HEART
FAILURE

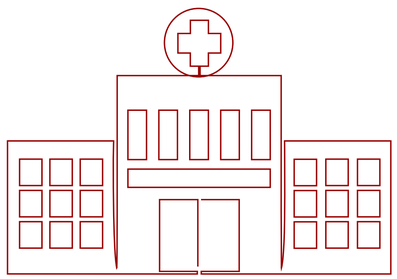
Integrating Heart Failure Pathways and Protocols Into Electronic Health Records

The Burden of Heart Failure in the US Calls for Improvements in Care[1]

HF has one of the highest

30-day

readmission rates of any medical condition[2]



HF-related admissions and readmissions cost

~ $11 billion

per year[3]

HF is the #1 potentially avoidable cause for hospital stays,
according to the Agency for Healthcare Research and Quality[4]

HF=heart failure.

Integrating Pathways and Protocols Into EHRs Can Streamline Appropriate Care for Patients With HF[5]

Health systems can leverage EHRs to implement pathways (a multidisciplinary set of interventions) and protocols (a set of treatment recommendations) to save clinicians time and to make the recommended clinical approach the "easiest" approach through streamlined order entry and documentation. This can help to:

- Standardize Care
- Promote Adherence to Evidence-Based Guidelines
- Optimize Workflow Efficiency
- Improve Performance and Readmission Metrics
- Facilitate Patient Engagement

Available EHR tools, including decision support and order sets, can help operationalize pathways and protocols and address common barriers to care.

EXAMPLES OF THE POTENTIAL IMPACT OF EHRs FOR HF MANAGEMENT[5]:

Limited EHR Use

- **Missed Patient Identification:** Documentation of clinical deterioration in narrative note missed → failure to follow up, resulting in hospitalization
- **Delayed GDMT Initiation:** No reminders to reassess LVEF → missed opportunity to start GDMT

Optimal EHR Use

- **Prompted Intensification/ Reevaluation:** Reminders based on structured data to detect clinical deterioration
- **Optimized GDMT Treatment:** Tailored admission or discharge orders to initiate medications, HF education, or reassessments

EHR=electronic health record; GDMT=guideline-directed medical therapy; LVEF=left ventricular ejection fraction.

3 Steps to Integrate HF Pathways and Protocols Into EHRs

1. Engage the Multidisciplinary Care Team to Support Pathway or Protocol Development
2. Develop an Evidence-Based Pathway or Protocol
3. Evaluate Available Tools to Integrate the Pathway or Protocol Into the EHR

STEP 1 | Engage the Multidisciplinary Care Team to Support Pathway or Protocol Development

It is important to include representatives from all groups that will be affected by the pathway or protocol.

PRIORITIZE:

- ✓ **Encouraging active physician participation** and leadership throughout the development and implementation process[6]
- ✓ Designating **specific responsibilities**, ensuring everyone works to the top of their licensure[6]
- ✓ Integrating **role-specific tools into the EHR** to improve adherence to disease-specific recommendations[5]

POTENTIAL TEAM MEMBERS INCLUDE:

Clinicians

- Cardiologists
- Endocrinologists
- Nephrologists
- Primary Care
- Hospitalists

Advanced Practice Providers

- Advanced Practice Registered Nurses
- Nurse Practitioners
- Physician Assistants
- Pharmacists

Extended Support Team

- Caregivers
- Care Coordinators
- Discharge Planners
- Nutritionists
- Technologists

STEP 2 | Develop an Evidence-Based Pathway or Protocol

Engage appropriate clinical, operational, and IT partners to develop a pathway or protocol. Define which clinical elements to include, considering:

- Admission Orders
- Physical Examination, Procedures, and Lab Work
- Consults and Referrals
- GDMT Continuation, Initiation, and Further Optimization
- Patient Education
- Follow-Up Appointments

THE 2022 AHA/ACC/HFSA GUIDELINE FOR THE MANAGEMENT OF HF RECOGNIZES[7]:

- The use of electronic point-of-care reminders to improve use of GDMT
- Hospitalization for HF as a critical opportunity to continue, initiate, and further optimize GDMT
- Prescribing appropriate GDMT at discharge as a strategy to decrease readmissions and mortality

TREATMENT OF HFrEF	TREATMENT OF HFmrEF	TREATMENT OF HFpEF
LVEF ≤40% (STAGE C)	SYMPTOMATIC HF WITH LVEF 41%-49%	SYMPTOMATIC HF WITH LVEF ≥50%
ARNi in NYHA II-III; ACEi or ARB in NYHA II-IV (1)	Diuretics, as needed (1)	Diuretics, as needed (1)
Beta blocker (1)	SGLT2i (2a)	SGLT2i (2a)
MRA (1)	ACEi, ARB, ARNi (2b)	ARNi† (2b)
SGLT2i (1)	MRA (2b)	MRA† (2b)
Diuretics, as needed (1)	Evidence-based beta blockers for HFrEF (2b)	ARB† (2b)

Class (STRENGTH) of Recommendation

- **CLASS 1** (STRONG) **Benefit >>> Risk**
- **CLASS 2a** (MODERATE) **Benefit >> Risk**
- **CLASS 2b** (WEAK) **Benefit ≥ Risk**

Adapted from the 2022 AHA/ACC/HFSA Guideline for the Management of HF

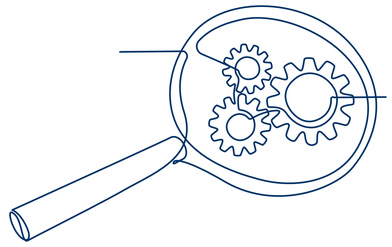
*The SGLT2 inhibitor class has gained a 1A recommendation for HFrEF, and a 2a-B-R recommendation for HFmrEF and HFpEF.
†Greater benefit in patients with LVEF closer to 50%.
ACC=American College of Cardiology; AHA=American Heart Association; ACEi=angiotensin-converting enzyme inhibitor; ARB=angiotensin receptor blocker; ARNi=angiotensin receptor-neprilysin inhibitor; eCVD=established cardiovascular disease; HFmrEF=heart failure with mildly reduced ejection fraction; HFpEF=heart failure with preserved ejection fraction; HFrEF=heart failure with reduced ejection fraction; HFSA=Heart Failure Society of America; IT=information technology; MRA=mineralocorticoid receptor antagonist; NYHA=New York Heart Association; SGLT2=sodium-glucose co-transporter 2.

STEP 3 | Evaluate Available Tools to Integrate the Pathway or Protocol Into the EHR

Different functionality and levels of customization are available for various EHR systems. Engage your IT team to evaluate available tools that may be appropriate to operationalize the pathway or protocol. Some examples of potential functionality to consider include:

DISCRETE DOCUMENTATION TOOLS TO DOCUMENT CARE

Flowsheets
SmartForms
Panels
MyPlans

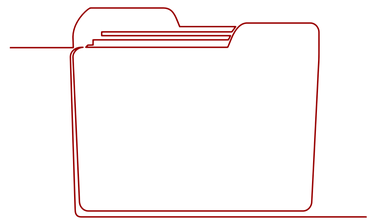


ALERTS OR REMINDERS TO STREAMLINE WORKFLOWS

Alerts
Care Guidelines
CDSS
Best Practice Advisories
Health Maintenance Reminders

COMPREHENSIVE ORDER SETS TO SUPPORT GDMT

Order Sets
Care Guides
Smart Sets
PowerPlans



CONSIDER OPPORTUNITIES TO COLLECT DATA TO REFINE PATHWAYS AND PROTOCOLS:

The implementation of the pathway or protocol is only the first action of the critical process. Data must be collected and analyzed, and processes must be improved to achieve the goal of resource savings with improvement in outcomes.[6]

Work with your IT team to collect data and evaluate baseline performance and improvement in system process goals and patient outcomes.

While EHRs may assist providers in identifying appropriate patients for consideration of assessment and treatment, the decision and action should ultimately be decided by a provider in consultation with the patient, after a review of the patient's records to determine eligibility, and Boehringer Ingelheim shall have no liability thereto.
End users using this resource should be informed of the availability, content, and target audience. Some end users may already use the described functionality so training may require minimal effort.
CDSS=clinical decision support systems.

Case Studies: Pathways in Action

YALE NEW HAVEN HEALTH | NEW YORK-PRESBYTERIAN BROOKLYN METHODIST HOSPITAL

Leveraging EHR Alerts to Improve GDMT in the Outpatient Setting[8,9]

SITUATION

Yale New Haven Health engaged 100 internal medicine and cardiology clinicians, including physicians and APPs, in the PROMPT-HF Trial. The trial sought to:

- Accelerate initiation and dose optimization of GDMT for patients with HFrEF
- Overcome barriers in guideline adoption, such as lack of knowledge about recommended management strategies

DESIGN

The trial created a pathway leveraging a customized alert and order set to identify and streamline opportunities to improve GDMT. Half of the clinicians received customized alerts, the other half did not.

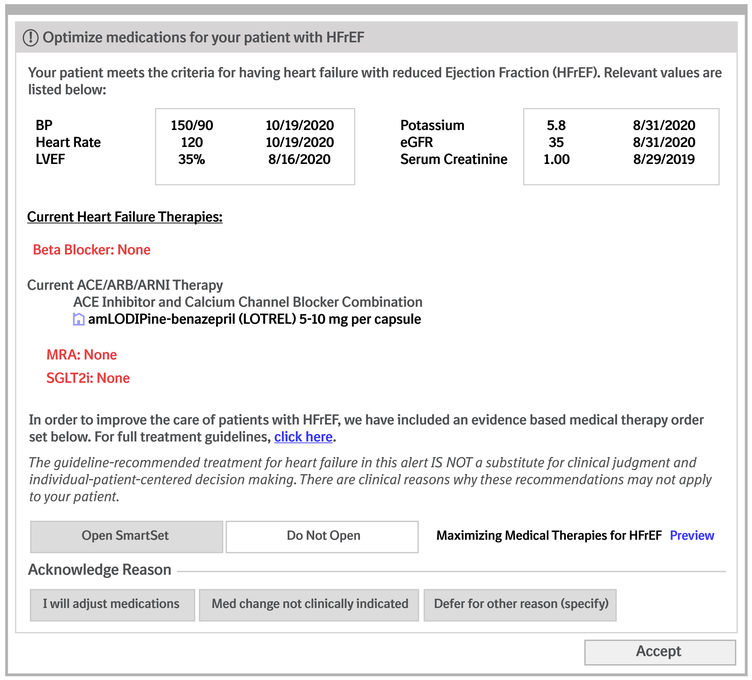
Identify HFrEF Patients
- >18 years old
- LVEF <40%
- Not on 4 classes of GDMT

↓

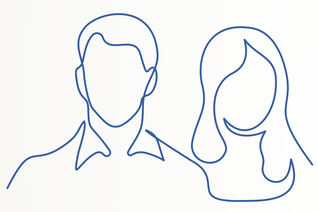
Receive Alert Upon Order Entry
- Show relevant patient data
- Provide recommendations for GDMT
- Link to order set

↓

Place HF Orders Utilizing Order Set
- Filter to only missing medication classes
- Include indications for each medication



OUTCOMES



26% **of patients** whose clinicians received alerts had an increase in number of classes of prescribed GDMT vs 19% of patients whose clinicians did not receive alerts

~80% **of clinicians** agreed or strongly agreed that the alert was helpful in improving GDMT regimens

APPs=advanced practice providers.

Boehringer Ingelheim | Lilly

Case Studies: Pathways in Action

YALE NEW HAVEN HEALTH | **NEW YORK-PRESBYTERIAN BROOKLYN METHODIST HOSPITAL**

Implementing a Multidisciplinary Clinical Care Pathway in the Inpatient Setting[10]

SITUATION

New York-Presbyterian Brooklyn Methodist Hospital designed a comprehensive HF pathway to:

- ✓ Maximize the use of team-based care and clarify team roles and responsibilities
- ✓ Optimize management of patients during acute hospitalization
- ✓ Improve post-discharge transitions of care in patients with HF

DESIGN

Admission

Identify HF Patients Upon Admission

- Elevated NT-proBNP > 300
- Use of IV diuresis on admission

Prompted to Place HF Orders Utilizing "PowerPlan"

- IV or oral diuresis
- Inotropic or vasodilator support
- Updated transthoracic echocardiogram
- GDMT
- Daily weights
- Input/output recordings
- Fluid-restricted diet
- Pharmacy, case management, and dietary consult

Pharmacist Conducts Admission Medication Reconciliation

During Hospitalization

Interdisciplinary Rounds Conducted to Guide Day-to-Day Management and Address Barriers

Case Manager Verifies Active HF Patients During Interdisciplinary Rounds

Registered Dietician Completes Education on All HF Patients

Prior to Discharge

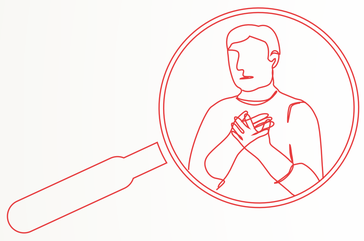
Case Manager Confirms With Resident That Follow-Up Appointment (7-14 days) Is Noted on Discharge Summary

Pharmacist Conducts Discharge Medication Reconciliation

Social Worker Delivers Medications Directly to Beds

Volunteer Reviews HF Education and Makes Follow-Up Phone Calls Post-Discharge

OUTCOMES



	Before Pathway Implementation	After Pathway Implementation
Patient Identification	3%	86%
EHR "PowerPlan" Use	8%	36%
Medication Reconciliation by Pharmacy	48%	58%
Post-Discharge Appointments Made	20%	58%

IV=intravenous; NT-proBNP=N-terminal-pro hormone brain natriuretic peptide.

References: 1. Maddox TM, Januzzi JL, Allen LA, et al. *J Am Coll Cardiol.* 2021;77(6):772–810. **2.** Heidenreich PA, Fonarow GC, Opsha Y, et al. *J Card Fail.* 2022;28(3):453-466. **3.** Jackson SL, Tong X, King R, et al. *Circ Heart Fail.* 2018;11(12):e004873. **4.** McDermott KW, Jiang HJ. *AHRQ.* Healthcare Cost and Utilization Project Statistical Brief#259, Characteristics and Costs of Potentially Preventable Inpatient Stays, 2017. https://hcup-us.ahrq.gov/reports/statbriefs/sb259-Potentially-Preventable-Hospitalizations-2017.pdf. Accessed July 18, 2022. **5.** Kao DP, Trinkley KE, Lin C-T. *JACC Heart Fail.* 2020;8(3):223-233. **6.** Every NR, Hochman J, Becker R, et al. *Circulation.* 2000;101:461-465. **7.** Heidenreich PA, Bozkurt B, Aguilar D, et al. *Circulation.* 2022;145(18):e895-e1032. **8.** PROMPT-HF: Customized Alert in EHR Improved Guideline Adherence For HF Treatment. https://www.acc.org/Latest-in-Cardiology/Articles/2022/04/02/13/22/Sun-945am-PROMPT-HF-acc-2022. Published April 3, 2022. Accessed June 8, 2022. **9.** Ghazi L, Desai NR, Simonov M, et al. *Am Heart J.* 2022;244:107-115. **10.** Thaker R, Pink K, Garapati S, et al. *Cureus.* 2022;14(1):e21123.

Boehringer Ingelheim

Lilly