Primary Care Management of Heart Failure

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Educational Objectives

By completing this educational activity, the participant should be better able to:

1. Describe how heart failure is a driver of costs.
2. Summarize the current evidence of primary care management of heart failure.
3. Describe the indications for RAS and beta-blockers in heart failure management.
4. Support the use of team-based care for improved outcomes in heart failure.
5. Recognize opportunities to improve heart failure management.

Speaker Disclosure

Dr. Fiesinger disclosed that he has no financial relationships with any ineligible organizations or commercial interests.

Texas Family Medicine Symposium

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Primary Care Management of Heart Failure

DR. TROY FIESINGER
Medical Director

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DISCLOSURES

Troy Fiesinger is employed by VillageMD or its subsidiaries and have no relevant financial conflicts of interest to disclose with any ineligible organization or commercial interest.

Documentation Integrity Program Disclaimer:

VillageMD's documentation integrity approach focuses on education, data-driven insight, reinforcement of documentation, excellence in coding accuracy and thoroughness.
Our goal is to code to the highest level of accuracy and specificity at every encounter to properly reflect a patient's appropriate disease burden. Compliance is in our DNA.

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LEARNING OBJECTIVES

At the end of this one-hour session participants should be able to:

- Describe how heart failure impacts the health of patient populations and drives healthcare costs.
- Accurately diagnose the patient with heart failure utilizing patient history, physical examination, and appropriate testing.
- Discuss evidence-based guidelines for primary care management of heart failure.
- Discuss how team-based care of patients with heart failure improves outcomes.
- Identify patients who are not responding to conventional treatment and delineate evidence-based treatment options for patients with advanced heart failure.

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THE HIGH COST OF HEART FAILURE
COST = MISERY

- Heart failure (HF) is a highly prevalent condition, with significant morbidity and a poor prognosis.[1,2]
- Current estimates suggest that 6.2 million individuals are affected by HF in the USA, a number expected to rise to 8.5 million by 2030.[3]
- In 2012, total cost of HF patients was $30.7 billion, expected to grow to $69.8 billion by 2030[4]
- Prognosis of patients with HF is poor - **more than half of patients with HF die** within 5 years.[1,5]
- Despite significant therapeutic advancements, patients with HF require frequent hospitalization for cardiovascular (CV) conditions such as
  - uncontrolled hypertension,
  - ischemia,
  - arrhythmias,
  - congestion, and hypervolemia,
  - as well as non-CV comorbidities.[5,6]

1. Mozaffarian D, Benjamin EJ, Go AS, et al. Heart disease and stroke statistics--2015 update: a report from the American Heart Association. Circulation. 2015;131(4):e29–e322.
2. Juenger J, Schellberg D, Kraemer S, et al. Health related quality of life in patients with congestive heart failure: comparison with other chronic diseases and relation to functional variables. Heart. 2002;87(3):235–241.
3. Heidenreich PA, Albert NM, Allen LA, et al. Forecasting the impact of heart failure in the United States: a policy statement from the American Heart Association. Circ Heart Fail. 2013;6(3):606–619.
4. Patel, Jaleen, PharmD. "Heart failure population health considerations" American Journal of Managed Care; 27:S191-195
5. Gheorghiade M, De Luca L, Fonarow GC, Filippatos G, Metra M, Francis GS. Pathophysiologic targets in the early phase of acute heart failure syndromes. Am J Cardiol. 2005;96(6A):11G–17G.
6. Gheorghiade M, Zannad F, Sopko G, et al. Acute heart failure syndromes: current state and framework for future research. Circulation. 2005;112(25):3958–3968.

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THE HIGH COST OF HEART FAILURE
COST = MISERY

How much does a heart failure admission cost?

- Patient with HF only: $13,418 (median)
- HF patient with comorbidities costs more: $14,015
- First 30 days post-discharge: $6,283
- If they are readmitted for HF within 30 days, the 2nd admission costs
  - $15,732 (same hospital)
  - $25,879 (different hospital)
- If they go to the ED for HF: $1,441 (median)
- Annual home care cost: $2,227

Heart Failure hospitalizations contributed to 65% of all medical HF costs during the first year after hospitalization

1. Patel, Jaleen, PharmD. "Heart failure population health considerations" American Journal of Managed Care; 27:S191-195

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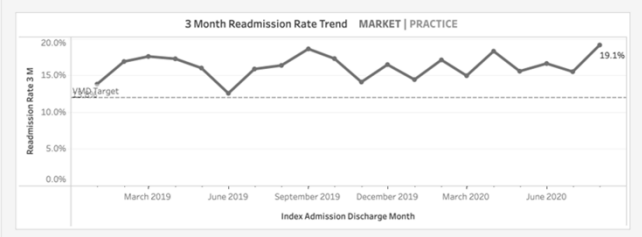
HEART FAILURE DRIVES UTILIZATION
Readmissions



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PREDISPOSING FACTORS FOR HEART FAILURE

The population attributable risk (PAR) that includes both the hazard ratio and the prevalence of the predisposing condition in the population.

1. Coronary heart disease
   - relative risk 8.1; overall PAR 62 percent
   - 68 percent in men and 56 percent in women
2. Cigarette smoking
   - relative risk 1.6, PAR 17 percent
3. Hypertension
   - relative risk 1.4, PAR 10 percent
4. Obesity
   - relative risk 1.3, PAR 8 percent
5. Diabetes
   - relative risk 1.9, PAR 3 percent
6. Valvular heart disease
   - relative risk 1.5, PAR 2 percent

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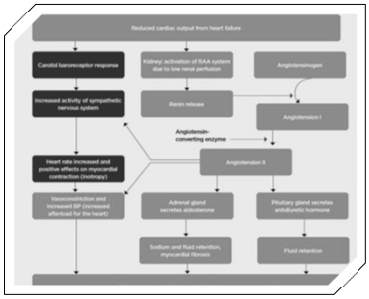

PATHOPHYSIOLOGY OF HEART FAILURE

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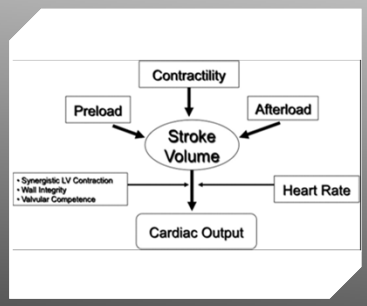

CARDIAC OUTPUT

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AUDIENCE POLLING QUESTION #1

What percentage of Medicare patients in the U.S. have CHF?

1. 2%
2. 8%
3. 14%
4. 20%
5. 26%

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AUDIENCE POLLING QUESTION #2

What percentage of Medicare total spend is for patients with CHF?

1. 25%
2. 35%
3. 45%
4. 55%
5. 65%

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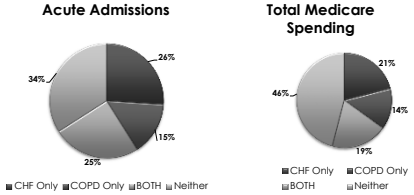
WHAT IS THE **PROBLEM** WE ARE TRYING TO SOLVE?

- Medicare patients with Heart Failure are admitted and readmitted much more often than the average Medicare patient
- For our patients in Houston in **2019,** Heart Failure impacted
  - **51%** of Medicare patients' acute admissions (26% + 25%)
  - **40%** of total Medicare spending (21% + 19%)



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HEART FAILURE CLINICAL BEST PRACTICES

How many Heart Failure patients are out there?

Village Medical Houston	All Payors
Patients with Heart Failure	4,295
% of total population	5.0%
High risk HF patients (Top 10% in HCC's, utilization, cost)	37.9%

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HEART FAILURE CLINICAL BEST PRACTICES

How well are we engaging our Heart Failure patients?

Village Medical Houston	All Payors
Patients with Heart Failure	4,295
% of total population	5.0%
High risk HF patients (Top 10% in HCC's, utilization, cost)	37.9%

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WHAT IS THE PRIMARY CARE **SOLUTION**?

Heart Failure Chronic Disease Management Program

To reduce hospitalizations, readmissions, and mortality while improving quality of life for heart failure patients, we need to **FOUR** things consistently well:

ASSESS diagnose Heart Failure correctly and assess its severity regularly

↓

TREAT with evidence-based medications at maximum tolerated doses

↓

TEACH patients to control their symptoms and manage their exacerbations with escalated outpatient diuretics

↓

ENGAGE patients often through their primary care providers, nurse care managers, nurse practitioner house calls, and virtual care management (using remote patient monitoring).

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Steps	What	How	Who
ASSESS	**ASSESS** severity of patient's HF every 90 days	Document • most recent ejection fraction and BNP / NT-proBNP • heart failure type: systolic [reduced EF (HFrEF)] or diastolic [preserved EF (HFpEF)] • NYHA Functional Classification	• Primary care physician • Nurse care manager • Clinic staff
TREAT	**TREAT** patient with evidence-based medications titrated to maximum tolerated dose	• Prescribe ACEI/ARB, beta blocker, and loop diuretic • Titrate medications to maximum tolerated doses • Prescribe rescue diuretics • Address barriers (cost, understanding, adherence)	• Primary care physician • Nurse care manager • Clinical pharmacist
TEACH	**TEACH** patient to • Control symptoms • Manage exacerbations	• Teach patient self-management (daily weights, manage salt and fluid intake) • Teach patient CHF Zone Tool and daily weight log to adjust diuretics based on weight changes • Confirm understanding of education every 3 months	• Primary care physician • Nurse care manager • Clinical pharmacist
ENGAGE	**ENGAGE** patient with care team	• Clinic visit every 90 days and more often as needed • Engage in care management • Evaluate for home visits and remote patient monitoring	• Primary care physician • Nurse care manager • Clinical pharmacist

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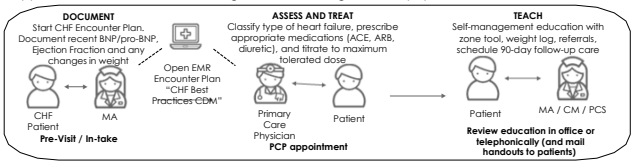
CHF Clinic Workflow

Our evidence-based clinical best practices are summarized in a recommended clinical workflow to support the identification and management of our targeted CHF population



Team Members to Address Treatment Barriers

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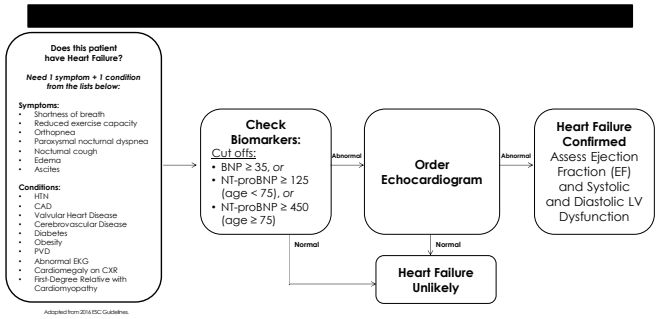
HEART FAILURE CLINICAL BEST PRACTICES

ASSESS



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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

[redacted]

Does this patient have Heart Failure?

Need 1 symptom + 1 condition from these lists

Symptoms	Condition		
	Past Medical History	Test Findings	Family History
Shortness of breath	Hypertension	Abnormal EKG	1st degree relative w cardiomyopathy
Reduced exercise capacity	Coronary artery disease	Cardiomegaly on CXR	
Orthopnea	Prior MI		
Paroxysmal nocturnal dyspnea	Valvular disease		
Nocturnal cough	Cerebrovascular disease		
Edema	Diabetes		
Ascites	Obesity		
	Peripheral vascular disease		

Adapted from 2016 ESC Guidelines.

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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

[redacted]

Does this patient have Heart Failure?

Need 1 symptom + 1 condition from the lists below:

Symptoms:
- Shortness of breath
- Reduced exercise capacity
- Orthopnea
- Paroxysmal nocturnal dyspnea
- Nocturnal cough
- Edema
- Ascites

Conditions:
- HTN
- CAD
- Valvular Heart Disease
- Cerebrovascular Disease
- Diabetes
- Obesity
- PVD
- Abnormal EKG
- Cardiomegaly on CXR
- First-Degree Relative with Cardiomyopathy

→ **BIOMARKERS**
Cut offs:
- BNP ≥ 35, *or*
- NT-proBNP ≥ 125 (age < 75), *or*
- NT-proBNP ≥ 450 (age ≥ 75)

Abnormal → **Order Echocardiogram**

Abnormal → **Heart Failure Confirmed** Assess Ejection Fraction (EF) and Systolic and Diastolic LV Dysfunction

Normal → **Heart Failure Unlikely**

Normal

Adapted from 2016 ESC Guidelines.

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HEART FAILURE CLINICAL BEST PRACTICES

[redacted]

Strategy	Test	Cutoff (pg/mL)	Sensitivity	Specificity	Pos Pred Value	Neg Pred Value
Single Cutoff	BNP	<100	**90%**	76%	79%	89%
	NT-proBNP	<900	**90%**	85%	76%	94%
Gray Zone	BNP	<100 to rule out >400 to rule in	90% (rule out) 63% (rule in)	73% (rule out) 91% (rule in)	75% **86%**	**90%** 74%
Age-stratified	NT-proBNP	<450 age <50 <900 age 50-75 <1800 age >75	**90%**	84%	**88%**	66%
eGFR <60	BNP	<200	88%	63%	**83%**	72%
	NT-proBNP	<1200	89%	72%	74%	94%
Obesity	BNP	170 (BMI <25)	**90%**	77%	78%	90%
		110 (BMI 25 - 34.9)	**90%**	77%	77%	90%
		54 (BMI ≥35	**91%**	70%	70%	91%
	NT-proBNP	<900 (no adjustment)	87%	76%	79%	90%

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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

ECHOCARDIOGRAM confirms type of heart failure (HFrEF or HFpEF) by a) assessing ejection fraction and b) distinguishing between systolic and diastolic LV dysfunction.

Type	EF (%)	Description
I. Heart failure with reduced ejection fraction (HFrEF)	≤40	AKA systolic HF • Randomized controlled trials mainly enrolled patients with HFrEF • Only in these patients have efficacious therapies been demonstrated
II. Heart failure with marginally reduced ejection fraction (HFmrEF)	41 to 49	• Formerly called "borderline" or "mid-range" heart failure • Characteristics, treatment patterns and outcomes similar to HFpEF.
III. Heart failure with preserved ejection fraction (HFpEF)	≥50	AKA diastolic HF • Several different criteria have been used to further define HFpEF. • Diagnosis is challenging because other potential noncardiac causes of symptoms must be excluded. • To date, efficacious therapies have not been identified.
IV. Heart failure with improved ejection fraction (HFimpEF)	>40	Symptomatic HF with baseline EF ≤40%, ≥ 10% increase from baseline EF, and 2nd EF > 40% • Patients with improvement or recovery in EF may be clinically distinct from those with persistent preserved or reduced EF.

When should you order an echocardiogram
- Initial evaluation of patients with known or suspected heart failure based on symptoms, signs or abnormal test results
- Re-evaluation of known heart failure IF:
  - Change in clinical status or cardiac exam without clear precipitating change in medication or diet.
  - Guide medical therapy
  - Assess candidacy for device therapy.
  - Clinical event occurred.
  - Treatment was given that may have significant effect on cardiac function.
- Annual echocardiogram **NO LONGER INDICATED**

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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

[redacted]

Does this patient have Heart Failure?

Need 1 symptom + 1 condition from the lists below:

Symptoms:
- Shortness of breath
- Reduced exercise capacity
- Orthopnea
- Paroxysmal nocturnal dyspnea
- Nocturnal cough
- Edema
- Ascites

Conditions:
- HTN
- CAD
- Valvular Heart Disease
- Cerebrovascular Disease
- Diabetes
- Obesity
- PVD
- Abnormal EKG
- Cardiomegaly on CXR
- First-Degree Relative with Cardiomyopathy

→ **Check Biomarkers**
Cut offs:
- BNP ≥ 35, *or*
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Abnormal → **Order ECHOCARDIOGRAM**

Abnormal → **Heart Failure Confirmed** Assess Ejection Fraction (EF) and Systolic and Diastolic LV Dysfunction

Normal → **Heart Failure Unlikely**

Normal

Adapted from 2016 ESC Guidelines.

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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

Diagnosing Heart Failure preserved EF:
Step 1 **P** for Pre-test assessment

SIGNS, SYMPTOMS, AND CONDITIONS

Signs and symptoms:
- Shortness of breath
- Shortness of breath with exertion
- Edema
- Orthopnea
- Paroxysmal nocturnal dyspnea
- Reduced exercise capacity

Risk factors:
- Hypertension
- Diabetes mellitus
- Atrial fibrillation
- Obesity
- Age 70+
- Physical inactivity

LABORATORY TESTING

Laboratory tests
- BMP
- CBC
- A1C
- TSH
- Iron, TIBC, and ferritin

Biomarkers
- BNP ≥35
- NT-proBNP ≥135

IMAGING

Electrocardiogram

Echocardiogram

Exercise testing
- 6 min walk test
- Exercise stress test
- Cardiopulmonary exercise testing

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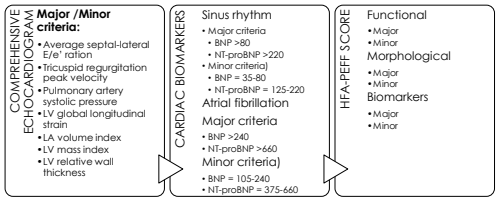
HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

Diagnosing Heart Failure preserved EF:
Step 2 **E** for Echocardiogram



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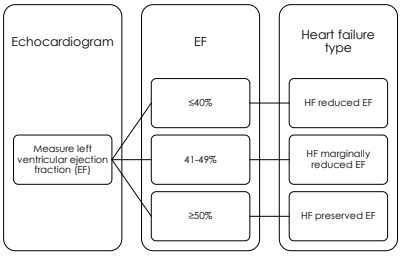
HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

What kind of heart failure does my patient have?



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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

To diagnosis Heart Failure preserved Ejection Fraction ("diastolic heart failure"), you need at least 1 item from category A and B and C

A. Ejection Fraction	B. Signs and Symptoms	C. Imaging / labs results
• LV EF ≥ 50%	• Shortness of breath (at rest or with exertion) • Edema • Orthopnea • Paroxysmal nocturnal dyspnea • Reduced exercise capacity • Nocturnal cough • Ascites	• Lab • BNP ≥ 35 or NT-proBNP ≥ 125 • Echocardiogram / cardiac cath • Nondilated LV w concentric remodeling • LV hypertrophy and LA enlargement • ↑ E/e' ratio • ↑ LA volume • ↑ LV filling pressure • PAP/PASP > 35 • RSVP > 125 • PCWP ≥ 15

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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

- If patient meets 1 criterion from A and B and C, then patient meets criteria for HFpEF.
- If patient meets 1 criterion from A and C, but not C (no signs of symptoms of heart failure), then patient does not have HFpEF
- If patient's echo shows impaired diastolic function or impaired diastolic relaxation, but dues not have signs or symptoms of heart failure, then patient has diastolic dysfunction

A. Ejection Fraction	B. Signs and Symptoms	C. Imaging / labs results
•LV EF ≥ 50%	• Shortness of breath (at rest or with exertion) •Edema •Orthopnea •Paroxysmal nocturnal dyspnea •Reduced exercise capacity •Nocturnal cough •Ascites	•Lab •BNP ≥ 35 or NT-proBNP ≥ 125 •Echocardiogram / cardiac cath •Nondilated LV w concentric remodeling •LV hypertrophy and LA enlargement •↑ E/e' ratio •↑ LA volume •↑ LV filling pressure •PAP/PASP > 35 •RSVP > 125 •PCWP ≥ 15

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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS Determine Type and Stage of Heart Failure

ACCF/AHA Stages of Heart Failure describes progression of the disease
NYHA Functional Classification focuses on exercise capacity and severity of symptoms.

ACCF/AHA Stages of Heart Failure		NYHA Functional Classification
A At high risk for HF but without structural heart disease or symptoms of HF	None	
B Patients without current or prior signs or symptoms of HF but has one of these: structural heart disease, abnormal cardiac function, elevated natriuretic peptide or cardiac troponin	I	No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.
C Patient with current or prior signs and/or symptoms of HF caused by structural or functional cardiac abnormality	I	No limitation of physical activity. Ordinary physical activity does not cause symptoms of HF.
	II	Slight limitation of physical activity. Comfortable at rest, but less than ordinary physical activity results in symptoms of HF
	III	Marked limitation of physical activity. Comfortable at rest, but less than ordinary activity causes symptoms.
	IV	Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.
D Refractory HF requiring specialized interventions	IV	Unable to carry on any physical activity without symptoms of HF, or symptoms of HF at rest.

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HEART FAILURE CLINICAL BEST PRACTICES

ASSESS

Measuring **BNP and NT-proBNP** helps establish the **prognosis and severity** of chronic heart failure.

- Improved levels of BNP and NT-proBNP with treatment of chronic heart failure are associated with improved clinical outcomes.
- BNP and NT-proBNP levels that do not decrease with treatment are associated with increased risk of hospitalization and death.

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT

Case Study

- JS, a 68 y/o female, seen by her PCP to establish care after prior physician retired.
  - At 1st visit, her BP = 180/100.
  - She was started on Lisinopril/HTCZ 20/25 BID and Atenolol 50 mg BID.
  - Since she complained of SOB and DOE, a BNP was ordered to rule out heart failure.
  - A CBC and CMP were also obtained.
- Lab results: BNP = 573, eGFR = 51.
  - Patient was diagnosed with Heart Failure and Chronic Kidney Disease Stage 3A.
- At 2nd visit, she still has orthopnea and pedal edema. BP now 162/95

Treatment

What would you do?

- Change lisinopril/HCTZ to losartan HCTZ?
- Start Furosemide 20 mg BID?
- Should Atenolol be changed to a different beta blocker?

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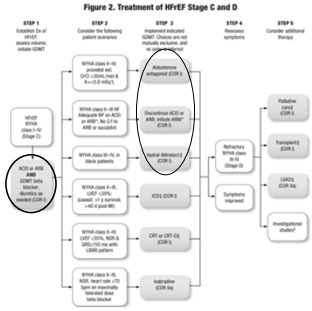
HEART FAILURE CLINICAL BEST PRACTICES

TREAT Heart Failure with reduced Ejection Fraction (**HFrEF**), aka systolic heart failure

- Choose evidence-based medications
- Titrate to maximum tolerated dose

TREAT TO TARGET!

- Hospitalizations and mortality reduced in patients on high doses of ACE-I/ARBs and beta blockers versus low doses
- 80% of heart failure patients receive less than recommended dose of medications
- Most common cause of heart failure hospitalization is medication non-adherence



Source: AHA Guideline Based Care: Your Guide to Better Outcomes for Heart Failure Patients.

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT Heart Failure with reduced Ejection Fraction (**HFrEF**) aka systolic heart failure

- Choose evidence-based medications
- Titrate to maximum tolerated dose

TREAT TO TARGET!

- Hospitalizations and mortality reduced in patients on high doses of ACE-I/ARBs and beta blockers versus low doses
- 80% of heart failure patients receive less than recommended dose of medications
- Most common cause of heart failure hospitalization is medication non-adherence

Source: AHA Guideline Based Care: Your Guide to Better Outcomes for Heart Failure Patients.

Recommendations for Stage C HFrEF

- Control blood pressure to < 130/80
- Use beta blockers, ACE inhibitors, and ARBs to control blood pressure in patients with HFpEF
- ARBs might decrease hospitalizations
- Treat patients with symptoms of volume overload with diuretics
- Aldosterone receptor antagonists reduce hospitalizations in patients with EF ≤ 45%, ↑ BNP, HF admission in last 1 yr, eGFR > 30, Cr < 2.5, K < 5.0
- Consider coronary revascularization in patients with CAD and angina or ischemia
- Manage atrial fibrillation to improve symptomatic HFpEF

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT Heart Failure with preserved Ejection Fraction (HFpEF) aka diastolic heart failure

- Choose evidence-based medications
- Titrate to maximum tolerated dose

Guideline-Directed Medical Therapy for Treating HFpEF

- ACC/AHA recommends stage-based approach to treating HFpEF.
- Treat patients with HFpEF and persistent hypertension to systolic BP of 120-129 mmHg.
- Treat patients with symptoms of volume overload with diuretics.

Source: AHA Guideline Based Care: Your Guide to Better Outcomes for Heart Failure Patients.

Table 4. American College of Cardiology/ American Heart Association Recommendations by Stage of Heart Failure

Stage	Recommendation
A: Heart failure risk factors	Guideline-directed treatment of hypertension and hyperlipidemia
B: Diastolic dysfunction without symptoms	Treat hypertension with thiazide diuretics, ACE inhibitors, ARBs, or non-dihydropyridine calcium channel blockers
C: Symptomatic heart failure with preserved ejection fraction and hypertension	Treat volume overload with diuretics; consider use of beta blockers, ACE inhibitors, and ARBs
C: Symptomatic heart failure with preserved ejection fraction without hypertension	Treat volume overload with diuretics; consider an ARB to prevent hospitalization (although randomized trials have not shown benefit)

ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker.

Information from reference 3.

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AUDIENCE POLLING QUESTION #3

What percentage of heart failure patients are not receiving less than the recommended dose of their maintenance medications?

1. 50%
2. 60%
3. 70%
4. 80%
5. 90%

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT Hypertension in Heart Failure patients

- Choose evidence-based medications
- Titrate to maximum tolerated dose

Treating hypertension in Heart Failure with reduced EF (HFrEF)

- ***ACE inhibitors***, ***ARB's***, and ***beta blockers*** are preferred
- Titrate to systolic blood pressure < 130 mm Hg
- Blood pressure lowering is associated with fewer adverse cardiovascular events

Treating hypertension in Heart Failure with preserved EF (HFpEF)

- ***ACE inhibitors*** and ***ARB's*** are preferred
- Titrate to systolic blood pressure < 130 mm Hg
- Control volume overload
- Limited data on using alpha blockers, beta blockers, and calcium channel blockers to treat hypertension in HFpEF
- Avoid nitrates unless indicated by specific condition

Source: AHA Guideline Based Care: Your Guide to Better Outcomes for Heart Failure Patients.

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT

Drugs for HFrEF

Drug	Initial Daily Dose(s)	Maximum Dose(s)	Mean Dose Achieved in Clinical Trials	References
ACE inhibitors				
Captopril	6.25 mg TID	50 mg TID	122.7 mg QD	158
Enalapril	2.5 mg BID	10–20 mg BID	16.6 mg QD	129
Fosinopril	5–10 mg QD	40 mg QD	N/A	—
Lisinopril	2.5–5 mg QD	20–40 mg QD	32.5–35.0 mg QD	130
Perindopril	2 mg QD	8–16 mg QD	N/A	—
Quinapril	5 mg BID	20 mg BID	N/A	—
Ramipril	1.25–2.5 mg QD	10 mg QD	N/A	—
Trandolapril	1 mg QD	4 mg QD	N/A	—
ARBs				
Candesartan	4–8 mg QD	32 mg QD	24 mg QD	157
Losartan	25–50 mg QD	50–150 mg QD	129 mg QD	136
Valsartan	20–40 mg BID	160 mg BID	254 mg QD	134
ARNI				
Sacubitril/valsartan	49/51 mg BID (sacubitril/valsartan) (therapy may be initiated at 24/26 mg BID)	97/103 mg BID (sacubitril/valsartan)	375 mg QD; target dose: 24/26 mg, 49/51 mg OR 97/103 mg BID	138
I$_f$ channel inhibitor				
Ivabradine	5 mg BID	7.5 mg BID	6.4 mg BID (at 28 d) 6.5 mg BID (at 1 y)	155–157
Aldosterone antagonists				
Spironolactone	12.5–25 mg QD	25 mg QD or BID	26 mg QD	142
Eplerenone	25 mg QD	50 mg QD	42.6 mg QD	159
Beta blockers				
Bisoprolol	1.25 mg QD	10 mg QD	8.6 mg QD	160
Carvedilol	3.125 mg BID	50 mg BID	37 mg QD	161
Carvedilol CR	10 mg QD	80 mg QD	N/A	—
Metoprolol succinate extended release (metoprolol CR/XL)	12.5–25 mg QD	200 mg QD	159 mg QD	139
Isosorbide dinitrate and hydralazine				
Fixed-dose combination	20 mg isosorbide dinitrate/37.5 mg hydralazine TID	40 mg isosorbide dinitrate/75 mg hydralazine TID	90 mg isosorbide dinitrate/ ~75 mg hydralazine QD	162
Isosorbide dinitrate and hydralazine	20–30 mg isosorbide dinitrate/25–50 mg hydralazine TID or QD	40 mg isosorbide dinitrate TID with 100 mg hydralazine TID	N/A	163

Modified (Table 15) from the 2013 HF guideline.[9]
ACE indicates angiotensin-converting enzyme; ARB, angiotensin receptor blocker; ARNI, angiotensin receptor-neprilysin inhibitor; BID, twice daily; CR, controlled release; CRM, controlled release/extended release; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; N/A, not applicable; QD, once daily; and TID, 3 times daily.

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AUDIENCE POLLING QUESTION #4

What medications should every HF patient take unless contraindicated?

1. ACE inhibitor
2. Angiotensin receptor blocker
3. Beta blocker
4. Diuretic
5. All of the above

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AUDIENCE POLLING QUESTION #5

Which beta blockers are recommended for patients with heart failure?

1. Bisoprolol
2. Carvedilol
3. Metoprolol succinate
4. Metoprolol succinate
5. 1, 2, and 3
6. All of the above

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AUDIENCE POLLING QUESTION #6

What is blood pressure target for CHF patients?

1. Less than 120/80
2. Less than 130/80
3. Less than 140/90
4. Less than 150/90

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT

Case Study

- JS, a 68 y/o female, seen by her PCP to establish care after prior physician retired.
  - At 1st visit, her BP = 180/100.
  - She was started on Lisinopril/HTCZ 20/25 BID and Atenolol 50 mg BID.
  - Since she complained of SOB and DOE, a BNP was ordered to rule out heart failure.
  - A CBC and CMP were also obtained.
- Lab results: BNP = 573, eGFR = 51.
  - Patient was diagnosed with Heart Failure and Chronic Kidney Disease Stage 3A.
- At 2nd visit, she still has orthopnea and pedal edema. BP now 162/95.

Treatment

What would you do?

- Change lisinopril/HCTZ to losartan HCTZ?
- Start Furosemide 20 mg BID?
- Should Atenolol be changed to a different beta blocker?

Evidence based approach

- Beta blocker: Change atenolol to carvedilol, titrate dose to BP < 130/80;
- ACEI/ARB: Could continue lisinopril, change to losartan, or choose different ACEI/ARB. Titrate dose to BP goal once BB is titrated to maximally tolerated dose
- Diuretic: Stop HCTZ combination. Start furosemide and titrate to relief of symptoms

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT

- Choose evidence-based medications
- **Titrate to maximum tolerated dose**

Medication Titration for Heart Failure

- Increase medication doses to achieve **maximally tolerated dose.**
- Adjust medications every two weeks,
- Aim to reach target dose in 3 – 6 months.
- Monitor vital signs, electrolytes and renal function:
  - Goal BP < 130/80 mmHg
  - Creatinine increases of 30% are acceptable during titration
- Recheck BNP/NT-proBNP after achieving maximally tolerated dose for three months.

Source: Yancy et al 2017 ACC Expert Consensus Decision Pathway for Optimization of Heart Failure Treatment.

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AUDIENCE POLLING QUESTION #7

How do you know you have reached the maximum tolerated dose for recommended CHF medications?

1. Blood pressure less than 130/80
2. Creatinine increased less than 30%
3. Patient taking highest dose of medication
4. All of the above

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT: What do I do if treatment with maximum tolerated doses isn't working?

Repeat BNP/NT-proBNP

- Recheck BNP/NT-proBNP after achieving the maximally tolerated dose for three months
- If BNP or NT-proBNP levels still elevated or rising after maximum tolerated dose, consider referral to heart failure specialist
- Serial BNP or NT-proBNP to guide titration of guideline-directed medical therapy is not indicated

Which patients should see cardiology?

- NYHA Class III or IV heart failure with depressed ejection fraction and:
  - Lack of clinical response after treatment with target dose medications for 6 months
  - BNP / NT-proBNP doesn't improve after treatment with target dose medications for 6 months
  - Hemodynamically unstable during medication titration
  - Under age 70 in need of transplant

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AUDIENCE POLLING QUESTION #8

When should you refer CHF patient to a cardiologist?

1. New York Heart Association Class III or IV
2. Ejection fraction less than 40%
3. No clinical response after reaching target doses of maintenance medications for 6 months
4. BNP / NT-proBNP not improved after taking target doses of maintenance medications for 6 months
5. Patient becomes hemodynamically unstable during titration of medications to maximum tolerated dose
6. All of the above

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HEART FAILURE CLINICAL BEST PRACTICES

TREAT

Train patient to use escalated outpatient diuretics to control worsening symptoms

Role of Escalated Outpatient Diuretics in Symptom Management

- Patients learn to recognize and respond promptly to weight changes and other symptoms of heart failure exacerbation.
- Patients taught to increase their dose of diuretics after weight gain of **TWO pounds** in **TWO days** or **FIVE pounds** in **FIVE days:**
  - Increase diuretic dose based on current daily dose.
  - Monitor blood pressure and heart rate at home.
  - Follow up with PCP in-person or virtually for further medication adjustments.

Who is appropriate?
Advanced Heart Failure/NYHA Class III or IV
≥1 heart failure hospitalization in past year or ≥2 heart failure exacerbations in past year
Heart failure admission <30 days
Village@Home patient
≥65 years old

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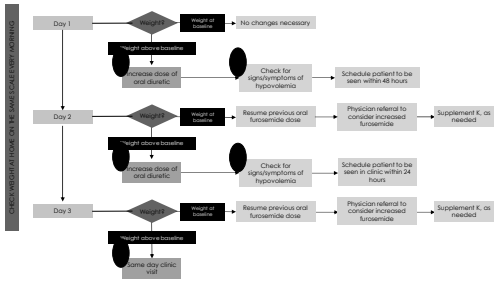
HEART FAILURE CLINICAL BEST PRACTICES

TREAT

- Train patient to use escalated outpatient diuretics to control worsening symptoms



Current Daily Lasix Dose	Suggested New Lasix Dose
≤20 mg BID	Double dose to max 40 mg BID
20 mg BID to 40 mg BID	Double a.m. dose to max 80 mg QAM and usual evening dose to max 40 mg QPM
> 40 mg BID	Discuss with provider

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HEART FAILURE CLINICAL BEST PRACTICES

TEACH

- Patient in self-monitoring and self-management

Self-Monitoring and Self-Management

- They'll know they're getting worse before you will
- Patient will be taught to:
  - Monitor for SOB and swelling
  - Check blood pressure and weight daily.
  - Record their daily weight, blood pressure and symptom zone in a log or mobile application
  - How to contact care team when symptoms change.


Weight and Zone Log

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HEART FAILURE CLINICAL BEST PRACTICES

TEACH

- Heart Failure Zones

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HEART FAILURE CLINICAL BEST PRACTICES

Heart Failure Provider Checklist

Testing

- ❑ Echocardiogram to confirm diagnosis
- ❑ Last ejection fraction (EF)
- ❑ Type of heart failure (HFrEF or HFpEF)
- ❑ Last BNP / NT-proBNP

Medications

- ❑ Taking ACE-I/ARB
- ❑ Taking beta blocker
- ❑ Taking diuretic

Self-Management

- ❑ HF Zone Tool
- ❑ Logging BP and weight daily
- ❑ Adjusting diuretics based on daily weight and symptoms

When to refer

- ❑ NYHA Class III or IV with depressed EF after 6 months on target therapy with:
  - ❑ Lack of response to medications
  - ❑ Lack of improvement of BNP or NT-proBNP
- ❑ Hemodynamically unstable during medication titration
- ❑ Under age 70 in need of transplant

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HEART FAILURE CLINICAL BEST PRACTICES

EMR Tools: Athena Encounter Plan

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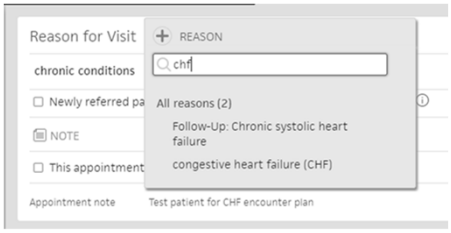
HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 1: Launch CHF encounter plan by selecting "congestive heart failure (CHF) as Reason for Visit



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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 1: Launch CHF encounter plan by selecting "congestive heart failure (CHF) as Reason for Visit

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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 2: Complete "Congestive Heart Failure (CHF) CDM" HPI template

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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 2: Complete "Congestive Heart Failure (CHF) CDM" HPI template

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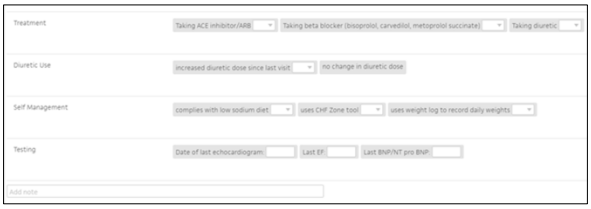
HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 2: Complete "Congestive Heart Failure (CHF) CDM" HPI template



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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 2: Complete "Congestive Heart Failure (CHF) CDM" HPI template

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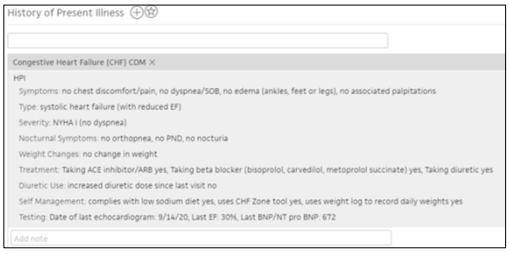
HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 2: Complete "Congestive Heart Failure (CHF) CDM" HPI template



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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 3: Complete Review of Systems

- Use your favorite ROS template
- Add the Saved Findings of your choice
- Document ROS in the HPI by clicking the box in the lower left

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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 4: Complete the Physical Exam

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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 5: Complete the Assessment and Plan

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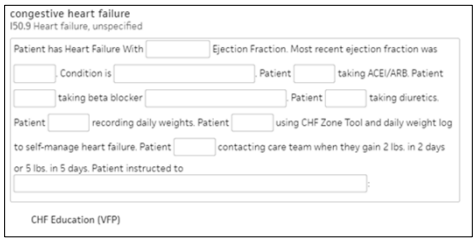
HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 5: Complete the Assessment and Plan

- Document thoroughly and efficiently using the CHFplan text macro



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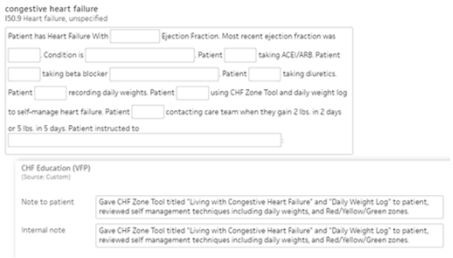
HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 5: Complete the Assessment and Plan

- Give patient standardized self-management tools loaded into EMR



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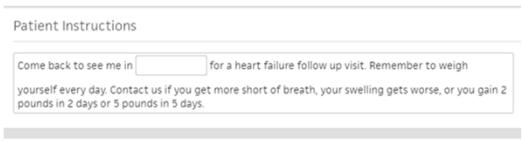
HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 6: Complete the Patient Instructions and Follow Up

- Patient instructions text macro preloaded
- Just add the follow up interval



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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 6: Complete the Patient Instructions and Follow Up

- Don't forget the appointment tickler!

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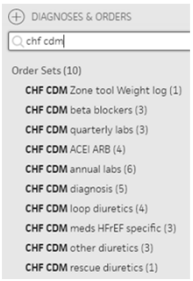
HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 7: Use CHF CDM order sets to speed assessment and treatment

- Diagnosis
- Testing
- Treatment
- Self-management



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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 7: Use CHF CDM order sets to speed assessment and treatment

- **DIAGNOSIS**
- Testing
- Treatment
- Self-management

CHF CDM diagnosis	3				• Congestive heart failure (I50.9: Heart failure, unspecified) • B-TYPE NATRIURETIC PEPTIDE (BNP)(#37306-QUEST, #140889-LABCORP) • NT-PROBNP (PROPEPTIDE OF BRAIN NATRIURETIC PEPTIDE) (QUEST #11188, LABCORP #143000) • CHEST PA/LAT 2 VIEW - "IH" • ELECTROCARDIOGRAM • US, ECHOCARDIOGRAM, TRANSTHORACIC, COMPLETE

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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 7: Use CHF CDM order sets to speed assessment and treatment

- Diagnosis
- **TESTING**
- Treatment
- Self-management

Name	Usage (Last 12 Mos.) ▼	Specialty	Users	Ordering	Diagnoses/Orders
CHF CDM annual labs	6				• Congestive heart failure (I50.9: Heart failure, unspecified) • "IH" CBC COMPLETE BLOOD COUNT W/AUTO DIFF (#6399-QUEST, #005009-LABCORP) • "IH" LIPID PANEL (#7600-QUEST, #303756-LABCORP) • "IH" CMP (AKA COMPREHENSIVE METABOLIC PANEL) (#10231-QUEST, #322000-LABCORP) • B-TYPE NATRIURETIC PEPTIDE (BNP)(#37306-QUEST, #140889-LABCORP) • NT-PROBNP (PROPEPTIDE OF BRAIN NATRIURETIC PEPTIDE) (QUEST #11188, LABCORP #143000) • MAGNESIUM, SERUM OR PLASMA
CHF CDM quarterly labs	5				• Congestive heart failure (I50.9: Heart failure, unspecified) • "IH" BMP (AKA BASIC METABOLIC PANEL)(#12165-QUEST, #322758-LABCORP) • B-TYPE NATRIURETIC PEPTIDE (BNP)(#37306-QUEST, #140889-LABCORP) • NT-PROBNP (PROPEPTIDE OF BRAIN NATRIURETIC PEPTIDE) (QUEST #11188, LABCORP #143000)

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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 7: Use CHF CDM order sets to speed assessment and treatment

- Diagnosis
- Testing
- **TREATMENT**
- Self-management

CHF CDM rescue diuretics	2				• Congestive heart failure (I50.9: Heart failure, unspecified) • furosemide 20 mg tablet
CHF CDM ACEI ARB	1				• Congestive heart failure (I50.9: Heart failure, unspecified) • lisinopril 10 mg tablet • ramipril 2.5 mg capsule • valsartan 40 mg tablet • losartan 25 mg tablet
CHF CDM beta blockers	1				• Congestive heart failure (I50.9: Heart failure, unspecified) • metoprolol succinate ER 50 mg tablet,extended release 24 hr • bisoprolol fumarate 5 mg tablet • carvedilol 3.125 mg tablet
CHF CDM loop diuretics	1				• Congestive heart failure (I50.9: Heart failure, unspecified) • furosemide 40 mg tablet • potassium chloride ER 10 mEq tablet,extended release • bumetanide 1 mg tablet • torsemide 10 mg tablet
CHF CDM other diuretics	1				• Edema (R60.9: Edema, unspecified) • metolazone 2.5 mg tablet • spironolactone 25 mg tablet
CHF CDM meds HFrEF specific					• Systolic heart failure (I50.20: Unspecified systolic (congestive) heart failure) • BiDil 20 mg-37.5 mg tablet • Entresto 24 mg-26 mg tablet

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HEART FAILURE CLINICAL BEST PRACTICES

Athena EMR Encounter Plan

Step 7: Use CHF CDM order sets to speed assessment and treatment

- Diagnosis
- Testing
- Treatment
- **Self-management**

CHF CDM Zone tool Weight log	2				• Congestive heart failure (I50.9: Heart failure, unspecified) • CHF Education (VFP)

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HEART FAILURE CLINICAL BEST PRACTICES

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Notes