The heart failure continuum:
Make an impact at every stage

Stage A: Patient with documented risk factors for heart failure (HF), such as hypertension, diabetes mellitus, or obesity, that may lead to cardiovascular disease progression

Stage B: Patient with a structural disorder, such as a previous myocardial infarction (MI) or left ventricular (LV) remodeling, but without HF signs or symptoms

Stage C: Patient with past or current symptoms of HF (eg, dyspnea and fatigue) associated with underlying structural heart disease such as left ventricular dysfunction

Stage D: Patient with end-stage, refractory HF requiring specialized interventions

The ACC/AHA HF staging system complements but does not replace the New York Heart Association (NYHA) functional classification. The ACC/AHA identifies patients during the course of their developing disease and links stages of the disease with appropriate treatments.

Adapted from ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. © 2005, American Heart Association. Although it attempts to preserve the integrity of the information and recommendations contained in the guideline, please consult the original, unabridged guideline for additional information (available at http://www.acc.org/qualityandscience/clinical/guidelines/failure/update/index.pdf), especially in case of questions or doubts.
Initial evaluation

Assess for HF in both high-risk and symptomatic patients

• Look for HF in asymptomatic patients without structural heart disease who are at high risk for HF (Stage A)
  – Patients with cardiac and/or noncardiac disorders that might cause HF
  – Patients with a family history of cardiomyopathy
  – Patients using cardiotoxins

• Look for HF in asymptomatic patients with structural heart disease at risk for HF (Stage B)
  – Patients with cardiac disorders that might accelerate the development of HF

• Look for HF in symptomatic patients (Stages C or D)
  – Patients with decreased exercise tolerance
  – Patients with fluid retention

Table 1
Evaluating possible causes of heart failure:

Patient history

• Hypertension
• Diabetes
• Dyslipidemia
• Valvular heart disease
• Coronary or peripheral vascular disease
• Myopathy
• Rheumatic fever
• Mediastinal irradiation
• History or symptoms of sleep-disordered breathing
• Exposure to cardiotoxic agents
• Current and past alcohol consumption
• Tobacco use
• Collagen vascular disease
• Exposure to sexually transmitted diseases
• Thyroid disorder
• Pheochromocytoma
• Obesity
• Heart murmur or congenital heart disease
• Illicit drug use
• Bacterial or parasitic infection
• Amyloidosis

“This classification recognizes that… therapeutic interventions performed even before the appearance of LV dysfunction or symptoms can reduce the population morbidity and mortality of HF.”

* Adapted from ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. © 2005, American Heart Association.
Perform the following assessments of patients presenting with heart failure

• History (see Tables 1 and 2) and physical examination to identify cardiac and noncardiac disorders or behaviors that might cause or accelerate the development or progression of HF
  – Signs of right and left HF, especially presence of elevated jugular pressure and a third heart sound
  – Ability to perform routine and desired activities of daily living
  – Patient’s volume status
  – Orthostatic blood pressure changes
  – Weight and height
  – Body mass index

• Laboratory tests
  – Complete blood count
  – Urinalysis
  – Serum electrolytes (including calcium and magnesium)
  – Blood urea nitrogen
  – Serum creatinine
  – Fasting blood glucose (glycohemoglobin)
  – Lipid profile
  – Liver function tests
  – Thyroid-stimulating hormone

• Function and structure of heart
  – 12-lead electrocardiogram and chest radiograph (posteroanterior and lateral)
  – Left ventricular ejection fraction (LVEF), LV size, wall thickness, and valve function using 2-dimensional echocardiogram with Doppler flow studies
  – LVEF and volumes can be assessed using radionuclide ventriculography
  – Coronary arteriography in patients presenting with HF who have angina or significant ischemia unless the patient is not eligible for revascularization of any kind

**Table 2**
Evaluating possible causes of heart failure:

**Family history**

• Sudden, unexplained death
• Predisposition to atherosclerotic disease (history of MIs, strokes, peripheral arterial disease)
• Sudden cardiac death
• Myopathy
• Conduction system disease (need for pacemaker)
• Tachyarrhythmias
• Cardiomyopathy (unexplained HF)
• Skeletal myopathies

* Adapted from ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. © 2005, American Heart Association.
Classification and treatment

Stage A: At high risk for HF but without structural heart disease or symptoms of HF1*

eg: Patients with:
- Hypertension
- Diabetes
- Atherosclerotic disease
- Obesity
- Metabolic syndrome

or Patients:
- Using cardiotoxins
- With family history of cardiomyopathy

Specific treatment recommendations for Stage A (Class I recommendations)1†

- Treat systolic and diastolic hypertension
  - Optimal blood pressure is primary goal
  - Depending on concomitant medical conditions, effective medicines can include diuretic-based antihypertensives, angiotensin-converting enzyme inhibitors (ACEIs), angiotensin II receptor blockers (ARBs), or beta-blockers
- Treat dyslipidemia
- Treat diabetes mellitus
- Counsel on avoidance of smoking, excessive alcohol consumption, and illicit drug use
- Control ventricular rate or restore sinus rhythm in patients with supraventricular tachyarrhythmias
- Treat thyroid disorders
- Periodically evaluate for signs and symptoms of HF
- Treat according to guidelines for secondary prevention in patients with atherosclerotic disease
- Evaluate LVEF noninvasively in patients with a strong family history of cardiomyopathy or receiving cardiotoxic interventions

* Adapted from ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. © 2005, American Heart Association.
† Class I = there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective.
Stage B:

Structural heart disease but without signs or symptoms of HF\(^*\)

eg: Patients with:
- Previous MI
- LV remodeling including left ventricular hypertrophy and low ejection fraction (EF)
- Asymptomatic valvular disease

Specific treatment recommendations for Stage B (Class I recommendations)\(^{†}\)

- Use Class I recommendations for treating Stage A HF, as appropriate (see page 4)
- Use beta-blockers and ACEIs in all patients with recent or prior MI
- Use beta-blockers in all patients with a reduced EF
- Use ACEIs in all patients with a reduced EF
- Use ARBs in post-MI patients without HF who are intolerant of ACEIs and have a low LVEF
- Treat according to guidelines after an acute MI
- Perform coronary revascularization in appropriate patients
- Perform valve replacement or repair in patients with hemodynamically significant valvular stenosis or regurgitation and no symptoms of HF according to guidelines

\(^*\) Adapted from ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult. © 2005, American Heart Association.

\(^{†}\) Class I = there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective.
Patients with reduced LVEF

- Use Class I recommendations for treating Stage A and Stage B HF, as appropriate (see pages 4 and 5)
- Use diuretics and restrict salt in patients with fluid retention
- Use ACEIs, unless contraindicated
- Use beta-blockers (use 1 of the 3 proven to reduce mortality) in stable patients, unless contraindicated
- Use ARBs approved for HF in appropriate patients intolerant to ACEIs
- Whenever possible, avoid or withdraw drugs that may exacerbate HF, including nonsteroidal anti-inflammatory drugs, most antiarrhythmic drugs, and most calcium channel blockers
- Recommend exercise training in ambulatory patients
- Use implantable cardioverter-defibrillator (ICD) in patients with a history of cardiac arrest, ventricular fibrillation, or hemodynamically destabilizing ventricular tachycardia

- Use ICD in patients with ischemic heart disease \( \geq 40 \text{ days post-MI} \) or with nonischemic cardiomyopathy, an LVEF \( \leq 30\% \), NYHA Class II or III symptoms on optimal medical therapy, and an expectation of survival with good function for >1 year
- Use cardiac resynchronization therapy, unless contraindivcated, in patients with an LVEF \( \leq 35\% \), sinus rhythm, and NYHA Class III or IV symptoms despite optimal therapy, and QRS duration >120 ms
- Add an aldosterone antagonist to selected patients with moderately severe to severe symptoms of HF whose renal function and potassium concentration can be carefully monitored. If monitoring is not feasible, the risks of aldosterone antagonists may outweigh the benefits

Patients with normal LVEF

- Treat hypertension
- Control ventricular rate in patients with atrial fibrillation
- Prescribe diuretics to manage pulmonary congestion and peripheral edema
Specific treatment recommendations for Stage D (Class I recommendations)*

- Identify and control fluid retention meticulously
- Refer potentially eligible patients for cardiac transplantation
- Refer to an HF program with expertise in the management of refractory HF
- Discuss options for end-of-life care with the patient and family when recommended therapies are insufficient
- Distribute to patients with ICDs information on the option to inactivate defibrillation

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† Class I = there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful, and effective.
Ongoing evaluation

**At each visit**¹

- Assess the patient’s ability to perform routine and desired activities of daily living
- Assess the patient’s volume status and weight
- Obtain a careful history of current use of alcohol, tobacco, illicit drugs, “alternative therapies,” and chemotherapy drugs, as well as sodium intake
- Assess adherence to diet, exercise program, and medication

**Routinely**¹

- Monitor laboratory results

**Referral**²

- Refer Stage A patients whose hypertension and diabetes are difficult to control to specialty care
- Request an initial consultation with a cardiologist for patients in Stage B, C, or D (see Table 3)
- Refer patients who are repeatedly hospitalized for HF to a multidisciplinary team, if available
  - Promptly refer patients with palpitations, symptomatic atrial fibrillation, or who have had syncope or nonsustained ventricular tachycardia
  - Refer patients to HF/transplant center when symptoms persist despite optimal therapy or when transplant may be an option

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**Table 3**

**The role of the cardiologist**²

- Confirm diagnosis
- Perform testing as needed
- Offer advice about cardiac catheterization
- Review treatment plan
- Evaluate for cardiac resynchronization therapy, ICD, or both
- Consider potential for revascularization or valvular surgery

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**References:**