Heart Failure 2017 ACC/AHA/HFSA Focused Update of the 2013 ACCF/AHA Guideline for the Management of Heart Failure

(1) Overview material	*Provide a structured abstract that includes the guideline's release date, status (original, revised, updated), and print and electronic sources.*
Release Date	Empty
Status	Empty
Available in Electronic Format	Empty
Available in Print Format	Empty
Bibliographic citation	Empty
Contact Information	Empty
Adapted From Another Guideline	Empty
(2) Focus	*Describe the primary disease/condition and intervention/ service/ technology that the guideline addresses. Indicate any alternative preventive, diagnostic or therapeutic interventions that were considered during development.*
Primary disease or condition	Empty
Alternative Strategies Available	Empty
Comparable Guideline	Empty
(3) Goal	*Describe the goal that following the guideline is expected to achieve, including the rationale for development of a guideline on this topic.*
Goal	Empty
Rationale	Empty
Outcomes or Performance Measures Considered	Empty
(4) Users/Setting	*Describe the intended users of the guideline (e.g., provider types, patients) and the settings in which the guideline is intended to be used.*
Users	Empty
Care Setting	Empty
(5) Target population	*Describe the patient population eligible for guideline recommendations and list any exclusion criteria.*
Population Target	Empty
Eligibility	Empty
Inclusion criteria	Empty
Exclusion criteria	Empty
(6) Developer	*Identify the organization(s) responsible for guideline development and the names/credentials/potential conflicts of interest of individuals involved in the guideline's development.*
Name of Developer	Empty
Name of Committee	Empty
Committee Expertise	Empty
(7) Funding source/sponsor	*Identify the funding source/sponsor and describe its role in developing, and/or reporting the guideline. Disclose potential conflict of interest.*
Source of Funding	Empty
Name of Developer	Empty
Role Of Sponsor	Empty
Conflict Of Interest	Empty
(8) Evidence collection	*Describe the methods used to search the scientific literature, including the range of dates and databases searched, and criteria applied to filter the retrieved evidence.*
Description of Evidence	

Collection	Empty
Number of Source Documents	Empty
Evidence Time Period	Empty
Criteria for Selecting Evidence	Empty
(9) Recommendation grading criteria	*Describe the criteria used to rate the quality of evidence that supports the recommendations and the system for describing the strength of the recommendations. Recommendation strength communicates the importance of adherence to a recommendation and is based on both the quality of the evidence and the magnitude of anticipated benefits or harms.*
Recommendation Grading Criteria	Empty
Evidence Quality Rating Scheme	Empty
Recommendation Strength Rating Scheme	Empty
(10) Method for synthesizing evidence	*Describe how evidence was used to create recommendations, e.g., evidence tables, meta-analysis, decision analysis.*
Description of Evidence Combination	Empty
Methods To Reach Judgment	Empty
(11) Pre-release review	*Describe how the guideline developer reviewed and/or tested the guidelines prior to release.*
External Review	Empty
Pilot testing	Empty
Formal Appraisal	Empty
(12) Update plan	*State whether or not there is a plan to update the guideline and, if applicable, an expiration date for this version of the guideline.*
Expiration	Empty
Scheduled Review	Empty
(13) Definitions	*Define unfamiliar terms and those critical to correct application of the guideline that might be subject to misinterpretation.*
Definitions	Empty
Term - Meaning	
(14) Recommendations and rationale	*State the recommended action precisely and the specific circumstances under which to perform it. Justify each recommendation by describing the linkage between the recommendation and its supporting evidence. Indicate the quality of evidence and the recommendation strength, based on the criteria described in 9.*
Recommendation	Assessment - *Conditonal* - A thorough history and physical examination should be obtained/ performed in patients presenting with HF to identify cardiac and noncardiac disorders or behaviors that might cause or accelerate the development or progression of HF. (I-C)
Decision Variable	patients presenting with HF
Action	A thorough history and physical examination should be obtained or performed
Reference	Empty
Reason	to identify cardiac and noncardiac disorders or behaviors that might cause or accelerate the development or progression of HF
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Assessment - *Conditonal* - In patients with idiopathic dilated cardiomyopathy (DCM), a 3-generational family history should be obtained to aid in establishing the diagnosis of familial DCM.
Decision Variable	patients with idiopathic dilated cardiomyopathy
Action	a 3-generational family history should be obtained
Reference	Empty
Reason	to aid in establishing the diagnosis of familial dilated cardiomyopathy
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Assessment - *Conditonal* - Volume status and vital signs should be assessed at each patient encounter. This includes serial assessment of weight, as well as estimates of jugular venous pressure and the presence of peripheral edema or orthopnea.

Decision Variable	at each patient encounter
Action	assess volume status
Action	assess vital signs
Action	serial assessment of weight
Action	estimate jugular venous pressure
Action	assess the presence of peripheral edema or orthopnea
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Assessment - *Conditonal* - Validated multivariable risk scores can be useful to estimate subsequent risk of mortality in ambulatory or hospitalized patients with HF.
Decision Variable	ambulatory or hospitalized patients with HF
Action	obtain validated multivariable risk scores
Reference	Empty
Reason	can be useful to estimate subsequent risk of mortality
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Diagnostic Tests - *Conditonal* - Initial laboratory evaluation of patients presenting with HF should include a complete blood cell count, urinalysis, measurement of serum electrolytes (including calcium and magnesium), blood urea nitrogen, serum creatinine, glucose, and thyroid-stimulating hormone, a fasting lipid profile, and liver function tests.
Decision Variable	Initial laboratory evaluation of patients presenting with HF
Action	perform complete blood cell count,
Action	perform urinalysis
Action	perform measurement of serum electrolytes (including calcium and magnesium),
Action	perform measurement of blood urea nitrogen
Action	perform measurement of serum creatinine
Action	perform measurement of glucose,
Action	perform measurement of thyroid-stimulating hormone
Action	perform a fasting lipid profile test
Action	perform liver function tests
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Diagnostic Tests - *Conditonal* - Serial monitoring, when indicated, should include serum electrolyte levels and renal function.
Decision Variable	Serial monitoring indicated
Action	include serum electrolyte levels and renal function
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Diagnostic Tests - *Conditonal* - A 12-lead electrocardiogram should be performed initially on all patients presenting with HF
Decision Variable	patients presenting with HF
Action	12-lead electrocardiogram should be performed initially
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Diagnostic Tests - *Conditonal* - Screening for hemochromatosis or HIV is reasonable in selected patients who present with HF.
Decision Variable	selected patients who present with HF
Action	Screening for hemochromatosis or HIV is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa

Quality of Evidence	C
Recommendation	Diagnostic Tests - *Conditonal* - Diagnostic tests for rheumatological diseases, amyloidosis, or pheochromocytoma are reasonable in patients presenting with HF in whom there is a clinical suspicion of these diseases.
Decision Variable	patients presenting with HF in whom there is a clinical suspicion of rheumatological diseases, amyloidosis, or pheochromocytoma
Action	perform diagnostic tests for rheumatological diseases
Action	perform diagnostic tests for amyloidosis
Action	perform diagnostic tests for pheochromocytoma
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Biomarkers for Prevention (2017) - *Conditonal* - For patients at risk of developing HF, natriuretic peptide biomarker–based screening followed by team-based care, including a cardiovascular specialist optimizing GDMT, can be useful to prevent the development of left ventricular dysfunction (systolic or diastolic) or new-onset HF.
Decision Variable	patients at risk of developing HF
Action	perform natriuretic peptide biomarker–based screening
Action	perform team-based care, including a cardiovascular specialist optimizing GDMT
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B-R
Recommendation	Biomarkers for Diagnosis (2017) - *Conditonal* - In patients presenting with dyspnea, measurement of natriuretic peptide biomarkers is useful to support a diagnosis or exclusion of HF.
Decision Variable	patients presenting with dyspnea
Action	perform measurement of natriuretic peptide biomarkers
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Biomarkers for Prognosis or Added Stratification (2017) - *Conditonal* - Measurement of BNP or NT-proBNP is useful for establishing prognosis or disease severity in chronic HF.
Decision Variable	chronic HF
Action	perform measurement of BNP or NT-proBNP
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Biomarkers for Prognosis or Added Stratification (2017) - *Conditonal* - Measurement of baseline levels of natriuretic peptide biomarkers and/or cardiac troponin on admission to the hospital is useful to establish a prognosis in acutely decompensated HF.
Decision Variable	admission to the hospital
Action	perform measurement of baseline levels of natriuretic peptide biomarkers and/or cardiac troponin
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Biomarkers for Prognosis or Added Stratification (2017) - *Conditonal* - During a HF hospitalization, a predischarge natriuretic peptide level can be useful to establish a postdischarge prognosis.
Decision Variable	During a HF hospitalization
Action	perform a measurement of predischarge natriuretic peptide level
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B-NR
Recommendation	Biomarkers for Prognosis or Added Stratification (2017) - *Conditonal* - In patients with chronic HF, measurement of other clinically available tests, such as biomarkers of myocardial injury or fibrosis, may be considered for additive risk stratification.
Decision Variable	patients with chronic HF
Action	perform measurement of clinically available tests, such as biomarkers of myocardial injury or fibrosis

Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B-NR
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - Patients with suspected or new-onset HF, or those presenting with acute decompensated HF, should undergo a chest x-ray to assess heart size and pulmonary congestion and to detect alternative cardiac, pulmonary, and other diseases that may cause or contribute to the patient's symptoms.
Decision Variable	Patients with suspected or new-onset HF,
Decision Variable	patients presenting with acute decompensated HF
Action	undergo a chest x-ray
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - A 2-dimensional echocardiogram with Doppler should be performed during initial evaluation of patients presenting with HF to assess ventricular function, size, wall thickness, wall motion, and valve function.
Decision Variable	initial evaluation of patients presenting with HF
Action	perform a 2-dimensional echocardiogram with Doppler
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - Repeat measurement of EF and measurement of the severity of structural remodeling are useful to provide information in patients with HF who have had a significant change in clinical status; who have experienced or recovered from a clinical event; or who have received treatment, including GDMT, that might have had a significant effect on cardiac function; or who may be candidates for device therapy.
Decision Variable	patients with HF
Decision Variable	who have had a significant change in clinical status
Decision Variable	who have experienced or recovered from a clinical event
Decision Variable	who have received treatment, including GDMT, that might have had a significant effect on cardiac function
Decision Variable	who may be candidates for device therapy
Decision Variable	Empty
Decision Variable	Empty
Action	repeat measurement of EF
Action	measurement of the severity of structural remodeling
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - Noninvasive imaging to detect myocardial ischemia and viability is reasonable in patients presenting with de novo HF, who have known CAD and no angina, unless the patient is not eligible for revascularization of any kind.
Decision Variable	patients presenting with de novo HF
Decision Variable	who have known CAD
Decision Variable	no angina
Decision Variable	unless the patient is not eligible for revascularization of any kind.
Action	Empty
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - Viability assessment is reasonable in select situations when planning revascularization in HF patients with CAD.
Decision Variable	select situations when planning revascularization in HF patients with CAD.
Action	Viability assessment
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa

Quality of Evidence	B
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - Radionuclide ventriculography or magnetic resonance imaging can be useful to assess LVEF and volume when echocardiography is inadequate.
Decision Variable	echocardiography is inadequate
Action	Radionuclide ventriculography
Action	magnetic resonance imaging
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - Magnetic resonance imaging is reasonable when assessing myocardial infiltrative processes or scar burden.
Decision Variable	assessing myocardial infiltrative processes
Decision Variable	assessing scar burden
Action	Magnetic resonance imaging
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Noninvasive Cardiac Imaging - *Conditonal* - Routine repeat measurement of LV function assessment in the absence of clinical status change or treatment interventions should NOT be performed.
Decision Variable	absence of clinical status change
Decision Variable	absence of treatment interventions
Action	perform routine repeat measurement of LV function assessment
Reference	Empty
Reason	Empty
Strength of Recommendation	III:No Benefit
Quality of Evidence	B
Recommendation	Invasive Evaluation - *Conditonal* - Invasive hemodynamic monitoring with a pulmonary artery catheter should be performed to guide therapy in patients who have respiratory distress or clinical evidence of impaired perfusion in whom the adequacy or excess of intracardiac filling pressures cannot be determined from clinical assessment.
Decision Variable	patients who have respiratory distress
Decision Variable	patients with clinical evidence of impaired perfusion in whom the adequacy or excess of intracardiac filling pressures cannot be determined from clinical assessment
Decision Variable	Empty
Action	Invasive hemodynamic monitoring with a pulmonary artery catheter
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Invasive Evaluation - *Conditonal* - Invasive hemodynamic monitoring can be useful for carefully selected patients with acute HF who have persistent symptoms despite empiric adjustment of standard therapies, and: • Whose fluid status, perfusion, or systemic or pulmonary vascular resistance is uncertain; • Whose systolic pressure remains low, or is associated with symptoms, despite initial therapy; • Whose renal function is worsening with therapy; • Who require parenteral vasoactive agents; or • Who may need consideration for mechanical circulatory support (MCS) or transplantation.
Decision Variable	carefully selected patients with acute HF
Decision Variable	who have persistent symptoms despite empiric adjustment of standard therapies,
Decision Variable	Whose fluid status, perfusion, or systemic or pulmonary vascular resistance is uncertain
Decision Variable	Whose systolic pressure remains low, or is associated with symptoms, despite initial therapy;
Decision Variable	Whose renal function is worsening with therapy;
Decision Variable	Who require parenteral vasoactive agents; or
Decision Variable	Who may need consideration for mechanical circulatory support (MCS) or transplantation.
Action	Invasive hemodynamic monitoring
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Invasive Evaluation - *Conditonal* - When ischemia may be contributing to HF, coronary arteriography is reasonable for patients eligible for revascularization. (IIa-C)

Decision Variable	ischemia may be contributing to HF
Decision Variable	for patients eligible for revascularization.
Action	coronary arteriography
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Invasive Evaluation - *Conditonal* - Endomyocardial biopsy can be useful in patients presenting with HF when a specific diagnosis is suspected that would influence therapy.
Decision Variable	patients presenting with HF
Decision Variable	when a specific diagnosis is suspected that would influence therapy
Action	Endomyocardial biopsy
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Invasive Evaluation - *Conditonal* - Routine use of invasive hemodynamic monitoring is NOT recommended in normotensive patients with acute decompensated HF and congestion with symptomatic response to diuretics and vasodilators.
Decision Variable	normotensive patients with acute decompensated HF
Decision Variable	congestion with symptomatic response to diuretics and vasodilators
Action	Routine use of invasive hemodynamic monitoring
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	B
Recommendation	Invasive Evaluation - *Conditonal* - Endomyocardial biopsy should NOT be performed in the routine evaluation of patients with HF.
Decision Variable	routine evaluation of patients with HF
Action	Endomyocardial biopsy
Reference	Empty
Reason	Empty
Strength of Recommendation	(III: Harm)
Quality of Evidence	C
Recommendation	Treatment Stage A - *Conditonal* - Hypertension and lipid disorders should be controlled in accordance with contemporary guidelines to lower the risk of HF.
Decision Variable	lowering the risk of HF
Action	control hypertension
Action	control lipid disorders
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Treatment Stage A - *Conditonal* - Other conditions that may lead to or contribute to HF, such as obesity, diabetes mellitus, tobacco use, and known cardiotoxic agents, should be controlled or avoided.
Decision Variable	obesity
Decision Variable	diabetes mellitus
Decision Variable	tobacco use
Decision Variable	known cardiotoxic agents
Action	controlled
Action	avoided
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Treatment Stage B - *Conditonal* - In all patients with a recent or remote history of MI or acute coronary syndrome and reduced EF, angiotensin-converting enzyme (ACE) inhibitors should be used to prevent symptomatic HF and reduce mortality. In patients intolerant of ACE inhibitors, angiotensin-receptor blockers are appropriate unless contraindicated.
Decision Variable	patients with a recent or remote history of MI

Decision Variable	acute coronary syndrome
Decision Variable	reduced EF
Action	angiotensin-converting enzyme (ACE) inhibitors should be used
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Treatment Stage B - *Conditonal* - In all patients with a recent or remote history of MI or acute coronary syndrome and reduced EF, angiotensin-converting enzyme (ACE) inhibitors should be used to prevent symptomatic HF and reduce mortality. In patients intolerant of ACE inhibitors, angiotensin-receptor blockers are appropriate unless contraindicated.
Decision Variable	patients with a recent or remote history of MI
Decision Variable	acute coronary syndrome
Decision Variable	reduced EF
Decision Variable	patients intolerant of ACE inhibitors
Action	angiotensin-receptor blockers are appropriate unless contraindicated
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Treatment Stage B - *Conditonal* - In all patients with a recent or remote history of MI or acute coronary syndrome and reduced EF, evidence-based beta blockers should be used to reduce mortality.
Decision Variable	patients with a recent or remote history of MI
Decision Variable	acute coronary syndrome
Decision Variable	reduced EF
Action	evidence-based beta blockers should be used to reduce mortality
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Treatment Stage B - *Conditonal* - In all patients with a recent or remote history of MI or acute coronary syndrome, statins should be used to prevent symptomatic HF and cardiovascular events.
Decision Variable	patients with a recent or remote history of MI
Decision Variable	acute coronary syndrome
Action	statins should be used to prevent symptomatic HF and cardiovascular events.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Treatment Stage B - *Conditonal* - In patients with structural cardiac abnormalities, including LV hypertrophy, in the absence of a history of MI or ACS, blood pressure should be controlled in accordance with clinical practice guidelines for hypertension to prevent symptomatic HF.
Decision Variable	patients with structural cardiac abnormalities, including LV hypertrophy
Decision Variable	the absence of a history of MI or ACS
Action	blood pressure should be controlled in accordance with clinical practice guidelines for hypertension to prevent symptomatic HF.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Treatment Stage B - *Conditonal* - ACE inhibitors should be used in all patients with a reduced EF to prevent symptomatic HF, even if they do not have a history of MI.
Decision Variable	patients with a reduced EF
Action	ACE inhibitors should be used
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
	Treatment Stage B - *Conditonal* - Beta blockers should be used in all patients with a reduced EF to prevent symptomatic HF, even if they

Recommendation	do not have a history of MI.
Decision Variable	patients with a reduced EF
Action	Beta blockers should be used
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Treatment Stage B - *Conditonal* - To prevent sudden death, placement of an implantable cardioverterdefibrillator (ICD) is reasonable in patients with asymptomatic ischemic cardiomyopathy who are 40 days post-MI, have an LVEF of 30%, are on appropriate medical therapy, and have a reasonable expectation of survival with a good functional status for >1 year.
Decision Variable	patients with asymptomatic ischemic cardiomyopathy who are 40 days post-MI
Decision Variable	have an LVEF of 30%,
Decision Variable	are on appropriate medical therapy
Decision Variable	have a reasonable expectation of survival with a good functional status for >1 year.
Action	placement of an implantable cardioverterdefibrillator (ICD) is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Treatment Stage B - *Conditonal* - Nondihydropyridine calcium channel blockers with negative inotropic effects may be harmful in asymptomatic patients with low LVEF and no symptoms of HF after MI.
Decision Variable	asymptomatic patients with low LVEF
Decision Variable	no symptoms of HF after MI.
Action	Nondihydropyridine calcium channel blockers with negative inotropic effects may be harmful
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	C
Recommendation	Treatment Stage C Nonpharmacological Interventions Education - *Conditonal* - Patients with HF should receive specific education to facilitate HF self-care.
Decision Variable	Patients with HF
Action	should receive specific education to facilitate HF self-care
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Treatment Stage C Nonpharmacological Interventions Sodium Restriction - *Conditonal* - Sodium restriction is reasonable for patients with symptomatic HF to reduce congestive symptoms.
Decision Variable	patients with symptomatic HF
Action	Sodium restriction is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Treatment Stage C Nonpharmacological Interventions Activity, Exercise Prescription, and Cardiac Rehabilitation - *Conditonal* - 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-A)
Decision Variable	patients with HF
Decision Variable	who are able to participate to improve functional status
Action	Exercise training (or regular physical activity) is recommended as safe and effective
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Treatment Stage C Nonpharmacological Interventions Activity, Exercise Prescription, and Cardiac Rehabilitation - *Conditonal* - Cardiac rehabilitation can be useful in clinically stable patients with HF to improve functional capacity, exercise duration, health-related quality of life (HRQOL), and mortality.
Decision Variable	clinically stable patients with HF

Action	Cardiac rehabilitation can be useful
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Treatment Stage C Pharmacological Treatment for Stage C HFrEF - *Conditonal* - Measures listed as Class I recommendations for patients in stages A and B are recommended where appropriate for patients in stage C. (I-A, I-B, and I-C as appropriate)
Decision Variable	patients in stage C
Action	use same measures listed in Class I recommendations for patients in stages A and B
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Treatment Stage C Pharmacological Treatment for Stage C HFrEF <<Not Marked>> - *Conditonal* - GDMT as depicted in Figure 1 should be the mainstay of pharmacological therapy for HFrEF. (I-A) <<Figure2>>
Decision Variable	Empty
Action	Empty
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - HFrEF NYHA class I–IV (Stage C) ACEI or ARB AND GDMT beta blocker; diuretics as needed (COR I)
Decision Variable	Stage C patient with HFrEF
Decision Variable	NYHA class I-IV
Action	treat with angiotensin-converting enzyme inhibitor or angiotensin receptor-blocker
Action	GDMT beta blocker;
Action	diuretics as needed
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	Empty
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - NYHA class II–IV, provided est. CrCl >30 mL/min & K+ <5.0 mEq/L implement Aldosterone antagonist (COR I)
Decision Variable	patient is NYHA class II–IV
Decision Variable	provided est. CrCl >30 mL/min
Decision Variable	K+ <5.0 mEq/L
Action	implement aldosterone antagonist
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	Empty
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - NYHA class II–III HF Adequate BP on ACEI or ARB; No C/I to ARB or sacubitril then Discontinue ACEI or ARB; initiate ARNI
Decision Variable	NYHA class II–III HF
Decision Variable	Adequate blood pressure on angiotensin-converting enzyme inhibitor or angiotensin receptor-blocker
Decision Variable	No contraindication to angiotensin receptor-blocker or sacubitril
Action	Discontinue ACEI or ARB
Action	initiate ARNI
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	Empty
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - NYHA class III–IV, in black patients implment Hydral-Nitrates
Decision Variable	NYHA class III–IV
Decision Variable	in black patients

Action	implement Hydral-Nitrates
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	Empty
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - NYHA class II–III, LVEF 35%; (caveat: >1 y survival, >40 d post MI) implement implantable cardioverter-defibrillator
Decision Variable	NYHA class II–III
Decision Variable	left ventricular ejection fraction 35%
Decision Variable	(caveat: >1 y survival, >40 d post MI)
Action	implement implantable cardioverter defibrillator
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	Empty
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - NYHA class II–IV, LVEF 35%, NSR & QRS 150 ms with LBBB pattern
Decision Variable	NYHA class II–IV
Decision Variable	left ventricular ejection fraction 35%
Decision Variable	normal sinus rhythm and QRS 150 ms with left bundle-branch block pattern
Decision Variable	Empty
Decision Variable	Empty
Action	implement cardiac resynchronization therapy
Action	implement cardiac resynchronization therapy–device
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	Empty
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - NYHA class II–III, NSR, heart rate 70 bpm on maximally tolerated dose beta blocker
Decision Variable	NYHA class II–III,
Decision Variable	normal sinus rhythm,
Decision Variable	heart rate 70 bpm on maximally tolerated dose beta blocker
Action	implement Ivabradine
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	Empty
Recommendation	Treatment of HFrEF Stage C and D (2017) - *Conditonal* - patients are Stage D refractory NYHA class III-IV consider additional therapy of palliative care (COR I) or transplant (COR I) or left ventricular assist device (COR IIa) or Investigational studies
Decision Variable	patients are Stage D refractory NYHA class III-IV
Action	consider additional therapy of palliative care (COR I)
Action	consider additional therapy of transplant (COR I)
Action	consider additional therapy of left ventricular assist device (COR IIa)
Action	consider investigational studies
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Diuretics - *Conditonal* - Diuretics are recommended in patients with HFrEF with fluid retention
Decision Variable	patients with HFrEF with fluid retention
Action	Diuretics are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C

Recommendation	Pharmacological Therapy for Management of Stage C HFrEF ACE Inhibitors - *Conditonal* - ACE inhibitors are recommended for all patients with HFrEF
Decision Variable	patients with HFrEF
Action	ACE inhibitors are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF ARBs - *Conditonal* - ARBs are recommended in patients with HFrEF who are ACE inhibitor–intolerant
Decision Variable	patients with HFrEF
Decision Variable	who are ACE inhibitor–intolerant
Action	ARBs are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF ARBs - *Conditonal* - ARBs are reasonable as alternatives to ACE inhibitors as first-line therapy in HFrEF
Decision Variable	patient with HFrEF
Decision Variable	first-line therapy
Action	ARBs are reasonable as alternatives to ACE inhibitors
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF ARBs - *Conditonal* - Addition of an ARB may be considered in persistently symptomatic patients with HFrEF on GDMT
Decision Variable	persistently symptomatic patients with HFrEF on GDMT
Action	Addition of an ARB may be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF ARBs - *Conditonal* - Routine combined use of an ACE inhibitor, ARB, and aldosterone antagonist is potentially harmful for patients with HFrEF.
Decision Variable	patients with HFrEF
Action	Routine combined use of an ACE inhibitor, ARB, and aldosterone antagonist is potentially harmful
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	C
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Beta Blockers - *Conditonal* - Use of 1 of the 3 beta blockers proven to reduce mortality is recommended for all stable patients
Decision Variable	stable patients
Action	Use of 1 of the 3 beta blockers proven to reduce mortality is recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Aldosterone Receptor Antagonists - *Conditonal* - Aldosterone receptor antagonists are recommended in patients with NYHA class II–IV HF who have LVEF 35%
Decision Variable	patients with NYHA class II–IV HF
Decision Variable	who have LVEF 35%
Action	Aldosterone receptor antagonists are recommended
Reference	Empty
Reason	Empty

Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Aldosterone Receptor Antagonists - *Conditonal* - Aldosterone receptor antagonists are recommended to reduce morbidity and mortality following an acute MI in patients who have LVEF of 40% who develop symptoms of HF or who have a history of diabetes mellitus, unless contraindicated.
Decision Variable	patients following an acute MI
Decision Variable	who have LVEF 40%
Decision Variable	who develop symptoms of HF
Decision Variable	who have a history of diabetes mellitus
Action	Aldosterone receptor antagonists are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Aldosterone Receptor Antagonists - *Conditonal* - Inappropriate use of aldosterone receptor antagonists is potentially harmful because of life-threatening hyperkalemia or renal insufficiency when serum creatinine is >2.5 mg/dL in men or >2.0 mg/dL in women (or estimated glomerular filtration rate <30 mL/min/1.73 m2), and/or potassium >5.0 mEq/L.
Decision Variable	serum creatinine is >2.5 mg/dL in men
Decision Variable	>2.0 mg/dL in women
Decision Variable	or estimated glomerular filtration rate <30 mL/min/1.73 m2
Decision Variable	and/or potassium >5.0 mEq/L.
Action	Inappropriate use of aldosterone receptor antagonists is potentially harmful because of life-threatening hyperkalemia or renal insufficiency
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Hydralazine and Isosorbide Dinitrate - *Conditonal* - The combination of hydralazine and isosorbide dinitrate is recommended for African Americans with NYHA class III–IV HFrEF on GDMT
Decision Variable	African Americans with NYHA class III–IV HFrEF on GDMT
Action	combination of hydralazine and isosorbide dinitrate is recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Hydralazine and Isosorbide Dinitrate - *Conditonal* - A combination of hydralazine and isosorbide dinitrate can be useful in patients with HFrEF who cannot be given ACE inhibitors or ARBs
Decision Variable	patients with HFrEF
Decision Variable	who cannot be given ACE inhibitors or ARBs
Action	A combination of hydralazine and isosorbide dinitrate can be useful
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Digoxin - *Conditonal* - Digoxin can be beneficial in patients with HFrEF, unless contraindicated, to decrease hospitalizations for HF.
Decision Variable	patients with HFrEF
Action	Digoxin can be beneficial, unless contraindicated
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Anticoagulants - *Conditonal* - Patients with chronic HF with permanent/persistent/paroxysmal AF and an additional risk factor for cardioembolic stroke (history of hypertension, diabetes mellitus, previous stroke or transient ischemic attack, or 75 years of age) should receive chronic anticoagulant therapy (in the absence of contraindications to anticoagulation).
Decision Variable	Patients with chronic HF
Decision Variable	with permanent/persistent/paroxysmal AF

Decision Variable	an additional risk factor for cardioembolic stroke
Decision Variable	absence of contraindications to anticoagulation
Action	should receive chronic anticoagulant therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Anticoagulants - *Conditonal* - The selection of an anticoagulant agent (warfarin, dabigatran, apixaban, or rivaroxaban) for permanent/persistent/paroxysmal AF should be individualized on the basis of risk factors, cost, tolerability, patient preference, potential for drug interactions, and other clinical characteristics, including time in the international normalized ratio therapeutic range if the patient has been taking warfarin. (
Decision Variable	permanent/persistent/paroxysmal AF
Action	The selection of an anticoagulant agent (warfarin, dabigatran, apixaban, or rivaroxaban) should be individualized
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Anticoagulants - *Conditonal* - Chronic anticoagulation is reasonable for patients with chronic HF who have permanent/persistent/paroxysmal AF but are without an additional risk factor for cardioembolic stroke (in the absence of contraindications to anticoagulation). (
Decision Variable	patients with chronic HF
Decision Variable	who have permanent/persistent/paroxysmal AF
Decision Variable	are without an additional risk factor for cardioembolic stroke
Decision Variable	(in the absence of contraindications to anticoagulation).
Action	Chronic anticoagulation is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Anticoagulants - *Conditonal* - Anticoagulation is NOT recommended in patients with chronic HFrEF without AF, a prior thromboembolic event, or a cardioembolic source
Decision Variable	patients with chronic HFrEF without AF
Decision Variable	a prior thromboembolic event
Decision Variable	a cardioembolic source
Action	Anticoagulation
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Statins - *Conditonal* - Statins are NOT beneficial as adjunctive therapy when prescribed solely for HF
Decision Variable	prescribed solely for HF
Action	Statins are NOT beneficial as adjunctive therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	A
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Omega-3 Fatty Acids - *Conditonal* - Omega-3 PUFA supplementation is reasonable to use as adjunctive therapy in HFrEF or HFpEF patients
Decision Variable	HFrEF patients
Decision Variable	HFpEF patients
Action	Omega-3 PUFA supplementation is reasonable to use as adjunctive therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Other - *Conditonal* - Nutritional supplements as treatment for HF are NOT recommended in patients with current or prior symptoms of HFrEF. (

Decision Variable	patients with current or prior symptoms of HFrEF
Action	Nutritional supplements as treatment for HF are NOT recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Other - *Conditonal* - Hormonal therapies other than to correct deficiencies are NOT recommended in HFrEF
Decision Variable	patient with HFrEF
Action	Hormonal therapies other than to correct deficiencies are NOT recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	C
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Other - *Conditonal* - Drugs known to adversely affect the clinical status of patients with current or prior symptoms of HFrEF are potentially harmful and should be avoided or withdrawn whenever possible (eg, most antiarrhythmic drugs, most calcium channel–blocking drugs [except amlodipine], nonsteroidal anti-inflammatory drugs, or thiazolidinediones).
Decision Variable	patients with current or prior symptoms of HFrEF
Action	avoided or withdrawn whenever possible (eg, most antiarrhythmic drugs, most calcium channel–blocking drugs [except amlodipine], nonsteroidal anti-inflammatory drugs, or thiazolidinediones).
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	B
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Other - *Conditonal* - Long-term use of infused positive inotropic drugs is potentially harmful for patients with HFrEF, except as palliation for patients with end-stage disease who cannot be stabilized with standard medical treatment
Decision Variable	patients with HFrEF
Action	Long-term use of infused positive inotropic drugs is potentially harmful
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	C
Recommendation	Pharmacological Therapy for Management of Stage C HFrEF Calcium Channel Blockers - *Conditonal* - Calcium channel–blocking drugs are NOT recommended as routine treatment in HFrEF
Decision Variable	patient with HFrEF
Action	Calcium channel–blocking drugs are NOT recommended as routine treatment
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	A
Recommendation	Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction - *Conditonal* - The clinical strategy of inhibition of the renin-angiotensin system with ACE inhibitors OR ARBs in conjunction with evidence-based beta blockers, and aldosterone antagonists in selected patients, is recommended for patients with chronic HFrEF to reduce morbidity and mortality.
Decision Variable	patients with chronic HFrEF
Action	The clinical strategy of inhibition of the renin-angiotensin system with ACE inhibitors OR ARBs in conjunction with evidence-based beta blockers, and aldosterone antagonists in selected patients
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction - *Conditonal* - The clinical strategy of inhibition of the renin-angiotensin system with ARNI in conjunction with evidence-based beta blockers, and aldosterone antagonists in selected patients, is recommended for patients with chronic HFrEF to reduce morbidity and mortality.
Decision Variable	patients with chronic HFrEF
Action	The clinical strategy of inhibition of the renin-angiotensin system with ARNI in conjunction with evidence-based beta blockers, and aldosterone antagonists in selected patients
Reference	Empty

Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B-R
Recommendation	Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction - *Conditonal* - The use of ACE inhibitors is beneficial for patients with prior or current symptoms of chronic HFrEF to reduce morbidity and mortality.
Decision Variable	patients with prior or current symptoms of chronic HFrEF
Action	The use of ACE inhibitors is beneficial
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction - *Conditonal* - The use of ARBs to reduce morbidity and mortality is recommended in patients with prior or current symptoms of chronic HFrEF who are intolerant to ACE inhibitors because of cough or angioedema.
Decision Variable	patients with prior or current symptoms of chronic HFrEF
Decision Variable	who are intolerant to ACE inhibitors because of cough or angioedema
Action	The use of ARBs to reduce morbidity and mortality is recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction - *Conditonal* - In patients with chronic symptomatic HFrEF NYHA class II or III who tolerate an ACE inhibitor or ARB, replacement by an ARNI is recommended to further reduce morbidity and mortality.
Decision Variable	In patients with chronic symptomatic HFrEF NYHA class II or III
Decision Variable	who tolerate an ACE inhibitor or ARB
Action	replacement by an ARNI is recommended to further reduce morbidity and mortality.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B-R
Recommendation	Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction - *Conditonal* - Angiotensin receptor-neprilysin inhibitor should not be administered concomitantly with ACE inhibitors or within 36 hours of the last dose of an ACE inhibitor.
Decision Variable	patients with HFrEF
Action	Angiotensin receptor-neprilysin inhibitor should not be administered concomitantly with ACE inhibitors or within 36 hours of the last dose of an ACE inhibitor.
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	B-R
Recommendation	Pharmacological Treatment for Stage C HF With Reduced Ejection Fraction - *Conditonal* - Angiotensin receptor-neprilysin inhibitor should not be administered to patients with a history of angioedema.
Decision Variable	patients with a history of angioedema
Action	Angiotensin receptor-neprilysin inhibitor should not be administered
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	C-EO
Recommendation	Ivabradine - *Conditonal* - Ivabradine can be beneficial to reduce HF hospitalization for patients with symptomatic (NYHA class II-III) stable chronic HFrEF (LVEF 35%) who are receiving GDEM, including a beta blocker at maximum tolerated dose, and who are in sinus rhythm with a heart rate of 70 bpm at rest.
Decision Variable	patients with symptomatic (NYHA class II-III) stable chronic HFrEF (LVEF 35%)
Decision Variable	who are receiving GDEM, including a beta blocker at maximum tolerated dose,
Decision Variable	who are in sinus rhythm with a heart rate of 70 bpm at rest.
Action	Ivabradine can be beneficial to reduce HF hospitalization
Reference	Empty
Reason	Empty
Strength of	

Recommendation	IIa
Quality of Evidence	B-R
Recommendation	Diuretics (see Table 15) - *Conditonal* - Diuretics are recommended in patients with HFrEF who have evidence of fluid retention, unless contraindicated, to improve symptoms.
Decision Variable	patients with HFrEF
Decision Variable	who have evidence of fluid retention
Decision Variable	not contraindicated
Action	Diuretics are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	ACE Inhibitors - *Conditonal* - ACE inhibitors are recommended in patients with HFrEF and current or prior symptoms, unless contraindicated, to reduce morbidity and mortality. (I-A)
Decision Variable	patients with HFrEF and current or prior symptoms,
Decision Variable	not contraindicated
Action	ACE inhibitors are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	ARBs - *Conditonal* - ARBs are recommended in patients with HFrEF with current or prior symptoms who are ACE inhibitor–intolerant, unless contraindicated, to reduce morbidity and mortality.
Decision Variable	patients with HFrEF with current or prior symptoms
Decision Variable	who are ACE inhibitor–intolerant
Decision Variable	not contraindicated
Action	ARBs are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	ARBs - *Conditonal* - ARBs are reasonable to reduce morbidity and mortality as alternatives to ACE inhibitors as first-line therapy for patients with HFrEF, especially for patients already taking ARBs for other indications, unless contraindicated.
Decision Variable	first-line therapy for patients with HFrEF
Decision Variable	patients already taking ARBs for other indications
Decision Variable	not contraindicated
Action	ARBs are reasonable to reduce morbidity and mortality as alternatives to ACE inhibitors
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	A
Recommendation	ARBs - *Conditonal* - Addition of an ARB may be considered in persistently symptomatic patients with HFrEF who are already being treated with an ACE inhibitor and a beta blocker in whom an aldosterone antagonist is not indicated or tolerated.
Decision Variable	persistently symptomatic patients with HFrEF
Decision Variable	who are already being treated with an ACE inhibitor and a beta blocker i
Decision Variable	an aldosterone antagonist is not indicated or tolerated.
Action	Addition of an ARB
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	A
Recommendation	ARBs - *Conditonal* - Routine combined use of an ACE inhibitor, ARB, and aldosterone antagonist is potentially harmful for patients with HFrEF.
Decision Variable	patients with HFrEF
Action	Routine combined use of an ACE inhibitor, ARB, and aldosterone antagonist is potentially harmful
Reference	Empty
Reason	Empty
Strength of	

Recommendation	III: Harm
Quality of Evidence	C
Recommendation	Beta Blockers - *Conditonal* - Use of 1 of the 3 beta blockers proven to reduce mortality (ie, bisoprolol, carvedilol, and sustained-release metoprolol succinate) is recommended for all patients with current or prior symptoms of HFrEF, unless contraindicated, to reduce morbidity and mortality.
Decision Variable	for all patients with current or prior symptoms of HFrEF,
Decision Variable	unless contraindicated
Decision Variable	Empty
Action	Use of 1 of the 3 beta blockers proven to reduce mortality (ie, bisoprolol, carvedilol, and sustained-release metoprolol succinate)
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Aldosterone Receptor Antagonists (see Table 17) - *Conditonal* - Aldosterone receptor antagonists (or mineralocorticoid receptor antagonists) are recommended in patients with NYHA class II–IV and who have LVEF of 35%, unless contraindicated, to reduce morbidity and mortality. Patients with NYHA class II should have a history of prior cardiovascular hospitalization or elevated plasma natriuretic peptide levels to be considered for aldosterone receptor antagonists. Creatinine levels should be 2.5 mg/dL in men or 2.0 mg/dL in women (or estimated glomerular filtration rate >30 mL/min/1.73 m2) 2) and potassium levels should be <5.0 mEq/L. Careful monitoring of potassium levels, renal function, and diuretic dosing should be performed at initiation and closely followed thereafter to minimize risk of hyperkalemia and renal insufficiency.
Decision Variable	patients with NYHA class II–IV
Decision Variable	and who have LVEF of 35%
Decision Variable	unless contraindicated
Decision Variable	Patients with NYHA class II should have a history of prior cardiovascular hospitalization or elevated plasma natriuretic peptide levels to be considered for aldosterone receptor antagonists.
Decision Variable	Creatinine levels should be 2.5 mg/dL in men or 2.0 mg/dL in women (or estimated glomerular filtration rate >30 mL/min/1.73 m2) 2)
Decision Variable	and potassium levels should be <5.0 mEq/L.
Action	Aldosterone receptor antagonists (or mineralocorticoid receptor antagonists)
Action	Careful monitoring of potassium levels, renal function, and diuretic dosing should be performed at initiation and closely followed thereafter to minimize risk of hyperkalemia and renal insufficiency.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Aldosterone Receptor Antagonists (see Table 17) - *Conditonal* - Aldosterone receptor antagonists are recommended to reduce morbidity and mortality following an acute MI in patients who have LVEF of 40% who develop symptoms of HF or who have a history of diabetes mellitus, unless contraindicated.
Decision Variable	following an acute MI in patients
Decision Variable	who have LVEF of 40%
Decision Variable	who develop symptoms of HF
Decision Variable	or who have a history of diabetes mellitus
Decision Variable	unless contraindicated
Action	Aldosterone receptor antagonists
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Aldosterone Receptor Antagonists (see Table 17) - *Conditonal* - Inappropriate use of aldosterone receptor antagonists is potentially harmful because of life-threatening hyperkalemia or renal insufficiency when serum creatinine is >2.5 mg/dL in men or >2.0 mg/dL in women (or estimated glomerular filtration rate <30 mL/min/1.73 m2), and/or potassium >5.0 mEq/L.
Decision Variable	patients with HFrEF
Decision Variable	serum creatinine is >2.5 mg/dL in men
Decision Variable	>2.0 mg/dL in women
Decision Variable	estimated glomerular filtration rate <30 mL/min/1.73 m2
Decision Variable	potassium >5.0 mEq/L
Action	Inappropriate use of aldosterone receptor antagonists is potentially harmful
Reference	Empty
Reason	because of life-threatening hyperkalemia or renal insufficiency
Strength of Recommendation	(III: Harm)
Quality of Evidence	B
	Hydralazine and Isosorbide Dinitrate - *Conditonal* - The combination of hydralazine and isosorbide dinitrate is recommended to reduce

Recommendation	morbidity and mortality for patients selfdescribed as African Americans with NYHA class III–IV HFrEF receiving optimal therapy with ACE inhibitors and beta blockers, unless contraindicated.
Decision Variable	patients self-described as African Americans with NYHA class III–IV HFrEF
Decision Variable	receiving optimal therapy with ACE inhibitors and beta blockers
Decision Variable	unless contraindicated
Decision Variable	Empty
Action	The combination of hydralazine and isosorbide dinitrate is recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Hydralazine and Isosorbide Dinitrate - *Conditonal* - A combination of hydralazine and isosorbide dinitrate can be useful to reduce morbidity or mortality in patients with current or prior symptomatic HFrEF who cannot be given an ACE inhibitor or ARB because of drug intolerance, hypotension, or renal insufficiency, unless contraindicated.
Decision Variable	patients with current or prior symptomatic HFrEF
Decision Variable	who cannot be given an ACE inhibitor or ARB because of drug intolerance, hypotension, or renal insufficiency,
Decision Variable	unless contraindicated
Action	A combination of hydralazine and isosorbide dinitrate can be useful
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Digoxin - *Conditonal* - Digoxin can be beneficial in patients with HFrEF, unless contraindicated, to decrease hospitalizations for HF.
Decision Variable	patients with HFrEF
Decision Variable	unless contraindicated
Action	Digoxin can be beneficial
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Anticoagulation - *Conditonal* - Patients with chronic HF with permanent/persistent/paroxysmal AF and an additional risk factor for cardioembolic stroke (history of hypertension, diabetes mellitus, previous stroke or transient ischemic attack, or 75 years of age) should receive chronic anticoagulant therapy (in the absence of contraindications to anticoagulation).
Decision Variable	Patients with chronic HF
Decision Variable	with permanent/persistent/paroxysmal AF
Decision Variable	and an additional risk factor for cardioembolic stroke (history of hypertension, diabetes mellitus, previous stroke or transient ischemic attack, or 75 years of age)
Decision Variable	(in the absence of contraindications to anticoagulation).
Action	should receive chronic anticoagulant therapy (in the absence of contraindications to anticoagulation).
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Anticoagulation - *Conditonal* - The selection of an anticoagulant agent (warfarin, dabigatran, apixaban, or rivaroxaban) for permanent/persistent/paroxysmal AF should be individualized on the basis of risk factors, cost, tolerability, patient preference, potential for drug interactions, and other clinical characteristics, including time in the international normalized ratio therapeutic range if the patient has been taking warfarin.
Decision Variable	on the basis of risk factors
Decision Variable	cost
Decision Variable	tolerability
Decision Variable	patient preference
Decision Variable	potential for drug interactions
Decision Variable	other clinical characteristics, including time in the international normalized ratio therapeutic range if the patient has been taking warfarin
Decision Variable	Empty
Decision Variable	Empty
Decision Variable	Empty
Action	individualize the selection of an anticoagulant agent (warfarin, dabigatran, apixaban, or rivaroxaban) for permanent/persistent/paroxysmal AF
Reference	Empty
Reason	Empty

Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Anticoagulation - *Conditonal* - Chronic anticoagulation is reasonable for patients with chronic HF who have permanent/persistent/paroxysmal AF but are without an additional risk factor for cardioembolic stroke (in the absence of contraindications to anticoagulation).
Decision Variable	patients with chronic HF
Decision Variable	who have permanent/persistent/paroxysmal AF
Decision Variable	but are without an additional risk factor for cardioembolic stroke
Decision Variable	in the absence of contraindications to anticoagulation
Action	Chronic anticoagulation is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Anticoagulation - *Conditonal* - Anticoagulation is NOT recommended in patients with chronic HFrEF without AF, a prior thromboembolic event, or a cardioembolic source. (III-B: No Benefit)
Decision Variable	patients with chronic HFrEF without AF
Decision Variable	a prior thromboembolic event
Decision Variable	a cardioembolic source
Action	Anticoagulation is NOT recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Statins - *Conditonal* - Statins are NOT beneficial as adjunctive therapy when prescribed solely for the diagnosis of HF in the absence of other indications for their use.
Decision Variable	Statins are prescribed solely for the diagnosis of HF in the absence of other indications for their use
Action	Statins are NOT beneficial as adjunctive therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	A
Recommendation	Omega-3 Fatty Acids - *Conditonal* - Omega-3 polyunsaturated fatty acid (PUFA) supplementation is reasonable to use as adjunctive therapy in patients with NYHA class II–IV symptoms and HFrEF or HFpEF, unless contraindicated, to reduce mortality and cardiovascular hospitalizations.
Decision Variable	patients with NYHA class II–IV symptoms
Decision Variable	HFrEF
Decision Variable	or HFpEF
Decision Variable	unless contraindicated,
Action	Omega-3 polyunsaturated fatty acid (PUFA) supplementation is reasonable to use as adjunctive therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Drugs of Unproven Value or That May Worsen HF - *Conditonal* - Nutritional supplements as treatment for HF are NOT recommended in patients with current or prior symptoms of HFrEF.
Decision Variable	patients with current or prior symptoms of HFrEF
Action	Nutritional supplements as treatment for HF are NOT recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	(III: No Benefit)
Quality of Evidence	B
Recommendation	Drugs of Unproven Value or That May Worsen HF - *Conditonal* - Hormonal therapies other than to correct deficiencies are NOT recommended for patients with current or prior symptoms of HFrEF.
Decision Variable	patients with current or prior symptoms of HFrEF
Action	Hormonal therapies other than to correct deficiencies are NOT recommended
Reference	Empty

Reason	Empty
Strength of Recommendation	(III: No Benefit)
Quality of Evidence	C
Recommendation	Drugs of Unproven Value or That May Worsen HF - *Conditonal* - Drugs known to adversely affect the clinical status of patients with current or prior symptoms of HFrEF are potentially harmful and should be avoided or withdrawn whenever possible (eg, most antiarrhythmic drugs, most calcium channel–blocking drugs [except amlodipine], nonsteroidal anti-inflammatory drugs, or thiazolidinediones).
Decision Variable	patients with current or prior symptoms of HFrEF
Action	Drugs known to adversely affect the clinical status are potentially harmful and should be avoided or withdrawn whenever possible
Reference	Empty
Reason	Empty
Strength of Recommendation	(III: Harm)
Quality of Evidence	B
Recommendation	Drugs of Unproven Value or That May Worsen HF - *Conditonal* - Long-term use of infused positive inotropic drugs is potentially harmful for patients with HFrEF, except as palliation for patients with end-stage disease who cannot be stabilized with standard medical treatment (see recommendations for stage D starting on page 34).
Decision Variable	patients with HFrEF
Action	Long-term use of infused positive inotropic drugs is potentially harmful except as palliation for patients with end-stage disease who cannot be stabilized with standard medical treatment
Reference	Empty
Reason	Empty
Strength of Recommendation	(III: Harm)
Quality of Evidence	C
Recommendation	Calcium Channel Blockers - *Conditonal* - Calcium channel–blocking drugs are NOT recommended as routine treatment for patients with HFrEF.
Decision Variable	patients with HFrEF.
Action	Calcium channel–blocking drugs are NOT recommended as routine treatment
Reference	Empty
Reason	Empty
Strength of Recommendation	(III: No Benefit)
Quality of Evidence	A
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - Systolic and diastolic blood pressure should be controlled in patients with HFpEF in accordance with published clinical practice guidelines to prevent morbidity.
Decision Variable	patients with HFpEF
Action	Systolic and diastolic blood pressure should be controlled
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - Diuretics should be used for relief of symptoms due to volume overload in patients with HFpEF.
Decision Variable	patients with HFpEF
Action	Diuretics should be used for relief of symptoms due to volume overload
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - Coronary revascularization is reasonable in patient with CAD in whom symptoms (angina) or demonstrable myocardial ischemia is judged to be having an adverse effect on symptomatic HFpEF despite GDMT.
Decision Variable	patient with CAD in whom symptoms (angina) or demonstrable myocardial ischemia is judged to be having an adverse effect on symptomatic HFpEF despite GDMT
Action	Coronary revascularization is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - Management of AF according to published

Recommendation	clinical practice guidelines in patients with HFpEF is reasonable to improve symptomatic HF.
Decision Variable	patients with HFpEF
Action	Management of AF according to published clinical practice guidelines is reasonable to improve symptomatic HF
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - The use of beta-blocking agents, ACE inhibitors, and ARBs in patients with hypertension is reasonable to control blood pressure in patients with HFpEF.
Decision Variable	patients with hypertension
Decision Variable	patients with HFpEF
Action	use beta-blocking agents
Action	use ACE inhibitors
Action	use ARBs
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - In appropriately selected patients with HFpEF (with EF 45%, elevated BNP levels or HF admission within 1 year, estimated glomerular filtration rate >30 mL/min, creatinine <2.5 mg/dL, potassium <5.0 mEq/L), aldosterone receptor antagonists might be considered to decrease hospitalizations.
Decision Variable	In appropriately selected patients
Decision Variable	with EF 45%
Decision Variable	, elevated BNP levels
Decision Variable	or HF admission within 1 year
Decision Variable	, estimated glomerular filtration rate >30 mL/min,
Decision Variable	creatinine <2.5 mg/dL, potassium <5.0 mEq/L),
Action	aldosterone receptor antagonists might be considered to decrease hospitalizations.
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B-R
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - The use of ARBs might be considered to decrease hospitalizations for patients with HFpEF.
Decision Variable	for patients with HFpEF
Action	use of ARBs might be considered to decrease hospitalizations
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - Routine use of nitrates or phosphodiesterase-5 inhibitors to increase activity or QoL in patients with HFpEF is ineffective.
Decision Variable	patients with HFpEF
Action	Routine use of nitrates or phosphodiesterase-5 inhibitors to increase activity or QoL is ineffective
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	B-R
Recommendation	Pharmacological Treatment for Stage C HFpEF: Recommendations (2017) - *Conditonal* - Routine use of nutritional supplements is not recommended for patients with HFpEF.
Decision Variable	patients with HFpEF
Action	Routine use of nutritional supplements is not recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	C
	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - ICD therapy is recommended for primary prevention of sudden cardiac

Recommendation	death (SCD) to reduce total mortality in selected patients with nonischemic DCM or ischemic heart disease 40 days post-MI with LVEF of 35% and NYHA class II or III symptoms on chronic GDMT, who have a reasonable expectation of meaningful survival for >1 year.a .a (I-A)
Decision Variable	selected patients with nonischemic DCM
Decision Variable	or ischemic heart disease 40 days
Decision Variable	post-MI
Decision Variable	with LVEF of 35%
Decision Variable	and NYHA class II or III symptoms
Decision Variable	on chronic GDMT
Decision Variable	, who have a reasonable expectation of meaningful survival for >1 year
Action	ICD therapy is recommended for primary prevention of sudden cardiac death to reduce total mortality
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	A
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - Cardiac resynchronization therapy is indicated for patients who have LVEF of 35% or less, sinus rhythm, left bundle-branch block (LBBB) with a QRS duration of 150 ms or greater, and NYHA class II, III, or ambulatory class IV symptoms on GDMT.
Decision Variable	patients who have LVEF of 35% or less
Decision Variable	sinus rhythm
Decision Variable	left bundle-branch block with a QRS duration of 150 ms or greater
Decision Variable	NYHA class II, III, or ambulatory class IV symptoms
Decision Variable	on GDMT
Action	Cardiac resynchronization therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	(I-A for NYHA class III/ IV; I-B for NYHA class II)
Quality of Evidence	(I-A for NYHA class III/ IV; I-B for NYHA class II)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - ICD therapy is recommended for primary prevention of SCD to reduce total mortality in selected patients at least 40 days post-MI with LVEF of 30% or less and NYHA class I symptoms while receiving GDMT, who have a reasonable expectation of meaningful survival for more than 1 year.
Decision Variable	selected patients at least 40 days post-MI
Decision Variable	with LVEF of 30% or less
Decision Variable	NYHA class I symptoms while receiving GDMT
Decision Variable	who have a reasonable expectation of meaningful survival for more than 1 year
Action	ICD therapy is recommended for primary prevention of SCD to reduce total mortality
Reference	Empty
Reason	Empty
Strength of Recommendation	(I-B)
Quality of Evidence	(I-B)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT can be useful for patients who have LVEF of 35% , sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms, and NYHA class III/ambulatory class IV symptoms on GDMT.
Decision Variable	patients who have LVEF of 35%
Decision Variable	sinus rhythm
Decision Variable	a non-LBBB pattern with a QRS duration of 150 ms
Decision Variable	NYHA class III/ambulatory class IV symptoms on GDMT
Action	CRT can be useful
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	A
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT can be useful for patients who have LVEF of 35%, sinus rhythm, LBBB with a QRS duration of 120–149 ms, and NYHA class II, III, or ambulatory class IV symptoms on GDMT.
Decision Variable	patients who have LVEF of 35%
Decision Variable	sinus rhythm
Decision Variable	LBBB with a QRS duration of 120–149 ms
Decision Variable	NYHA class II, III, or ambulatory class IV symptoms on GDMT
Action	CRT can be useful
Reference	Empty

Reason	Empty
Strength of Recommendation	(IIa-B)
Quality of Evidence	(IIa-B)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT can be useful in patients with AF and LVEF of 35% on GDMT if a) the patient requires ventricular pacing or otherwise meets CRT criteria and b) atrioventricular nodal ablation or pharmacological rate control will allow near 100% ventricular pacing with CRT.
Decision Variable	patients with AF and LVEF of 35% on GDMT
Decision Variable	patient requires ventricular pacing or otherwise meets CRT criteria
Decision Variable	atrioventricular nodal ablation or pharmacological rate control will allow near 100% ventricular pacing with CRT
Decision Variable	Empty
Action	CRT can be useful
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT can be useful for patients on GDMT who have LVEF of 35% and are undergoing placement of a new or replacement device with anticipated requirement for significant (>40%) ventricular pacing.
Decision Variable	patients on GDMT
Decision Variable	who have LVEF of 35%
Decision Variable	undergoing placement of a new or replacement device with anticipated requirement for significant (>40%) ventricular pacing.
Decision Variable	Empty
Action	CRT can be useful
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - The usefulness of implantation of an ICD is of uncertain benefit to prolong meaningful survival in patients with a high risk of nonsudden death as predicted by frequent hospitalizations, advanced frailty, or comorbidities such as systemic malignancy or severe renal dysfunction.
Decision Variable	patients with a high risk of nonsudden death as predicted by frequent hospitalizations, advanced frailty, or comorbidities such as systemic malignancy or severe renal dysfunction.
Action	The usefulness of implantation of an ICD is of uncertain benefit to prolong meaningful survival
Reference	Empty
Reason	Empty
Strength of Recommendation	(IIb-B)
Quality of Evidence	(IIb-B)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT may be considered for patients who have LVEF of 35%, sinus rhythm, a non-LBBB pattern with a QRS duration of 120–149 ms, and NYHA class III/ambulatory class IV on GDMT.
Decision Variable	patients who have LVEF of 35%
Decision Variable	sinus rhythm
Decision Variable	a non-LBBB pattern with a QRS duration of 120–149 ms
Decision Variable	and NYHA class III/ambulatory class IV on GDMT
Action	CRT may be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	(IIb-B)
Quality of Evidence	(IIb-B)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT may be considered for patients who have LVEF of 35%, sinus rhythm, a non-LBBB pattern with a QRS duration of 150 ms, and NYHA class II symptoms on GDMT.
Decision Variable	patients who have LVEF of 35%
Decision Variable	sinus rhythm
Decision Variable	a non-LBBB pattern with a QRS duration of 150 ms
Decision Variable	NYHA class II symptoms on GDMT
Action	CRT may be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	(IIb-B)

Quality of Evidence	(IIb-B)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT may be considered for patients who have LVEF of 30%, ischemic etiology of HF, sinus rhythm, LBBB with a QRS duration of 150 ms, and NYHA class I symptoms on GDMT.
Decision Variable	patients who have LVEF of 30%
Decision Variable	ischemic etiology of HF
Decision Variable	sinus rhythm
Decision Variable	LBBB with a QRS duration of 150 ms
Decision Variable	NYHA class I symptoms on GDMT
Action	CRT may be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	(IIb-C)
Quality of Evidence	(IIb-C)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT is NOT recommended for patients with NYHA class I or II symptoms and non-LBBB pattern with a QRS duration of <150 ms.
Decision Variable	patients with NYHA class I or II symptoms
Decision Variable	non-LBBB pattern with a QRS duration of <150 ms
Action	CRT is NOT recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	(III-B: No Benefit)
Quality of Evidence	(III-B: No Benefit)
Recommendation	Device Therapy for Stage C HFrEF (see Table 20) - *Conditonal* - CRT is NOT indicated for patients whose comorbidities and/or frailty limit survival with good functional capacity to <1 year.
Decision Variable	patients whose comorbidities and/or frailty limit survival with good functional capacity to <1 year
Action	CRT is NOT indicated
Reference	Empty
Reason	Empty
Strength of Recommendation	(III-C: No Benefit)
Quality of Evidence	C
Recommendation	Water Restriction - *Conditonal* - Fluid restriction (1.5–2 L/d) is reasonable in stage D, especially in patients with hyponatremia, to reduce congestive symptoms.
Decision Variable	especially in patients with hyponatremia
Decision Variable	in stage D
Action	Fluid restriction (1.5–2 L/d) is reasonable to reduce congestive symptoms
Reference	Empty
Reason	Empty
Strength of Recommendation	(IIa-C)
Quality of Evidence	(IIa-C)
Recommendation	Inotropic Support (see Tables 23 and 24) - *Conditonal* - Until definitive therapy (eg, coronary revascularization, MCS, heart transplantation) or resolution of the acute precipitating problem, patients with cardiogenic shock should receive temporary intravenous inotropic support to maintain systemic perfusion and preserve endorgan performance.
Decision Variable	Until definitive therapy (eg, coronary revascularization, MCS, heart transplantation)
Decision Variable	or resolution of the acute precipitating problem,
Decision Variable	patients with cardiogenic shock
Action	should receive temporary intravenous inotropic support
Reference	Empty
Reason	Empty
Strength of Recommendation	(I-C)
Quality of Evidence	(I-C)
Recommendation	Inotropic Support (see Tables 23 and 24) - *Conditonal* - Continuous intravenous inotropic support is reasonable as “bridge therapy” in patients with stage D HF refractory to GDMT and device therapy who are eligible for and awaiting MCS or cardiac transplantation.
Decision Variable	patients with stage D HF
Decision Variable	refractory to GDMT and device therapy
Decision Variable	who are eligible for and awaiting MCS or cardiac transplantation.
Action	Continuous intravenous inotropic support is reasonable as “bridge therapy”
Reference	Empty
Reason	Empty

Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Inotropic Support (see Tables 23 and 24) - *Conditonal* - Short-term, continuous intravenous inotropic support may be reasonable in those hospitalized patients presenting with documented severe systolic dysfunction who present with low blood pressure and significantly depressed cardiac output to maintain systemic perfusion and preserve end-organ performance.
Decision Variable	hospitalized patients
Decision Variable	presenting with documented severe systolic dysfunction
Decision Variable	who present with low blood pressure
Decision Variable	significantly depressed cardiac output to maintain systemic perfusion and preserve end-organ performance
Decision Variable	Empty
Action	Short-term, continuous intravenous inotropic support may be reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Inotropic Support (see Tables 23 and 24) - *Conditonal* - Long-term, continuous intravenous inotropic support may be considered as palliative therapy for symptom control in select patients with stage D HF despite optimal GDMT and device therapy who are not eligible for either MCS or cardiac transplantation.
Decision Variable	select patients with stage D HF despite optimal GDMT and device therapy
Decision Variable	who are not eligible for either MCS or cardiac transplantation.
Action	Long-term, continuous intravenous inotropic support may be considered as palliative therapy for symptom control
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Inotropic Support (see Tables 23 and 24) - *Conditonal* - Long-term use of either continuous or intermittent, intravenous parenteral positive inotropic agents, in the absence of specific indications or for reasons other than palliative care, is potentially harmful in the patient with HF.
Decision Variable	patient with HF
Decision Variable	in the absence of specific indications or for reasons other than palliative care
Action	Long-term use of either continuous or intermittent, intravenous parenteral positive inotropic agents is potentially harmful
Reference	Empty
Reason	Empty
Strength of Recommendation	(III: Harm)
Quality of Evidence	B
Recommendation	Inotropic Support (see Tables 23 and 24) - *Conditonal* - Use of parenteral inotropic agents in hospitalized patients without documented severe systolic dysfunction, low blood pressure, or impaired perfusion, and evidence of significantly depressed cardiac output, with or without congestion, is potentially harmful.
Decision Variable	hospitalized patients
Decision Variable	without documented severe systolic dysfunction,
Decision Variable	low blood pressure
Decision Variable	or impaired perfusion
Decision Variable	and evidence of significantly depressed cardiac output, with or without congestion
Action	Use of parenteral inotropic agents is potentially harmful
Reference	Empty
Reason	Empty
Strength of Recommendation	(III: Harm)
Quality of Evidence	B
Recommendation	Mechanical Circulatory Support - *Conditonal* - MCS is beneficial in carefully selected patients with stage D HFrEF in whom definitive management (eg, cardiac transplantation) or cardiac recovery is anticipated or planned.
Decision Variable	carefully selected patients with stage D HFrEF
Decision Variable	in whom definitive management (eg, cardiac transplantation) or cardiac recovery is anticipated or planned
Action	MCS is beneficial
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
	Mechanical Circulatory Support - *Conditonal* - Nondurable MCS, including the use of percutaneous and extracorporeal ventricular assist

Recommendation	devices, is reasonable as a “bridge to recovery” or a “bridge to decision” for carefully selecteda HFrEF a H patients with acute, profound hemodynamic compromise.
Decision Variable	carefully selected HFrEF patients
Decision Variable	with acute, profound hemodynamic compromise
Action	Nondurable MCS, including the use of percutaneous and extracorporeal ventricular assist devices, is reasonable as a “bridge to recovery” or a “bridge to decision”
Reference	Empty
Reason	Empty
Strength of Recommendation	(IIa-B)
Quality of Evidence	B
Recommendation	Mechanical Circulatory Support - *Conditonal* - Durable MCS is reasonable to prolong survival for carefully selecteda a patients with stage D HFrEF.
Decision Variable	carefully selected a patients with stage D HFrEF
Action	Durable MCS is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Cardiac Transplantation - *Conditonal* - Evaluation for cardiac transplantation is indicated for carefully selected patients with stage D HF despite GDMT, device, and surgical management.
Decision Variable	carefully selected patients
Decision Variable	with stage D HF
Decision Variable	GDMT
Decision Variable	device management
Decision Variable	surgical management
Action	Evaluation for cardiac transplantation is indicated
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Precipitating Causes of Decompensated HF - *Conditonal* - ACS precipitating acute HF decompensation should be promptly identified by ECG and serum biomarkers, including cardiac troponin testing, and treated optimally as appropriate to the overall condition and prognosis of the patient.
Decision Variable	patient with ACS precipitating acute HF decompensation
Action	should be promptly identified by ECG and serum biomarkers, including cardiac troponin testing,
Action	and treated optimally as appropriate to the overall condition and prognosis of the patient.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Precipitating Causes of Decompensated HF - *Conditonal* - Common precipitating factors for acute HF should be considered during initial evaluation, as recognition of these conditions is critical to guide appropriate therapy.
Decision Variable	during initial evaluation
Action	common precipitating factors for acute HF should be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Maintenance of GDMT During Hospitalization - *Conditonal* - In patients with HFrEF experiencing a symptomatic exacerbation of HF requiring hospitalization during chronic maintenance treatment with GDMT, it is recommended that GDMT be continued in the absence of hemodynamic instability or contraindications.
Decision Variable	In patients with HFrEF
Decision Variable	experiencing a symptomatic exacerbation of HF requiring hospitalization during chronic maintenance treatment with GDMT
Action	it is recommended that GDMT be continued in the absence of hemodynamic instability or contraindications.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B

Recommendation	Maintenance of GDMT During Hospitalization - *Conditonal* - Initiation of beta-blocker therapy is recommended after optimization of volume status and successful discontinuation of intravenous diuretics, vasodilators, and inotropic agents. Beta-blocker therapy should be initiated at a low dose and only in stable patients.
Decision Variable	after optimization of volume status
Decision Variable	successful discontinuation of intravenous diuretics
Decision Variable	successful discontinuation of vasodilators
Decision Variable	successful discontinuation of inotropic agents
Decision Variable	only in stable patient
Action	Initiation of beta-blocker therapy at a low dose is recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Maintenance of GDMT During Hospitalization - *Conditonal* - Caution should be used when initiating the use of beta blockers in patients who have required inotropes during their hospital course.
Decision Variable	patients who have required inotropes during their hospital course.
Action	Caution should be used when initiating the use of beta blockers
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Diuretics in Hospitalized Patients: Recommendations - *Conditonal* - Patients with HF admitted with evidence of significant fluid overload should be promptly treated with intravenous loop diuretics to reduce morbidity.
Decision Variable	Patients with HF
Decision Variable	admitted with evidence of significant fluid overload
Action	should be promptly treated with intravenous loop diuretics
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Diuretics in Hospitalized Patients: Recommendations - *Conditonal* - If patients are already receiving loop diuretic therapy, the initial intravenous dose should equal or exceed their chronic oral daily dose
Decision Variable	patients are receiving loop diuretic therapy
Action	the initial intravenous dose should equal or exceed their chronic oral daily dose
Action	should be given as either intermittent boluses or continuous infusion.
Action	Urine output and signs and symptoms of congestion should be serially assessed,
Action	and the diuretic dose should be adjusted accordingly to relieve symptoms, reduce volume excess, and avoid hypotension.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Diuretics in Hospitalized Patients: Recommendations - *Conditonal* - The effect of HF treatment should be monitored with careful measurement of fluid intake and output, vital signs, body weight that is determined at the same time each day, and clinical signs and symptoms of systemic perfusion and congestion. Daily serum electrolytes, urea nitrogen, and creatinine concentrations should be measured during the use of intravenous diuretics or active titration of HF medications.
Decision Variable	patients with HF
Action	The effect of HF treatment should be monitored with careful measurement of fluid intake and output, vital signs, body weight that is determined at the same time each day, and clinical signs and symptoms of systemic perfusion and congestion
Action	Daily serum electrolytes, urea nitrogen, and creatinine concentrations should be measured during the use of intravenous diuretics or active titration of HF medications.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Diuretics in Hospitalized Patients: Recommendations - *Conditonal* - When diuresis is inadequate to relieve symptoms, it is reasonable to intensify the diuretic regimen using either: a. Higher doses of intravenous loop diuretics (IIa-B), or b. Addition of a second (eg, thiazide) diuretic (IIa-B).
Decision Variable	When diuresis is inadequate to relieve symptoms
Action	it is reasonable to intensify the diuretic regimen using higher doses of intravenous loop diuretics
Action	it is reasonable to intensify the diuretic regimen using addition of a second (eg, thiazide) diuretic

Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Diuretics in Hospitalized Patients: Recommendations - *Conditonal* - Low-dose dopamine infusion may be considered in addition to loop diuretic therapy to improve diuresis and better preserve renal functio and renal blood flow.
Decision Variable	improve diuresis and better preserve renal functio and renal blood flow
Action	Low-dose dopamine infusion may be considered in addition to loop diuretic therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Renal Replacement Therapy—Ultrafiltration - *Conditonal* - Ultrafiltration may be considered for patients with obvious volume overload to alleviate congestive symptoms and fluid weight.
Decision Variable	patients with obvious volume overload
Action	Ultrafiltration may be considered to alleviate congestive symptoms and fluid weight
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Renal Replacement Therapy—Ultrafiltration - *Conditonal* - Ultrafiltration may be considered for patients with refractory congestion not responding to medical therapy.
Decision Variable	patients with refractory congestion not responding to medical therapy.
Action	Ultrafiltration may be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	C
Recommendation	Parenteral Therapy in Hospitalized HF - *Conditonal* - If symptomatic hypotension is absent, intravenous nitroglycerin, nitroprusside, or nesiritide may be considered as an adjuvant to diuretic therapy for relief of dyspnea in patients admitted with acute decompensated HF.
Decision Variable	symptomatic hypotension is absent
Decision Variable	patients admitted with acute decompensated HF
Action	intravenous nitroglycerin, nitroprusside, or nesiritide may be considered as an adjuvant to diuretic therapy for relief of dyspnea
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	A
Recommendation	Venous Thromboembolism Prophylaxis in Hospitalized Patients - *Conditonal* - A patient admitted to the hospital with decompensated HF should receive venous thromboembolism prophylaxis with an anticoagulant medication if the risk–benefit ratio is favorable.
Decision Variable	A patient admitted to the hospital with decompensated HF
Action	should receive venous thromboembolism prophylaxis with an anticoagulant medication
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Arginine Vasopressin Antagonists - *Conditonal* - In patients hospitalized with volume overload, including HF, who have persistent severe hyponatremia and are at risk for or having active cognitive symptoms despite water restriction and maximization of GDMT, vasopressin antagonists may be considered in the short term to improve serum sodium concentration in hypervolemic, hyponatremic states with either a V2 receptor–selective or a nonselective vasopressin antagonist.
Decision Variable	patients hospitalized with volume overload, including HF
Decision Variable	who have persistent severe hyponatremia
Decision Variable	are at risk for or having active cognitive symptoms despite water restriction and maximization of GDMT
Action	vasopressin antagonists may be considered in the short term to improve serum sodium concentration in hypervolemic, hyponatremic states with either a V2 receptor–selective or a nonselective vasopressin antagonist
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb

Quality of Evidence	B
Recommendation	Inpatient and Transitions of Care - *Conditonal* - The use of performance improvement systems and/or evidence-based systems of care is recommended in the hospital and early postdischarge outpatient setting to identify appropriate HF patients for GDMT, provide clinicians with useful reminders to advance GDMT, and assess the clinical response.
Decision Variable	identify appropriate HF patients for GDMT
Decision Variable	provide clinicians with useful reminders to advance GDMT
Decision Variable	assess the clinical response
Action	The use of performance improvement systems and/or evidence-based systems of care is recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Inpatient and Transitions of Care - *Conditonal* - Throughout the hospitalization as appropriate, before hospital discharge, at the first postdischarge visit, and in subsequent follow-up visits, the following should be addressed (I-B): 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 h. Consideration for palliative care or hospice care in selected patients
Decision Variable	Throughout the hospitalization as appropriate,
Decision Variable	before hospital discharge,
Decision Variable	at the first postdischarge visit
Decision Variable	in subsequent follow-up visits
Action	Initiation of GDMT if not previously established and not contraindicated b.
Action	Precipitant causes of HF, barriers to optimal care transitions, and limitations in postdischarge support c.
Action	Assessment of volume status and supine/upright hypotension with adjustment of HF therapy, as appropriate
Action	Titration and optimization of chronic oral HF therapy
Action	Assessment of renal function and electrolytes, where appropriate
Action	Assessment and management of comorbid conditions
Action	Reinforcement of HF education, self-care, emergency plans, and need for adherence
Action	Consideration for palliative care or hospice care in selected patients
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Inpatient and Transitions of Care - *Conditonal* - Multidisciplinary HF disease-management programs are recommended for patients at high risk for hospital readmission, to facilitate the implementation of GDMT, to address different barriers to behavioral change, and to reduce the risk of subsequent rehospitalization for HF.
Decision Variable	for patients at high risk for hospital readmission
Action	Multidisciplinary HF disease-management programs are recommended
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Inpatient and Transitions of Care - *Conditonal* - Scheduling an early follow-up visit (within 7–14 days) and early telephone follow-up (within 3 days) of hospital discharge is reasonable.
Decision Variable	(within 3 days) of hospital discharge
Action	Scheduling an early follow-up visit (within 7–14 days) and early telephone follow-up
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Inpatient and Transitions of Care - *Conditonal* - Use of clinical risk-prediction tools and/or biomarkers to identify patients at higher risk for postdischarge clinical events is reasonable.
Decision Variable	identify patients at higher risk for postdischarge clinical events
Action	Use of clinical risk-prediction tools and/or biomarkers
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa

Quality of Evidence	B
Recommendation	Table 28. Anemia: Recommendations (2017) - *Conditonal* - In patients with NYHA class II and III HF and iron deficiency (ferritin <100 ng/mL or 100–300 ng/mL if transferrin saturation is <20%), intravenous iron replacement might be reasonable to improve functional status and QoL.
Decision Variable	patients with NYHA class II and III HF and iron deficiency (ferritin <100 ng/mL or 100–300 ng/mL if transferrin saturation is <20%)
Action	intravenous iron replacement might be reasonable to improve functional status and QoL
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B-R
Recommendation	Table 28. Anemia: Recommendations (2017) - *Conditonal* - In patients with HF and anemia, erythropoietin-stimulating agents should not be used to improve morbidity and mortality.
Decision Variable	patients with HF and anemia
Action	erythropoietin-stimulating agents should not be used to improve morbidity and mortality
Reference	Empty
Reason	Empty
Strength of Recommendation	III: No Benefit
Quality of Evidence	B-R
Recommendation	Table 30. Treating Hypertension to Reduce the Incidence of HF: Recommendation (2017) - *Conditonal* - In patients at increased risk, stage A HF, the optimal blood pressure in those with hypertension should be <130/80 mm Hg.
Decision Variable	In patients at increased risk, stage A HF
Decision Variable	in those with hypertension
Action	the optimal blood pressure should be <130/80 mm Hg.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B-R
Recommendation	Table 31. Recommendation for Hypertension in Stage C HFrEF (2017) - *Conditonal* - Patients with HFrEF and hypertension should be prescribed GDMT titrated to attain systolic blood pressure <130 mm Hg.
Decision Variable	Patients with HFrEF
Decision Variable	and hypertension
Action	should be prescribed GDMT titrated to attain systolic blood pressure <130 mm Hg.
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C-EO
Recommendation	Table 32. Treating Hypertension in Stage C HFpEF: Recommendation (2017) - *Conditonal* - Patients with HFpEF and persistent hypertension after management of volume overload should be prescribed GDMT titrated to attain systolic blood pressure <130 mm Hg
Decision Variable	Patients with HFpEF
Decision Variable	persistent hypertension after management of volume overload
Action	should be prescribed GDMT titrated to attain systolic blood pressure <130 mm Hg
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C-LD
Recommendation	Table 33. Sleep Disordered Breathing: Recommendations (2017) - *Conditonal* - In patients with NYHA class II–IV HF and suspicion of sleep disordered breathing or excessive daytime sleepiness, a formal sleep assessment is reasonable
Decision Variable	In patients with NYHA class II–IV HF
Decision Variable	and suspicion of sleep disordered breathing
Decision Variable	or excessive daytime sleepiness,
Action	a formal sleep assessment is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	C-LD
Recommendation	Table 33. Sleep Disordered Breathing: Recommendations (2017) - *Conditonal* - In patients with cardiovascular disease and obstructive sleep apnea, CPAP may be reasonable to improve sleep quality and daytime sleepiness

Decision Variable	In patients with cardiovascular disease
Decision Variable	obstructive sleep apnea
Action	continuous positive airway pressure may be reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B-R
Recommendation	Table 33. Sleep Disordered Breathing: Recommendations (2017) - *Conditonal* - In patients with NYHA class II–IV HFrEF and central sleep apnea, adaptive servo-ventilation causes harm
Decision Variable	In patients with NYHA class II–IV HFrEF
Decision Variable	central sleep apnea
Action	adaptive servo-ventilation causes harm
Reference	Empty
Reason	Empty
Strength of Recommendation	III: Harm
Quality of Evidence	B-R
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - Coronary artery revascularization via coronary artery bypass graft (CABG) or percutaneous intervention is indicated for patients (HFpEF and HFrEF) on GDMT with angina and suitable coronary anatomy, especially for a left main stenosis (>50%) or left main–equivalent disease. (I-C)
Decision Variable	patients (HFpEF and HFrEF) on GDMT
Decision Variable	with angina
Decision Variable	suitable coronary anatomy, especially for a left main stenosis (>50%) or left main–equivalent disease
Action	Coronary artery revascularization via coronary artery bypass graft
Action	or percutaneous intervention
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - Coronary artery revascularization via coronary artery bypass graft to improve survival is reasonable in patients with mild to moderate LV systolic dysfunction (EF 35%–50%) and significant (70% diameter stenosis) multivessel CAD or proximal left anterior descending (LAD) coronary artery stenosis when viable myocardium is present in the region of intended revascularization. (IIa-B)
Decision Variable	patients with mild to moderate LV systolic dysfunction (EF 35%–50%)
Decision Variable	and significant (70% diameter stenosis) multivessel coronary artery disease
Decision Variable	or proximal left anterior descending coronary artery stenosis when viable myocardium is present in the region of intended revascularization.
Action	Coronary artery revascularization via coronary artery bypass graft to improve survival is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	Empty
Quality of Evidence	Empty
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - CABG or medical therapy is reasonable to improve morbidity and cardiovascular mortality for patients with severe LV dysfunction (EF <35%), HF, and significant CAD.
Decision Variable	patients with severe LV dysfunction (EF <35%)
Decision Variable	heart failure
Decision Variable	significant coronary artery disease
Action	coronary artery bypass graft
Action	medical therapy
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - Surgical aortic valve replacement is reasonable for patients with critical aortic stenosis and a predicted surgical mortality of <10%. (IIa-B)
Decision Variable	patients with critical aortic stenosis
Decision Variable	and a predicted surgical mortality of <10%.
Action	Surgical aortic valve replacement is reasonable
Reference	Empty
Reason	Empty

Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - Transcatheter aortic valve replacement after careful candidate consideration is reasonable for patients with critical aortic stenosis who are deemed inoperable. (IIa-B)
Decision Variable	patients with critical aortic stenosis
Decision Variable	who are deemed inoperable
Action	Transcatheter aortic valve replacement after careful candidate consideration is reasonable
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - CABG may be considered with the intent of improving survival in patients with ischemic heart disease with severe LV systolic dysfunction (EF <35%) and operable coronary anatomy whether or not viable myocardium is present. (IIb-B)
Decision Variable	patients with ischemic heart disease with severe LV systolic dysfunction (EF <35%)
Decision Variable	and operable coronary anatomy whether or not viable myocardium is present.
Action	coronary artery bypass graft may be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - Transcatheter mitral valve repair or mitral valve surgery for functional mitral insufficiency is of uncertain benefit and should only be considered after careful candidate selection and with a background of GDMT.
Decision Variable	after careful candidate selection
Decision Variable	and with a background of GDMT.
Action	Transcatheter mitral valve repair or mitral valve surgery for functional mitral insufficiency is of uncertain benefit and should only be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Surgical/Percutaneous/Transcatheter Interventional Treatments of HF - *Conditonal* - Surgical reverse remodeling or LV aneurysmectomy may be considered in carefully selected patients with HFrEF for specific indications including intractable HF and ventricular arrhythmias.
Decision Variable	carefully selected patients with HFrEF for specific indications including intractable HF and ventricular arrhythmias.
Action	Surgical reverse remodeling
Action	or LV aneurysmectomy may be considered
Reference	Empty
Reason	Empty
Strength of Recommendation	IIb
Quality of Evidence	B
Recommendation	Coordinating Care for Patients With Chronic HF - *Conditonal* - Effective systems of care coordination with special attention to care transitions should be deployed for every patient with chronic HF that facilitate and ensure effective care that is designed to achieve GDMT and prevent hospitalization.
Decision Variable	every patient with chronic HF that facilitate and ensure effective care that is designed to achieve GDMT and prevent hospitalization
Action	Effective systems of care coordination with special attention to care transitions should be deployed
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Coordinating Care for Patients With Chronic HF - *Conditonal* - Every patient with HF should have a clear, detailed, and evidencebased plan of care that ensures the achievement of GDMT goals, effective management of comorbid conditions, timely follow-up with the healthcare team, appropriate dietary and physical activities, and compliance with secondary prevention guidelines for cardiovascular disease. This plan of care should be updated regularly and made readily available to all members of each patient’s healthcare team. (I-C)
Decision Variable	patient with HF
Action	should have a clear, detailed, and evidencebased plan of care
Action	should be updated regularly a
Action	made readily available to all members of each patient’s healthcare team

Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	C
Recommendation	Coordinating Care for Patients With Chronic HF - *Conditonal* - Palliative and supportive care is effective for patients with symptomatic advanced HF to improve quality of life. (I-B)
Decision Variable	patients with symptomatic advanced HF
Action	Palliative and supportive care is effective
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Quality Metrics/Performance Measures - *Conditonal* - Performance measures based on professionally developed clinical practice guidelines should be used with the goal of improving quality of care for HF.
Decision Variable	patient with HF
Action	Performance measures based on professionally developed clinical practice guidelines should be used with the goal of improving quality of care .
Reference	Empty
Reason	Empty
Strength of Recommendation	I
Quality of Evidence	B
Recommendation	Quality Metrics/Performance Measures - *Conditonal* - Participation in quality improvement programs and patient registries based on nationally endorsed, clinical practice guideline–based quality and performance measures can be beneficial in improving quality of HF care.
Decision Variable	in improving quality of HF care.
Action	Participation in quality improvement programs and patient registries based on nationally endorsed, clinical practice guideline–based quality and performance measures can be beneficial
Reference	Empty
Reason	Empty
Strength of Recommendation	IIa
Quality of Evidence	B
(15) Potential benefits and harms	*Describe anticipated benefits and potential risks associated with implementation of guideline recommendations.*
Health Outcomes	Empty
Cost Analysis	Empty
Description of Harms and Benefits	Empty
Quantification of Harms and Benefits	Empty
Alternative Practices Risks	Empty
(16) Patient preferences	*Describe the role of patient preferences when a recommendation involves a substantial element of personal choice or values.*
Role of Patient Preferences	Empty
(17) Algorithm	*Provide (when appropriate) a graphical description of the stages. and decisions in clinical care described by the guideline.*
Algorithm	Empty
Action Steps	Empty
Conditional Steps	Empty
Alternative Steps	Empty
Synchronization Step	Empty
(18) Implementation considerations	*Describe anticipated barriers to application of the recommendations. Provide reference to any auxiliary documents for providers or patients that are intended to facilitate implementation. Suggest review criteria for measuring changes in care when the guideline is implemented.*
Implementation Plan	Empty

Implementation Strategy	Empty
Supporting Documents	Empty
Patient Resources	Empty
Anticipated Enabler	Empty
Anticipated Barrier	Empty
Quick Reference Guide	Empty
Technical Report	Empty