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CEP Centre for Effective Practice

eHealth

Heart Failure Toolkit

Epic Hospitals

April 2024

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Summary

Purpose

The purpose of this Order Set Review Toolkit is to guide hospitals across Ontario in reviewing and implementing a Heart Failure Admission Order Set. This initiative is part of Evidence2Practice (E2P) Ontario, a cross-sector collaborative in partnership with North York General Hospital, the Centre for Effective Practice, and Amplify Health. E2P aims to improve provider experience and enhance patient care through digital interventions that integrate evidence and quality standards into frontline clinical systems, beginning with heart failure.

This toolkit equips hospitals with the process for analyzing current order sets and after visit summaries related to heart failure, and amending these to integrate up-to-date evidence. This toolkit includes a step-by-step guide and suggestions from Enhance Ontario (formerly Central East Hospital Cluster - CEHC) who implemented the use case across 7 hospitals.

Before You Start

Depending on the organization, this guide will be useful to clinical informaticians, cardiology subject matter experts, and/or project managers who may be involved in reviewing and implementing the E2P Heart Failure Use Case, which includes a Heart Failure Admission Order Set and updates to an After Visit Summary/Discharge Summary to support best practice for Heart Failure at their respective sites. The length of this process may differ based on an organization's resources and state of readiness (~4-7months). All Epic build steps are located on the Epic Community Portal here

Overall Approach

Step by Step Guide

The steps below outline the recommended high-level overall approach to conducting the Heart Failure Admission Order Set review. The Canadian Heart Failure Society (CHFS) Heart Failure Admission Order Set was a key resource in developing the final product. This review is the first step of a five-month process for implementing evidence-based care for heart failure. By integrating the key principles of heart failure care upon admission, hospitals across Ontario can improve patient and provider experience.

Note: CHFS is the national association representing cardiovascular specialists devoted to treating heart failure. To ensure that their hospital-based colleagues across Canada have the latest evidence-based recommendations to optimize treatment for their patients, they launched the CHFS Heart Failure Admission Order Set. This paper Order Set encompasses the latest evidence and recommended therapy for the management of heart failure in the hospital. The CHFS Heart Failure Admission Order Set can be used as a main resource in conducting your hospital's order set review, containing heart failure standards and evidence from 2021.

Step 1: Run a Heart Failure Order Set utilization report to better understand how order sets are being utilized in your organization

Step 2: Review evidence from the list below and compare it to your current Order Set

Step 3: Review Enhance Ontario's Heart Failure Admission Order Sets & build steps (2022)

Step 4: Consult acute care subject matter experts (e.g., cardiologists, nurse practitioners), on discrepancies between current order set, CHFS order set, and other evidence

Step 5: Send Order Set for review and approval through internal channels (e.g., Medical Advisory Committee)

Step 1: Run a heart failure order set utilization report

To better understand how order sets are currently utilized in your organization, run a Heart Failure Order Set Utilization report based on a 1- year sample of all discharged and coded electronic charts with a primary coded discharge diagnosis CMG (case mix group) of congestive heart failure.

Step 2: Review evidence and compare to current order set

Once the baseline utilization of the heart failure order set has been established, the order set review can begin. This process entails reviewing a number of heart failure resources and comparing the evidence to your hospital's current order set. A recommended primary resource is the CHFS Heart Failure Admission Order Set from 2021 as this proved to be the most translatable source. Note that other heart failure resources may also be useful. Below is a list of resources to consider:

1. CHFS Heart Failure Admission Order Set (2021)
2. Heart Failure Quality Based Procedure (2015)
3. Ontario Health Heart Failure Quality Standards
4. Zynx
5. CCS Guidelines (2017; HFrEF 2021)
6. CCS Quality Indicators for Heart Failure

Step 3: Review Enhance Ontario's order set & build steps

Click here to view Enhance Ontario's sample order set.

Step 4: Consult subject matter experts

In your literature review, you may start to identify gaps between the CHFS Heart Failure Admission Order Set 2021, other evidence, and your current order set. These potential changes can be reconciled by consulting your subject matter experts at

your hospital.

Step 5: Send order set out for review

Once you have identified updates to your heart failure admission order set, you will need to send it out for review. Note that each hospital may have an established review and approval process.

Implementing Changes to an Order Set in Epic

The standard (Epic) order set for Enhance Ontario already contained most of the E2P key principles. Upon detailed review with the non-invasive Cardiology and Medical workgroups and site assigned subject matter experts, the team agreed on enhancements that would improve transitions in care for people with heart failure. As part of existing governance, there is an order set working group that is responsible for reviewing and ensuring approval is met from each of the 7 MACs that are part of the region. Once changes were reviewed, approved and ready to be implemented, we gathered another group of site specific leads that would be able to support the changes with front line staff once live.

For the order set, Enhance Ontario focused on ensuring required orders were preselected and by creating some new sections on the order set to meet best practice requirements as defined by E2P.

Ensuring that sites were aware of the changes made, prior to the changes going live, a tip sheet was created and shared with SMEs and leads as mentioned above.

Discharge Summary - Key Principles

The following key principles of a quality after visit summary and discharge summary outline the crucial components of both documents. These elements should be incorporated in both documents in order to improve communication with patients and receiving clinicians, and enable seamless transitions in care. Note that hospitals may connect with local PFAs to ensure that enhancements are appropriate.

After Visit Summary

The patient discharge summary must be a comprehensive document with literacy appropriate instructions and patient education materials. A completed patient discharge summary helps patients successfully transition from the hospital. The following elements will need to be incorporated in the patient discharge summary:

Reason for Visit/Chief Complaint/Diagnosis

At the time of discharge, the patient should be provided with a document that explains why they were in the hospital. The hospital stay can be an overwhelming time for patients, and having a clear description of the main problem and why the patient was in the hospital is important.

Medication Reconciliation

Including an updated list on new, changed, and discontinued medications with a rationale on what these medications are for and/or why they were changed is important for the patient to know upon transitioning home. This is consistent with what is being highlighted in the Patient Oriented Discharge Summary practice guide.

Follow Up Appointments

Follow up appointments including location, date, time, and a contact number if the patient has any questions about the appointment enables a seamless transition in care. In a survey, patients reported that often times it is unclear whether they are to call the clinic and book the appointment, or if the clinic will contact them. Sites are encouraged to make this distinction clear in the discharge summary and also during the discharge process.

Guidance on How to Manage Heart Failure at Home

When being discharged from the hospital with heart failure, there are many signs and symptoms that a patient needs to look out for. This education can be incorporated within the discharge summary, or as a separate pamphlet/booklet. According to the American College of Cardiology, some key items on their discharge checklist to include in your discharge documentation and to discuss with the patient are:

- Activity level
- Dietary sodium restriction
- Fluid restriction
- Daily weight monitoring
- Assessment of peripheral edema
- List of worsening signs for decompensation
- Rationale for the change or indication of new/changed medications
- Who to call for increased weight/worsening symptoms

Discharge Summary

The primary function of a provider discharge summary is to provide a complete summary of a patient's visit and enable transitions in care by providing a discharge plan to receiving clinicians. This must be distributed in a timely manner in order to ensure a seamless transition to providers outside the hospital. The following elements must be incorporated in the provider discharge summary:

Date of Admission and Discharge

According to the primary care provider representatives in the E2P Topic Expert Group, University Health Network (UHN), and a systematic review that looked at optimizing the quality of hospital discharge summaries, an admission date and discharge date are key information to include in the provider discharge summary. This helps inform the receiving clinician on how long the patient's length of stay was and also when the patient was discharged from the hospital so that subsequent follow up can be arranged in a timely manner.

Primary Discharge Diagnosis

The E2P Topic Expert Group identified that it is helpful to have one primary discharge diagnosis or most responsible diagnosis clearly highlighted on the discharge document. This is in accordance with suggestions and evidence from UHN and HIM. As per feedback from primary care providers, it is important to have the main discharge diagnosis clearly indicated in the beginning of the provider discharge summary.

Medication Reconciliation

Literature consistently suggested that a full medication reconciliation is essential to include in the discharge summary. CPSO encourages physicians to include any changes to ongoing medications and the rationale for these changes. This was also echoed by the E2P Topic Expert Group.

Follow up Plan

Having a clear follow up plan for the receiving clinician is crucial for a seamless transition in care. UHN suggests an itemized follow up plan with instructions for the receiving clinician, as well as a list of follow up arrangements and referrals scheduled/ to be scheduled. This is echoed by the HIM key principles and CPSO.

Significant Lab, Diagnostic Imaging, and Pertinent Results

Including labs, diagnostic imaging, and pertinent results that are related to the patient's heart failure diagnosis and stay in the hospital can help the receiving clinician better understand the admission, care provided, and patient's post discharge needs. As per the E2P Ontario Topic Expert Group, labs relating to renal function, potassium, sodium, and the patient's weight upon discharge are key indicators of a patient's condition upon discharge.

It is beneficial for the follow up care providers to be aware of relevant lab, DI, and pertinent results for a seamless transition to home. The recommendation is to only include the significant content from these reports to reduce content fatigue.

After Visit Summary

The standard (Epic) AVS and discharge summary for the Enhance Ontario already contained most of the E2P key principles. Upon detailed review with the non-invasive Cardiology and Medical workgroups and site assigned subject matter experts, the team agreed on enhancements that would improve transitions in care for people with heart failure. Once changes were reviewed, approved and ready to be implemented, we gathered another group of site specific leads that would be able to support the changes with front line staff once live.

For the AVS, the focused on standardizing Patient instruction and facilitating the inclusion of discharge education in the AVS. An internal team reviewed the current AVS for each of the sites and completed a gap analysis related to the key principles set out by E2P. The current AVS was compliant with all recommendations from E2P, apart from some sites not having access to Lexicomp/UpToDate information that would provide current heart failure education. This issue was quickly rectified, which then ensured all sites had access to standardized education for all CHF patients. They also created SmartText that would allow for pre populated CHF patient instructions..

After going live, we found that there was poor compliance with measuring and documenting daily weight. After discussions with our Nursing SMEs, we changed the default time assigned to the weight order from 0600 to 0700. This allowed the task to populate on the day shift's brain.

Discharge Summary

The discharge summary enhancements were tackled using a similar approach to the AVS above. An internal team reviewed the current discharge summary against the key principles set out by E2P and outlined the changes required. There were minimal changes required, however It was agreed that the creation of a CHF specific Provider Discharge Summary would make it easier for providers and support compliance. The redesigned CHF Discharge Summary will have selected test results, weight trends, and a new direct link to add Patient Instructions to the AVS.

Rounding Reports

To further support clinical decision making, Enhance Ontario also created CHF

Rounding Report that includes streamlines flowsheet data and CHF metric Smartform. The report also contains separate sections for in hospital and at home diuretics. The GDMT Meds Prescribed at Home section displays the patient's CHF specific medications at home. Additionally, the report contains direct links to open the GDMT order set and link to the CHF Discharge Summary Note.

Streamlined Flowsheet data The flowsheet data section will include basic vitals, weight trends, cumulative intake, cumulative output, net I/O, current diuretics, and Guideline Directed Medical Therapy (GDMT) information.

The CHF Rounding Metric SmartForm will guide users towards the best guideline directed treatments when managing CHF. The SmartForm can be accessed and updated throughout admission by clicking on the section's title. Recommended medications that are already prescribed will appear as preselected. The SmartForm also provides the option to defer a recommended treatment and include a deferral reason. This SmartForm snapshot makes it easier for clinicians to review the current plan of care and make updates if necessary.

Heart Failure Process Indicators

The below includes a compilation of process indicators that can be measured for patients with a main diagnosis of heart failure. These indicators focus on the inpatient setting and were created based on the Heart Failure Quality Standard and Heart Failure Quality Based Procedure. These indicators are relevant to the main quality statements implemented, or E2P Ontario pilot sites have deemed that the indicator is measurable within Health Information Systems and valuable to collect for quality improvement opportunities. Reasons for not including indicators include them being patient self-reported, beyond the time frame of this project, not documented in HIS' and more.

Heart Failure Inclusion Criteria

- Data Source: DAD (coded data = CIHI Discharge Abstract Database)
- Patients with a Most Responsible Diagnosis of I500 (Congestive Heart Failure)
- Patients that were discharged within the reporting month

E2P Process Indicator	**Percentage of patients with heart failure who have the heart failure admission order set ordered**
Numerator and Denominator	Numerator: # of patients with heart failure who have the heart failure admission order set ordered Denominator: # of patients with a main diagnosis of heart failure
Definitions	This indicator looks at the percentage of patients with heart failure who had a Heart Failure Admission Order Set ordered. The enhanced order set was built to include recommendations from the Heart Failure Quality Standard (QS), Heart Failure QBP (Quality Based Procedure) the Canadian Heart Failure Society (CHFS) Heart Failure Admission Order Set, and more.

E2P Process Indicator	**Percentage of patients with heart failure who have their daily weight ordered**
Numerator and Denominator	Numerator: # of patients with heart failure who have a daily weight ordered Denominator: # of patients with a main diagnosis of heart failure
Definitions	This indicator reviews the percentage of patients with heart failure who had a daily weight ordered, which aligns with recommendations from the Heart Failure QS. It is recommended that when diagnosing heart failure, clinicians assess for weight change (Quality Statement 1). Also, patients with heart failure are encouraged to measure their weight daily as a part of self-management (Quality Statement 3).
E2P Process Indicator	**Percentage of patients with heart failure who have their weight measured daily for the first 3 days**
Numerator and Denominator	Numerator: # of patients with major depression who at least 1 weight record daily for the first 3 days from date of registration Denominator: # of patients with a main diagnosis of heart failure
Definitions	In the acute care setting, nurses typically assist patients with obtaining a daily weight, typically in the morning before breakfast. This metric looks at the percentage of heart failure patients who have at least 1 weight recorded daily for the first 3 days from registration. 3 days was chosen by cardiology subject matter experts as this is the average length of the acute stabilization phase.

E2P Process Indicator	**Percentage of patients with heart failure who have their intake and output ordered**
Numerator and Denominator	Numerator: # of patients with heart failure who have their intake and output ordered Denominator: # of patients with heart failure
Definitions	In accordance with the Heart Failure QBP, it is recommended that intake and output be measured every 6 hours (Module 2.1 Acute Care Stabilization). In this report, an intake and output order regardless of frequency qualified as meeting the standard. As per heart failure subject matter experts, orders for intake and output vary depending on the acuity of patient, therefore capturing that an order was entered sufficed as meeting the standard.
E2P Process Indicator	**Percentage of patients with heart failure who have their Intake and output documented at least once a day for 3 days**
Numerator and Denominator	Numerator: # of patients heart failure who have their intake and output documented at least once daily for the first 3 days from their date of registration Denominator: # of patients with a main diagnosis of major depression
Definitions	The Heart Failure QS and Heart Failure QBP don't specify how many days intake and output should be monitored, but as per the explanation above, there is a recommendation from the QBP to monitor this. Based on consultation with cardiologists, 3 days was chosen as this is the average length of the acute stabilization phase.
E2P Process Indicator	**Percentage of patients with heart failure who**

	have low sodium intake ordered (includes heart healthy or low sodium equivalent diet)
Numerator and Denominator	Numerator: # of patients with heart failure who have low sodium intake (includes a heart healthy or low sodium equivalent diet) ordered Denominator: # of patients with a main diagnosis of heart failure
Definitions	In the Heart Failure QS, assessing sodium intake as a part of the Medical History is recommended. In parallel, the Heart Failure QBP suggests sodium intake measurement for patients with heart failure. A low sodium intake diet order is a way to ensure that patients admitted with heart failure are adhering to the appropriate sodium requirements.
E2P Process Indicator	**Percentage of patients with heart failure who had a chest x-ray completed once in the first 3 days from their registration**
Numerator and Denominator	Numerator: # of patients with heart failure who had a chest x-ray completed once in the first 3 days Denominator: # of patients with a main diagnosis of heart failure
Definitions	According to the Heart Failure QS, a chest x-ray should be part of an initial evaluation for patients with suspected heart failure.
E2P Process Indicator	**Percentage of patients with heart failure who are given intravenous furosemide given at least twice daily during the during the first 3 days of admission.**
Numerator and Denominator	Numerator: # of patients with heart failure who are given intravenous furosemide at least twice daily during the first 3 days of admission.

	Denominator: # of patients with a main diagnosis of heart failure
Definitions	Loop diuretics are listed as additional medications for patients with HFrEF in the Heart Failure QS. Furosemide is recommended to be given twice daily intravenously in the acute stabilization phase as per the Heart Failure QBP for moderate intensity heart failure. The QBP does not specify how long the loop diuretic should be given. Patients with heart failure are routinely started on IV furosemide BID upon admission, but the duration of this treatment depends on the patient's presentation. In consultation with a cardiologist, if IV furosemide is given twice daily within the first 3 days of admission, the standard is met. The goal is to successfully diurese the patient, and wean them off intravenous furosemide to oral furosemide as soon as it is safe to do so.
E2P Process Indicator	**Percentage of patients with heart failure who have their initial labs completed (CBC, electrolytes, glucose, creatinine, PT and/or INR) within the first 24h of registration**
Numerator and denominator	Numerator: # of patients with heart failure who have their initial labs completed within the first 24h of registration Denominator: # of patients with a main diagnosis of heart failure
Definitions	The Heart Failure QS lists complete blood count, serum electrolytes, serum creatinine, blood urea nitrogen (BUN), glucose, thyroid stimulating hormone (TSH), and glycated hemoglobin as the minimum investigative laboratory investigations for a person with heart failure. All 5 labs need to be

	completed for this standard to be met. TSH and glycated hemoglobin were left out as mandatory initial labs, since they are optional within the 2021 CHF Heart Failure Admission Order Set. Also, the Choosing Wisely campaign encourages clinicians to only order BUN if it provides information on renal function above and beyond what creatinine can offer, thus BUN was not included in the list of initial labs to meet the standard.
E2P Process Indicator	**Percentage of patients with heart failure who had blood urea nitrogen resulted once during the admission**
Numerator and denominator	Numerator: # of patients with heart failure who have their blood urea nitrogen completed once during the admission Denominator: # of patients with a main diagnosis of heart failure
Definitions	BUN was measured separately from the initial labs since it is not listed as a mandatory lab within the CHFS Heart Failure Admission Order Set, but was mentioned in the Quality Standard.
E2P Process Indicator	**Percentage of patients with heart failure who had BNP resulted once during the admission**
Numerator and denominator	Numerator: # of patients with heart failure who had BNP resulted once during the admission Denominator: # of patients with a main diagnosis of heart failure
Definitions	As per the Heart Failure QS, natriuretic peptide (BNP) testing should be used judiciously, because it is expensive and not always useful in the diagnosis of heart failure. This was left out of the list of initial labs, but still included as a metric in this report, as

	BNP is pre-selected as a laboratory investigation in the CHFS Heart Failure Admission Order Set.
E2P Process Indicator	**Percentage of patients with heart failure whose first serum troponin resulted within the first 24h of admission and the second troponin resulted within 8 hours of the first.**
Numerator and denominator	Numerator: # of patients with heart failure who had their first serum troponin resulted within 24h of admission, and the second troponin resulting within 8 hours of the first Denominator: # of patients with a main diagnosis of heart failure
Definitions	An initial troponin is defaulted in the CHFS Heart Failure Admission Order Set. Also, the QBP recommends troponin measurements as a part of initial investigations to rule out acute coronary syndrome.
E2P Process Indicator	**Percentage of patients with heart failure who had an electrocardiogram completed once during admission within the first 3 days**
Numerator and denominator	Numerator: # of patients with heart failure who had an electrocardiogram completed once during admission within the first 3 days Denominator: # of patients with a main diagnosis of heart failure
Definitions	According to the HF Quality Standard, an electrocardiogram should be performed as part of the initial investigation (Quality Statement 1). Also, the percentage of patients with heart failure who receive an electrocardiogram as a part of their initial investigation is one of the process indicators in the HF Quality Standard.

E2P Process Indicator	**Percentage of patients with heart failure who had an echocardiogram ordered during admission.**
Numerator and denominator	Numerator: # of patients with heart failure who had an echocardiogram ordered during admission Denominator: # of patients with a main diagnosis of heart failure
Definitions	In the HF Quality Standard, it is recommended that an echocardiogram is ordered if heart failure is suspected after the initial laboratory investigations (Quality Statement 1).
E2P Process Indicator	**Percentage of patients with heart failure who have quadruple therapy prescribed during the admission**
Numerator and denominator	Numerator: # of patients with heart failure who have quadruple therapy prescribed during the admission Denominator: # of patients with a main diagnosis of major depression who have an ejection fraction of < 40% **E2P Update:** Most HIS systems do not have a discrete data element for ejection fraction result to calculate this indicator. Therefore, the program recommends future sites to measure the overall pre- post implementation prescription for drug class A, B, C, and/or D ordered during admission for heart failure patients. Particularly the MRA (class C) and SGLT2i (class D) which are newer additions to the HF guidelines, unlike class A and class B medications.
Definitions	As per the Heart Failure QS, patients with an ejection fraction of less than 40% should be dispensed quadruple therapy (Quality Statement

	5). This standard is met if the person is prescribed at least one medication from each category: 1. An angiotensin receptor-neprilysin inhibitor (ARNI) or angiotensinconverting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) 2. A beta blocker 3. A mineralocorticoid receptor agonist (MRA) A sodium glucose transport 2 (SGLT2) inhibitor
E2P Process Indicator	**Percentage of patients with heart failure who have an enhanced patient discharge summary provided to patient/family upon discharge from the hospital**
Numerator and denominator	Numerator: # of patients with heart failure who have a patient discharge summary printed upon discharge from the hospital Denominator: # of patients with a main diagnosis of heart failure
Definitions	The HF Quality Standard makes recommendations on a transition from hospital to home, one of which is for the patient to receive a follow up appointment within 7 days of discharge. The E2P Ontario program approached this quality standard by focusing on digital functionalities that help patients transition out of the hospital, such as a discharge summary. In the Transitions from Hospital to Home Quality Standard, it is recommended that patients transitioning from hospital to home should have the information and support they need to manage their health care needs after the hospital stay (Quality Statement 4). This process indicator measures the percentage of patients with heart failure who have an enhanced

	(meets the E2P key principles) patient discharge summary upon discharge from the hospital.
E2P Process Indicator	**Percentage of patients with heart failure who have education provided (e.g., instructions on how to manage their heart failure) during their admission**
Numerator and denominator	Numerator: # of patients with heart failure who receive heart failure related education Denominator: # of patients with a main diagnosis of heart failure
Definitions	Before leaving the hospital, the Heart Failure QS recommends that patients should have self-care instructions on how to manage their heart failure, warning signs and symptoms to watch out for, and changes to diet or physical activity (Quality Statement 4). Patients can receive education in various forms, such as pamphlets or booklets from the interdisciplinary team. Each organization may disseminate and document on education given in different ways.
E2P Process Indicator	**Percentage of patients with heart failure who had an enhanced provider discharge summary completed within 48 hours after discharge**
Numerator and denominator	Numerator: # of patients with heart failure who have an enhanced provider discharge summary completed within 48 hours of discharge Denominator: # of patients with a main diagnosis of heart failure
Definitions	As per the HF QS, part of a seamless transition from hospital to home also includes ensuring that receiving clinicians receive the necessary information about a patient's hospital stay (Quality

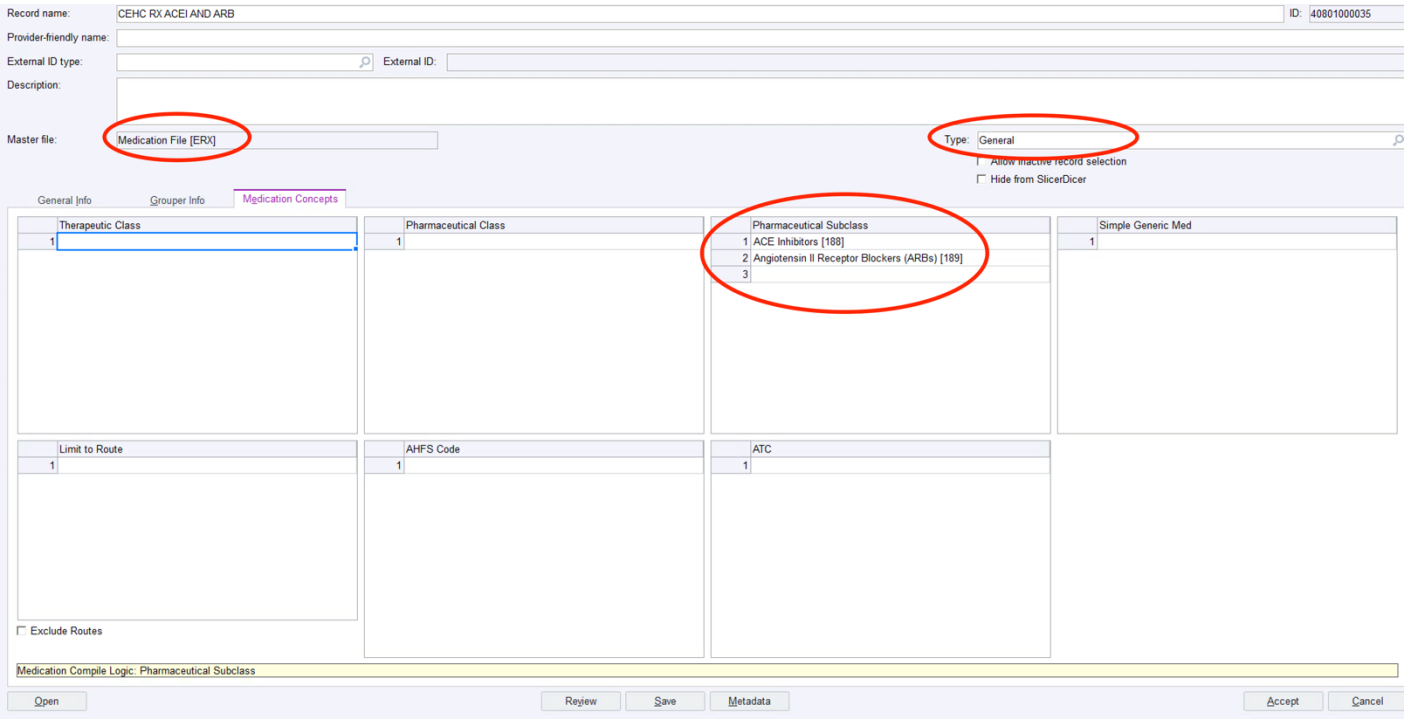
	Statement 9). According to the document on Transitions Between Hospital and Home developed by Health Links and the Clinical Reference Group, physician discharge summaries should be completed within 48 hours after discharge. This process indicator measures the percentage of patients who receive an enhanced provider discharge summary (meets the E2P provider discharge summary key principles) upon discharge.

Technical Approach

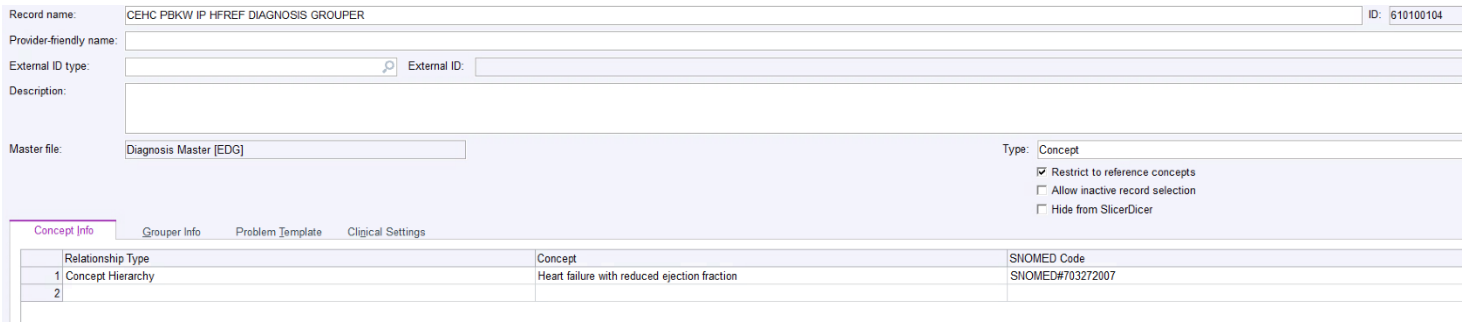
Upon detailed review of the required Indicators as set out by E2P, Enhance Ontario's analyst team created a list of data fields required for the report. Fields included order set INIs, flowsheet ID/INIs, procedure code INIs and Medication/Medication Categories. Working with the physician builder, groupers were created to support the reporting process.

Cardiac Medication Groupers (VCG)

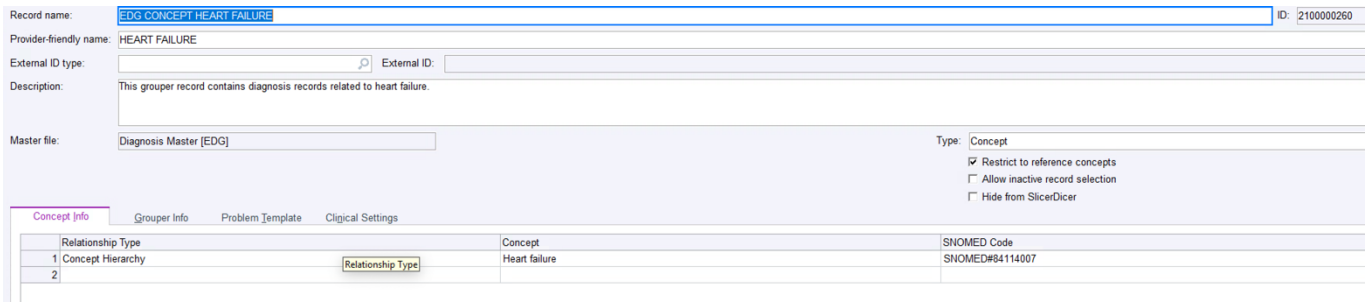
Used in various CER/LPG builds for decision support – MRA, SGLT2, Cardiac Beta blocker (used Simple Generic Med to only include carvedilol, metoprolol and bisoprolol), ARNI, ACE/ARB, and Isosorbide Dinitrate (ISDN).



CHF diagnosis grouper: HFREF (used for reporting)



CHF (used for BPA/Denominator population)



Once built, the Cogito analyst worked closely with the Willow, Clin Doc and

Orders analysts to audit the report and refine the parameters to the data being pulled. This process was intensive, as chat audits were required to better understand when the patient did or did not meet a requirement, and to ensure all data points were accounted for. After completing the internal audit, the report was sent to local SMEs to review the data and provide feedback.

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