm, a non-LBBB pattern with QRS 120 to 149 ms, and NYHA class III/ambulatory class IV on GDMT</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>CRT may be considered for patients who have LVEF ≤35%, sinus rhythm, a non-LBBB pattern with a QRS ≥150 ms, and NYHA class II symptoms on GDMT</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>CRT may be considered for patients who have LVEF ≤30%, ischemic etiology of HF, sinus rhythm, LBBB with a QRS ≥150 ms, and NYHA class I symptoms on GDMT</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>CRT is not recommended for patients with NYHA class I or II symptoms and non-LBBB pattern with QRS &lt;150 ms</td>
<td>III: No Benefit</td>
<td>B</td>
</tr>
<tr>
<td>CRT is not indicated for patients whose comorbidities and/or frailty limit survival to &lt;1 year</td>
<td>III: No Benefit</td>
<td>C</td>
</tr>
</tbody>
</table>
**Therapies in the Hospitalized HF Patient**

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF patients hospitalized with fluid overload should be treated with intravenous diuretics</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>HF patients receiving loop diuretic therapy, should receive an initial parenteral dose greater than or equal to their chronic oral daily dose, then should be serially adjusted</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>HFrEF patients requiring HF hospitalization on GDMT should continue GDMT unless hemodynamic instability or contraindications</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Initiation of beta-blocker therapy at a low dose is recommended after optimization of volume status and discontinuation of intravenous agents</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Thrombosis/thromboembolism prophylaxis is recommended for patients hospitalized with HF</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Serum electrolytes, urea nitrogen, and creatinine should be measured during the titration of HF medications, including diuretics</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Recommendation</td>
<td>COR</td>
<td>LOE</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>When diuresis is inadequate, it is reasonable to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Give higher doses of intravenous loop diuretics; or</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>b) add a second diuretic (e.g., thiazide)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-dose dopamine infusion may be considered with loop diuretics to improve diuresis</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>Ultrafiltration may be considered for patients with obvious volume overload</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>Ultrafiltration may be considered for patients with refractory congestion</td>
<td>IIb</td>
<td>C</td>
</tr>
<tr>
<td>Intravenous nitroglycerin, nitroprusside or nesiritide may be considered an adjuvant to diuretic therapy for stable patients with HF</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>In patients hospitalized with volume overload and severe hyponatremia,</td>
<td>IIb</td>
<td>B</td>
</tr>
<tr>
<td>vasopressin antagonists may be considered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendation or Indication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance improvement systems in the hospital and early postdischarge outpatient setting to identify HF for GDMT</td>
<td>I</td>
<td>B</td>
</tr>
</tbody>
</table>

Before hospital discharge, at the first postdischarge visit, and in subsequent follow-up visits, the following should be addressed:

- a) initiation of GDMT if not done or contraindicated;
- b) causes of HF, barriers to care, and limitations in support;
- c) assessment of volume status and blood pressure with adjustment of HF therapy;
- d) optimization of chronic oral HF therapy;
- e) renal function and electrolytes;
- f) management of comorbid conditions;
- g) HF education, self-care, emergency plans, and adherence; and
- h) palliative or hospice care.

| Multidisciplinary HF disease-management programs for patients at high risk for hospital readmission are recommended | I | B |

| A follow-up visit within 7 to 14 days and/or a telephone follow-up within 3 days of hospital discharge is reasonable | IIa | B |

| Use of clinical risk-prediction tools and/or biomarkers to identify higher-risk patients is reasonable | IIa | B |
Full guideline document available at

- https://circ.ahajournals.org/content/128/16/e240.full.pdf+html
Benefits of Guideline Implementation

Lee R. Goldberg, MD, MPH
Associate Professor of Medicine
Medical Director, Heart Failure and Cardiac Transplant Program
University of Pennsylvania
Heart Failure Outcomes

- Readmission of patients with heart failure is common and costly.
- The Patient Protection Affordable Care Act of 2010 has created new incentives to reduce readmissions, and hospitals with high readmissions rates can lose $\leq 3\%$ of their Medicare reimbursement by 2015.
- Hospitals vary widely in the strategies they use to reduce readmissions.
- Several randomized, controlled trials have reported discharge and follow-up interventions that have reduced readmissions, but less is known outside the context of controlled trials.
Background

- Many studies of interventions and systems of care have shown improvements in heart failure outcomes
  - Readmissions
  - Mortality
  - Quality of Life
  - Cost

- There have been a multitude of trials evaluating disease management strategies to implement guideline directed care
  - There have been conflicting results
  - Many are not generalizable – dependent on “people” more than systems
  - Some interventions have **increased cost or utilization**
    - ? due to improved access to care
    - ? due to better guideline adherence
  - There is a trend toward decreasing mortality (but this may increase cost)
Throughout the hospitalization as appropriate, before hospital discharge, at the first postdischarge visit, and in subsequent follow-up visits, the following should be addressed:

a. **initiation of GDMT** if not previously established and not contraindicated;
b. precipitant causes of HF, barriers to optimal care transitions, and limitations in postdischarge support;
c. assessment of volume status and supine/upright hypotension with adjustment of HF therapy, as appropriate;
d. titration and optimization of chronic oral HF therapy;
e. assessment of renal function and electrolytes, where appropriate;
f. assessment and management of comorbid conditions;
g. reinforcement of HF education, self-care, emergency plans, and need for adherence; and
h. consideration for palliative care or hospice care in selected patients.
<table>
<thead>
<tr>
<th>Recommendation or Indication</th>
<th>COR</th>
<th>LOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance improvement systems in the hospital and early postdischarge outpatient setting to identify HF for GDMT</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Before hospital discharge, at the first postdischarge visit, and in subsequent follow-up visits, the following should be addressed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) initiation of GDMT if not done or contraindicated;</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>b) causes of HF, barriers to care, and limitations in support;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) assessment of volume status and blood pressure with adjustment of HF therapy;</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>d) optimization of chronic oral HF therapy;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) renal function and electrolytes;</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>f) management of comorbid conditions;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) HF education, self-care, emergency plans, and adherence; and</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>h) palliative or hospice care.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multidisciplinary HF disease-management programs for patients at high risk for hospital readmission are recommended</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>A follow-up visit within 7 to 14 days and/or a telephone follow-up within 3 days of hospital discharge is reasonable</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>Use of clinical risk-prediction tools and/or biomarkers to identify higher-risk patients is reasonable</td>
<td>IIa</td>
<td>B</td>
</tr>
</tbody>
</table>
Hospital Strategies Associated With 30-Day Readmission Rates for Patients With Heart Failure

Elizabeth H. Bradley, PhD; Leslie Curry, MPH, PhD; Leora I. Horwitz, MD, MHS; Heather Sipsma, PhD; Yongfei Wang, MS; Mary Norine Walsh, MD; Don Goldmann, MD; Neal White, MD; Ileana L. Piña, MD, MPH; Harlan M. Krumholz, MD, SM

*Circ Cardiovasc Qual Outcomes*. 2013;6:444-450
doi: 10.1161/CIRCOU101ES.111.000101
*Circulation: Cardiovascular Quality and Outcomes* is published by the American Heart Association
### Strategies associated with lower readmission rates

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Percentage point change in RSRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partnering with community physicians and physician groups</td>
<td>-0.33</td>
</tr>
<tr>
<td>Partnering with local hospitals</td>
<td>-0.34</td>
</tr>
<tr>
<td>Having nurses responsible for medication reconciliation</td>
<td>-0.18</td>
</tr>
<tr>
<td>Arranging for follow-up visits before discharge</td>
<td>-0.19</td>
</tr>
<tr>
<td>Sending discharge summaries to primary care physician</td>
<td>-0.21</td>
</tr>
<tr>
<td>Assigning staff to follow up on test results after discharge</td>
<td>-0.26</td>
</tr>
</tbody>
</table>
Strategies implemented & readmission rates

The graph shows the risk-standardized readmission rate against the number of selected strategies implemented. As the number of selected strategies increases from 0 to 10, the risk-standardized readmission rate decreases from approximately 26.0 to 21.0.
Strategies associated with higher readmission rates?

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Percentage point change in RSRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher frequency of outpatient and inpatient prescription records</td>
<td>+0.18</td>
</tr>
<tr>
<td>linked electronically</td>
<td></td>
</tr>
<tr>
<td>All patients or their caregivers receive written emergency plan on</td>
<td>+0.38</td>
</tr>
<tr>
<td>discharge</td>
<td></td>
</tr>
<tr>
<td>Reliable process is in place to ensure outpatient physicians are</td>
<td>+0.42</td>
</tr>
<tr>
<td>alerted to patient’s discharge within 48h of discharge</td>
<td></td>
</tr>
<tr>
<td>Hospital regularly calls patients after discharge to either follow</td>
<td>+0.34</td>
</tr>
<tr>
<td>up on post-discharge needs or provide additional education</td>
<td></td>
</tr>
</tbody>
</table>
Improving post-discharge access

- Most patients do not visit a physician within a week of discharge

- Patients who are discharged from hospitals that have higher early follow-up rates have a lower risk of 30-day readmission.

- Patients need a timely evaluation of medication changes and clinical status

Hernandez AF et al. JAMA. 2010
Diagnoses and Timing of 30-Day Readmissions After Hospitalization for Heart Failure

Dharmarajan K et al. JAMA. 2013;309(4):355-363
Proportions of Readmissions for Causes Other Than the Condition at Initial Discharge

Old care pathway

- Home
- Clinic
- ED
- Hospital
A new care pathway

- Home
- Clinic
- Enhanced outpatient support
- ED
- Hospital
Using data in real-time for HF patients

- Automate the computation of patient-specific risk of readmission and/or mortality within 30 days
- Integrate a tool seamlessly into the clinical workflow at the point of discharge

Validated, Electronic Health Record Deployable Prediction Models for Assessing Patient Risk of 30-Day Rehospitalization and Mortality in Older Heart Failure Patients

Zubin J. Eapen, MD,* Li Liang, Ph.D,* Gregg C. Fonarow, MD,† Paul A. Heidenreich, MD, MS,‡ Lesley H. Curtis, Ph.D,* Eric D. Peterson, MD, MPH,* Adrian F. Hernandez, MD, MHS*

Durham, North Carolina; and Los Angeles and Palo Alto, California
Automating risk stratification at the point of care

\[
\text{log_odds_{30DayReadmission}} = 5.8899 - 0.0046\times\text{age} + 0.0999\times\text{black race} - 0.0048\times\text{Systolic BP at admission (in range } \leq 150) + 0.0100\times\text{Heart rate at admission (in range } \leq 80) - 0.0573\times\text{Hemoglobin at admission (in range } 10-14) + 0.0747\times(\text{BNP/2000}) + 0.1255\times\text{Troponin abnormal} + 0.0049\times\text{BUN} - 0.0491\times\text{Sodium at discharge (in range 135-140)} + 0.1073\times\text{Scr at discharge (in range 1-2.5)} + 0.2308\times\text{# all hospitalizations in prior 6 month};
\]
What is the patient’s risk of readmission within 30 days?

What is the patient’s risk of death within 30 days?

What is the patient’s risk of readmission or death within 30 days?
Additional Challenges

How do you identify heart failure patients?

- Admission diagnoses
  - Shortness of breath
  - Pneumonia
  - COPD
  - Swelling
  - Chest Pain
  - Atrial Fibrillation
  - Etc.

How do you risk stratify patients so as to apply resources during hospitalization and transition to home?

- Use this data to improve system performance
  - Understand which interventions work and add the most “value”
  - Identify modifiable risk factors for patients and families
- Identify patients for early referral for advanced therapies

All of these diagnoses could be heart failure
The pathway is initiated based on specific criteria within 24 hours of stay on an anchor admission into the acute care / hospital setting. Based on this identification, patients are triaged into at risk or not at risk. Care team will verify and then triage / filter into two categories: low or high risk HF. Risk is defined as need for preventive measures, risk for readmission, requiring more services and or advanced care. The HF Disease Team will develop care processes within these patient populations for Penn Medicine.
Signals: Which data indicate HF Risk?

<table>
<thead>
<tr>
<th></th>
<th>Inpatient</th>
<th>Emergency</th>
<th>Outpatient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>Age</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Demographics</td>
<td>Gender</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Previous Use</td>
<td>Inp/OutP, ER visits</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Previous ICD9 coding</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Medications</td>
<td>Diuretic Order Hx</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Cardio Specific Order Hx</td>
<td>ECHO orders</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Admission Reason</td>
<td>SOB, Dyspnea etc.</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Cardio Specific clinical</td>
<td>EF results</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Vital Sign</td>
<td>SBP</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Vital Sign</td>
<td>DBP</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Vital Sign</td>
<td>RR</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Vital Sign</td>
<td>SP02</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Vital Sign</td>
<td>Temp</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Vital Sign</td>
<td>HR</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Labs</td>
<td>Metabolic Panels</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>Lipid Panels</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>Cholesterol Panels</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>Hepatic Function Panels</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>BNP</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>Hemoglobin A1c</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Labs</td>
<td>eGFR</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Health Behavior</td>
<td>Tobacco use (ICD9 or admission Q)</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Health Behavior</td>
<td>Weight</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

- Performance measures and the guidelines require:
  - Identification of heart failure patients
  - Application of appropriate guideline designated therapies
  - Systems of care that reduce heart failure readmissions and improve “quality and value”

- Several interventions incorporated within care paths for heart failure patients can impact readmissions and other quality measures

- Developing systemic solutions that leverage technology are the most likely to be successful and generalizable

- All interventions need to be evaluated for their effectiveness as unintended consequences can occur
  - New models of care may be necessary to impact the outcomes of interest
Disclosures

I work too hard, sleep too little..... and wonder, like the rest of you, where all the changes in health care will lead us.

Research:

NIH
GlaxoSmithKline
Corthera
OptumHealth
Quintiles
Medtronic
Cardioentis
Biocontrol
BioControl Medical
Novartis

Speaker:

Novartis

I’m not much of a joiner
New York
- Population: 1.5 million
- Together with Brooklyn and Queens
  - >38/50 US States
  - 96th largest country in the world
  - 1/5 is Medicaid or self-pay

New York, NY

Long Island, NY
Stony Brook University Medical Center

- Largest hospital in Suffolk County
- The only tertiary care hospital and academic medical center
- 571 beds
- 20-25 full-time cardiologists
- ~100 cardiologists in our covered practice
- Treat ~30,000 inpatients and > 250,000 outpatients year
Dr. Javed Butler MD, MPH was named by Dr. Vincent Yang, Simons Chair in Internal Medicine at Stony Brook University, as the next Chief of the Cardiology Division effective September 1st, 2014. Dr. Butler is currently Professor of Medicine and Director of Heart Failure Research at Emory University in Atlanta, Georgia.
Heart Failure Before 2006
Stony Brook University Medical Center

Heart failure care

Core Measures- HF care 2006-7
A Heart Failure CQI Team is Born

• Initially, to address our core measures
• What should our Heart Failure Program look like?
• How would we care for our heart failure patients?
• What data was going to be important to us?

Core measures allowed a monthly discussion of HF care to occur
Allowed a conversation about identifying and caring for Hospitalized Heart Failure Patients

- Establish databases of hospitalized heart failure patients
- Ensure core measures completed and encourage evidence based practices
- Establish outpatient and inpatient Heart Failure services to serve as a community resource
- Provide patient education for self-management
- Identify areas for clinical improvement that impact and improve patient outcomes
Who’s Really In Charge of Hospitalized Heart Failure Patients?

“Do you want to speak to the physician in-charge... or the nurse who actually knows what’s going on?”
Sustaining Excellence and Results in the Care of Heart Failure Patients (SEARCH)

How nursing-based interventions can deliver excellence in Heart Failure care to hospitalized patients

- Teaching Program for nurses
- Teaching Program for everyone else
- Active involvement in high risk patients
Risk-Adjusted Process-Outcome Link for CMS Performance Measures for Heart Failure

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Predictive of Mortality</th>
<th>Predictive of Mortality/Rehospitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Discharge instructions</td>
<td>0.93</td>
<td>0.70 – 1.24</td>
</tr>
<tr>
<td>Evaluation of LVSF</td>
<td>0.91</td>
<td>0.64 – 1.29</td>
</tr>
<tr>
<td>ACEi/ARB for LVSD</td>
<td>0.80</td>
<td>0.42 – 1.54</td>
</tr>
<tr>
<td>Smoking cessation counseling</td>
<td>0.64</td>
<td>0.35 – 1.19</td>
</tr>
<tr>
<td>Warfarin for atrial fibrillation</td>
<td>0.72</td>
<td>0.48 – 1.07</td>
</tr>
<tr>
<td>β-Blocker at discharge</td>
<td>0.51</td>
<td>0.34 – 0.76</td>
</tr>
</tbody>
</table>

Heart Failure Mortality Rates
July 1, 2008 – June 30, 2011

NYU Medical Center
Maimonides Medical Center
Yale-New Haven Hospital
NY Presbyterian Hospital
Stony Brook Medical Center
Mount Sinai Hospital
Cleveland Clinic
Montefiore Medical Center
Good Samaritan Hospital
Johns Hopkins Hospital
University Hospital of Brooklyn, Downstate
Staten Island University Hospital
St. Francis Hospital
Brookhaven Memorial Hospital
Coney Island Hospital
St. Luke’s Roosevelt Hospital
South Nassau Communities Hospital
Beth Israel Medical Center
St. Joseph Hospital
Huntington Hospital
John T. Mather Memorial
Northport VA Medical
Winthrop-University Hospital
NY Hospital Medical Center of Queens
LI Jewish Medical Center
Peconic Bay Hospital
Mercy Medical Center
Franklin Hospital
Glen Cove Hospital
St. Catherine of Siena
Southside Hospital
Plainview Hospital
North Shore University Hospital, Manhasset
National Rate

Better than U.S. National Rate
No Different than U.S. National Rate

n = 820
n = 1421
n = 3010
n = 2977
n = 1156
n = 1153
n = 895
n = 442
n = 320
n = 701
n = 1356
n = 660
n = 550
n = 660
n = 422
n = 895
n = 1220
n = 513
n = 877
n = 660
n = 245
n = 978
n = 1102
n = 744
n = 344
n = 305
n = 400
n = 479
n = 677
n = 349
n = 641
n = 1257
n = 1220
n = 513
n = 877
n = 660
n = 245
n = 978
n = 1102
n = 744
n = 344
n = 305
n = 400
n = 479
n = 677
n = 349
n = 641
n = 1257

7.1%
7.5%
8.0%
8.0%
8.9%
9.2%
9.4%
9.6%
9.6%
9.6%
9.8%
9.9%
10.0%
10.0%
10.2%
10.4%
10.6%
10.6%
10.6%
10.6%
10.9%
10.9%
10.9%
10.9%
11.2%
11.2%
11.5%
11.5%
11.6%
11.6%
11.8%
12.2%
12.5%
12.5%
12.5%
12.8%
13.2%
13.2%
11.6%
Stony Brook Medicine Mortality Rate in Comparison to All Reporting Hospitals

Stony Brook Medicine Readmission Rate in Comparison to All Reporting Hospitals

Stony Brook Medicine

30-day Risk-standardized Readmission Rate (%)

Number of Hospitals

Get With the Guidelines

What did we learn

- Administrative support
  - Speak the language of IT
  - Speak the language of Quality
  - Assist with documentation
- Teamwork
  - Monthly meeting critical
  - Data review essential
  - Enormous # stakeholders
- Role of risk stratification
- Role of co-management
GWTG Quality Measures Plus

Required

- ACEI/ARB for LVSD or contraind noted
- LVEF documented
- HF specific beta blocker for LVSD/contra
- Adv Direct/Adv care plan
  - Document discussion
  - Document plan execution
- Post D/c appt scheduled < 7 d
- Care transition record transmitted < 7d
- Post d/c documentation of eval of HF pt w/i 48 hrs (business) phone call
**Specific Beta-Blockers Indicated for Systolic Heart Failure**

**Recommended for Heart Failure (at maximum tolerated dose)**

<table>
<thead>
<tr>
<th>Generic name:</th>
<th>Bisoprolol</th>
<th>Carvedilol</th>
<th>Carvedilol Phosphate</th>
<th>Metoprolol Succinate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade name:</td>
<td><strong>Zebeta</strong></td>
<td><strong>Coreg</strong></td>
<td><strong>Coreg CR</strong></td>
<td><strong>Toprol XL</strong></td>
</tr>
<tr>
<td>Dosages:</td>
<td>2.5 mg daily</td>
<td>3.125 mg BID</td>
<td>10 mg daily</td>
<td>25 mg daily</td>
</tr>
<tr>
<td></td>
<td>5 mg daily</td>
<td>6.25 mg BID</td>
<td>20 mg daily</td>
<td>50 mg daily</td>
</tr>
<tr>
<td></td>
<td>10 mg daily</td>
<td>12.5 mg BID</td>
<td>40 mg daily</td>
<td>100 mg daily</td>
</tr>
<tr>
<td></td>
<td>20 mg daily</td>
<td>25 mg BID</td>
<td>80 mg daily</td>
<td>200 mg daily</td>
</tr>
</tbody>
</table>

**Not Recommended for the Treatment of Heart Failure:**

<table>
<thead>
<tr>
<th>Generic name:</th>
<th>Atenolol</th>
<th>Labetalol</th>
<th>Metoprolol Tartrate</th>
<th>Nadalol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade name:</td>
<td><strong>Tenormin</strong></td>
<td><strong>Normodyne, Trandate</strong></td>
<td><strong>Lopressor</strong></td>
<td><strong>Corgard</strong></td>
</tr>
<tr>
<td>Dosages:</td>
<td>25 mg daily</td>
<td>100 mg BID</td>
<td>12.5 mg BID/TID</td>
<td>20 mg daily</td>
</tr>
<tr>
<td></td>
<td>50 mg daily</td>
<td>200 mg BID</td>
<td>25 mg BID/TID</td>
<td>40 mg daily</td>
</tr>
<tr>
<td></td>
<td>100 mg daily</td>
<td>300 mg BID</td>
<td>50 mg BID/TID</td>
<td>80 mg daily</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75 mg TID</td>
<td>160 mg daily</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 mg BID</td>
<td></td>
</tr>
</tbody>
</table>
### ACE-I approved for HF

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Captopril (Capoten)</td>
<td>25 – 150 mg b.i.d. or t.i.d.</td>
</tr>
<tr>
<td>Enalapril (Vasotec)</td>
<td>2.4 – 30 mg q.d or b.i.d.</td>
</tr>
<tr>
<td>Quinapril (Accupril)</td>
<td>10 – 80 mg q.d or b.i.d.</td>
</tr>
<tr>
<td>Benazepril (Lotensin)</td>
<td>2.5 – 20 mg q.d or b.i.d.</td>
</tr>
<tr>
<td>Trandolapril (Mavik)</td>
<td>1 – 4 mg q.d.</td>
</tr>
<tr>
<td>Lisinopril (Prinivil)</td>
<td>10 – 40 mg q.d.</td>
</tr>
<tr>
<td>Fosinopril (Monopril)</td>
<td>10 – 40 mg q.d.</td>
</tr>
<tr>
<td>Perindopril (Aceon), Moexipril (Univase), Benazepril (Lotensin), and Imidapril (Tanatril)</td>
<td>not yet demonstrated to be effective in clinical trials.</td>
</tr>
</tbody>
</table>

### ARBs approved for HF

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Losartan (Cozaar)</td>
<td>12.5 – 150 mg q.d.</td>
</tr>
<tr>
<td>Candesartan (Atacand)</td>
<td>4 – 32 mg q.d.</td>
</tr>
<tr>
<td>Valsartan ( Diovan)</td>
<td>40 – 160 mg b.i.d.</td>
</tr>
</tbody>
</table>

Irbesartan (Avapro), and Telmisartan (Micardis) have not yet been demonstrated to be effective in clinical trials.

### Beta-Blockers approved for HF

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bisoprolol (Zebeta)</td>
<td>2.5 – 20 mg q.d.</td>
</tr>
<tr>
<td>Carvedilol (Coreg)</td>
<td>3.125 - 25 mg b.i.d.</td>
</tr>
<tr>
<td>Carvedilol Phosphate (Coreg CR)</td>
<td>10 – 80 mg q.d.</td>
</tr>
<tr>
<td>Metoprolol Succinate (Toprol XL)</td>
<td>25 – 200 mg q.d.</td>
</tr>
</tbody>
</table>

Atenolol (Tenormin), Labetalol (Normodyne, Trandate), Metoprolol Tartrate (Lopressor), and Nadalol (Corgard) have not been demonstrated to be effective in clinical trials.

### Get With The Guidelines

- **ACE-I/ARB at discharge if LVEF < 40%**
- **Evidence-based specific beta-blockers if LVEF < 40%**
- **Measurement of LV function (LVEF) documented in chart**
- **Aldosterone antagonist at discharge if patient is NYHA Class III-IV if LVEF < 40% (K+ <5, Cr <2.0) or Class II with LVEF ≤ 35%**
- **ICD counseling, or ICD placed or prescribed at discharge, in appropriate patients with LVEF ≤ 35%**
- **Biventricular pacemaker (CRT-D or CRT-P) placed or prescribed at discharge in patients with LVEF ≤ 35% + QRS >150 ms**
- **Post-discharge appointment scheduled and documented—goal is to occur within 7 days of discharge (document Day, Date, Time).**
  - Call Heart Failure Nurse Transitional Clinic at extension x4-9600 or send note (day, date and time) to CHF Nurses on CERNER
- **Anticoagulation for atrial fibrillation or atrial flutter**
- **Non-ambulatory patients with HF should have DVT prophylaxis**

* Or contraindication documented in chart

### Pearls

- Beware, last EF may be different than admitting EF! Last EF counts!
- African-American HF patients with LVEF <40% may benefit from addition of **hydralazine-nitrate**.
- Nursing and physician staff should check that patients have **advanced directives** in records.
- A **Care Transition Record** will be transmitted to the patient’s next level care provider.
Why Joint Commission Certification

- We were eligible

- Hospitals with an established inpatient heart failure clinical treatment program
- Provide ambulatory care services through a hospital-based and hospital-owned heart failure clinic OR a collaborative relationship with one or more cardiology practices
- At least a Bronze performance award from Get With The Guidelines-Heart Failure
Why Advanced Certification

- We were eligible
- A chance to galvanize hospital resources
Partnering with your Institution in the Management of ADHF

- Length Of Stay
- 30-Day Readmission
- Mortality

QUALITY
Hospital Wanted to Partner With Us on “Avoidable” Readmissions

2/3 Hospitals lost up to 2% of Medicare reimbursements due to “excessive” readmissions

2,215 Hospitals lost up 2% of Medicare reimbursements due to “excessive” readmissions

$227,000,000 Total financial penalties levied by Medicare for “excessive” readmissions
Diagnoses & Timing of 30-Day Readmissions After Hospitalization for Heart Failure

Proportions of Readmissions for Causes Other Than the Condition at Initial Discharge

Dharmarajan K et al. JAMA. 2013;309(4):355-363

# Heart Failure Outpatient Nurse and Nurse Practitioner Visits

## Nurses’ clinic

<table>
<thead>
<tr>
<th></th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>9-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- See 60 HF hospital pts/mo
- See all 1° hospital d/c
  - All within 7 days
  - Med reconciliatation
  - Weights/symptoms
- See urgent care ED/Outpts
- Arrange fuv/calls to ↑care
- Manage GWTG performance measures

## Nurse practitioner’s clinic

<table>
<thead>
<tr>
<th></th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- See 36 pts/mo
- See all potentially unstable
- See all frequent flyters
- Perform 48 hour post d/c calls
- ? Bill
- Arrange fuv/calls to ↑care
- Manage GWTG performance measures
Cardiology vs. Internal Medicine

CHF Readmission Rates by Month

Cardiology
Internal Medicine

Oct. 2014: 16.1
Nov. 2014: 12.9
Dec. 2014: 9.5
Jan. 2014: 10.2
Feb. 2014: 11.1
Mar. 2014: 11.1
Apr. 2014: 18.2
May 2014: 18.3
Why Joint Commission Certification

- We were eligible
- A chance to galvanize hospital resources
- A chance to work with community resources
Clinical Integration

- True areas of overlap and integration between captive PC and hospital
- Identify areas for clinical improvements
- Establish guidelines/protocols for improvement
- Establish metrics to be followed
- Establish penalties for non-compliance
- Establish a clinical reporting system to describe metrics, degree of compliance
Why Advanced Certification

- We were eligible
- A chance to galvanize hospital resources
- A chance to work with community resources
- A chance to improve our care and reevaluate how and why we do things every 2 years
## Evidence-based, Guideline-recommended Therapies for Heart Failure

<table>
<thead>
<tr>
<th>Guideline Recommended Therapy</th>
<th>Relative Risk Reduction in Mortality</th>
<th>Number Needed to Treat for Mortality (NNT)</th>
<th>NNT for Mortality (standardized to 36 months)</th>
<th>Relative Risk Reductions in Heart Failure Hospitalizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEi/ARB</td>
<td>17%</td>
<td>22 over 42 months</td>
<td>26</td>
<td>31%</td>
</tr>
<tr>
<td>Beta-blocker</td>
<td>34%</td>
<td>28 over 12 months</td>
<td>9</td>
<td>41%</td>
</tr>
<tr>
<td>Aldosterone Antagonist</td>
<td>30%</td>
<td>9 over 24 months</td>
<td>6</td>
<td>35%</td>
</tr>
<tr>
<td>Hydralazine/Nitrate</td>
<td>43%</td>
<td>25 over 10 months</td>
<td>7</td>
<td>33%</td>
</tr>
<tr>
<td>CRT</td>
<td>36%</td>
<td>12 over 24 months</td>
<td>8</td>
<td>52%</td>
</tr>
<tr>
<td>ICD</td>
<td>23%</td>
<td>14 over 60 months</td>
<td>23</td>
<td>NA</td>
</tr>
</tbody>
</table>
Optimize Neurohomoral Antagonists and Device Therapy

If not, why not

Make patients feel better or improve quality of life

Diuretics

Improve survival and decrease hospitalization

ACE-inhibitors

β-blockers

Spironolactone

ICD therapy

Biventricular pacing

IF not, why not
Heart Failure Specific D/C Instruction
Section 3025 of the ACA established the Hospital Readmissions Reduction Program, which requires CMS to reduce payments to hospitals with excess readmissions. The economics of a HF hospitalization LOS is as follows:

- **Revenue Gain**
  - 4 days

- **Break Even**
  - 5-6 days

- **Revenue Loss**
  - ≥ 6 days

Readmission within 30 days:

- Revenue Gain
- Break Even
- Revenue Loss
Length of Stay
All Hospital Units

Principal CHF Hospitalizations

# of Hospitalizations vs. Length of Stay (Days)
Why Advanced Certification

• We were eligible
• A chance to galvanize hospital resources
• A chance to work with community resources
• A chance to improve our care and reevaluate how and why we do things every 2 years
• A chance to demonstrate the clinical excellence we had been working on
Heart Failure & Cardiomyopathy Program at Stony Brook Medicine
Why Not Become Advanced Certified in Heart Failure?

- Create a culture of focused on quality patient care
- Justify resource utilization
- Review and know your data
- Resources (AHA/JC, AHA Webinars, access to local AHA Quality & Systems Improvement Reps and pt management tools
- Gold Seal & Heart Check

American Heart Association & The Joint Commission’s Advanced Certification in Heart Failure program, please visit www.heart.org/certification or www.jointcommission.org/certification/heart failure.aspx

Send questions/comments to the American Heart Association at accreditation@heart.org or The Joint Commission at dscinfo@jointcommission.org
“I think a relationship is like a shark…
It has to constantly move forward or it dies.”

Alvy Singer in Woody Allen’s “Annie Hall”

If you don’t like change...
You are going to hate extinction.
Questions...?
Thank you for Attending!