Quality-Based Procedures: Clinical Handbook for **Heart Failure (Acute and Postacute)**

Health Quality Ontario &
Ministry of Health and Long-Term Care

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(This handbook includes, in its acute phase, an update of the Clinical Handbook for Congestive Heart Failure, published in April 2013.)

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Conflict of Interest Statement

All authors in the Evidence Development and Standards branch at Health Quality Ontario are impartial. There are no competing interests or conflicts of interest to declare.

About Health Quality Ontario

Health Quality Ontario is an arms-length agency of the Ontario government. It is a partner and leader in transforming Ontario's health care system so that it can deliver a better experience of care, better outcomes for Ontarians, and better value for money.

Health Quality Ontario strives to promote health care that is supported by the best available scientific evidence. Health Quality Ontario works with clinical experts, scientific collaborators, and field evaluation partners to develop and publish research that evaluates the effectiveness and cost-effectiveness of health technologies and services in Ontario.

Based on the research conducted by Health Quality Ontario and its partners, the Ontario Health Technology Advisory Committee (OHTAC)—a standing advisory subcommittee of the Health Quality Ontario Board—makes recommendations about the uptake, diffusion, distribution, or removal of health interventions to Ontario's Ministry of Health and Long-Term Care, clinicians, health system leaders, and policy makers.

Rapid reviews, evidence-based analyses and their corresponding OHTAC recommendations, and other associated reports are published on the Health Quality Ontario website. Visit http://www.hqontario.ca for more information.

About the Quality-Based Procedures Clinical Handbooks

As legislated in Ontario's *Excellent Care for All Act*, Health Quality Ontario's mandate includes the provision of objective, evidence-informed advice about health care funding mechanisms, incentives, and opportunities to improve quality and efficiency in the health care system. As part of its Quality-Based Funding initiative, Health Quality Ontario works with multidisciplinary expert advisory panels (composed of leading clinicians, scientists, and administrators) to develop evidence-based practice recommendations and define episodes of care for selected disease areas or procedures. Health Quality Ontario's recommendations are intended to inform the Ministry of Health and Long-Term Care's Health System Funding Strategy.

For more information on Health Quality Ontario's Quality-Based Funding initiative, visit www.hqontario.ca.

Disclaimer

The content in this document has been developed through collaborative efforts between the Ministry of Health and Long-Term Care, the Evidence Development and Standards branch at Health Quality Ontario, and the Acute and Postacute (Community) Care for Heart Failure Episode-of-Care Advisory Panel. The template for the Quality-Based Procedures Clinical Handbook and all content in the "Purpose" and "Introduction to Quality-Based Procedures" sections were provided in standard form by the Ministry. All other content was developed by Health Quality Ontario with input from the expert advisory panel. As it is based in part on rapid reviews and expert opinion, this handbook may not reflect all the available scientific research and is not intended as an exhaustive analysis. Health Quality Ontario assumes no responsibility for omissions or incomplete analysis resulting from its reports. In addition, it is possible that other relevant scientific findings may have been reported since completion of the handbook and/or rapid reviews. This report is current to the date of the literature search specified in the Research Methods section of each rapid review. This handbook may be superseded by an updated publication on the same topic. A list of all Health Quality Ontario's Quality-Based Procedures Clinical Handbooks is available at: http://www.hqontario.ca/evidence/publications-and-ohtac-recommendations/clinical-handbooks.

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List of Abbreviations

AGREE	Appraisal of Guidelines for Research & Evaluation
CCI	Canadian Classification of Health Interventions
CCS	Canadian Cardiovascular Society
DAD	Discharge Abstract Database
DNR	Do not resuscitate
ED	Emergency department
EHMRG	Emergency Heart Failure Mortality Risk Grade
Expert advisory panel	Acute Heart Failure Episode-of-Care Advisory Panel or Postacute (Community) Care for Heart Failure Episode-of-Care Advisory Panel
GRADE	Grades of Recommendation, Assessment, Development, and Evaluation
HARP	Hospital Admission Risk Prediction
HBAM	Health-Based Allocation Model
HF	Heart failure
HIG	HBAM Inpatient Grouper
ICD-10-CA	International Classification of Diseases
ICES	Institute for Clinical Evaluative Sciences
LHIN	Local Health Integration Network
LOS	Length of stay
LVAD	Left ventricular assistive device
MCC	Major clinical category
NACRS	National Ambulatory Care Reporting System
OHTAC	Ontario Health Technology Advisory Committee
QBP	Quality-Based Procedure
RCT	Randomized controlled trial

Preface

This document has been developed through collaborative efforts between the Ministry of Health and Long-Term Care, Health Quality Ontario, and its Acute Heart Failure Episode-of-Care Advisory Panel and Postacute (Community) Care for Heart Failure Episode-of-Care Advisory Panel (the "expert advisory panel").

The content in the following "Purpose" and "Introduction" sections were provided in standard form by the Ministry. Health Quality Ontario developed all other content with input from the expert advisory panels.

The content of this Clinical Handbook was developed to conform with specific deliverables agreed upon by the Ministry and Health Quality Ontario.

In the area of quality-based procedures, Health Quality Ontario will:

- Take a provincial leadership role in knowledge translation related to quality-based procedures (QBP) work.
- Include in their analyses consultations with clinicians and scientists who have knowledge and expertise in identified priority areas, either by convening a reference group or engaging an existing resource of clinicians and scientists.
- Work with the reference group to:
  - Define the population or patient cohorts for analysis and refine inclusion and exclusion criteria for the QBP, using data to review use and length of stay (LOS) trends.
  - Develop clinical best practices for defined QBP including transition to the community.
  - Seek consensus on a set of evidence-based clinical pathways and standards of care for each episode of care.
- Submit to the Ministry, within the deadlines set by the Agreement, a draft report and clinical handbook, including:
  - A summary of Health Quality Ontario's clinical engagement process.
  - Guidance on the real-world implementation of recommended practices contained in the Clinical Handbook, with a focus on implications for multidisciplinary teams, service capacity planning considerations, and new data collection requirements.

The Ministry also asked Health Quality Ontario to recommend performance indicators aligned with the chosen episodes of care, in order to inform the Ministry's Integrated Scorecard and to provide guidance on real-world implementation of the recommended practices contained in the Clinical Handbook. The Ministry asked that recommendations focus on implications for multidisciplinary teams, service capacity planning considerations, and new data collection requirements.

Key Principles

Discussions between Health Quality Ontario, expert advisory panels, and the Ministry established a set of key principles or "ground rules" to guide this evolving work:

- **Handbook analysis does not involve costing or pricing.** The Ministry will complete all costing and pricing related to the QBP funding methodology by using a standardized approach, informed by the content produced by Health Quality Ontario. This principle also extends to the deliberations of the expert advisory panels, where discussions are steered away from considering the dollar cost of particular interventions or models of care and instead toward focusing on quality considerations and noncost measures of use, such as LOS.
- **The scope of this work includes both hospital care and postacute, community care.** Recognizing the importance of this issue, the Ministry has communicated that conditions analyzed will span all parts of the continuum of care.
- **Recommended practices, supporting evidence, and policy applications will be reviewed to determine if an updated is required, at least every 2 years**. The limited time frame provided for completion of this work meant that many of the recommended practices in this document could not be assessed with the full rigour and depth of Health Quality Ontario's established evidence-based analysis process. Recognizing this limitation, Health Quality Ontario reserves the right to revisit the recommended practices and supporting evidence later by conducting a full evidence-based analysis or to update this document with relevant newly published research. In cases where episode-of-care models are updated, any policy applications informed by the models should also be similarly updated.
  Consistent with this principle, the Ministry has stated that QBP models will be reviewed at least every 2 years.
- **Recommended practices should reflect the best patient care possible, regardless of cost or barriers to access.** Health Quality Ontario and its expert advisory panels are instructed to focus on defining best practice for an *ideal* episode of care, regardless of cost implications or potential barriers to access. Hence, the resulting cost implications of the recommended episodes of care are unknown. However, all of the expert advisory panels have discussed various barriers that will challenge implementation of their recommendations across the province. These include gaps in measurement capabilities for tracking many of the recommended practices, shortages in health human resources, and limitations in community-based care capacity in many parts of the province.
  Some of these barriers and challenges are briefly addressed in the section "Implementation of Best Practices." However, with the limited time available to address these issues, the considerations outlined here should be viewed as only an initial starting point toward a comprehensive analysis of these challenges.

Finally, Health Quality Ontario and the expert advisory panels recognize that, given the limitations of their mandate, the ultimate effect of the analysis and advice in this document will depend on how the Ministry incorporates it into the QBP policy and funding methodology. This work will be complex, and it will be imperative to ensure that any new funding mechanisms are aligned with the recommendations of the expert advisory panels.

In addition to aiding decisions regarding funding methodology, recommended practices can also provide the basis for broader provincial standards of care for patients with heart failure. These standards could be linked not only to funding mechanisms, but to other health system change levers, such as guidelines and care pathways, performance measurement and reporting, program planning, and quality improvement.

Purpose

Provided by the Ministry of Health and Long-Term Care

This Clinical handbook has been created to serve as a compendium of the evidence-based rationale and clinical consensus driving the development of the policy framework and implementation approach for the management of acute and postacute heart failure.

This document has been prepared for informational purposes only. It does not mandate health care providers to provide services in accordance with the recommendations included herein. The recommendations included in this document are not intended to take the place of the professional skill and judgment of health care providers.

Introduction to Quality-Based Procedures

Provided by the Ministry of Health and Long-Term Care

The Ministry of Health and Long-Term Care (ministry) established Health System Funding Reform (HSFR) in Ontario in 2012 with a goal to develop and implement a strategic funding system that promotes the delivery of quality health care services across the continuum of care and is driven by evidence and efficiency. HSFR is based on the key principles of quality, sustainability, access, and integration, and aligns with the four core principles of the *Excellent Care for All Act* (ECFAA):

- Care is organized around the person to support their health;
- Quality and its continuous improvement is a critical goal across the health system;
- Quality of care is supported by the best evidence and standards of care; and
- Payment, policy, and planning support quality and efficient use of resources.

Since its inception in April 2012, the ministry has shifted much of Ontario's health care system funding away from the its current global funding allocation (currently representing a large proportion of funding) toward a funding model that is founded on payments for health care based on best clinical evidence-informed practices. HSFR comprises two key components:

- Organizational-level funding, which will be allocated as base funding using the Health-Based Allocation Model (HBAM); and
- Quality-Based Procedure (QBP) funding, which will be allocated for targeted activities based on a "(price x volume) + quality" approach premised on evidence-based practices and clinical and administrative data.

"Money Follows the Patient"

Prior to the introduction of HSFR, a significant proportion of hospital funding was allocated using a global funding approach, with specific funding for select provincial programs, wait times services, and other targeted activities. However, a global funding approach may not account for complexity in patients, service levels, and costs, and it may reduce incentives to adopt clinical best practices that result in improved patient outcomes in a cost-effective manner. These variations in patient care evident in the global funding approach warranted a move toward a system in which "the money follows the patient."

Under HSFR, provider funding is based on the types and quantities of patients providers treated, the services they delivered, the quality of care delivered, and patient experiences/outcomes. Specifically, QBPs incent give health care providers an incentive to become more efficient and effective in their patient management by accepting and adopting clinical best practices that ensure Ontarians get the right care, at the right time and in the right place.

QBPs were initially implemented in the acute care sector, but as implementation evolves, they are being expanded across the continuum of care, including the community home care sector, to address the varying needs of different patient populations.

Internationally, similar models have been implemented since 1983. Ontario is one of the last leading jurisdictions to move down this path, but this positions the province uniquely to learn from international best practices and pitfalls to create a sustainable, efficient, and effective funding model that is best suited for the province and the people of Ontario.

What Are Quality-Based Procedures?

QBPs are clusters of patients with clinically related diagnoses or treatments who have been identified using an evidence-based framework as providing an opportunity for process improvements, clinical redesign, improved patient outcomes, enhanced patient experience, and potential health system cost savings.

Initially developed in the acute (hospital) sector, QBPs were defined as "procedures." However, implementation has evolved since the introduction of QBPs in 2012, and the approach has as well. Currently, the expanded focus is on care provided in other parts of the health care sector, and on a more functional/programmatic/population-based approach. As a result, the definition of QBPs is expanding to include quality-based procedures, programs, and populations.

QBPs have been selected using an evidence-based framework. The framework uses data from various sources such as, but not limited to: the Discharge Abstract Database (DAD) and the National Ambulatory Care Reporting System (NACRS), adapted by the ministry for its HBAM repository. The HBAM Inpatient Grouper (HIG) groups inpatients based on the diagnosis or treatment responsible for the majority of their patient stay. Additional data have been used from the Ontario Case Costing Initiative (OCCI) and the Ontario Cost Distribution Methodology (OCDM). Evidence published in literature from Canada and international jurisdictions, as well as in World Health Organization reports, has also assisted with the definition of patient clusters and the assessment of potential opportunities (e.g., reducing variation, improving patient outcomes, sustainability).

The evidence-based framework assesses patients using five perspectives, as presented in Figure 1. This evidence-based framework has identified QBPs with the potential to improve quality of care, standardize care delivery across the province, and show increased cost-efficiency.

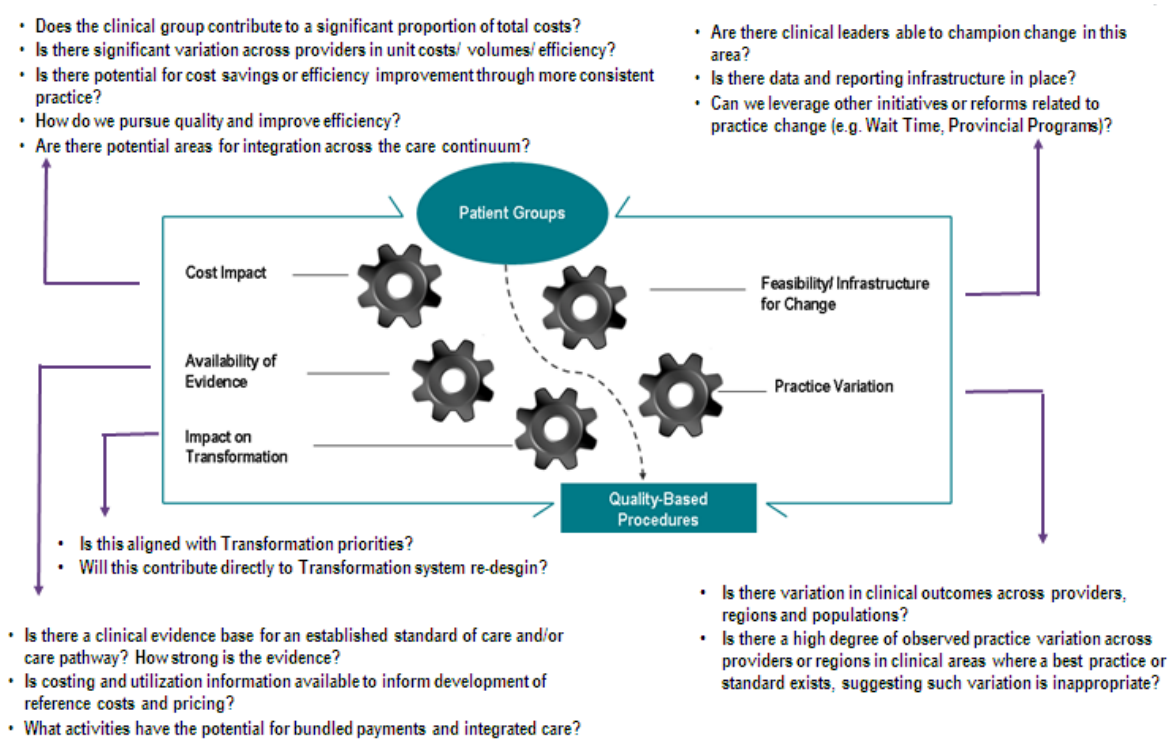

Figure 1: Evidence-Based Framework

Practice Variation

Practice variation is the cornerstone of the QBP evidence-based framework. A demonstrated large practice or outcome variance across providers or regions in clinical areas, where a best practice or standard exists, represents a significant opportunity to improve patient outcomes by focusing on the delivery of standardized, evidence-informed practices. A large number of "beyond expected length of stay" and a large standard deviation for length of stay and costs have been flags to such variation.

Availability of Evidence

A significant amount of research has been conducted and collected, both nationally and internationally, to help develop and guide clinical practice. Working with clinical experts, best practice guidelines and clinical pathways can be developed for QBPs and establish appropriate evidence-informed indicators. These indicators can be used to measure the quality of care and help identify areas for improvement at the provider level, and to monitor and evaluate the impact of QBP implementation.

Feasibility/Infrastructure for Change

Clinical leaders play an integral role in this process. Their knowledge of the identified patient populations and the care currently provided and/or required for these patients represents an invaluable element in the assessment of much needed clinical delivery and clinical process improvements. Many groups of clinicians have already developed care pathways to create evidence-informed practice. There is now an opportunity for this knowledge to be transferred provincially.

Cost Impact

The provincial footprint from a financial perspective also impacts the selection of the QBP. This may include QBPs that are high-volume and low-cost, as well as those that are low-volume and high-cost (i.e., specialized procedures that demonstrate an opportunity for improvement).

A selected QBP should have, as a guide, no fewer than 1,000 cases per year in Ontario and represent at least 1% of the provincial direct cost budget. For patient cohorts that fall below these thresholds, the resource requirements to implement a QBP can be restrictive. Even where the patient cohorts represent an opportunity for improvement, it may not be feasible to create a QBP, even if there are some cost efficiencies.

Impact on Transformation

The *Action Plan for Health Care* was launched in January 2012 and is already making a difference to Ontarians and the Ontario health care system:

- We have bent the cost curve since 2011/2012;
- We are improving the health of Ontarians;
- We are enhancing the experience of Ontarians when they use the health care system; and
- We are working with our health sector partners to improve the quality of health care.

The next phase of transformation will build on and deepen implementation of the action plan. HSFR is a key element of the health system transformation agenda because it ensures sustainability and quality.

Selected QBPs should, where possible, align with the government's transformational priorities. In addition, the impact on the transformation of certain patient populations not previously prioritized by the framework can be included as QBPs. This will ensure that QBPs are wide ranging in their scope (e.g., paediatric patient populations or patients requiring community care). QBPs with a lower cost impact but a higher impact on the provincial health care system may still be a high priority for creation and implementation.

How Will QBPs Encourage the Delivery of High-Quality, Evidence-Based Care and Innovation in Health Care Delivery?

The QBP methodology is driven by clinical evidence and best practice recommendations from expert advisory panels. Expert advisory panels comprise a cross-sectoral, multi-geographic, and multidisciplinary membership, including representation from patients. Members leverage their clinical experience and knowledge to define patient populations and recommend best practices.

Once defined, best practice recommendations are used to understand the required resource utilization for QBPs and will further assist in the development of evidence-informed prices. The development of evidence-informed pricing for the QBPs is intended to give health care providers an incentive to adopt best practices in their care delivery models, maximize their efficiency and effectiveness, and engage in process improvements and/or clinical redesign to improve patient outcomes.

Best practice development for QBPs is intended to promote the standardization of care by reducing inappropriate or unexplained variation and ensuring that patients get the right care at the right place and at the right time. Best practice standards will encourage health service providers to ensure that appropriate resources are focused on the most clinically effective and cost-effective approaches.

QBPs create opportunities for health system transformation where evidence-informed prices can be used as a financial lever to incent providers to:

- adopt best practice standards
- re-engineer their clinical processes to improve patient outcomes
- improve coding and costing practices
- develop innovative care delivery models to enhance the experience of patients

An integral part of the enhanced focus on quality patient care is the development of indicators to allow for the evaluation and monitoring of actual practice and support ongoing quality improvement.

In addition, the introduction of additional QBPs—such as outpatient and community-based QBPs—will further help integrate care across sectors and encourage evidence-based care across the health care continuum.

Methods

Overview of Episode-of-Care Analysis Approach

To produce this work, Health Quality Ontario has developed a novel method known as an *episode-of-care analysis* that draws conceptually and methodologically from several of Health Quality Ontario's core areas of expertise:

- **Evidence Based Analyses**: Recommended practices incorporate components of Health Quality Ontario's evidence-based analysis method and draw from the recommendations of the Ontario Health Technology Advisory Committee (OHTAC).
- **Case-mix grouping and funding methodology:** Cohort and patient group definitions use clinical input to adapt and refine case-mix methods from the Canadian Institute for Health Information (CIHI) and the Ontario Health-Based Allocation Model (HBAM).
- **Clinical practice guidelines and pathways:** Recommended practices synthesize guidance from credible national and international bodies, with attention to the strength of evidence supporting each guideline.
- **Analysis of empirical data:** Expert advisory panel recommendations were supposed by descriptive and multivariable analysis of Ontario administrative data (e.g., Discharge Abstract Database and National Ambulatory Care Reporting System) and data from disease-based clinical data sets (e.g., the Ontario Stroke Audit and Enhanced Feedback for Effective Cardiac Treatment databases). Health Quality Ontario works with researchers and Ministry analysts to develop analyses for the expert advisory panel's review.
- **Clinical engagement**: All aspects of this work were guided and informed by leading clinicians, scientists, and administrators with a wealth of knowledge and expertise in the clinical area of focus.
- **Performance indicators**: Health Quality Ontario has been asked to leverage its expertise in performance indicators and public reporting to support the development of measurement frameworks to manage and track actual performance against recommended practices in the episodes of care.

Phases of Development

This full continuum of the episode of care was developed in 3 phases:

Phase 1: developed the acute episode of care
Phase 2: developed the postacute (or "community") episode of care
Phase 3: updated the acute episode of care and integrated with the postacute episode of care for one coherent continuum of care

Each phase had its own unique leadership, expert advisory panel membership, and stakeholders engaged. All individuals involved in all phases were aware of the previous work done and built on prior efforts to ensure consistency and flow between the phases. In 2012 the first expert advisory panel was created to develop the acute episode of care. Stemming from the work of this acute episode of care, another expert advisory panel was convened in fall 2013 to develop a postacute episode of care. Finally, in summer 2014 the acute episode of care was updated and at the same time integrated with the postacute episode of care to create one coherent continuum of care.

The development of the episode-of-care analysis involves the following key steps:

1. **Defining the cohort and patient stratification approach**
2. **Defining the scope of the episode of care**
3. **Developing the episode-of-care model**
4. **Identifying recommended practices, including the Rapid Review process**
5. **Supporting the development of performance indicators to measure the episode of care**

The following sections describe each of these steps in further detail.

Defining the Cohort and Patient Stratification Approach

At the outset of this project, the Ministry of Health and Long-Term Care provided Health Quality Ontario with a broad description of each assigned clinical population (e.g., "heart failure"), and asked Health Quality Ontario to work with the Acute Heart Failure Episode-of-Care Advisory Panel and Postacute (Community) Care for Heart Failure Episode-of-Care Advisory Panel to define inclusion and exclusion criteria for the cohort they would examine using data from routinely reported provincial administrative databases. Each of these populations might encompass multiple distinct subpopulations (referred to as "patient groups") with varying clinical characteristics. For example, the heart failure population includes subpopulations with HF, myocarditis, and cardiomyopathies. These patient groups have very different levels of severity, different treatments, and different distributions of expected resource use. Consequently, these groups could need different funding policies.

Conceptually, the process employed here for defining cohorts and patient groups shares many similarities with methods used around the world for the development of case-mix methodologies, such as Diagnosis-Related Groups or CIHI's Case Mix Groups. Case-mix methodologies have been used since the late 1970s to classify patients by similarities in clinical characteristics and in resource use for the purposes of payment, budgeting, and performance measurement (1). Typically, these groups are developed using statistical methods such as classification and regression tree analysis to cluster patients with similar diagnoses, procedures, age, and other variables. After the initial statistical criteria have been established, clinicians are often engaged to ensure that the groups are clinically meaningful. Patient groups are merged, split, and otherwise reconfigured until the grouping algorithm reaches a satisfactory compromise between cost prediction, clinical relevance, and usability. Most modern case-mix methodologies and payment systems also include a final layer of patient complexity factors that modify the resource weight (or price) assigned to each group upward or downward. These can include comorbidity, use of selected interventions, long- or short-stay status, and social factors.

In contrast with these established methods for developing case-mix systems, the approach the Ministry asked Health Quality Ontario and the expert advisory panels to undertake is unusual in that patient classification *begins* with the input of clinicians rather than with statistical analysis of resource use. The expert advisory panels were explicitly instructed not to focus on cost considerations, but instead to rely on their clinical knowledge of patient characteristics that are commonly associated with differences in indicated treatments and expected resource use. Expert advisory panel discussions were also informed by summaries of relevant literature and descriptive tables containing Ontario administrative data.

On the basis of this information, the expert advisory panels recommended a set of inclusion and exclusion criteria to define each disease cohort. Starting with identifying the *International Classification of Diseases*, 10th Revision (Canadian Edition) (ICD-10-CA) diagnosis codes included for the population, the expert advisory panels then excluded diagnoses with treatment protocols that

would differ substantially from those of the general population, including pediatric cases and patients with very rare disorders. Next, the expert advisory panels recommended definitions for major patient groups within the cohort. Finally, the expert advisory panels identified patient characteristics that they believe would contribute to additional resource use for patients within each group. This process generated a list of factors ranging from commonly occurring comorbidities to social characteristics, such as housing status.

In completing the process described above, the expert advisory panel encountered some noteworthy challenges:

- **Absence of clinical data elements capturing important patient complexity factors:** the expert advisory panels quickly discovered that several important patient-based factors related to the severity of patients' conditions or to expected resource use are not routinely collected in Ontario hospital administrative data. These include both key clinical measures (such as ratio of forced expiratory volume in 1 second to forced vital capacity for chronic obstructive pulmonary disease [COPD] patients and AlphaFIM®[*] scores for stroke patients) and important social characteristics (such as caregiver status).[†] For stroke and heart disease, some of these key clinical variables have been collected in the past through the Ontario Stroke Audit and Enhanced Feedback for Effective Cardiac Treatment data sets, respectively. However, these data sets were limited to a group of participating hospitals and at this time are not funded for future data collection.
- **Limited focus on a single disease or procedure grouping within a broader case-mix system:** while the expert advisory panels were asked to recommend inclusion and exclusion criteria for only specified populations, the patient populations assigned to Health Quality Ontario are a small subset of the many patient groups under consideration for Quality-Based Procedures (QBPs). Defining population cohorts introduced some additional complications; after the expert advisory panels had recommended their initial definitions (based largely on diagnosis), the Ministry informed the expert advisory panels that several other patient groups that were planned for future QBP funding efforts overlapped with the cohort definitions.

  For example, while nearly all patients discharged from hospital with a "most responsible diagnosis" (MRDx) of COPD receive largely ward-based medical care, a few patients diagnosed with COPD receive much more costly interventions, such as lung transplants or resections. On the basis of this substantially different use of resources, the Ministry's HBAM algorithm assigns these patients to a group different from the general COPD population. Given this methodologic challenge, the Ministry requested that the initial cohorts defined by the expert advisory panels be modified to exclude patients that receive selected major interventions. These patients are likely to be assigned to other QBP patient groups in the future. This document presents both the initial cohort definition defined by the expert advisory panel and the modified definition recommended by the Ministry.

In short, the final cohorts and patient groups described here should be viewed as a compromise based on currently available data and the parameters of the Ministry's HBAM grouping.

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[*]The Functional Independence Measure (FIM) is a composite measure consisting of 18 items assessing 6 areas of function. These fall into 2 basic domains; physical (13 items) and cognitive (5 items). Each item is scored on a 7-point Likert scale indicative of the amount of assistance required to perform each item (1 = total assistance, 7 = total independence). A simple summed score of 18–126 is obtained where 18 represents complete dependence / total assistance and 126 represents complete independence.

[†]For a comprehensive discussion of important data elements for capturing various patient risk factors, see Iezzoni. (3)

Defining the Scope of the Episode of Care

Health Quality Ontario's episode-of-care analysis draws on a conceptual theory from the emerging worldwide use of episode-based approaches for performance measurement and payment. Averill et al(1), Hussey et al (2), and Rosen and Borzecki (3) describe the key parameters required for defining an appropriate episode of care:

- **Index event:** The event or time point triggering the start of the episode. Examples of index events include admission for a particular intervention, presentation at the emergency department (ED), or diagnosis of a particular condition.
- **Endpoint:** The event or time point triggering the end of the episode. Examples of endpoints include death, 30 days after hospital discharge, or a "clean period" with no relevant acute health care service use for a defined window of time.
- **Scope of services included:** Although an "ideal" episode of care might capture all health and social care interventions received by the patient from index event to endpoint, in reality not all these services may be relevant to the objectives of the analysis. Hence, the episode could exclude some types of services such as prescription drugs or services tied to other unrelated conditions.

Ideally, the parameters of an episode of care are defined on the basis of the nature of the disease or health problem studied and the intended applications of the episode (e.g., performance measurement, planning, or payment). For Health Quality Ontario's initial work here, many key parameters were set in advance by the Ministry in the government's QBP policy parameters. For example, in fiscal year 2013/2014 the QBPs will focus on reimbursing acute care and will not include payments for physicians or other non-hospital providers. These policy parameters limited flexibility to examine non-hospital elements, such as community-based care or readmissions.

Largely restricted to a focus on community care, the Chairs of the expert advisory panels recommended that the episode of care for HF begin with a patient's discharge from the hospital in order to allow discharge planning to be incorporated. The expert advisory panels included all elements of postacute care during the 60-day postdischarge period.

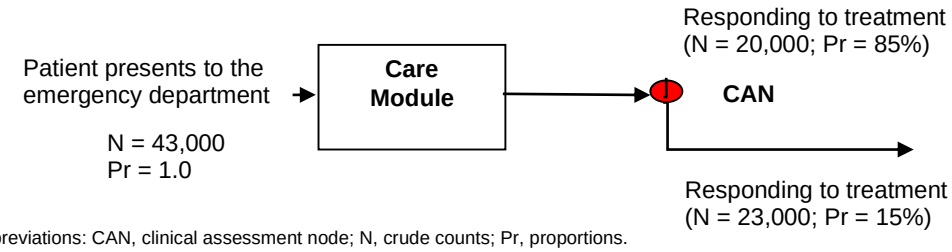
Developing the Episode-of-Care Pathway Model

Health Quality Ontario has developed a model that brings together key components of the episode-of-care analysis through an integrated schematic. The model is structured around the parameters defined for the episode of care, including boundaries set by the index event and endpoints, segmentation (or stratification) of patients into the defined patient groups, and relevant services included in the episode. The model describes the pathway of each patient case included in the defined cohort, from initial presentation through segmentation into one of the defined patient groups on the basis of their characteristics, and finally through the subsequent components of care that patients receive before reaching discharge or endpoints otherwise defined.

Although the model bears some resemblance to a clinical pathway, it is not intended to be used as a traditional operational pathway for implementation in a particular setting. Rather, the model presents the critical decision points (clinical assessment nodes [CANs]) and phases of treatment (care modules) within the episode of care. Clinical assessment nodes provide patient-specific criteria for whether a particular case proceeds down one branch of the pathway or another. Once a particular branch is determined, a set of recommended practices are clustered together as a care module. Care

modules represent the major phases of care that patients receive during a hospital episode, such as treatment in the ED, care on the ward, and discharge planning. The process for identifying the recommended practices within each CAN and care module is described in the next section.

Drawing from the concepts of decision analytic modelling, the episode-of-care model includes crude counts and proportions of cases proceeding down each branch of the pathway model. For this Clinical Handbook, these counts were determined on the basis of utilization data from administrative databases including the Discharge Abstract Database and NACRS. These counts are based on current Ontario practice and are not intended to represent normative or ideal practice. For some clinical populations, evidence-informed targets have been set at certain CANs for the proportions of cases that should ideally proceed down each branch. For example, a provincial target has been set for 90% of pneumonia patients to be discharged home (versus discharged to an inpatient rehabilitation setting) from acute care, on the basis of a 2005 OHTAC recommendation. Where relevant, these targets have been included in the episode model. Figure 2 provides an example of a care module and CAN:



Abbreviations: CAN, clinical assessment node; N, crude counts; Pr, proportions.

Figure 2: Episode-of-Care Model

Identifying Recommended Practices

Consideration of Evidence Sources

Several evidence sources were considered and presented to the expert advisory panels to develop the episode-of-care model and populate individual modules with best practice recommendations. Preference was given to OHTAC recommendations. Where OHTAC recommendations did not exist, additional evidence sources were sought including guidelines from other evidence-based organizations, Health Quality Ontario's rapid reviews, empirical analysis of Ontario data, and, where necessary and appropriate, expert consensus.

OHTAC Recommendations

The OHTAC recommendations are considered the criterion standard of evidence for several reasons:

- **Consistency:** While many guidance bodies issue disease-specific recommendations, OHTAC provides a common evidence framework across all the clinical areas analyzed in all disease areas.
- **Economic modelling:** The OHTAC recommendations are often supported by economic modelling to determine the cost-effectiveness of an intervention, whereas many guidance bodies assess only effectiveness.
- **Decision-Making Framework:** The OHTAC recommendations are guided by a decision determinants framework that considers the clinical benefit offered by a health intervention, in

addition to value for money; societal and ethical considerations; and economic and organizational feasibility.

- **Context:** In contrast with recommendations and analyses from international bodies, OHTAC recommendations are developed specifically for Ontario. This ensures that the evidence is relevant to the Ontario health system.

Notwithstanding these strengths, it is also crucial to mention several important limitations in the mandate and capacity of OHTAC to provide a comprehensive range of evidence to support Health Quality Ontario's episode-of-care analyses:

- **Focus on non-drug technologies:** While evidence shows that various in-hospital drugs are effective in treating all 3 of the patient populations analyzed, OHTAC traditionally does not consider pharmaceuticals under its mandate. Recently, OHTAC has reviewed some drug technologies in comparison with non-drug technologies for a given population as part of mega-analyses.
- **Capacity constraints:** There are a considerable number of candidate practices and interventions that require consideration for each episode of care. As OHTAC makes recommendations largely based on evidence-based analyses supplied by Health Quality Ontario, it may be limited in its capacity to undertake new reviews in all required areas.
- **Focus on high-quality evidence:** The OHTAC uses the GRADE criteria to assess the strength of evidence for an intervention, with randomized controlled trials considered the gold standard of evidence here. Not every practice within an episode of care may be appropriate or feasible to study through a randomized controlled trial. For example, some interventions may be regarded as accepted clinical practice, while others may be unethical to evaluate as part of a clinical trial.

Thus, in situations where OHTAC recommendations do not exist, Health Quality Ontario's episode-of-care analysis makes use of other sources of evidence:

Clinical Guidelines

Published Canadian and international guidelines that encompass the entirety of the heart failure pathway were searched with guidance from Health Quality Ontario's medical librarians. Additionally, the expert advisory panels were further consulted to ensure all relevant guidelines were identified.

The methodological rigour and transparency of clinical practice guidelines were evaluated by use of the Appraisal of Guidelines for Research & Evaluation (AGREE) II instrument. (4) The AGREE II instrument comprises 23 items organized into 6 quality domains—scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence. (4) The AGREE II domain scores provide information about the relative quality of the guideline. A score of 1 indicates an absence of information or poor reporting; a score of 7 indicates exceptional reporting that meets all criteria. Guidelines were selected for inclusion on the basis of individual AGREE scores, with an emphasis on the rigour of development score, which reflects the methods used to assess the quality of evidence supporting the recommendations. The final selection of guidelines included a minimum of 1 contextually relevant guideline (i.e., a Canadian guideline) and 3 to 4 highest quality guidelines, when available.

The contextually relevant, or Canadian, guideline served as the baseline and was directly compared with the other included guidelines. The quality of the evidence supporting each recommendation, as

assessed and reported by the published guidelines, was identified, and inconsistencies and gaps between recommendations were noted for further evaluation.

Rapid Reviews

Where there was inconsistency between guidelines, disagreement among expert advisory panel members, or uncertainty about evidence, a Health Quality Ontario evidence review was considered. Recognizing that a full evidence-based analysis would be impractical for all topics, a rapid review of evidence was used to identify the best evidence within the compressed timeframe of developing the entire episode-of-care pathway. Where a rapid review was deemed insufficient or inappropriate to answer the research question, a full evidence-based analysis was considered.

Articles were reviewed if they were:

- English language full-text reports
- published within 5–10 years
- health technology assessments, randomized controlled studies, observational studies, systematic reviews, and meta-analyses

The methodological quality of systematic reviews was assessed using the Assessment of Multiple Systematic Reviews (AMSTAR) measurement tool. (5) The quality of the body of evidence for each outcome was examined according to the GRADE Working Group criteria. (6) The overall quality was determined to be very low, low, moderate, or high using a step-wise, structural methodology.

Study design was the first consideration; the starting assumption was that randomized controlled trials are high quality, whereas observational studies are low quality. Five additional factors—risk of bias, inconsistency, indirectness, imprecision, and publication bias—were then taken into account. Limitations or serious limitations in these areas resulted in downgrading the quality of evidence. Finally, 3 factors that could raise the quality of evidence were considered: large magnitude of effect, dose response gradient, and accounting for residual confounding. (6) For more detailed information, please refer to the latest series of GRADE articles. (6) As stated by the GRADE Working Group, (6) the final quality score can be interpreted using the following definitions (6):

High	High confidence in the effect estimate—the true effect lies close to the estimate of the effect
Moderate	Moderate confidence in the effect estimate—the true effect is likely to be close to the estimate of the effect, but may be substantially different
Low	Low confidence in the effect estimate—the true effect may be substantially different from the estimate of the effect
Very Low	Very low confidence in the effect estimate—the true effect is likely to be substantially different from the estimate of effect

Analysis of Administrative and Clinical Data

In addition to evidence reviews of the published literature, the expert advisory panels also examined the results of descriptive and multivariable regression analysis using Ontario administrative and clinical data sets. Analyses modeling such patient characteristics as age, diagnoses, and procedures

were developed for their association with such outcomes of interest as LOS, resource use, and mortality. Dependent (outcome) and independent variables for analysis were identified by expert advisory panel members on the basis of their clinical experience and their review of summaries of the literature evaluating the association between patient characteristics and a range of outcomes. The expert advisory panels also provided advice on the analytical methods used, including data sets included and the most functional forms of the variables.

Other analyses reviewed included studies of current utilization patterns, such as average hospital LOS and regional variation across Ontario in admission practices and hospital discharge settings.

Expert Consensus

The expert advisory panels assessed the best evidence for the Ontario health care system to arrive at the best practice recommendations (see "Recommended Practices"). Where the available evidence was limited or nonexistent, recommendations were made on the basis of consensus agreement by the expert advisory panel members.

Description of Heart Failure

Heart failure (HF) is a complex syndrome in which abnormal heart function is responsible for the failure of the heart to pump blood at a rate that is necessary for metabolizing tissues. (7-10) Common symptoms of HF include shortness of breath; cough; sudden weight gain; bloating; loss of energy; loss or change in appetite; increased swelling of the ankles, feet, legs, sacrum (base of spine), or abdomen; and increased urination at night. (11) However, it is difficult to diagnose HF because the symptoms are nondiscriminating and, therefore, have limited diagnostic value. (12-16) Some leading causes for HF are coronary artery disease, hypertension, diabetes, heart valve disease, obesity, and excessive use of alcohol or drugs. (17-20)

The number of people with HF in North America is estimated to exceed 5 million. (21) Between 1997 and 2008, there were 419,551 incident cases of heart failure in Ontario. (22) Heart failure is characterized by high mortality and hospitalization as well as physical, emotional, and functional impairment; reduced quality of life; and increased caregiver burden. (23, 24) Heart failure is the most common cause of hospitalization for adults older than the age of 65 years. (21)

Recommended Heart Failure Cohort Definition and Patient Grouping

Cohort Inclusion and Exclusion Criteria

The expert advisory panel recommended that heart failure (HF) cohorts be defined by an index event of initial presentation to hospital (including both emergency department [ED] visits and direct inpatient admissions) with a recorded diagnosis of HF, as defined in Table 1 below. Hence, this cohort definition should include activity in the ED, acute inpatient care, and postacute care (including community-based services, such as home care and heart failure clinics). It is important that the funding definition for the quality-based procedure (QBP) should include patients that can be treated and discharged from the ED without requiring inpatient admission. As of the time of writing this document, the QBP definition did not include these cases and applied only to admitted HF cases. This could create perverse financial disincentives against hospitals that are able to implement strategies to reduce the need for inpatient hospitalization.

The parameters for the cohort definition are as follows:

- The HF pathway has been developed for adult patients presenting to Ontario's EDs with a major diagnosis of HF. These patients are admitted to an inpatient bed, transferred to another hospital, or discharged from the ED. Patients with a primary diagnosis of HF received from another hospital or who develop HF during their stay in hospital are not included in this pathway.
- For QBP funding purposes, cases are included only if HF-related diagnoses are assigned as the most responsible diagnosis for an acute inpatient (Discharge Abstract Database [DAD] data) or as the main problem for an ED patient (National Ambulatory Care Reporting System [NACRS] data) and have not had a "major qualifying procedure" performed.

The following age ranges, diagnosis codes (*International Classification of Diseases, 10th Revision [Canadian Edition]* [ICD-10-CA]), and diagnosis types were used to define the HF population for this episode-of-care analysis.

Age: 20 years and older

Heart failure is predominantly a disease of older people; the largest cohort of patients is those 75 years of age or older. Patients younger than age 20 with HF are quite rare, and their disease tends to result from congenital factors; the care pathway and treatment protocols for such patients are likely to be substantially different. The expert advisory panel developed the HF care pathway for adult patients using the 20-year age threshold used in many Institute for Clinical Evaluative Sciences studies.

Note that, although the original expert advisory panel defined an age threshold of 20 years and older for inclusion, it was recommended that the ministry should strive for consistency across QBPs in terms of the age ranges included. Thus, the ministry could consider standardizing QBPs to an age cut-off of 18 years, for example, unless the QBP was intended to include pediatric populations.

Diagnosis codes

The ICD-10-CA codes used to define the cohort of patients with HF are listed below.

- I50.x heart failure, left ventricular dysfunction, etc.
- I25.5 ischemic cardiomyopathy
- I40.x, I41.x myocarditis
- I42.x, I43.x cardiomyopathies
- I11.x plus I50.x (secondary diagnosis) hypertensive heart disease plus heart failure, left ventricular dysfunction
- I13.x plus I50.x (secondary diagnosis) hypertensive heart disease and renal disease plus heart failure, left ventricular dysfunction)

Appendix 1 shows ICD-10-CA details for the HF patient groups.

Diagnosis types

The following diagnosis types are included in the HF patient definition, depending on the hospital care–type setting where the encounter occurs:

- *Acute inpatient cases* include most responsible diagnosis codes—the diagnosis determined as the diagnosis or condition held most responsible for the greatest portion of the length of stay or greatest use of resources.
- *Emergency department* cases include main problem codes—the diagnosis or condition determined to be most responsible for the greatest proportion of the length of stay or greatest use of resources.

As noted above, using the DAD and the NACRS databases, the following codes defined the HF population:

- Most responsible diagnosis of "I50.X" "I25.5" "I40.X" "I41.X" "I42.X" "I43.X"
  OR
- Most responsible diagnosis of "I11.X" and comorbidity "I50.X" code
  OR
- Most responsible diagnosis of "I13.X" and comorbidity "I50.X" code

It should be noted that comorbidity diagnoses are only with diagnosis type "1" preadmission comorbidity, "2" postadmission comorbidity, or "W," "X," "Y" service transfer diagnosis.

Typical HF patients

In the DAD, typical patients include those coded as both "typical" and "short stay" using the Health Based Allocation Model Inpatient Grouper (HIG). Deaths, transfers, sign-outs, and long-stay outliers are considered atypical cases. Table 1 shows the breakdown of HF patients by type and distribution of the resource intensity weights for 2010/2011.

Table 1: Patients With Congestive Heart Failure in 2010/2011

Case Type	Number of Cases	Weight (Mean)	Weight (Minimum)	Weight (50th Percentile)	Weight (Median)	Weight (75th Percentile)	Weight (Maximum)
All	22,342	1.89	0.24	0.98	1.06	1.84	134.77
Atypical	3,298	4.76	0.24	1.04	2.85	5.38	134.77
Typical	19,044	1.39	0.26	0.98	1.06	1.29	40.66

Source: Discharge Abstract Database 2010/2011.

The expert advisory panel considered both typical and atypical patients in the development of the HF care pathway. The expert advisory panel believed smaller hospitals would need to transfer patients to other acute care hospitals with more appropriate resources, such as catheterization laboratories.

Exclusions

The Acute Heart Failure Episode-of-Care Advisory Panel recommended the following exclusion criteria be applied in addition to the original acute care definition:

- **Intervention:** Cases are excluded if they are assigned to an intervention-based HIG cell, given the current methodology. (i.e., major clinical category [MCC] partition variable is not "I")
- **Palliative cases:** Cases are excluded if they have a record of palliative hospice care in the 6 months preceding the index hospitalization. *Definitions for other excluded community-based palliative cases to be determined.*
  Post-transplants: Cases are excluded if they have received a heart transplant in the 6 months preceding the index hospitalization.
- **Postimplantation of LVADs:** Cases are excluded if they have received a left ventricular assist device (LVAD) in the 6 months preceding the index hospitalization.

Recommended HF Patient Stratification Approach: Acute Care

Patients Presenting to the Emergency Department

The expert advisory panel recommends that patients presenting to hospital with acute HF be classified into the following 3 broad groups for the purposes of establishing care pathways and defining major groups for QBP funding:

- **Low-intensity:** These patients can be treated in the ED or as outpatients and discharged home without requiring inpatient admission.
- **Average-intensity:** These patients require admission to inpatient care with normal nurse-to-patient staffing.
- **High-intensity:** These patients require ventilation (either noninvasive or invasive ventilation) or admission to an intensive care unit with higher nurse-to-patient staffing.

These 3 patient groups are largely recognized to be based on level of care. The expert advisory panel has identified several high-risk markers:

- respiratory distress
- hypoxemia
- severity of pulmonary edema
- poor response to furosemide administered in the ED
- hemodynamic compromise
- significant arrhythmias
- positive troponin
- concomitant acute life-threatening directives

The expert advisory panel suggests that an acute heart failure risk score—for example, the Emergency Heart Failure Mortality Risk Grade (EHMRG)—be calculated to assist with clinical decision-making and predicting the 7-day mortality risk of HF patients (predicted mortality risk increases incrementally with higher EHMRG risk score). As a general guide, patients who are low-risk (e.g., EHMRG quintiles 1 and 2) can be considered for discharge home if they have responded to initial treatment in the ED, provided that there are no other considerations (e.g., advanced-directives, severe dementia, estimated impact of admission on life-expectancy, bed-availability). Patients who are high-risk (e.g., EHMRG quintile 5) can be considered for admission to a higher-intensity unit.

Ultimately, the decision to admit is based on clinical judgment and the availability of hospital resources.

Note: a full review of the evidence is required to determine the essential markers and defined thresholds for the 3 HF patient groups (high-intensity, average-intensity, and low-intensity).

Admitted Patients

The expert advisory panel identified 2 pathways for admitted patients based on severity:

- High-intensity case-mix–adjusted patient
- Average-intensity case-mix–adjusted patient

The high-intensity case-mix–adjusted patient implies that a patient is high-risk enough to necessitate a 1:1 nurse-to-patient ratio. Similarly, the lower-intensity case-mix–adjusted patient implies that a patient is of sufficiently low risk to be managed with the usual hospital-ward 1:5 nurse-to-patient ratio.

The case-mix adjustment implies that the high-intensity as well as average-intensity care pathway corresponds to an individual of average comorbidity for HF patients in the province of Ontario. Patients with higher-than-average or lower-than-average comorbidity would not necessarily alter the patient intensity level or the care pathway, but rather the cost bundle associated with the care pathway. The rationale for cost adjustments for case-mix variation is based on the understanding that care intensity and length of stay correlate with the management of other (not related to heart failure) chronic conditions. Such management of other comorbidities is not taken into account in this care pathway. Case-mix cost attribution could use several methodologies, including resource intensity weights.

The mean total length of hospital stay for the high-intensity and low-intensity patients using the 2005 EFFECT database and the 2010/2011 DAD are:

- High-intensity (2005 EFFECT): 8.8 days (SD = 8) with mean length of ward stay of 5.0 days (SD = 8.2)
- High-intensity (2010/2011): 12.2 days (SD = 21.3)
- Low-intensity (2005 EFFECT): 8.5 days (SD = 10.7)
- Low-intensity (2010/2011): 8.8 days (SD = 15.1)

Factors Contributing to Patient Complexity

Using 2010/2011 DAD data, the expert advisory panel reviewed preadmission and postadmission comorbidities. Preadmission comorbidities are conditions that exist before admission and have been assigned an ICD-10-CA code that satisfies the requirements for determining comorbidity (Table 2). Similarly, postadmission comorbidities are conditions that arise after admission (Table 3).

Table 2: Top 30 Preadmission Comorbidities in Heart Failure

ICD-10 Description	Number	Percent
I48.0 Atrial fibrillation	3,977	9.61
J18.9 Pneumonia, unspecified	2,076	5.02
N17.9 Acute renal failure, unspecified	1,898	4.59
I10.0 Benign hypertension	1,224	2.96
N39.0 Urinary tract infection, site not specified	1,162	2.81
D64.9 Anaemia, unspecified	1,042	2.52
E11.52 Type 2 diabetes mellitus with certain circulatory complications	969	2.34
J90 Pleural effusion, not elsewhere classified	959	2.32
Z51.5 Palliative care	951	2.30
I25.10 Atherosclerotic heart disease of native coronary artery	802	1.94
J44.1 Chronic obstructive pulmonary disease with acute exacerbation, unspecified	796	1.92
E11.23 Type 2 diabetes mellitus with established or advanced kidney disease (N08.3-)	740	1.79
J44.0 Chronic obstructive pulmonary disease with acute lower respiratory infection	718	1.74
I21.4 Acute subendocardial myocardial infarction	693	1.67
J44.9 Chronic obstructive pulmonary disease, unspecified	559	1.35
E11.64 Type 2 diabetes mellitus with poor control, so described	556	1.34
E87.1 Hypo-osmolality and hyponatraemia	523	1.26
N18.9 Chronic kidney disease, unspecified	517	1.25
E87.6 Hypokalaemia	478	1.16
I35.0 Aortic (valve) stenosis	430	1.04
L03.11 Cellulitis of lower limb	415	1.00
E87.5 Hyperkalaemia	385	0.93
I25.5 Ischaemic cardiomyopathy	352	0.85
I27.2 Other secondary pulmonary hypertension	349	0.84
I50.0 Congestive heart failure	349	0.84
I42.0 Dilated cardiomyopathy	298	0.72
I95.9 Hypotension, unspecified	282	0.68
I48.1 Atrial flutter	238	0.58
D50.9 Iron deficiency anaemia, unspecified	234	0.57
E86.0 Dehydration	232	0.56

Abbreviation: ICD-10, International Classification of Diseases, 10th Revision.
Data source: Discharge Abstract Database 2010/2011.

Table 3: Top 20 Postadmission Comorbidities for Heart Failure

ICD-10 Description	Number	Percent
N39.0 Urinary tract infection, site not specified	530	8.03
N17.9 Acute renal failure, unspecified	341	5.16
E87.6 Hypokalaemia	261	3.95
I95.9 Hypotension, unspecified	205	3.10
J18.9 Pneumonia, unspecified	203	3.07
I48.0 Atrial fibrillation	168	2.54
I46.9 Cardiac arrest, unspecified	139	2.10
R33 Retention of urine	110	1.67
E11.63 Type 2 diabetes mellitus with hypoglycaemia	109	1.65
E87.5 Hyperkalaemia	105	1.59
A04.7 Enterocolitis due to *Clostridium difficile*	104	1.57
J96.0 Acute respiratory failure	102	1.54
E87.1 Hypo-osmolality and hyponatraemia	100	1.51
F05.9 Delirium, unspecified	99	1.50
I46.0 Cardiac arrest with successful resuscitation	93	1.41
A09.9 Gastroenteritis and colitis of unspecified origin	90	1.36
I21.4 Acute subendocardial myocardial infarction	85	1.29
J96.9 Respiratory failure, unspecified	77	1.17
R57.0 Cardiogenic shock	77	1.17
I47.2 Ventricular tachycardia	75	1.14

Abbreviations: ICD-10, International Classification of Diseases, 10th Revision.
Source: Discharge Abstract Database 2010/2011.

Preadmission and postadmission comorbidities are not included in the current episode-of-care pathway for the "typical" HF case. Following completion of the current pathway, the expert advisory panel may consider the implications of commonly occurring comorbidities, such as pneumonia, acute renal failure, and diabetes. While it is expected that the foundational pathway will remain the same, inclusion of comorbidities could lead to recommendation of additional interventions in each care module.

Inclusion and Exclusion Criteria for QBP Funding

During the development of the episode-of-care pathway, ministry representatives explained the challenges of incorporating HF cohort definitions into the QBP funding methodology. To align the HF cohort to the present HIGs, the following ICD-10-CA diagnosis codes, diagnosis types, and ICD-10 Canadian Classification of Health Interventions (CCI) intervention exclusion criteria are recommended for the purposes of funding HF through the QBP funding mechanism:

- **Age:** Age greater than or equal to 20 years at time of admission.
- **Diagnosis codes:** The ICD-10-CA most responsible diagnosis codes are listed below.
  - I50.x Heart failure, left ventricular dysfunction, etc.
  - I40.x, I41.x Myocarditis
  - I25.5 Ischemic cardiomyopathy
  - I42.x, I43.x Cardiomyopathies
  - I11.x plus I50.x (secondary diagnosis) Hypertensive heart disease plus heart failure, left ventricular dysfunction

I13.x plus I50.x (secondary diagnosis) Hypertensive heart disease and renal disease plus heart failure, left ventricular dysfunction)

- **Intervention:** Patients are not assigned to an intervention-based HIG cell, given the current methodology (i.e., major clinical category [MCC] partition variable is not "I"). Case management group algorithms used by the Ministry for QBP funding typically assign cases to groups based on either principal intervention (typically a major qualifying procedure, such as a surgery) or in cases where there is no major qualifying procedure, by most responsible diagnosis. Case management groups should be mutually exclusive: that is, the logic of the grouping algorithm should assign a case to 1 group or another—not both.

When the MCC partition variable "I" is included, HF patients fall into many HIGs. Using the existing case management group funding methodology and 2011/2012 inpatient data, most of the 22,435 admitted HF patients as defined by the expert advisory panel fall into 3 HIGs: HIG 195 "Heart Failure With Coronary Angiogram," HIG 196 "Heart Failure Without Coronary Angiogram," and HIG 209 "Other/Miscellaneous Cardiac Disorder."

Cases assigned to an intervention-based HIG cell are likely to be more advanced and funded using a different episode-of-care pathway (to be developed in the future). As a result, for funding purposes, the MCC partition "I" has been excluded from the current pathway.

Table 4 shows the distribution of HF patients in the ED using the Comprehensive Ambulatory Care Classification System.

Table 4: Distribution of HF Patients in ED Across CACS Cells

CACS	CACS Description	Patients with HF Diagnosis Codes, n	All Patients in These CACS Cells, n
A001	Dead on arrival	8	696
A002	Left without being seen or triaged and not seen	2	193,799
B001	Cardiovascular condition with acute admission/transfer	18,506	97,974
B051	Emergency visit interventions	233	73,648
B053	Interventions generally performed by non-emergency department service: other	19	1,559
B121	Congestive heart failure	8,645	8,645
B122	Other disease or disorder cardiac system	203	278,635
C154	Pleurocentesis	3	41
E201	Cardiovascular disorders	4	115
E202	Congestive heart failure	27	27

Abbreviations: CACS, Comprehensive Ambulatory Care Classification System; ED, emergency department.
Source: National Ambulatory Care Reporting System 2011/2012.

For funding purposes, the Ministry will be considering methods of dealing with low-volume Comprehensive Ambulatory Care Classification System cells.

Recommended Patient Stratification Approach: Postacute Care

The expert advisory panel noted that the patient groups defined for the acute care phase of the HF QBP were based largely on disposition—mild if discharged from the ED, moderate if admitted to a ward, and severe if admitted to the ICU—but did not necessarily reflect patients' complexity or risk of adverse outcomes in the postacute setting. A new risk stratification model is required to assign these patients to the appropriate level of risk for the postdischarge period analyzed in this project. Such a risk stratification model can inform the development of patient groups on the basis of differing levels of risk.

The expert advisory panel discussed the heart failure–specific utility of existing risk stratification methods currently applied in Ontario, including the LACE index (length of stay "L"; acuity of admission "A"; comorbidity, as measured with the Charlson comorbidity index score, "C"; emergency department use, as measured by the number of visits in the 6 months before admission, "E") and Health Quality Ontario's Hospital Admission Risk Prediction (HARP) tool. Members of the expert advisory panel expressed skepticism about the predictive power of the LACE index in a HF population. This discussion concluded with the recommendation that an analysis be conducted to evaluate methods for stratifying the posthospital HF cohort by risk of adverse outcomes.

Risk Stratification Analysis

The following analysis has been conducted by Dr. Douglas Lee and team at the Institute for Clinical Evaluative Sciences.

The expert advisory panel identified the following patient characteristics as factors that they believed, on the basis of their clinical experience, were likely to be associated with differences in patient complexity and risk of adverse outcomes:

- age
- sex
- new (incident) HF
- known HF within past year:
  - no HF hospitalization
  - 1 HF hospitalization
  - 2+ HF hospitalization
- discharged from ED
- long-term care resident
- receiving Community Care Access Centre nursing care

They also cited the LACE index, because of its common use as a variable that might be worth including in a heart failure–specific model, even if LACE in itself does not perform well for the HF population.

The preliminary analysis compared the LACE index, HARP "simple" model, HARP "complex" model, and an "HF-specific" model that uses the variables identified by the expert advisory panel, together with the LACE index. The analysis used 30-day unplanned readmissions as the outcome of interest (further analysis will include mortality as well), was conducted on 3 years (2009–2011) of

heart failure discharges of both ED patients and inpatients, and used the previously established HF QBP definition.

The results presented in Table 5 indicate that all covariates identified by the expert advisory panel—including the number of prior HF hospitalizations, long-term care residency status, and receipt of Community Care Access Centre nursing services—were all significant predictors of increased risk of readmission. Notably, patients discharged from the ED have a 1.425 times greater risk (95% CI 1.341–1.514, $P < 0.001$) of readmission, suggesting the need to pay particular focus to this oft-neglected population.

Table 5: Heart Failure–Specific + LACE Model

Variable[a]	OR (95% CI)	*P* Value
Age	1.009 (1.007–1.011)	<0.001
Sex	1.113 (1.065–1.162)	<0.001
New HF	0.887 (0.843–0.932)	<0.001
Known HF in past year		
▪ No HF hospitalization		
▪ 1 HF hospitalization	1.121 (1.049–1.198)	0.007
▪ 2+ HF hospitalization	1.326 (1.199–1.466)	<0.001
Discharged from ED	1.425 (1.341–1.514)	<0.001
LTC resident	1.444 (1.254–1.662)	<0.001
Receiving CCAC nursing	1.249 (1.176–1.326)	<0.001
LACE index	1.097 (1.088–1.107)	<0.001

Abbreviations: CCAC, Community Care Access Centre; CI, confidence interval; ED, emergency department; HF, heart failure; LACE, length of stay "L"; acuity of admission "A"; comorbidity, as measured with the Charlson comorbidity index score, "C"; emergency department use, as measured by the number of visits in the 6 months before admission, "E"; LTC, long-term care; OR, odds ratio.
[a]C statistic 0.610, lowest decile rate 12.5%

Tables 6 and 7 compare the results of the 4 models for patients discharged from inpatient care and the ED, respectively. The results demonstrate that the HARP complex model and the HF-specific model perform similarly well ($P = 0.744$) for admitted cases, but the HF-specific model performs significantly better ($P = 0.006$) for the ED patient subgroup.

Notwithstanding the comparative performance of the models, the results in Tables 6 and 7 also demonstrate that the predictive power of all these models as measured by the C statistic is relatively low, with the HF-specific model returning C statistics of 0.610 and 0.622 for inpatient and ED discharges, respectively. This C statistic will likely be improved with the addition of mortality as an outcome to these models, as previous studies have shown risk prediction models to predict mortality more accurately than readmissions.

Table 6: Comparison of Risk Models for Heart Failure Discharges From Hospital

Risk Model	C Statistic	Change in C Statistic	P Value
HF-specific with LACE index	0.610	0	n/a
LACE alone	0.604	−0.00601	<0.001
HARP Simple	0.599	−0.0108	<0.001
HARP Complex	0.611	0.000688	0.744

Abbreviations: HARP, Hospital Admission Risk Prediction; HF, heart failure; LACE, length of stay "L"; acuity of admission "A"; comorbidity, as measured with the Charlson comorbidity index score, "C"; emergency department use, as measured by the number of visits in the 6 months before admission, "E"; n/a, not applicable.

Table 7: Comparison of Risk Models for Heart Failure Discharges From the Emergency Department

Risk Model	C Statistic	Δ C	P Value
HF-specific with LACE index	0.622	0	n/a
LACE alone	0.613	−0.00917	<0.001
HARP simple	0.607	−0.0148	<0.001
HARP complex	0.616	−0.00637	0.006

Abbreviations: HARP, Hospital Admission Risk Prediction; HF, heart failure; LACE, ; n/a, not applicable.

Conclusions and Recommendations

The results of the preliminary analysis described above suggest that an HF cohort–specific postacute risk prediction model is feasible to develop and can outperform other generic risk prediction models. The relatively low predictive power demonstrated for the outcome of unplanned 30-day readmissions should be noted; further analysis will incorporate mortality outcomes and likely result in improved predictive power for the combined outcome of 30-day mortality or 30-day readmission.

Upon the completion of this analysis, the risk score generated by the HF-specific model can be used to stratify the HF patient cohort into QBP subgroups through establishing threshold values to segment the population by levels of risk.

In-Hospital Utilization Analysis

At the initial expert advisory panel meetings, the HF patient journey was mapped out. Patient presentation at the ED with suspected HF was established as the index event, and administrative data were used to inform and guide the HF patient journey in hospital. Using Canadian Institute for Health Information administrative databases, the disposition of ED patients and admitted patients was reviewed. In 2010/2011, 62.5% of patients presenting to the ED with the main problem reported as HF were admitted (Table 8).

Table 8: Patient Visit Dispositions from Emergency Departments in Ontario, 2010/2011

Visit Disposition	Frequency	%
01 – Discharged home (private dwelling, not an institution; no support services)	8,819	30.54
02 – Client register, left without being seen or treated by a service provider	—	—
03 – Client triaged and then left ED; not seen by physician or primary care provider	2	0.01
04 – Client triaged, registered, and assessed by a service provider and left without treatment	7	0.02
05 – Client triaged, registered, and assessed by a service provider and treatment initiated; left against medical advice before treatment completed	101	0.35
06 – Admitted into reporting facility as an inpatient to critical care unit or operating room directly from an ambulatory care visit functional centre	2,151	7.45
07 – Admitted into reporting facility as an inpatient to another unit of the reporting facility directly from the ambulatory care visit functional centre	15,895	55.05
08 – Transferred to another acute care facility directly from the ambulatory care visit functional centre	818	2.83
09 – Transferred to another non–acute care facility directly from an ambulatory care visit functional centre	28	0.10
10 –DAApatient expired after initiation of ambulatory care visit; resuscitative measures (e.g., CPR) could occur during the visit but were not successful	78	0.27
11 –DOA—patient was dead on arrival to the ambulatory care service; generally there is no intent to resuscitate (e.g., perform CPR); includes cases where patient is brought in for pronouncement of death	8	0.03
12 – Intra-facility transfer to day surgery	2	0.01
13 – Intra-facility transfer to ED	—	—
14 – Intra-facility transfer to clinic	42	0.15

Abbreviations: CPR, cardiopulmonary resuscitation; DAA, death after arrival; DOA, death on arrival; ED, emergency department.
Source: National Ambulatory Care Reporting System 2010/2011.

The expert advisory panel also investigated HF patients transferred from other facilities, and the types of facilities transferring patients. For 2010/2011, 13% of transferred HF patients were from acute care facilities. Table 9 shows the number of HF patients transferred to Ontario's acute care hospitals in 2010/2011, as reported in the DAD. After careful consideration, the expert advisory panel chose to treat HF patients transferred from other institutions as a special cohort; these patients were excluded from the episode-of-care pathway model developed for this report.

Table 9: Patients Transferred From Other Institutions, 2010/2011

From Institution by Type	Frequency	Percent
0 – Organized outpatient department of reporting facility	1	0.02
1 – Acute care	722	13.06
2 – General rehabilitation facility	111	2.01
3 – Chronic care facility	108	1.95
4 – Nursing home	1,189	21.5
5 – Psychiatric facility	16	0.29
6 – Unclassified or other type of facility	71	1.28
7 – Special rehabilitation facility	11	0.20
8 – Home care	577	10.43
9 – Home for the aged	1,563	28.26
N – Ambulatory care	1,161	20.99

Data source: DAD 2010/2011.

Finally, the expert advisory panel reviewed discharge disposition data for HF patients admitted from the ED (Table 10). Most patients admitted for HF are discharged home; 21% require further supportive services.

Table 10: Discharge Disposition for Patients With Heart Failure, 2010/2011

Discharge Disposition	Total	Percent
01 – Transferred to another facility providing inpatient hospital care (includes other acute, subacute, psychiatric, rehabilitation, cancer centre/agency, pediatric hospital, etc.)	863	3.84
02 – Transferred to a long-term care facility (personal care home, auxiliary care, nursing home, extended care, home for the aged, senior's home, etc.)	2,858	12.73
03 – Transferred to other (palliative care/hospice, addiction treatment centre, etc.)	103	0.46
04 – Discharged to a home setting with support services (senior's lodge, attendant care, home care, Meals on Wheels, homemaking, supportive housing, etc.)	4,716	21.01
05 – Discharged home	11,719	52.20
06 – Signed out (against medical advice)	169	0.75
07 – Died	2,022	9.01
Total	**22,450**	100.00

Data source: DAD 2010/2011.

On the basis of these data, the expert advisory panel established the ED visit disposition to include patients returning home or to their place of residence, patients transferred to another acute care facility, admission to the hospital, or death.

Utilization Analysis of Postacute Care

In collaboration with Dr. Jason Sutherland and a team from the Centre for Health Services and Policy Research, University of British Columbia, costs and service utilization for postacute episodes of care were analyzed for HF patients. These analyses compared costs and utilization for episodes of 30, 60,

and 90 days' duration, as well as variation in these outcomes across the 14 Local Health Integration Networks (LHINs), by patient residence.

Figure 3 describes average Ontario costs for postacute HF episodes, illustrating the increase in postacute costs from just under $3000 for a 30-day postacute episode to just under $7000 for a 90-day episode. Whatever the duration, the 2 largest spending components were physician services, ranging from $705 for 30 days to $1,543 over 90 days, and readmissions to acute inpatient care, ranging from $605 over 30 days to $1,558 over 90 days. Other substantial spending components include complex continuing care and long-term care and also emergency department and outpatient costs. Home care and inpatient rehabilitation make up smaller proportions of total expenditure.

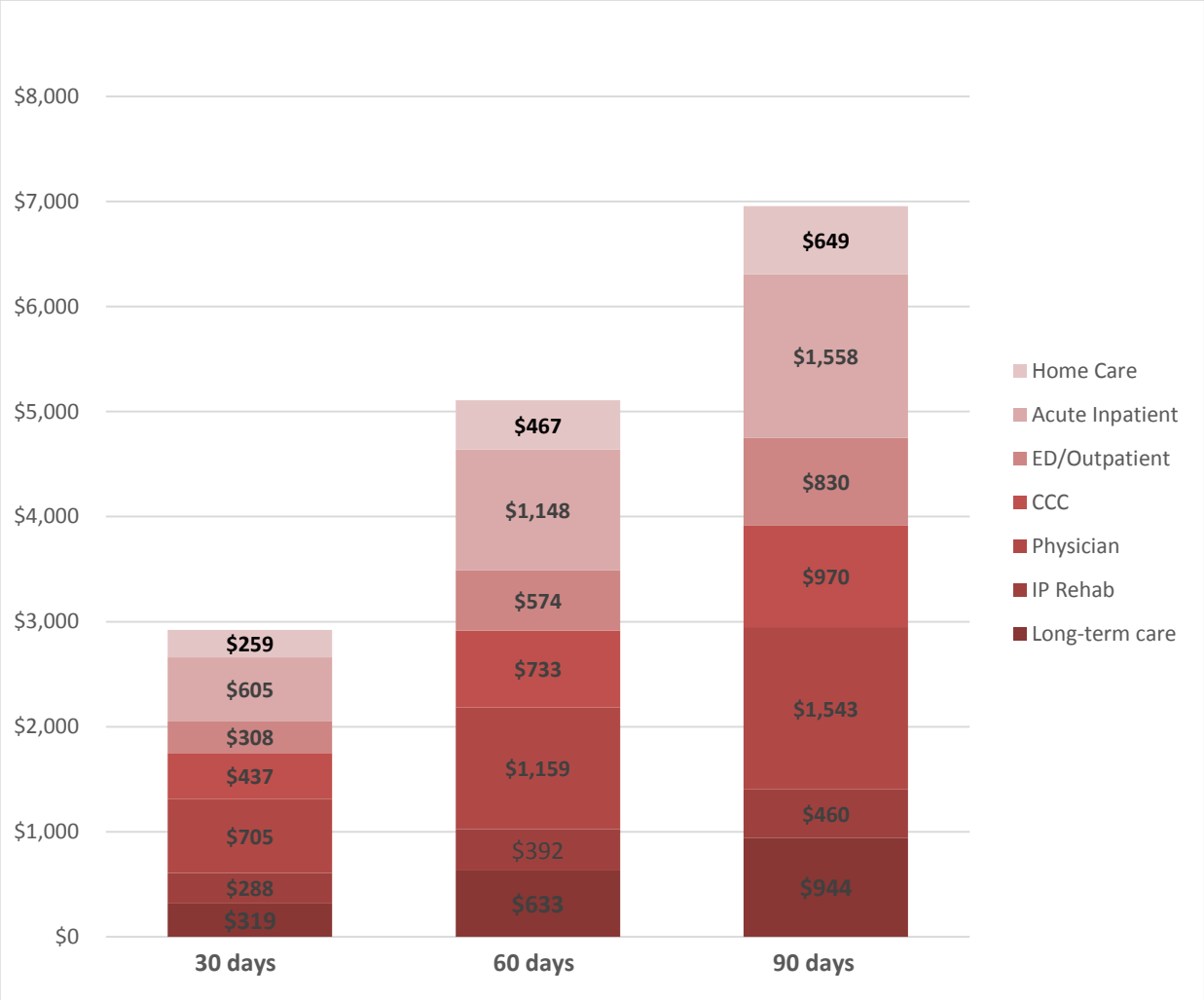


Figure 3: Ontario's Costs for Treatment of Heart Failure by Health Service for 30-, 60- and 90-day Postacute Episodes (2009/2010–2010/2011 Discharges)
Abbreviations: CCC, complex continuing care; ED, emergency department; IP, inpatient.

While Figure 3 presents average HF patient postacute cost and utilization across Ontario, there is considerable regional variation in these utilization patterns. Figure 4 presents 90-day postacute episode costs both for patients' LHIN of residence and for Ontario overall. As the graph illustrates, the largest areas of inter-LHIN variation from a cost perspective are in the use of inpatient rehabilitation and complex continuing care during the postacute period. This variation in discharge patterns tends to also drive variation in total episode costs between LHINs.

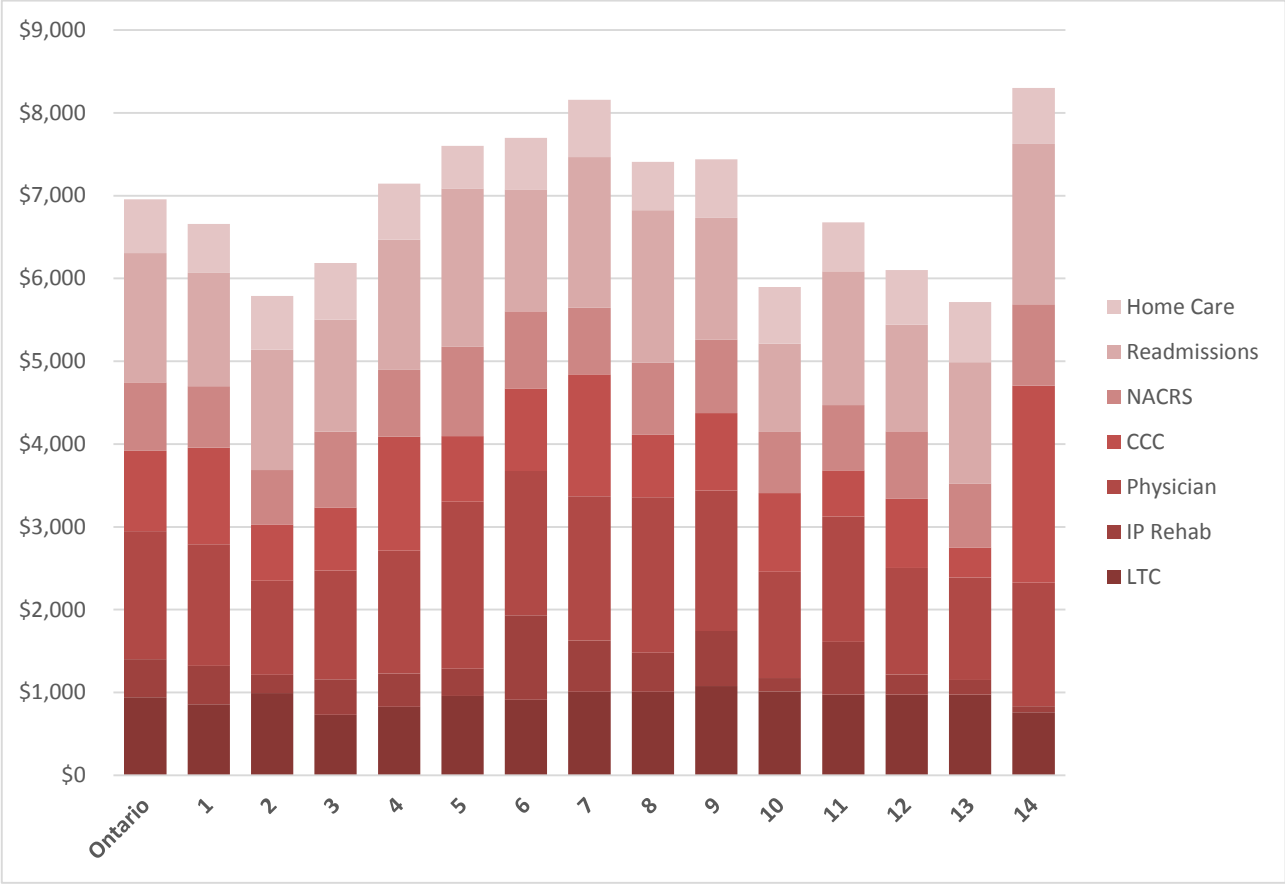


Figure 4: 90-Day Costs of Postacute Care by Health Service in Ontario Local Health Integration Networks Where Patients Reside (2009/2010–2010/2011 Discharges)

Abbreviations: CCC, community care canter; IP, inpatient; LTC, long-term care; NACRS, National Ambulatory Care Reporting System.

Continuum-of-Care Model

As mentioned previously, this clinical handbook integrates the acute heart failure handbook and the postacute (community) heart failure handbook. The integration of the 2 handbooks is represented in Figure 5. The model has served as a working model as the components of this clinical handbook were developed. Beginning as a simplified sketch of key phases in the heart failure episode of care, the model has been modified to reflect the elements of the pathway.

The following sections lay out the recommended practices for the modules in Figure 5 and divide the continuum into 2 episodes of care: acute care (Figure 6) and postacute community care (Figure 7).

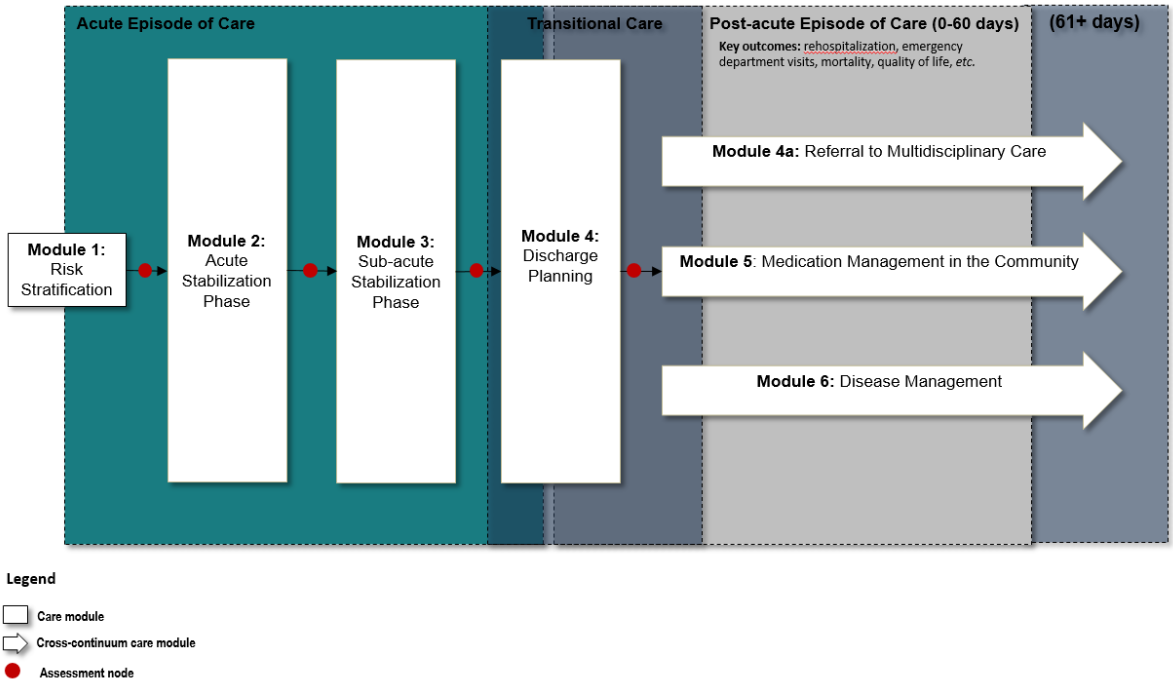


Figure 5: Integrated Continuum-of-Care Model for Heart Failure, Including Both Acute and Postacute (Community) Phases of Care

Recommended Practices for Heart Failure

Evidence Used to Develop Recommended Practices

OHTAC Recommendations

Four evidence-based analyses from Health Quality Ontario and corresponding OHTAC recommendations were identified that directly relate to the heart failure episode of care:

- Specialized Community-Based Care: An Evidence-Based Analysis (25)
- Experiences of Living and Dying With COPD: A Systematic Review and Synthesis of the Qualitative Empirical Literature (26)
- Health Care for People Approaching the End of Life: An Evidentiary Framework (27)
- OHTAC Recommendation: Implantable Cardioverter Defibrillators for Primary Prevention of Sudden Cardiac Death (28)

Clinical Handbooks

Four clinical handbooks from Health Quality Ontario containing recommendations relevant to the heart failure episode of care were incorporated as sources of evidence:

- Quality-Based Procedures: Clinical Handbook for Congestive Heart Failure (29)
- Quality-Based Procedures: Clinical Handbook for Chronic Obstructive Pulmonary Disease (30)
- Quality-Based Procedures: Clinical Handbook for Community-Acquired Pneumonia (31)
- Quality-Based Procedures: Clinical Handbook for Postacute Medical Discharge Short-Stay Populations (32)

Health Quality Ontario's Rapid Reviews

Rapid reviews were conducted on specific topics requested by the expert advisory panels or where gaps or inconsistencies in the evidence were identified:

Rapid Reviews completed for the Acute Heart Failure Clinical Handbook

- Coronary revascularization in ischemic heart failure patients
- Early mobilization and ambulation in hospitalized heart failure patients
- Vasodilators for in hospital heart failure management
- Chest x-rays for diagnosing pulmonary infection as a precipitant of acute heart failure
- B-type natriuretic peptide testing
- In hospital performance indicators for in hospital heart failure management
- Implantable cardioverter defibrillators or cardiac resynchronization therapy for in hospital heart failure
- Intra-aortic balloon pumps for heart failure management
- Electrocardiograms for diagnosing ischemia as a precipitant to acute heart failure
- Inotropic and vasoactive agents for in hospital heart failure
- In hospital electrocardiographic (ECG) telemetry monitoring for acute heart failure

- Invasive monitoring with pulmonary artery catheters in heart failure

Rapid Reviews completed for the Update of the Acute Heart Failure Clinical Handbook

- Ultrafiltration in heart failure: a rapid review
- Vasodilators for inhospital heart failure management: a rapid review (update)

Rapid Reviews completed for the Postacute Heart Failure Clinical Handbook

- Communication of discharge instructions for heart failure patients: a rapid review
- Medication reconciliation at discharge: a rapid review
- Criteria for referral to home care: a rapid review
- Criteria for referral to heart failure clinics: a rapid review
- Home-based exercise programs in heart failure: a rapid review
- Aerobic exercise training in patients with heart failure: a rapid review
- Physical activity counselling for heart failure patients: a rapid review
- Sodium restriction in heart failure: a rapid review

Clinical Guidelines

The guideline review process identified 1 series of Canadian guidelines that was used as the reference standard owing to its relevance and local context: Canadian Cardiovascular Society, 2006 (33); 2008 (34); 2010 (35); 2011 (36); 2012 (37); 2013. (38)

Three additional international clinical guidelines encompassing the continuum of care for heart failure were identified:

- American College of Cardiology Foundation/American Heart Association 2009 (39) and 2013 (40)
- National Institute for Health and Care Excellence, 2010 (41)
- Scottish Intercollegiate Guidelines Network, 2007 (42)

Quality assessment using the AGREE domain scores for each of the guidelines are presented in Table 13. Given the limited number of guidelines identified for each cohort, all guideline recommendations were included for consideration by the expert advisory panel.

Table 13. AGREE II Domain Scores for Heart Failure Guidelines

Guideline, Year	AGREE II Domain (*maximum possible score*)					
	Scope and Purpose	Stakeholder Involvement	Rigour of Development	Clarity of Presentation	Applicability	Editorial Independence
CCS, 2006	28%	33%	40%	78%	32%	83%
CCS, 2008	42%	50%	45%	81%	52%	83%
CCS, 2010	56%	50%	55%	78%	44%	92%
CCS, 2012	33%	39%	58%	89%	44%	92%
CCS, 2013	33%	50%	66%	94%	52%	92%
ACCF/AHA, 2009	11%	11%	58%	94%	40%	92%
ACCF/AHA, 2013	11%	22%	57%	89%	36%	92%
NICE, 2010	83%	89%	79%	89%	88%	83%
SIGN, 2007	8%	33%	84%	92%	60%	92%

Abbreviations: ACCF, American College of Cardiology Foundation; AGREE, Appraisal of Guidelines for Research & Evaluation; AHA, American Heart Association; ATS, American Thoracic Society; BOA, British Orthopaedic Association; BTS, British Thoracic Society; CCS, Canadian Cardiovascular Society; CIDS, Canadian Infectious Disease Society ; CTS, Canadian Thoracic Society; IDSA, Infectious Diseases Society of America; NICE, National Institute for Clinical Excellence; NSW, New South Wales; NVALT, Dutch Association of Chest Physicians; SIGN, Scottish Intercollegiate Guidelines Network; SWAB, Dutch Working Party on Antibiotic Policy.

The guidelines supporting expert advisory panel recommendations, in addition to the quality of evidence supporting individual guideline recommendations, were summarized. The quality-assessment tools used by each guideline are summarized in Table 14.

Table 14. Summary of Evidence Assessments Used by Guidelines

Organization	Grade of Recommendation/Level of Evidence
CCS (CA)[a]	Body of evidence is composed of: **A**: Multiple RCTs or meta-analyses **B**: Single RCT or nonrandomized studies **C:** Consensus of opinion of experts or small studies **Class of recommendations:** **Class I:** Evidence that a treatment is beneficial, useful, and effective **Class II:** Conflicting evidence about the usefulness of the treatment **Class IIa:** Weight of evidence indicates usefulness **Class IIb:** Usefulness is less well established by evidence or opinion **Class III:** Weight of evidence indicates treatment is not useful, and in some cases can be harmful
NICE (UK)	No explicit level of evidence applied to the recommendations
ACCF/AHA (US)	Body of evidence is composed of: **A**: Multiple populations evaluated. Multiple RCTs or meta-analyses **B**: Limited populations evaluated. Single RCT or nonrandomized studies **C**: Very limited populations evaluated. Consensus opinion of experts, case studies, or standard of care **Level of uncertainty:** **Class I:** Procedure should be performed or administered **Class IIa:** Procedure is reasonable to perform or administer **Class IIb:** Procedure may be considered **Class III:** Procedure has no benefit or could risk harm
SIGN (SCT)	Body of evidence is composed of: **A**: At least one MA, SR of RCTs, or high-quality RCTs directly applicable to the target population **B**: High-quality SRs of case control or cohort studies directly applicable to the target population **C**: Well-conducted case-control or cohort studies with high risk of confounding or bias **D**: Expert opinion, nonanalytic studies, or extrapolated evidence from case-control or cohort studies **Good Practice Points:** Based on clinical experience of guideline development group

Abbreviations: ACCF, American College of Cardiology Foundation; AHA, American Heart Association; CA, Canada; CCS, Canadian Cardiovascular Society; GRADE, ; MA, meta-analysis; NICE, National Institute for Health and Clinical Excellence; RCT, randomized controlled trial; SCT, Scotland; SIGN, Scottish Intercollegiate Guideline Network; SR, systemic review; UK, United Kingdom; US, United States
[a]CCS adopted GRADE methods after 2006 to assess quality of studies (explained on pg 24).

The expert advisory panels reviewed guideline recommendations to inform their recommendations and identify gaps or inconsistencies in the evidence that would be good candidates for rapid reviews. Some discrepancies in details were identified in several areas; for example, while all of the guidelines emphasized the importance of sodium restriction, daily intake of sodium varied across the recommendations.

Other Sources Contributing to Recommendations

In addition to the evidence provided through OHTAC recommendations, Health Quality Ontario's clinical handbooks, rapid evidence reviews, and international guidelines, the following sources of evidence were used to devise and further inform recommendations and to ensure consistent care is provided throughout the province:

- Health Quality Ontario Initiative: Adopting a Common Approach to Transitional Care Planning: Helping Health Links Improve Transitions and Coordination of Care (43)
- CCS Consensus Conference, 2003: Assessment of the cardiac patient for fitness to drive and fly (44)

- Expert advisory panel evidence: Any scientific report presented by members of the expert advisory panel was incorporated into drafting corresponding recommendations, particularly if the evidence placed the recommendation for Ontario into context. Specifically, we used the Cardiac Care Network Heart Failure Strategy 2014. (45)
- Expert advisory panel consensus: Where other forms of evidence were lacking, expert advisory panel members' opinions and consensus were incorporated.

Language Used to Reference Contributing Sources of Evidence

For clarity and transparency, the following terms were consistently applied to describe how the expert advisory panel used various evidence sources to develop episode-of-care best practice recommendations.

Taken from	• Recommendation was taken directly from another source
Modified	• Minor modifications were made to the recommendation from the source materials
Consistent with	• Recommendation was developed by the expert advisory panel and was consistent with other sources
Based on	• Recommendation was largely derived from a source but was not taken verbatim, or it was developed by expert panel consensus.

What's New?
During Phase 3, recommended practices could have been added, amended (e.g., owing to reorganization of modules, new evidence has changed an original recommendation), or deleted. Below is a summary of these changes; recommendations follow in the modules.

Additions

- 1.1 Risk Assessment/Stratification
- 2.4 Investigation of Ischemia
- Recommendations in Modules 4–7 (from the Postacute (Community) Care for Heart Failure Episode-of-Care Advisory Panel)

Amendments

- 2.7 Advanced Care Discussions and Planning
- 2a.1 Ventilation Support
- 2a.2 High-Intensity Heart Failure Treatment Considerations

Deletions

Counselling (in Module 4 on discharge planning—it was expanded into multiple recommendations by the Postacute (Community) Care for Heart Failure Episode-of-Care Advisory Panel)

Episode of Care for Acute Heart Failure

The Acute Heart Failure Episode-of-Care Advisory Panel developed the episode-of-care model for acute heart failure (Figure 6). Modules 1 through 3 represent the acute heart failure episode of care. The following recommendations include the recommendations from the clinical handbook on acute heart failure published in 2013 (29) and updates to the recommendations (as noted in the What's New box above).

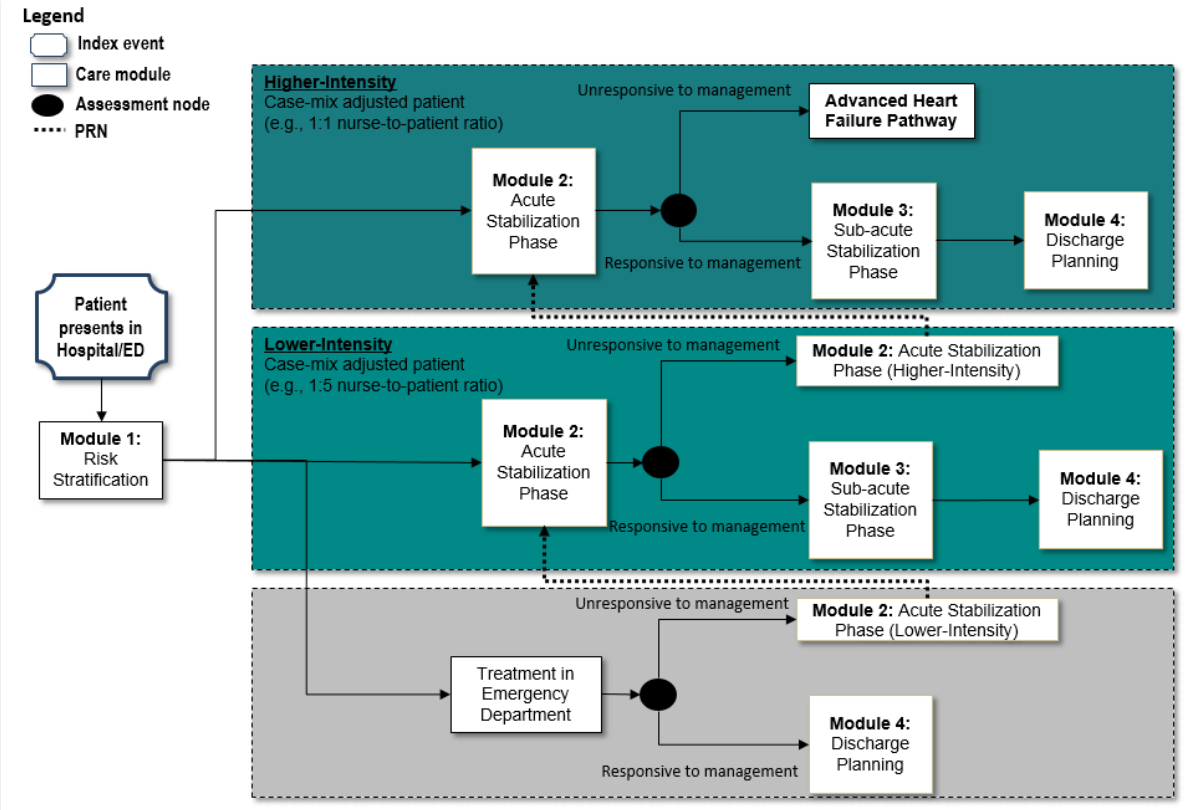


Figure 6. Episode-of-Care Model for Acute Heart Failure

Module 1: Risk Stratification

Recommended Practices	Contributing Sources of Evidence
1.1 Risk Assessment/Stratification	
Risk-stratification tools that can be used for multiple conditions (including HF) should be developed and consistently applied across all Ontario hospitals	Based on expert advisory panel consensus
1.2 Responsiveness to Diuresis	
Initial investigations should include: serum creatinine and electrolyte levels troponin measurements complete blood count electrocardiogram chest x-ray examination and an echocardiogram if no recent echocardiogram is available frequent measurement of heart rate, blood pressure, and oxygen saturation until patient is stabilized	Consistent with: CCS, 2006 (Class I, level C evidence) NICE, 2010 AHA/ACCF, 2013 (Class I, level C evidence)

Recommended Practices	Contributing Sources of Evidence
1.3 Risk Stratification Patient Groups	
Low intensity: Patients can be treated in the ED or in outpatient settings and discharged home without requiring inpatient admission. However, these patients require a follow-up visit with their primary care provider within days of discharge from the ED **Average intensity:** Patients require admission to inpatient care with normal nurse-to-patient staffing **High intensity:** Patients require ventilation (either noninvasive or invasive ventilation) and/or admission to an intensive care unit with higher nurse-to-patient staffing High-risk markers include: respiratory distress hypoxemia severity of pulmonary edema poor response to furosemide administered in ED hemodynamic compromise significant arrhythmias positive troponin	Based on expert advisory panel consensus
1.4 Heart Failure Risk Score	
An acute heart failure risk score—for example, the EHMRG—be calculated to assist with clinical decision-making and predicting the 7-day mortality risk of HF patients (predicted mortality risk increases incrementally with higher EHMRG risk score). As a general guide, patients who are low-risk (e.g., EHMRG quintiles 1 and 2) can be considered for discharge home if they have responded to initial treatment in the ED, provided that there are no other considerations (e.g., advanced-directives, severe dementia, estimated impact of admission on life-expectancy, etc.). Patients who are at higher-risk (e.g., EHMRG quintiles 3-5) should be admitted to hospital.	Consistent with AHA/ACCF, 2013 (Class IIa, level B evidence)

Abbreviations: ACCF, American College of Cardiology Foundation; AHA, American Heart Association; CCS, Canadian Cardiovascular Society; ED, emergency department; EHMRG, Emergency Heart Failure Mortality Risk Grade; HF, heart failure; NICE, National Institute for Clinical Excellence.

The following implementation considerations were expressed by members of the expert advisory panel concerning the module recommendations:

General Considerations for Risk Stratification

- Hospitals should use a common standardized risk stratification assessment tool or process to determine where and how to assist with clinical decision making when patients present to the emergency department.
- All hospitals should have a pathway or mechanism to transfer patients to a higher level provider

Module 2: Acute Stabilization Phase

Recommended Practices	Contributing Sources of Evidence
2.1 Diuretic monitoring and management (acute phase)	
Diuretic management approaches should take an "early and frequently" approach where initially a higher dose of diuretics could be considered for many patients Those at higher intensity should receive IV bolus of furosemide every 6 to 12 hours (twice daily) or continuous IV infusion Those at lower intensity should receive IV bolus of furosemide daily or BID Recording of: ▪ Daily weights ▪ Input and output every 6 hours ▪ Sodium intake ▪ Possible fluid restriction ▪ Electrolytes (at least daily for first 2–3 days) ▪ Renal function (creatinine, at least daily for first 2–3 days) ▪ Chest x-ray results: frequency of chest x-ray examinations depends on extent of pulmonary edema at baseline, a patient's clinical status, and his/her responsiveness to diuretics	Consistent with: ▪ CCS, 2012 (strong recommendation, moderate-quality evidence) ▪ NICE, 2010 ▪ ACCF/AHA, 2013 (Class I, level C evidence)
2.2 Identifying and treating precipitating factors	
Efforts to identify precipitating factors should include exploration of all the usual known factors, including medication and dietary noncompliance. However, precipitating factors should focus on identification of 2 particular prognostic indicators that have been shown to correlate with poorer 30-day outcomes of death or recurrent hospitalization, either of which would be severe enough to warrant surgical or interventional procedures: ▪ presence of myocardial ischemia ▪ worsening of valvular heart disease Evaluation for precipitating factors must also include application of a risk-stratification process, to help clinicians decide whether a patient should or should not undergo cardiac catheterization	Based on expert advisory panel consensus Consistent with: ▪ NICE, 2010 ▪ ACCF/AHA, 2009 (Class I, level C evidence)
2.3 Echocardiography	
Most patients should be considered for 2D echocardiography for assessment of left ventricular systolic and diastolic function and underlying valvular disease	Consistent with: ▪ CCS, 2006 (Class I, level C evidence) ▪ NICE, 2010 ▪ AHA/ACCF, 2009 (Class I, level C evidence) ▪ SIGN, 2007 (level B evidence)
2.4 Investigation of Ischemia	
Inclusion of a process that requires health care providers to document that they have considered patient for cardiac catheterization or noninvasive cardiac imaging for evaluation of coronary ischemia or valvular abnormality, and that patient was deemed either appropriate or inappropriate candidate, along with the reason If severe valvular heart disease is found, and patient is a potential candidate for valve surgery or repair, patient should be considered for cardiac catheterization	Based on expert advisory panel consensus

Recommended Practices	Contributing Sources of Evidence
We recommend coronary angiography be performed in patients with angina pectoris who are deemed suitable candidates for coronary revascularization	Taken from CCS, 2012 (strong recommendation, low-quality evidence)
2.5 Evidence-based pharmacotherapy management	
Patients with left ventricular systolic dysfunction who have not been prescribed evidence-based medications before admission should have these medications initiated in hospital. ACE inhibitors and ARBs should be initiated early after the acute event (e.g., > 24 hours) if the patient is hemodynamically stable. However, initiation of β-blockers should begin only once patient has had diuresis and pulmonary congestion is stable For patients who have been introduced recently to β-blockers and have acute decompensated heart failure associated with the increase, consideration should be given to halving the dose if they have severe pulmonary edema. However, health care providers should be discouraged from discontinuing ACE inhibitors or ARBs unless there is acute renal insufficiency or discontinuing ACE inhibitors or ARBs and β-blockers unless patient is hemodynamically unstable ACE inhibitors, ARBs, and β-blockers should be continued, particularly if patient is already receiving long-term treatment with these agents (provided that no new contraindications to therapy are present) Initial doses of ACE inhibitors, ARBs, and β-blockers should be low, and increased slowly In patients with severe left ventricular systolic dysfunction and NYHA Class II to IV heart failure, use of other evidence-based pharmacotherapy (e.g., aldosterone receptor antagonists) should be considered if ACE inhibitors, ARBs, or β-blockers have already been prescribed. Patients should be closely monitored for hyperkalemia and worsening renal function	Consistent with: ▪ CCS, 2006 (Class I, level A evidence) ▪ CCS, 2012 (strong recommendation, moderate-quality evidence) ▪ ACCF/AHA, 2009 (Class I, level A evidence) ▪ ACCF/AHA, 2013 (Class I, level A evidence)
2.6 Telemetry	
Telemetry may be considered, but due to lack of evidence, this intervention needs to be reassessed. Furthermore, hospitals using telemetry should develop policies identifying patients' eligibility and timing for reassessment.	Based on expert advisory panel consensus
2.7 Advanced Care Discussions and Planning (same recommendation as 6.16)	
In making palliative care services available, fluctuating physical, psychosocial, spiritual, and information needs should be considered without necessarily forgoing acute care. Caregivers should not give up hope for improvement during and after severe exacerbations	OHTAC for HQO COPD Mega-Analysis Systematic Review and Synthesis of the Qualitative Empirical Literature on Palliative Care
Device therapy, if applicable, should be discussed with patients. For instance, health care providers might discuss discontinuing antitachycardia therapy in patients with ICDs	Based on expert advisory panel consensus
End-of-life care for patients with HF should be based on total assessment of needs, symptoms, and estimated life expectancy	Taken from CCS, 2011 (strong recommendation, low-quality evidence)
Plans for end-of-life care should be communicated to ALL health care providers on the team	Based on expert advisory panel consensus

Recommended Practices	Contributing Sources of Evidence
Advanced care planning with patients and their caregivers should not be limited to DNR requests, but include discussions about specific life-supporting treatments, such as intubation, ventilation, defibrillation, and inotropic support	Based on expert advisory panel consensus
2.8 Reassessment and Re-evaluation	
Re-evaluate underlying and precipitating cause ▪ Echocardiography ▪ Cardiac catheterization ▪ Noninvasive cardiac imaging Screen for complications (e.g., arrhythmia, urosepsis, COPD, renal failure, pneumonia) Continue management and monitoring as per care pathway Discuss advanced directives	Based on expert advisory panel consensus

Abbreviations: 2D, 2-dimensional; ACE, angiotensin-converting enzyme ACCF, American College of Cardiology Foundation; AHA, American Heart Association; ARB, angiotensin receptor blockers; COPD, chronic obstructive pulmonary disease; CCS, Canadian Cardiovascular Society; DNR, do not resuscitate; ED, emergency department; HQO, Health Quality Ontario; ICD, Implantable cardioverter defibrillator; OHTAC, Ontario Health Technology Advisory Committee; SIGN, Scottish Intercollegiate Guidelines Network.

The following implementation considerations were expressed by members of the expert advisory panel concerning the module recommendations.

General Considerations for Acute Stabilization Phase

- Predischarge planning should commence shortly after admission to hospital.
- Where required, discussion with the family and patient regarding end-of-life care, advance care directives, and DNR orders should take place shortly after admission to hospital.
- At a system level, OHTAC end-of-life recommendations should be fully implemented.
- DNR forms should include discussions on components of DNR (i.e., defibrillation, ventilator support).
- Advance care planning should occur at each transition point in patient care.
- DNR orders should include management of patients in a nonacute setting.
- A province-wide standardized DNR form and process should be developed and implemented.
- Collect DNR as a data element in DAD and National Ambulatory Care Reporting System.

Module 2a: Acute Stabilization Phase—High-Intensity Heart Failure Inpatients

Recommended Practices	Contributing Sources of Evidence
2a.1 Ventilation Support	
Endotracheal intubation with mechanical ventilation may be used if less invasive modes of respiratory support fail or if the patient is in cardiogenic shock	Taken from: CCS, 2012 (Expert consensus)
2a.2 High-Intensity Heart Failure Treatment Considerations (Advanced Care Pathway)	
Patients requiring treatment of advanced heart failure should be managed in a higher intensity unit (e.g., ICU) by health care providers with expertise in management of heart failure. The following interventions may be considered for these patients: • IV inotropes and/or IV vasodilators	Based on expert advisory panel consensus **Vasodilators for Inhospital Heart Failure Management:** • Based on moderate quality of evidence, there was no statistically significant difference in renal function

Recommended Practices	Contributing Sources of Evidence
• Pulmonary arterial catheterization • IABP and other assistive devices • Ultrafiltration Note: Access to these interventions could require transferring patients to hospitals with these facilities	biomarkers (at baseline, 24 h, 48 h, and discharge) among patients who received nesiritide versus nitroglycerin • Based on low quality of evidence, there was no statistically significant difference in mortality (at 3 or 6 months postdischarge) among patients who received nesiritide versus nitroglycerin **Ultrafiltration in Heart Failure:** Despite several systematic reviews on ultrafiltration, effectiveness of ultrafiltration remains unclear: ▪ Based on low quality of evidence, there is a significant improvement in fluid removal and weight loss in patients with heart failure receiving ultrafiltration compared with diuretic therapy after 48 hours of treatment. However, the duration of the effect is unclear. ▪ Based on very low quality of evidence, there do not appear to be any significant differences in the rates of adverse events among patients with heart failure receiving ultrafiltration compared with diuretic therapy

Abbreviations: CCS, Canadian Cardiovascular Society; HQO, Health Quality Ontario; IABP, Intra-aortic balloon pump; ICU, intensive care unit; IV, intravenous.

The following implementation considerations were expressed by members of the expert advisory panel concerning the module recommendations:

General Considerations for High-Intensity Heart Failure

Use of IV inotropes and IV vasodilators should be restricted to CCU or ICU settings if patients in the acute stabilization phase have high-intensity heart failure.

Module 3: Subacute Stabilization Phase

Recommended Practices	Contributing Sources of Evidence
3.1 Diuretic Monitoring and Management (Subacute Phase)	
Diuretic monitoring and management in the subacute phase is similar to that of the acute phase, recognizing that the patient is now more stable, has less pulmonary congestion, and has been responsive to more intensive diuretics Weight and input/output should still be recorded daily. Electrolytes and renal function can be monitored daily, every second day, or every third day, depending on the patient's clinical status, dose of furosemide, responsiveness to therapy, and prior electrolyte or renal laboratory abnormalities	Consistent with: • CCS, 2012 (strong recommendation, moderate-quality evidence) • NICE, 2010 • ACCF/AHA, 2013 (Class I, level C evidence)

Recommended Practices	Contributing Sources of Evidence
3.2 Early mobilization	
The mobilization/activity care map should follow early-mobilization maps for other care pathways (e.g., COPD) Mobilization depends upon responsiveness to diuresis, and activities such as walking should not be encouraged for patients with severe residual pulmonary congestion or refractory heart failure. Nevertheless, for most patients, activities should be scaled from sitting up in bed to sitting in a chair with bathroom privileges, to walking (in the room and on the ward) Patients should be encouraged to mobilize (with walking) at least once every 6 hours during daytime waking hours	Based on expert advisory panel consensus
3.3 Evidence-based pharmacotherapy (subacute phase)	
Similar to the acute phase, patients in the subacute phase should be treated with β-blockers (assuming there is no absolute contraindication), and ACE inhibitors/ARBs. Nitrates and hydralazine should be used in patients intolerant of or with contraindications to ACE inhibitors/ARBs. Again, the focus (in treatment-naïve patients) should be on initiating therapy at low doses and titrating slowly The use of mineralocorticoid receptor antagonists should be considered (as described in section 2.5)	Consistent with: • CCS, 2006 (Class I, level A evidence) • CCS, 2012 (strong recommendation, moderate-quality evidence) • ACCF/AHA, 2009 (Class I, level A evidence) • ACCF/AHA, 2013 (Class I, level A evidence)
3.4 Other Heart Failure Management Considerations	
Other heart failure management considerations include: ▪ CPAP for patients with confirmed sleep apnea and as recommended by a sleep specialist ▪ Nitrates can be considered for preload reduction ▪ Digoxin can be considered if heart failure symptoms persist despite otherwise optimal therapy ▪ If patient is older and has atrial fibrillation, digoxin should be used with caution ▪ Patients can be considered for an ICD or CRT at the discretion of the treating physician The decision to insert ICD or CRT devices should be made after optimization of heart failure therapy and reassessment of ejection fraction, unless the patient who requires the ICD presents after cardiac arrest or with sustained ventricular tachyarrhythmia	Consistent with SIGN, 2007 (level B evidence) Based on expert advisory panel consensus Consistent with: ▪ CCS, 2006 (Class I, level A evidence) ▪ CCS, 2012 (strong recommendation, moderate-quality evidence) ▪ ACCF/AHA, 2013 (Class IIa, level B evidence) Consistent with OHTAC recommendation: ICDs for Primary Prevention of Sudden Cardiac Death

Abbreviations: ACCF, American College of Cardiology Foundation; AHA, American Heart Association; CCS, Canadian Cardiovascular Society; CPAP, continuous positive airway pressure; CRT, cardiac resynchronization therapy; ICD; implantable cardioverter defibrillator; NICE, National Institute for Health and Care Excellence; OHTAC, Ontario Health Technology Advisory Committee; SIGN, Scottish Intercollegiate Guidelines Network.

The following implementation considerations were expressed by members of the expert advisory panel concerning the module recommendations:

General Considerations for Subacute Stabilization Phase

- Early referral to physiotherapy to mobilize patient once condition is stable
- Assess patient's and caregiver's level of health literacy
- Ensure patient is informed, in language of choice, of treatment options

Postacute (Community) Heart Failure Episode of Care

Modules 4 through 7 represent the postacute (community) heart failure episode of care. Figure 7 is the postacute heart failure episode-of-care model developed by the Postacute (Community) Care for Heart Failure Episode-of-Care Advisory Panel. The following recommendations were developed through a separate, but not independent, process of the earlier modules. The evidence sources and expert advisory panel members used for these modules differ from those used for the acute episode of care and were targeted to postacute episode of care for patients with heart failure. With that said, some aspects of the following recommendations refer to care processes that could, or should, occur in hospital. Consequently, the following modules are not intended to be considered in isolation from the earlier modules, and the entire episode of care should be considered as a whole for providing good quality of care across the continuum.

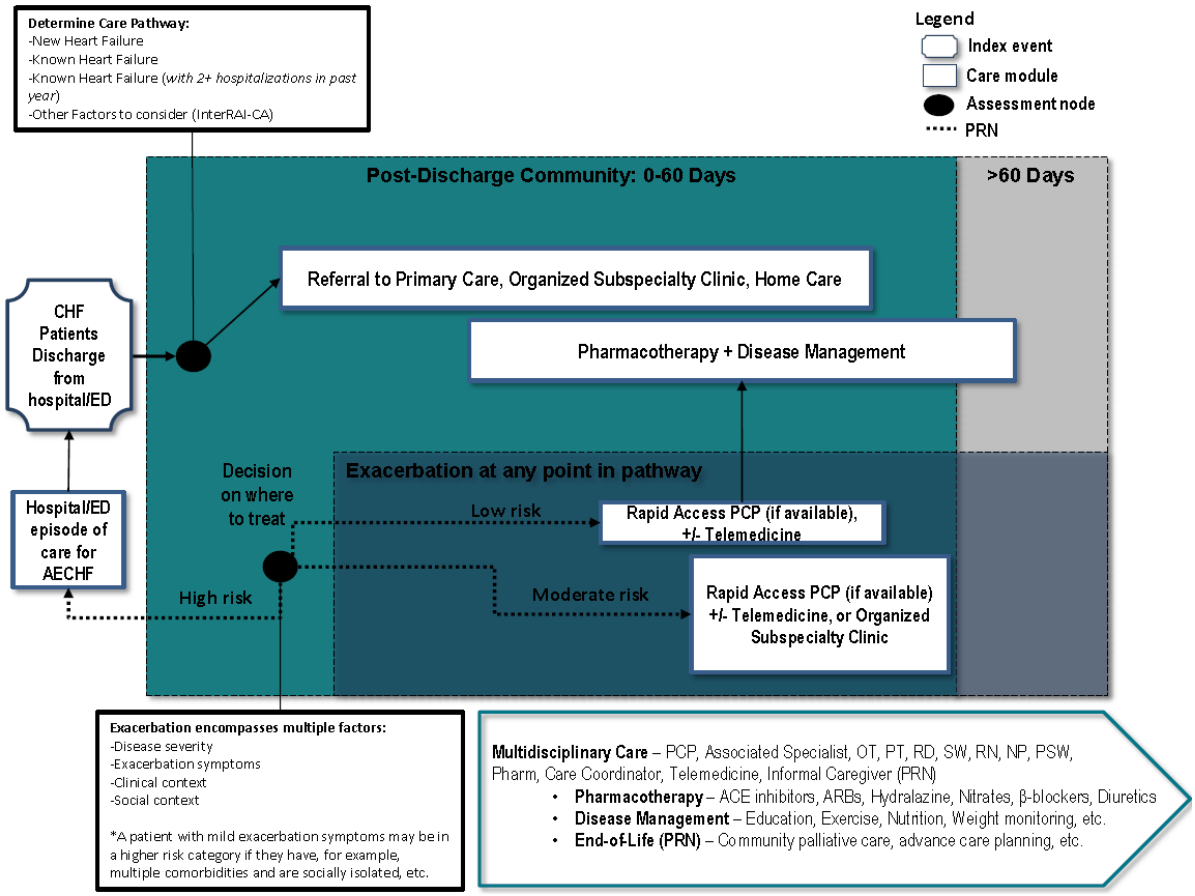


Figure 7. Episode-of-Care Model for Postacute (Community) Heart Failure

Module 4: Discharge Planning

Recommended Practices	Contributing Sources of Evidence
4.1 Medication Reconciliation	
Protocol should be established (consider Accreditation Canada) to ensure medication reconciliation occurs at all transition points. Medication therapy should be communicated to ALL health care providers on the team	Consistent with: • HQO Acute CHF QBP Handbook, 2012 • HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014 • Adopting a Common Approach to Transitional Care Planning, 2013 • ACCF/AHA, 2009 (Class I, level of evidence C) • SIGN, 2007 (good practice point) • **Medication Reconciliation at Discharge**: It is impossible to determine effect of medication reconciliation on patient outcomes, as there is limited evidence on medication reconciliation in isolation of other care-coordination interventions
4.2 Predischarge Planning	
Predischarge planning encompasses the following standards: ▪ Predischarge planning is incorporated as a standard of care for patients admitted to hospital ▪ Patients and caregivers are involved in the discharge planning process ▪ Individualized comprehensive assessments and care plans are developed for patients on admission ▪ Individualized discharge plans[a] are developed on admission for patients ▪ Families and caregivers are provided with information and resources to support transition ▪ Standardized risk-assessment tools should be used to assess and stratify patients at discharge	Taken from Adopting a Common Approach to Transitional Care Planning, 2013
4.3 Predischarge Assessments	
Assessment before discharge should include: • Functional capacity assessment (e.g., 6MWT or able to walk around ED or hospital ward) • Social support assessment (e.g., does patient have a caregiver, access to community resources, suitable living situation, financial stability?) • For clinically overt cognitive impairment, refer patient to geriatrician or appropriate clinic • Consider cognitive assessment for heart failure patients after discharge If any of these assessments warrant further investigation, patient should be referred to appropriate provider (or arrangements made to support access to postdischarge appointments)	Consistent with SIGN, 2007 (good practice point)
4.4 Timing of Initial Follow-Up After Discharge	
Patients who are discharged after hospital admission should be evaluated by their family physician within 3 d Patients who are discharged from the ED should be evaluated by their family physician within 3 d	Modified Adopting a Common Approach to Transitional Care Planning, 2013

Recommended Practices	Contributing Sources of Evidence
Patients requiring specialized HF care should have rapid access to follow-up regardless of outpatient care setting (home care, HF clinic, specialists, primary care, cardiac rehabilitation, etc.) Patients should ideally receive a follow-up phone call from a designated health care provider within 48 h of discharge from hospital. To ensure continuity, the designated health care provider should be from the same institution where the initial hospitalization occurred ***Note:*** *Expert advisory panel members agreed that communication shortly after discharge is critical for continuity of care; however, logistics of making connection between hospital and primary care might be challenging*	Consistent with CCN Heart Failure Strategy, 2014
4.5 Timely Documentation	
Discharge notes should be dictated and sent to primary care (and relevant other) provider(s) within 1 wk of patient discharge, but preferably within 48 h	Consistent with: • ACCF/AHA, 2009 • CCS, 2008
4.6 Type of Communication as Discharge	
Written and verbal discharge plans[a] (accounting for health literacy, numeracy, and language barriers) should be given to patients and caregivers At minimum patients and their caregivers should know signs and symptoms of worsening HF and know which health care providers they should contact As an example provided by the community HF expert advisory panel, patients could be provided the "Stop Light" document for information on what do to when they have worsening HF (Appendix: Stop Light Document)	Consistent with: • ACCF/AHA, 2009 (Class I, level of evidence C) • CCS, 2008 (Class IIa, level of evidence B) • **Communication of Discharge Instructions for Heart Failure Patients**: Communication of discharge plans is important; however, there is limited evidence on the best method of communicating the discharge plan
4.7 Discharge Plan[a]	
Individualized discharge plans[a] (medications, referrals, investigations [including lab tests] that need to be done postdischarge, etc.) should be dictated and sent to the family physician and other relevant provider(s) before discharge including home care follow-up within 1 wk of patient discharge, but preferably within 48 h	Consistent with: ▪ HQO Acute CHF QBP Handbook, 2012 ▪ CCS, 2008 (Class IIa, level of evidence B) ▪ CCN Heart Failure Strategy, 2014
Patients and their caregivers should have their follow-up appointment(s) booked by a designated health care provider with a family physician or specialist before discharge. In addition, patients and caregivers should be given a copy of the discharge plan Barriers to accessing early postdischarge appointments should be identified and addressed	Modified Adopting a Common Approach to Transitional Care Planning, 2013
Consider Referral to Multidisciplinary Community Care (Module 4a)	

Abbreviations: 6MWT, 6-minute walk test; ACCF, American College of Cardiology Foundation; AHA, American Heart Association; CCN, Cardiac Care Network; CCS, Canadian Cardiovascular Society; CHF, congestive heart failure; ED, emergency department; HF, heart failure; HQO, Health Quality Ontario; QBP, Quality-Based Procedure; SIGN, Scottish Intercollegiate Guideline Network.
[a]*Discharge plan* refers to the official hospital documentation including the dictated details of the hospital episode and full care plan.

Implementation considerations expressed by members of the expert advisory panel concerning the module recommendations are listed in Table 15.

Table 15: Implementation Considerations for Modules

Predischarge planning should commence shortly after admission to hospital
Advanced planning discussion should take place at each health care transition point
Where required, hospital-based CCAC Care Coordinator should be engaged shortly after patient's admission to hospital
Readiness for discharge should be based on patient's being clinically, socially, physically, and mentally ready for discharge
Cognitive ability triage should be undertaken as a component of predischarge planning and, where required, referral made for assessment while in hospital or as part of postdischarge follow-up plan
Follow-up care should be with a family physician. If possible, the family physician should have direct access to a health care provider with expertise in HF
Patients who require highly specialized care providers, advanced diagnostics, and interventions should be assessed by a HF clinic within a tertiary care centre
Until accepted community-based risk assessment and stratification tools are available, best clinical practices should be adopted to reduce the risk of avoidable readmission to hospital or presentation to the ED
Service providers should do the following when undertaking discharge planning: • Confirm the preferred maintenance therapy and gauge patient's daily care practices • Arrange follow-up and home care • Provide clear instructions about appropriate medication use and potential adverse effects • Formally assess daily living activities if concerns remain about how patient will cope at home • Ensure that hospitals identify or establish services to review people admitted to hospital with a primary diagnosis of HF within 2 wk after discharge • Follow-up contact should be made by hospital-based staff within 48 h of discharge • Medication reconciliation should be completed before discharge
Ensure that discharge plan identified the cause for admission and treatment provided so that family physician can assist in providing appropriate community-based service
Ensure that HQO/Health Transformation Secretariat Transitions standards for discharged are fully implemented

Abbreviations: CCAC, Community Care Access Centre; ED, emergency department; HF, heart failure; HQO, Health Quality Ontario.

Recommended practices in Module 4a address appropriate referrals to health care professionals.

Module 4a: Referral to Multidisciplinary Care

Recommended Practices	Contributing Sources of Evidence
4a.1 Referral to Home Care	
Patients with an *apparent* need for home care service (nursing monitoring of HF, functional issues, mobility limitations, limited access to transportation, caregiver burden, etc.) or patients who have frequent admissions or ED visits should be referred for a home care assessment. Home care referral should be considered for patients where home assessments might be beneficial	Consistent with **Criteria for Referral to Home Care**: Patients without an obvious need for home care services can be overlooked and experience poor outcomes as a result. Patients with major mobility limitations, longer hospital stays, more comorbidities, and older age are more likely to be identified for home care services than those without an obvious need
4a.1.1. Care coordination is recommended in accordance with the HQO Community Home Care Handbook	Taken from HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014
4a.1.2. Nursing assessment and monitoring, wound care, intravenous therapy, continence, and pain management should accord with the HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations	Taken from HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014
4a.1.3. Occupational therapy services should accord with the HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations	Taken from HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014
4a.2 Referral to Cardiologist/Specialist	

Recommended Practices	Contributing Sources of Evidence
4a.2.1. Patients with HF without a completed diagnostic workup have persistent symptoms, new unexplained symptoms or clinical instability requiring investigation or treatment, need for cardiovascular interventions, need for frequent follow-up, difficulty with initiation or optimization of medical therapy, or patients for whom a family physician is unable to provide necessary care should be referred to an internist specializing in cardiac care, cardiologist, or HF clinic	Consistent with: ▪ CCS, 2006 (Class I, level of evidence C) ▪ CCN Heart Failure Strategy, 2014
4a.2.2. Referral for advanced HF therapy, high-risk CV surgery program, mechanical circulatory support, or transplantation	Consistent with: • CCS, 2006 (Class I, level of evidence C) • CCN Heart Failure Strategy, 2014
4a.2.3. Referral to regional congenital program for patients with HF and congenital heart disease	Consistent with: CCS, 2006 (Class I, level of evidence C)
4a.3 Referral to Geriatrician	
Refer for geriatrician assessment when an older patient has multiple comorbidities, difficulty with medication management, cognitive impairment, or functional limitations	Based on expert advisory panel consensus (Modified wording from BC Guidelines & Protocols Advisory Committee) Consistent with CCN Heart Failure Strategy, 2014
4a.4 Referral to Outpatient Subspecialty Clinic	
We recommend that patients with HF who have the following characteristics should be considered for referral to an outpatient subspecialty clinic: ▪ Patients with high-risk HF ▪ Recurrent hospitalizations ▪ New-onset HF that requires diagnostic or therapeutic intervention ▪ Concomitant ischemia ▪ NYHA Class III–IV ▪ Asymptomatic or symptomatic patients with LVEF <35% ▪ Renal dysfunction (not requiring dialysis) ▪ Multiple comorbidities ▪ Concomitant RV dysfunction	Consistent with: • OHTAC Recommendation on Community-Based Care for the Specialized Management of Heart Failure, 2009 • HQO Acute CHF QBP Handbook, 2012 • ACCF/AHA, 2013 (Class I, level of evidence B) • CCS, 2006 (Class I, level of evidence C) • CCN Heart Failure Strategy, 2014 • **Criteria for Referral to Heart Failure Clinics**: Optimal eligibility criteria for HF clinics are unclear
4a.5 Referral to Cardiac Rehabilitation Program	
Patients should be referred to cardiac rehabilitation, where available	Consistent with: • ACCF/AHA, 2013 (Class IIa, level of evidence B) • CCS, 2008 (Class I, level of evidence C) • CCN Heart Failure Strategy, 2014
4a.6 Services Provided in Outpatient Subspecialty Clinic	
Health care professionals should provide education, self-management training, and counselling (as outlined in recommendations 4.1 to 4.16) to patients and their caregivers. Special efforts should be made to encourage caregivers to participate in patient management to ensure knowledge translation has been successful whenever possible	Taken from OHTAC Recommendation on Community-Based Care for the Specialized Management of Heart Failure, 2009 Consistent with: CCS, 2006 (Class I, level of evidence A)

Abbreviations: ACCF, American College of Cardiology Foundation; AHA, American Heart Association; BC, British Columbia; ED, emergency department; CCN, Cardiac Care Network; CCS, Canadian Cardiovascular Society; CV, cardiovascular; CHF, congestive heart failure; HF, heart failure; HQO, Health Quality Ontario; LVEF, left ventricle ejection fraction; NYHA, New York Heart Association; OHTAC, Ontario Health Technology Advisory Committee; RV, right ventricular.

General Considerations for Discharge and Referral Planning

The following implementation considerations were expressed by members of the expert advisory panel concerning the module recommendations:

- A predischarge functional assessment should be completed and care plan followed up or re-assessed in patients' homes.
- A provincial database accessible to all patients outlining where in their community they can receive treatment, advice, and education should be developed.
- Direction on where to go if symptoms worsen should be provided to patients and their caregivers on discharge.
- Referral to a geriatrician should be considered.
- Barriers that restrict access to a HF clinic and cardiac rehabilitation program should be removed at a system level, provider level, and patient level.

Module 5: Medication Management in the Community

This module identifies recommended practices for prescribing pharmacotherapy for patients with heart failure.

Recommended Practices	Contributing Sources of Evidence
5.1 Evidence-Based Pharmacotherapy	
For heart failure with reduced ejection fraction: • All patients without contraindications should receive ACE inhibitors or ARBs. If patients cannot tolerate ACE inhibitors or ARBs or have contraindications, they should receive hydralazine and nitrates • All patients without contraindications should receive β-blockers • The use of aldosterone-receptor antagonists should be considered for patients with symptomatic heart failure (NYHA Class II–IV) despite optimal medical therapy with ACE inhibitors or ARBs, β-blockers, and diuretics (if necessary)	Consistent with: • HQO Acute CHF QBP Handbook, 2012 • CCS, 2006 (Class I, level of evidence A) • CCS, 2012 (Class I, level of evidence A) • CCN Heart Failure Strategy, 2014
5.2 Other Relevant Medical Therapies	
Additional therapies include diuretics, cardiac glycosides (digoxin) for symptom management, statins and antiplatelets for patients with ischemic heart disease, or anticoagulation for patients with atrial fibrillation	Modified HQO Acute CHF QBP Handbook, 2012 Consistent with: • CCS, 2006 (Class I, level of evidence A) • CCS, 2012 (Class I, level of evidence A) • CCN Heart Failure Strategy, 2014

Abbreviations: ACE, angiotensin-converting enzyme; ARB, angiotensin-receptor blockers; CHF, congestive heart failure; CCN, Cardiac Care Network; CCS, Canadian Cardiovascular Society; HQO, Health Quality Ontario; NYHA, New York Heart Association.

The following implementation considerations were expressed by members of the expert advisory panel concerning the module recommendations:

General Considerations for Medical Management in the Community

- Financial barriers to accessing drugs should be identified early and action taken to eliminate or minimize cost to patients who cannot afford to pay for medications.
- All patients and their caregivers should be educated on proper use of prescribed medications, including who can answer any questions.

- All patients should have a complete list of all of their medications (including nonprescription and complementary medications).
- Practitioners should know the contraindication(s) and known side effects of each medication and advise patients accordingly.
- Patient medication allergies should be entered in the electronic health record.
- Medication reconciliation should be undertaken as a component of postdischarge follow-up and, where possible, in patients' homes.
- All changes to medications, which can be frequent, should be communicated to the entire health care team.

Module 5 identifies recommended practices for patients with HF being discharged to the community. The recommended practices in this module can be undertaken by family physicians, interdisciplinary group practices, home care, heart failure clinics, internal medicine and cardiology specialists, and other health service providers in the community.

Module 6: Disease Management

Recommended Practices	Contributing Sources of Evidence
6.1 Patient Education	
• Informal assessment of health literacy, numeracy, and cognition should be completed to adapt the education plans as necessary (including materials in various languages) • Education should start before discharge (e.g., Stop Light document, Appendix 1) and should be continued and enhanced in the community • Education should be provided frequently, consistently, and through a variety of mediums • Education should be provided to patients, caregivers, and primary care providers on medication management, smoking cessation, alcohol use, weight monitoring, symptom monitoring, nutritional assessment (e.g., sodium restriction, fluid intake), physical activity and exercise, and advanced care planning • By the end of educational programs, patients and caregivers should be able to state, at a minimum, the plan for dealing with worsening signs and symptoms (or exacerbation)	Consistent with: • HQO Acute CHF QBP Handbook, 2012 • HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014 • ACCF/AHA, 2013 (Class I, level of evidence C) • NICE, 2010 • CCN Heart Failure Strategy, 2014
6.2 Medication Management	
Patients and medications should be assessed to ensure: ▪ Optimization of evidence-based and guideline-recommended medications ▪ Use of appropriate symptom-relief medications ▪ Adherence is assessed (e.g., community HF expert advisory panel noted patients could be assessed with Morisky's 4-Item Medication Adherence Questionnaire from Appendix 1. Health care providers should address reasons for poor compliance where possible) ▪ Identification of potential medication therapy problems or discrepancies	Consistent with: • OHTAC Recommendation on Community-Based Care for the Specialized Management of Heart Failure, 2009 • CCN Heart Failure Strategy, 2014 • HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014

Recommended Practices	Contributing Sources of Evidence
6.3 Nutritional Assessment	
When initially diagnosed with HF, patients should ideally receive education on sodium and fluid restriction. This could be done individually or in a group (either inpatient or outpatient) The following patients should be referred for an individualized nutritional assessment, through an outpatient subspecialty clinic, primary care, or home care: ▪ Patients with advanced heart failure (NYHA Class III or IV) ▪ Frail elderly patients ▪ Patients with unintended weight loss of nonedematous weight of more than 6% of the previous normal weight over 6 mo associated with HF (cardiac cachexia) ▪ Patients with frequent readmissions to hospital for decompensated HF ▪ Patients with serious comorbidities affecting nutrition	Based on expert advisory panel consensus Consistent with HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014
6.4 Sodium Restriction	
Use clinical judgment and be realistic about patient factors when prescribing sodium restrictions. Patients should be advised to: ▪ Add little or no salt when cooking or at the table ▪ Start reading food labels and choose foods that contain less than 200 mg of sodium, or 8% of daily value, per serving ▪ Look for products that claim to have low sodium or no salt added ▪ Try to limit prepared, processed, and restaurant foods and to cook more at home ▪ Prepare more meals at home using fresh ingredients	Consistent with: • CCS, 2006 (Class I, level of evidence C) • ACCF/AHA, 2013 (Class IIa, level of evidence C) • **Sodium Restriction in Heart Failure:** There is conflicting evidence about effects of restricting sodium in patients with HF
6.5 Fluid Intake	
Concomitant restriction of daily fluid intake to between 1.5 L/d and 2 L/d should be considered for all patients with fluid retention or congestion not easily controlled with diuretics, or in patients with substantial renal dysfunction or hyponatremia	Consistent with: • CCS, 2006 (Class I, level of evidence C) • ACCF/AHA, 2013 (Class IIa, level of evidence C)
6.6 Weight Monitoring	
Daily weights should be recorded for all patients who receive diuretics on a standing or PRN basis. Patients or caregivers should be able to state action plan for changes in weight, and should be aware of their target weight	Consistent with: • HQO Acute CHF QBP Handbook, 2012 • CCS, 2006 (Class I, level of evidence C) • SIGN, 2007
6.7 Physical Activity Counselling	
Patients should be encouraged to be physically active consistently by all members of their health care team. Patients who find it difficult to maintain physical activity should be considered for physical activity counselling with the appropriate provider	Consistent with: ▪ HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014 ▪ SIGN, 2007 ▪ **Physical Activity Counselling for Heart Failure Patients**: The largest and longest study on physical activity counselling identified by this review found that a 50-min individualized physical activity counselling session with a physiotherapist, followed up with 4–5 telephone sessions over the next 2 y resulted in maintenance of mobility in older adults
▪ Physiotherapy services are recommended to be provided in accordance with the HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations,	Taken from HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014

Recommended Practices	Contributing Sources of Evidence
2014	
6.8 Exercise	
All stable HF patients (regardless of disease severity) should be referred to cardiac rehabilitation or an alternative exercise program where home-based rehabilitation is unavailable. Senior patients who are frail should be referred to geriatric rehabilitation. Patients should be physically active or engage in regular exercise that does not produce uncomfortable symptoms. Expert advisory panel endorses recommendations on exercise frequency and intensity by severity of HF from CCS 2013 Guidelines	Consistent with: • HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014 • CCS, 2013 (Class I, level of evidence A) • ACCF/AHA, 2013 (Class I, level of evidence A) • NICE, 2010 • SIGN, 2007 (good practice point) • **Home-Based Exercise Programs in Heart Failure**: Home-based exercise training increased 6MWT distance compared with usual care. Peak VO2 and QOL did not differ between home-based exercise training and usual care • **Aerobic Exercise Training in Patients With Heart Failure**: There is a trend toward improved QOL in patients with HF who receive exercise training. Exercise training reduces HF-related hospital admissions
6.9 Smoking Cessation	
Patients who smoke should receive smoking cessation counselling and referral to smoking cessation program. Could include providing information to patients with contact information and instructions for resources or other guidance	Consistent with: • HQO Acute COPD Handbook, 2012 • HQO Community-Acquired Pneumonia QBP Handbook, 2013
6.10 Alcohol Consumption	
If HF is alcohol-related, patients should be advised to abstain from consuming alcohol	Consistent with: • NICE, 2010 • SIGN, 2007 (level C)
6.11 Vaccinations	
Patients who do not have up-to-date influenza (annual) or pneumococcal vaccinations should be vaccinated, unless contraindications are present	Taken from: • HQO Acute COPD Handbook, 2012 • HQO Community-Acquired Pneumonia QBP Handbook, 2013
6.12 Sleep Apnea	
Referral to sleep laboratory with expertise in HF. Criteria for referral can include risk factors for sleep-disordered breathing or suspicion on basis of clinical assessment	Modified HQO Acute CHF QBP Handbook, 2012 Consistent with: • CCS, 2011 (weak recommendation, moderate-quality evidence) • ACCF/AHA, 2013 (Class IIa, level of evidence B)
6.13 Depression	
Assess psychological status once HF has stabilized and carefully consider risks and benefits of drug treatment and cognitive behavioural therapy for depression	Modified NICE, 2010
Mental health support services are recommended in accordance with HQO Community Home Care Handbook	Taken from HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014
6.14 Support for Caregivers	

Recommended Practices	Contributing Sources of Evidence
Health care providers should be aware of resources (home care, community support services, advocacy groups, community centres, etc.) available for caregivers and should provide support when needed	Consistent with: • HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014 • NICE, 2010 • SIGN, 2007 (good practice point) • CCN Heart Failure Strategy, 2014 Caregiver Support for Postdischarge Patients With Chronic Conditions:* Caregiver or family support interventions are effective at improving physical (level of dependency, activities of daily living) and mental (QOL) outcomes for community-living, adult patients who were recently discharged from hospital owing to exacerbation of HF, stroke, COPD, or pneumonia
Caregiver and family support interventions are recommended in accordance with HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014	
Personal support services are recommended in accordance with HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014	Taken from HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations, 2014
6.15 Driving	
Health care providers should consider the CCS's Consensus Conference 2003: Assessment of HF patients for fitness to drive and fly to determine whether patient should maintain his or her driving licence	Based on expert advisory panel consensus
6.16 Advanced Care Discussions and Planning (same recommendation as 2.7)	
In making palliative care services available, fluctuating physical, psychosocial, spiritual, and information needs should be considered, without necessarily forgoing acute care. Caregivers should not give up hope for improvement during and after severe exacerbations	OHTAC for HQO COPD Mega-Analysis Systematic Review and Synthesis of the Qualitative Empirical Literature on Palliative Care
Device therapy, if applicable, should be discussed with patients. For instance, health care providers might discuss discontinuing antitachycardia therapy in patients with ICDs	Based on expert advisory panel consensus
End-of-life care for patients with HF should be based on total assessment of needs, symptoms, and estimated life expectancy	Taken from CCS, 2011 (strong recommendation, low-quality evidence)
Plans for end-of-life care should be communicated to ALL health care providers on the team	Based on expert advisory panel consensus
Advanced care planning with patients and their caregivers should not be limited to DNR requests, but include discussions about specific life-supporting treatments, such as intubation, ventilation, defibrillation, and inotropic support	Based on expert advisory panel consensus

Abbreviations: ACCF, American College of Cardiology Foundation; AHA, American Heart Association; CCN, Cardiac Care Network; CCS, Canadian Cardiovascular Society; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; DNR, do not resuscitate; HF, heart failure; HQO, Health Quality Ontario; ICD, implantable cardioverter-defibrillator; NICE, National Institute for Health and Clinical Excellence; NYHA, New York Heart Association; OHTAC, Ontario Health Technology Advisory Committee; PRN, as needed; QBP, Quality-Based Procedure; QOL, quality of life; SIGN, Scottish Intercollegiate Guideline Network; VO2, oxygen uptake.

The following implementation considerations were expressed by members of the expert advisory panel concerning the module recommendations.

*McMartin, K. Caregiver support for post-discharge patients with chronic conditions: a rapid review. Toronto: Health Quality Ontario. In press.

General Considerations for Disease Management

Patient and caregiver education should include information on medications, sodium intake, fluid intake, diet and weight monitoring, exercise, alcohol consumption, sleep apnea, how to deal with stress, and end of life. Materials should be provided to both patient and primary caregiver and must include contacts on where to get additional information in the community.

Smoking Cessation

Smoking cessation strategies that specifically target patients with HF and COPD should be developed and implemented. Targeted smoking cessation materials and messaging should be heavily stressed to all HF patients, as smoking cessation in this group is shown to have a substantial positive and immediate clinical outcome.

Nicotine replacement therapy should be made a free benefit to any Ontario resident with a health card issued by the Ontario Ministry of Health and Long Term Care.

Public Health departments should provide free nicotine replacement therapy under the "STOP" program; pharmacies should be permitted to do the same when following up or screening patients.

Smoking cessation drug therapies should be made available at no cost to all Ontarians with a prescription by a health care provider trained in smoking cessation.

Screening and Education/Self-Management

Standardized self-management education materials should be available and consistently used both in hospitals and in communities to ensure consistent messaging to patients and caregivers. At a minimum, patient education materials (for both the patient and primary caregiver) should include:

- how to deal with worsening HF symptoms as well as other aspects of managing the disease, including where to find medical intervention if required
- medication management
- diet and nutrition counselling
- weight monitoring
- sodium intake
- fluid intake
- alcohol consumption
- smoking cessation
- physical activity
- sleep apnea
- vaccinations

All patients should have a formal exercise program developed by a health professional.

The Centre for Addiction and Mental Health's behavior modification program "the universal 6 pack" (smoking, weight loss, sleep, exercise, stress, and alcohol) should be explored for province-wide implementation.

When goals of therapy related to medications are not being reached, a medication adherence assessment should be conducted. Actions to resolve identified issues should be taken, which typically requires better communication between family physicians and other health care providers.

Implementation of Best Practices

The Expert Advisory Panel on postacute, community-based care for HF patients believes that implementation of best practices related to community-based HF care will require significant investment. The following points highlight some of the key issues for and barriers to the successful implementation of the community-based HF QBP best practices discussed:

1. A transitional approach to funding is recommended so as to enable the building of capacity in the community and to avoid the consequences of patients receiving no specialized service.

2. It will not be possible to promote the movement of appropriate patients to community or ambulatory care and achieve the associated cost efficiencies without addressing best practices for capacity and access issues, and whether there is adequate outpatient HF clinic services and cardiac rehabilitation (CR) services post discharge.

3. Information within patient education materials should be standardized, available in multiple languages, and be accessible for people with reading challenges. Education materials for patients and their caregivers at discharge should be used and reinforced by the home care team. Patients have concerns that new educational materials distributed by home care service providers were conflicted with materials provided on discharge or were confusing.

4. Pathways recommended in this report should be adopted by all providers. Provincial guidelines and pathways should be available in electronic format for health care providers. **Provincial versus local care pathways:** It should be recognized that the practices recommended in this clinical handbook have been defined at an aspirational provincial level to guide all hospitals across the province. It is not intended to be an operational care pathway—individual providers will have to implement these best practices based on their own local circumstances and available capacities. In many cases, the implementation of these recommendations will be challenged by local arrangements or the availability of services.

5. All hospitals and health care providers should adopt the forthcoming health transformation discharge planning standards.

6. Smoking cessation counselling should be made readily available at no cost to all patients and caregivers.

7. Barriers to accessing Nicotine Replacement Therapy should be removed.

8. Barriers to accessing smoking cessation drug therapy should be removed.

9. Patient self-management programs should be developed and incorporated into care plans. Monitoring of self-management care plans is a responsibility of all health care providers. Barriers to communication that hinder multidisciplinary care provision should be removed.

10. The Health Quality Ontario/Healthlinks care coordination initiative should be adopted by all primary care providers to facilitate greater coordination and integration with community health services.

11. Once developed, the Health Quality Ontario/Healthlinks care coordination e-chart should be adopted by all primary care providers, Community Care Access Centres, and their contracted service providers to improve communication and integration in patient care

12. The impact on hospitals of implementing the 9 discharge standards identified in the Health Quality Ontario/Health Transformation Secretariat should be addressed early in the roll out.

13. All home care service providers should work to integrate care to drive performance and improve communication to ensure common care plan are followed, and to report health changes and changes related to self-management plans along with the home care coordinator.

14. The challenge of shortages in human resources on the implementation of community care for post-discharge populations in some regions of the province should be considered. In regions where human resources are in shortage, the regional LHIN and provincial government should be involved to grow capacity

15. The impact of this QBP should be analyzed on a regular basis and updated where required.

16. Physicians and other health care leaders should be engaged early in the development of funding programs and quality-based measures to promote understanding and acceptance and ensure successful uptake of the clinical handbook recommendations.

17. Health care leaders, clients, and their caregivers should be involved in the development of implementation materials.

18. Family physicians, other health care providers, and HF specialty clinics should have adequate decision support to respond to the increasing demand for data and the analytics to examine/report on trends, etc.

19. Once developed, implementation of this QBP should use evidence-based Knowledge Translation and Exchange (KTE) strategies to increase the uptake of recommendations

20. Once completed, OHTAC recommendations on end-of-life care and planning should be implemented.

21. Where a patient would benefit from an interdisciplinary heart failure clinic, barriers (e.g. too unwell to attend outpatient setting, unreasonable distance from the clinic location) to access should be removed.

22. Actions should be taken to improve communication between multi-speciality care providers and patient transitions through the continuum of care.

Implement as a Program of Care

Many of these considerations speak to the need to approach the implementation of the recommended practices not simply at the level of individual patients and clinicians, but within a program of care that requires organization-level planning, resourcing, and the involvement of administrators. Program design should also involve a measurement system for tracking performance, supporting quality improvement

Track Current Practice Against Recommended Practices

Many of the practices recommended by the expert advisory panel are not currently tracked in any consistent way at either the local or provincial level. Thus, it is difficult to know what the "gap" is between current and ideal CHF practice or how much this gap varies across different organizations and parts of the province. A key objective of developing a CHF performance measurement strategy should be to enable organizations to track, audit, and evaluate the implementation of care pathways and recommended practices at the organizational level. Through such monitoring, variances can be identified, progress can be monitored, and the pathway can be refined over time.

As a quality improvement initiative, the expert advisory panel suggests that the Ministry of Health and Long Term Care undertake a review of ambulatory care data that can be used to determine where gaps exists in service delivery and where best to optimize funding in an outpatient setting. Where data do not currently exist, the ministry should consider identifying mechanisms to collect and report data.

Expert Advisory Panel Membership

Health Quality Ontario's Expert Advisory Panel on Episodes of Care for Congestive Heart Failure

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Kory Kingsbury	Cardiac Care Network	Chief Executive Officer

Appendices

Appendix 1

Exercise Guidelines for Your Patients With Heart Failure

Causes of Effort Intolerance

The causes of fatigue and exercise intolerance in patients with heart failure (HF) are multifactorial. Possible reasons include:

- skeletal muscle alterations and dysfunction
- exaggerated increases in ventilation disproportionate to increase in CO_2 production
- inadequate tissue perfusion due to inadequate cardiac output
- deconditioning from lack of physical activity
- aging (reduced muscle strength and power, reduced joint range of motion)
- Comorbidities (e.g., COPD, peripheral vascular disease, arthritis)
- Inspiratory muscle weakness

Clinical Benefits of Regular Physical Activity and an Exercise Program

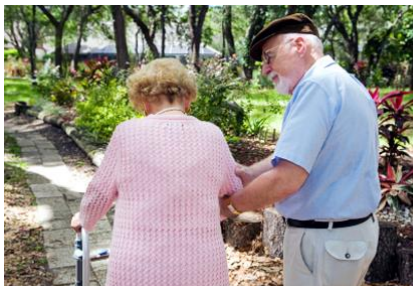
- improve skeletal muscle function and efficiency
- improve endothelial function
- improve ventilatory function (especially with respiratory training)
- decrease risk of falls in the elderly
- improve quality of life
- decrease hospitalization
- improve HF symptoms

Exercise training in HF improves skeletal muscle function, and facilitates several physiological mechanisms that collectively improve functional capacity. Patients are then able to complete activities with reduced sensations of shortness of breath or fatigue.

The purpose of this information is to guide family physicians and primary care providers who provide exercise advice for patients with HF. Most patients with HF will benefit from referral to a cardiac rehabilitation program (or physiotherapist where programs are unavailable) for additional advice regarding exercise.
Please refer to the patient education pamphlet on exercise guidelines that can be given to your patients with HF.

Types of Exercise

Aerobic



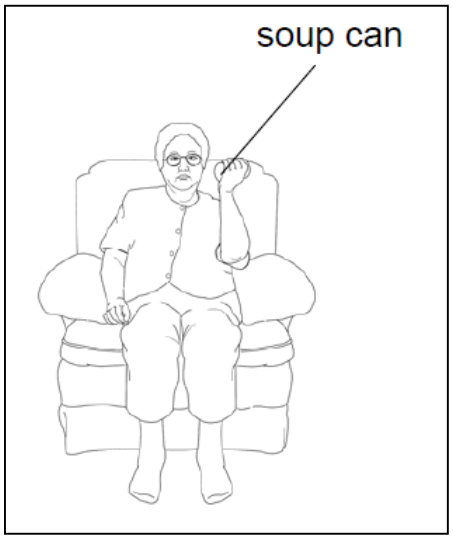
Aerobic exercise includes any physical activity that uses large muscle groups and increases the heart rate (e.g., walking). Walking or riding a stationary bike (no resistance) is an excellent way to begin an exercise program.

When starting an exercise program, encourage patients to walk (or ride a stationary bike) for a total of 10–15 minutes each day. Gradually work up to 30 minutes a day as tolerated.

Patients should include a 5- to 10-minute warm up and cool down with light stretching before and after exercise.

Tip: Often patients with HF will need to pace themselves and might not be able to exercise for 10–15 minutes during a single session. In this case, patients can try 2–3 sessions of 5 minutes for a total of 15 minutes a day. Patients with HF tend to tolerate increasing the number of sets rather than the time for each set as they gradually increase their physical activity.

Strength Training or Resistance Training



The goal of resistance training is optimizing muscle strength and therefore is also known as "strength training." Progressive resistance training involves moving joints through range-of-motion exercises with some form of resistance.

For people recently discharged from hospital or severely deconditioned, resistance training can be initiated using gravity as resistance. This type of exercise can be completed at home, in bed, or in a seated position. Conventional weights can be added under direction of or with advice from an exercise specialist.

Tip: Resistance training is not as stressful on the cardiovascular system as traditional aerobic exercise, allowing for building of peripheral muscle strength with lower perceptions of shortness of breath. This is an attractive option for patients with advanced HF who might not be able to complete aerobic exercise training because of intolerable shortness of breath or leg fatigue.

Overexercise

Exercise should be stopped when patients experience symptoms of overexertion. Patients need to stop an activity if they feel dizzy, have palpitations, nausea or chest pain. If symptoms are severe and do not go away within 15 minutes of rest, they should call 911.

The rating of perceived exertion (RPE) scale is used to measure how easy or difficult an activity is to complete. Patients often find this scale easier to use as to guide their response to activity than monitoring their pulse.
The RPE scale ranges in perceived difficulty from 0 (nothing at all) to 10 (maximal). Patients should target an RPE score of 3–5 (moderate to hard) while exercising.

RPE Scale

Rating	Perceived Exertion
	Nothing at all, very easy
1	Very slight
2	Slight
3	Moderate
4	Somewhat difficult
5	Difficult
6	
7	Very difficult
8	
9	Very, very difficult
10	Maximal

Tip: "Walk so you can talk rule". It is normal for patients with HF to feel short of breath during activity. However, they should have enough breath to carry on a conversation. If patients cannot talk while exercising, they need to slow down or rest.

Exercise routines should be reduced (by approximately 50%) when patients are:

- Experiencing worsening symptoms of HF or requiring additional diuretics for recent weight gain
- Involved in other activities that are tiring (e.g., family gatherings, social events)
- Experiencing other health difficulties (e.g., infection)
- Unable to exercise for the previous 5–7 days

What activities should be avoided until reviewed by an exercise specialist?

- Lifting an object over 10 pounds
- If a patient has to hold his/her breath or strain to lift an object, it is too heavy.
- Shoveling snow
- Activities that require stretching with both arms above the head, as he/she may become lightheaded or dizzy
- Using a sauna or hot tub

What patients should not engage in progressive exercise training?
Any patient with stable HF can engage in a level of physical activity that does not produce uncomfortable symptoms. However, a progressive exercise program is not indicated for the following:

- NYHA Class IV symptoms
- Decompensated or uncontrolled HF
- High-risk unstable angina
- Left main or coronary stenosis or equivalent
- Acute noncardiac comorbidities (e.g., infection)
- Severe or critical aortic stenosis
- Hypertrophic cardiomyopathy or other forms of outflow tract obstruction
- Poorly or uncontrolled atrial fibrillation
- Tachydysrythmias or bradydysrhythmias

General exercise tips

- Avoid exercising in extreme temperatures or windy weather. Climate-controlled locations, such as shopping malls, are better.
- Avoid exercising for at least 90 minutes after a large meal.
- If patients feel tired during exercise, it is better to sit down and rest than to take a nap in bed, as lying down reduces exercise tolerance.
- Schedule exercise into a daily routine and at a time when patients feel most rested. Patients should be encouraged to record their exercise and symptoms on a daily log, as this practice can encourage participation and help caregivers monitor progress.
- When drinking fluids during exercise, continue to keep within fluid-restriction guidelines.

Morisky Medication-Taking Adherence Scale-MMAS (4-item)

English Version

(Please check one box on each line)

	Yes	*No*
1. Do you ever forget to take your (name of health condition) medicine?	o	o
2. Do you ever have problems remembering to take your (name of health condition) medication?	o	o
3. When you feel better, do you sometimes stop taking your (name of health condition) medicine?	o	o
4. Sometimes if you feel worse when you take your (name of health condition) medicine, do you stop taking it?	o	o

MEASUREMENT AND SCORING CRITERIA

The MMAS is a generic self-reported, medication-taking behavior scale in which the specific health issue (high blood pressure, diabetes, elevated cholesterol, HIV, contraception, etc.) is inserted for the "health concern". The MMAS consists of four items with a scoring scheme of "Yes" = 0 and "No" = 1. The items are summed to give a range of scores from 0 to 4.

Stoplight Tool

Signs of Worsening Heart Failure

Your heart failure may be getting worse if you have:

- Gained more than 2 pounds (1 kg) in one day.
- Gained more than 5 pounds (2 to 3 kg) in one week.
- An increase in swelling in your feet, ankles, or legs.
- Fullness or bloating in your stomach.
- More shortness of breath than usual.
- Difficulty breathing when lying flat.

When you have any of the symptoms listed above:

- Call your doctor or nurse practitioner right away because your medications may need to be changed.

Call 911 or have someone take you to the hospital if you are extremely short of breath, cannot sleep because of your breathing, have chest pain that is not relieved with nitrospray, feel like your heart is "racing", or you are coughing up frothy or pink sputum.

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