


Quality-Based Procedures: Clinical Handbook for Chronic Obstructive Pulmonary Disease (Acute and Postacute)

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

February 2015

(This handbook includes, in its acute phase, an update of the Clinical Handbook for Chronic Obstructive Pulmonary Disease, published in April 2013.)



Suggested Citation

This report should be cited as follows:

Health Quality Ontario; Ministry of Health and Long-Term Care. Quality-based procedures: Clinical handbook for chronic obstructive pulmonary disease (acute and poastacute). February 2015. 88 p. Available from: <http://www.hqontario.ca/evidence/evidence-process/episodes-of-care#community-copd>.

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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 expert advisory panels on COPD. 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 HQO with input from the expert advisory panels. 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 HQO's Quality-Based Procedures Clinical Handbooks is available at: <http://www.hqontario.ca/evidence/publications-and-ohhtac-recommendations/clinical-handbooks>.

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List of Abbreviations

| | |
|------------------------|---|
| AGREE | Appraisal of Guidelines for Research & Evaluation |
| ARF | Acute respiratory failure |
| BODE | A COPD index using body mass index, airflow obstruction, dyspnea, and exercise capacity |
| CAT | COPD Assessment Test |
| CIHI | Canadian Institute for Health Information |
| COPD | Chronic obstructive pulmonary disease |
| CTS | Canadian Thoracic Society |
| ECFAA | Excellent Care for All Act |
| ED | Emergency department |
| FEV₁ | Forced expiratory volume in 1 second |
| FVC | Forced vital capacity |
| GOLD | Global Initiative for Chronic Obstructive Lung Disease |
| GRADE | Grading of Recommendations, Assessment, Development, and Evaluation |
| HIG | Health-based allocation model inpatient group |
| HQO | Health Quality Ontario |
| HSFR | Health system funding reform |
| ICD-10-CA | International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canadian Edition |
| ICES | Institute for Clinical Evaluative Sciences |
| LACE | A COPD index using length of stay, acuity of admission, comorbidity, and emergency department visits |
| LHIN | Local health integration network |
| LOS | Length of stay |
| MMRC | Modified Medical Research Council dyspnea scale |
| MRD_x | Most responsible diagnosis |
| NICE | National Institute for Health and Care Excellence ¹ |
| NRT | Nicotine replacement therapy |
| OHTAC | Ontario Health Technology Advisory Committee |
| PBF | Patient-based funding |
| PCP | Primary care provider |
| PR | Pulmonary rehabilitation |
| QBP | Quality-based procedure |

¹ Prior to 2013, NICE was known as the National Institute for Health and Clinical Excellence. In this handbook, we cite NICE evidence from 2010 and use the name in effect at that time.

Preface

This document has been developed through collaborative efforts between the Ministry of Health and Long-Term Care, Health Quality Ontario (HQO), and the HQO Expert Advisory Panels on the Continuum of Care for COPD (the “expert advisory panels”).

The content in the following “Purpose” and “Introduction” sections were provided in standard form by the ministry. All other content was developed by HQO with input from the expert advisory panel.

The content of this Clinical Handbook was developed to conform with the specific deliverables agreed upon by the ministry and HQO.

In the area of quality-based procedures, HQO will:

1. Take a provincial leadership role in knowledge translation related to QBP work.
2. 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/scientists.
3. Work with the reference group to:
 - a. Define the population/patient cohorts for analysis and refine inclusion and exclusion criteria for the QBP, using data to review utilization and length of stay trends.
 - b. Develop clinical best practices for defined QBP including transition to the community.
 - c. Seek consensus on a set of evidence-based clinical pathways and standards of care for each episode of care.
4. Submit to the ministry within the deadlines set by the Agreement, a draft report and clinical handbook, including:
 - a. A summary of HQO’s clinical engagement process.
 - b. Guidance on the real-world implementation of the recommended practices contained in the Clinical Handbook, with a focus on implications for multi-disciplinary teams, service capacity planning considerations and new data collection requirements.

The ministry also asked HQO to make recommendations on performance indicators aligned with the recommended episodes of care, in order to inform the ministry’s Quality-Based Procedure (QBP) Integrated Scorecard and to provide guidance on the real-world implementation of the recommended practices contained in the Clinical Handbook. The ministry asked that recommendations focus on implications for multi-disciplinary teams, service capacity planning considerations, and new data collection requirements.

Key Principles

Discussions between HQO, the expert advisory panels, and the ministry established a set of key principles or “ground rules” to guide this evolving work:

- **The handbook analysis does not involve costing or pricing.** All costing and pricing work related to the QBP funding methodology will be completed by the ministry using a

standardized approach, informed by the content produced by HQO. 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 focused on quality considerations and non-cost measures of utilization, such as length of stay (LOS).

- **The scope of this work includes both hospital care and postacute, community-based care.** Recognizing the importance of this issue, the ministry has communicated that conditions analysed will span all parts of the continuum of care.
- **Recommended practices, supporting evidence, and policy applications will be reviewed and updated at least every 2 years.** The limited 4-month time frame provided for the 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 HQO’s established evidence-based analysis process. Recognizing this limitation, HQO reserves the right to revisit the recommended practices and supporting evidence at a later date by conducting a full evidence-based analysis or to update this document with relevant newly published research. In cases where the 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 the 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.** HQO and the 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 not known. However, all expert advisory panels have discussed a number of 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 the continuum of care capacity across 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 only be viewed as an initial starting point towards a comprehensive analysis of these challenges.

Finally, HQO 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 well-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 COPD patients. 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 Chronic Obstructive Pulmonary Disease.

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?

QBP 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.

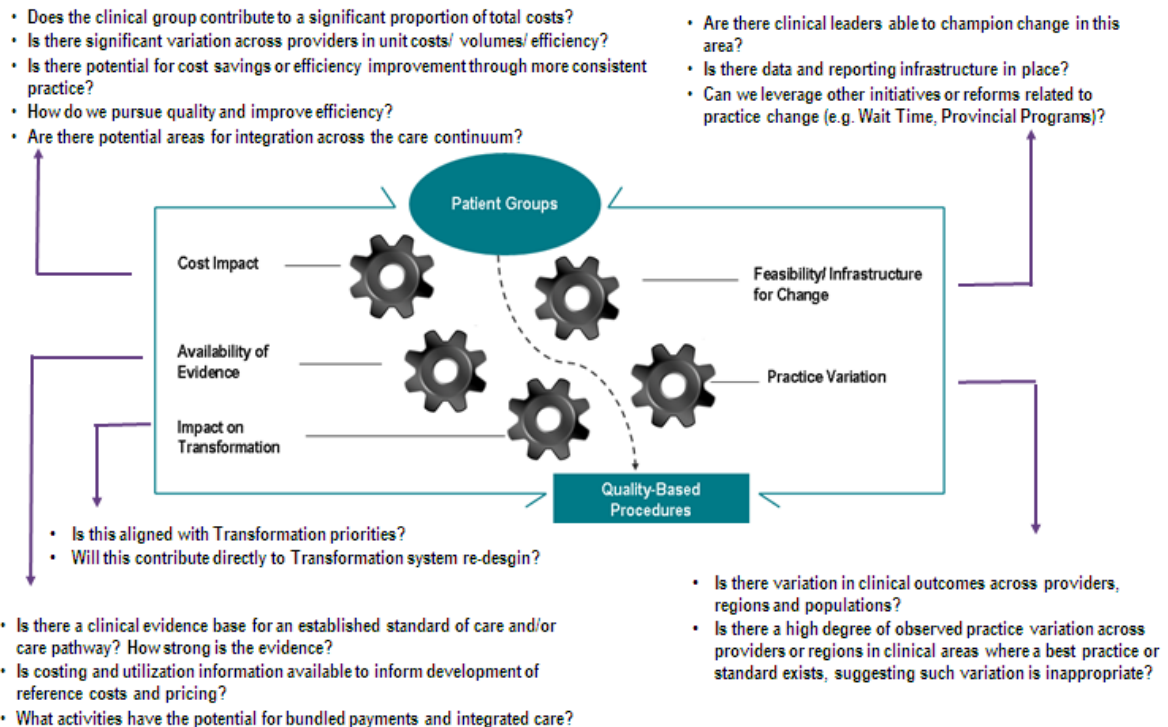


Figure 1: Evidence-Based Framework

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 HQO's core areas of expertise:

- **Evidence-based analyses:** Recommended practices incorporate components of HQO'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 panels' recommendations were supported 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 panels' 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 (1)

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 their own unique leadership, expert panel membership (see Acknowledgements), 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 (Update and Integration COPD Expert Advisory Panel).

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 HQO with a broad description of each assigned clinical population (e.g., “stroke”), and asked HQO to work with the expert advisory panels 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 congestive heart failure population includes subpopulations with heart failure, 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 HQO 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^{®2} scores for stroke patients) and important social characteristics (such as caregiver status).³ For stroke and congestive 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 HQO 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.

² 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.

³ For a comprehensive discussion of important data elements for capturing various patient risk factors, see Iezzoni LI (Editor). (2)

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.

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 (2), Hussey et al (3), and Rosen and Borzecki (4) 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 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 HQO'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.

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 across the continuum of care.

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 across the continuum of care. 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 the COPD 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.

Figure 2 provides an example of a care module and CAN.

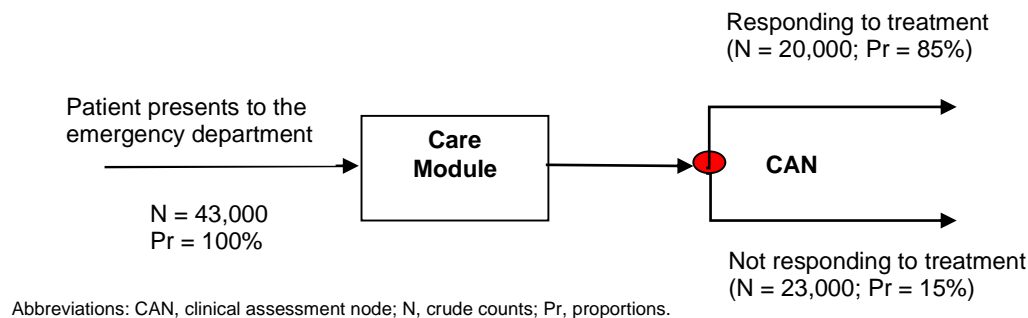


Figure 2: Episode of Care Model

Identifying Recommended Practices

Consideration of Evidence Sources

Several evidence sources were considered and presented to the expert advisory panel 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, HQO 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:** 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:** 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.

Clinical Guidelines

Published Canadian and international guidelines that encompass the entirety of the COPD continuum of care were searched with guidance from HQO 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. (5) AGREE II comprises 23 items organized into 6 quality domains—scope and purpose, stakeholder involvement, rigour of development, clarity of presentation, applicability, and editorial independence. (5) 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 for each phase of the episode of care.

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, an HQO 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.

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 panels.

Description of Chronic Obstructive Pulmonary Disease

The following is an excerpt from the 2012 Chronic Obstructive Pulmonary Disease (COPD) Evidentiary Framework by the OHTAC COPD Collaborative. (6)

Background

COPD is a disease state characterized by airflow limitation that is not fully reversible. The airflow limitation is usually both progressive and associated with an abnormal inflammatory response by the lungs to noxious particles or gases. The airflow limitation is caused by small airway disease (obstructive bronchiolitis) and parenchymal destruction (emphysema), both of which contribute to the disease to varying degrees, depending on the person. Chronic inflammation causes structural changes in the lungs and narrowing of the small airways. Inflammatory processes also cause destruction of the lung parenchyma, which leads to the loss of alveolar attachments to the small airways and decreases lung elastic recoil. These changes diminish the ability of the airways to remain open during expiration.

The most common symptoms of COPD include chronic and progressive breathlessness, cough, sputum production, wheezing, and chest congestion. In addition to the airflow restriction and changes to the lung, COPD is associated with systemic effects and comorbidities. Systemic effects include weight loss, nutritional abnormalities and malnutrition, and skeletal muscle dysfunction. Common comorbidities are ischemic heart disease, osteoporosis, respiratory infection, bone fractures, depression and anxiety, diabetes, sleep disorders, anemia, glaucoma, cataracts, and cancer.

Natural History of COPD

COPD is a progressive disease. The rate of progression varies and may occur over several years or several decades, depending on factors such as continued exposure to noxious particles (e.g., tobacco smoke). There are several systems for classifying the severity of COPD; one of the most widely used is the Global Initiative for Chronic Obstructive Lung Disease (GOLD) staging criteria, which are based on postbronchodilator spirometry (forced expiratory volume in 1 second [FEV₁]). In the GOLD system there are 4 stages, which range from mild to very severe (Table 1).

Table 1: GOLD Staging Criteria for COPD

| Stage | Severity | FEV ₁ /FVC | FEV ₁ | Symptoms |
|-------|-------------|-----------------------|-------------------|---|
| I | Mild | < 0.70 | ≥ 80% predicted | Symptoms may or may not be present Possible symptoms include chronic cough and sputum production |
| II | Moderate | < 0.70 | 50%–80% predicted | Shortness of breath on exertion Cough and sputum production are sometimes present |
| III | Severe | < 0.70 | 30%–50% predicted | Greater shortness of breath, reduced exercise capacity, fatigue, and repeated exacerbations |
| IV | Very severe | < 0.70 | < 30% predicted | Respiratory failure, which may also lead to cor pulmonale |

Abbreviations: COPD, chronic obstructive pulmonary disease; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; GOLD: Global Initiative for Chronic Obstructive Lung Disease.

Source: *Global Initiative for Chronic Obstructive Lung Disease, 2010. (7)*

The disease course varies, but typically patients fluctuate between stable disease and acute exacerbations, which become more common as the disease progresses. Acute exacerbations are periods when symptoms worsen. There is debate about the best definition for exacerbations; a consensus definition developed by GOLD defines an acute exacerbation as “an event in the natural course of the disease characterized by a change in the patient’s baseline dyspnea, cough, and/or sputum that is beyond normal day-to-day variations, is acute in onset, and may warrant a change in regular medication in a patient with underlying COPD.” (7) Patients may also experience a variety of other symptoms, such as worsening exercise tolerance, fatigue, malaise, and decreased oxygen saturation. After an acute exacerbation, the individual may not recover to his/her previous level of airflow limitation, and this permanent loss of lung function contributes to the progressive nature of the disease.

Two-thirds of exacerbations are caused by either an infection of the tracheobronchial tree or air pollution, but the cause is unknown in the remaining cases. Risk factors for exacerbations include disease severity, winter months, and a previous exacerbation in the past 8 weeks. The frequency of exacerbations varies by disease severity. Using data from 3 European studies (the Inhaled Steroids in Obstructive Lung Disease in Europe [ISOLDE] study, the European Respiratory Society Study on Chronic Obstructive Pulmonary Disease [EUROSCOP], and the Copenhagen City Lung Study [CCLS]), Donaldson and Wedzicha found that patients with severe disease (GOLD stage III) experienced an average of 3.43 exacerbations per year, while patients with moderate disease (GOLD stage II) experienced an average of 2.68 exacerbations per year. (8)

Epidemiology of COPD

Prevalence

Estimates of COPD prevalence vary depending on the methods and diagnostic criteria used to identify cases. Many of the prevalence estimates are also believed to be underestimates due to underdiagnosis and underrecognition of COPD and to limited diagnoses of mild cases, as individuals often do not require health care services until they reach the moderate to severe stages of the disease.

Based on the Canadian Community Health Survey, in 2007 about 4.4% of Canadians self-reported that they had been diagnosed with COPD by physicians. (9) Based on Ontario administrative data sets, Gershon et al (10) estimated the 2007 age- and sex-standardized prevalence of COPD in Ontario to be 9.5%. (10) The prevalence of COPD has increased over time; Gershon et al (10) found a 23% increase in the prevalence rate between 1996 and 2007 (1996, 7.8%; 2007, 9.5%), (10) and this corresponds to an increase of 64.8% in the number of adults with COPD. The aging population alone does not entirely account for this increase. (10)

Incidence

Based on Ontario administrative data sets, the 2007 age- and sex-standardized incidence of COPD in Ontario was 8.5 cases per 1,000 adults. (10) Gershon et al (10) showed that the incidence rate has been declining since 1996, when it was 11.8 cases per 1,000 adults. (10) The age-standardized incidence rate is higher in males than in females (9.4 cases per 1,000 adults vs. 7.8 cases per 1,000 adults, respectively); however, the incidence rate has been declining faster in males than females (% decline since 1996, 32.3% vs. 24.7%, respectively). (10)

Risk Factors for COPD

The most common risk factor for COPD—and the primary cause of COPD in 80% to 90% of cases—is exposure to tobacco smoke. (9) There are numerous other risk factors, however, including exposure to occupational dusts and chemicals (e.g., vapours, irritants, fumes), indoor air pollution (e.g., from burning biomass fuels for heating and cooking in confined spaces in developing countries), outdoor air pollution, genetics, lung growth and development, oxidative stress, respiratory infections and previous tuberculosis, and asthma. The quality and strength of evidence supporting these risk factors vary, with the strongest evidence being for tobacco smoke, occupational exposures, indoor air pollution, and alpha₁-antitrypsin deficiencies.

Diagnosis of COPD

The GOLD guidelines recommend that any individual with breathlessness, chronic cough, or sputum production—especially those with risk factors (such as cigarette smokers)—be evaluated for COPD. Spirometry, the best standardized, objective measurement for airflow limitation, should be used to confirm all COPD diagnoses. Spirometry (a type of pulmonary function test) includes the forced vital capacity (FVC, volume of air forcibly exhaled from the point of maximal inspiration) and the FEV₁ (volume of air exhaled during the first second of the FVC measurement). During a test, patients' reference values are based on age, height, sex, and race; spirometry results are presented as a percentage of the predicted value.

Apart from spirometry, other tests may be conducted to help assess severity of disease and provide additional information necessary for treatment. These tests include bronchodilator reversibility testing, chest x-ray, and arterial blood gas measurements.

Both over- and underdiagnosis of COPD are possible issues. Overdiagnosis can occur when the diagnosis is based solely upon an individual's medical history and physical examination and is not confirmed by spirometry. Underdiagnosis can occur due to underrecognition of COPD by both clinicians and patients.

Management of COPD

COPD management and treatment is a staged process depending on the severity of the disease, with new treatments/management strategies introduced as needed. It begins with avoiding risk factors (e.g., through smoking cessation, vaccinations) and, as the disease progresses, introducing additional treatments and medications (e.g., drug therapy, pulmonary rehabilitation, oxygen therapy).

Impact of COPD

First and foremost, COPD has a considerable impact on the person with the disease. This impact varies and is influenced not just by the degree of airflow limitation, but also by the severity of symptoms, including breathlessness, decreased exercise capacity, systemic effects, and comorbidities. These symptoms can have a substantial impact on people living with the disease: based on the 1998/1999 National Population Health Survey, 51% of Canadians with COPD reported that their disease restricted their activity at home, at work, or in other activities. (11)

In addition, people with moderate to severe COPD typically experience 1 or more acute exacerbations per year. These exacerbations impact health-related quality of life and lung function; may require hospitalization and invasive treatment such as invasive mechanical ventilation; and increase the risk of mortality. COPD is the fourth leading cause of death in Canada and is expected to be the third leading cause of death by 2020. The 2007 age- and sex-standardized mortality rate in Ontario was 4.3%, which translates to 32,156 deaths. (10)

Apart from its impact on individual patients, COPD has a substantial effect on the health system. COPD is a leading cause of health care utilization, both globally and in Canada. In 1997, COPD was the fourth most common cause of hospitalization among Canadian men and the sixth most common among Canadian women. The age- and sex-standardized average hospitalization rate from 1996 to 1999 was 632 hospitalizations per 100,000 adults in Ontario. (11)

Furthermore, acute exacerbations of COPD are a leading cause of emergency department visits and hospitalizations, particularly in the winter. The economic burden of COPD is high. The Canadian component of a large-scale international survey, *Confronting COPD in North America and Europe*, showed an annual direct cost of almost \$2,000 (Cdn) per patient for COPD-related primary and secondary care visits, treatment, and laboratory tests. (12)

Recommended COPD Cohort Definition and Patient Stratification Approach

Notes on Updates to COPD Cohort Definition

In 2013, the initial COPD Episode of Care Expert Advisory Panel recommended a quality-based-procedure (QBP) cohort definition consisting of inclusion and exclusion criteria based on patient characteristics recorded at a patient's initial presentation to hospital. The expert panel recommended that the scope of activity included and funded under the COPD cohort include the emergency department (ED) visit, inpatient admission (if the patient is admitted), and any subsequent postacute care.

The Ministry of Health and Long-Term Care modified the initial panel's COPD cohort definition for use in the QBP funding methodology. The original definition included cases discharged from the emergency department (i.e., without an inpatient admission) and cases assigned a preadmit comorbidity diagnosis of COPD, even if the most responsible diagnosis is not COPD. In contrast, the ministry's QBP funding approach for COPD does not include these cases. The Update and Integration COPD Expert Advisory Panel understands the challenges faced by the ministry in implementing the recommended cohort definition in the context of a case-mix funding system, where there may be overlap with populations funded through other QBPs. However, after considering the cohort definition for this update of the COPD handbook, the panel recommends the ministry address 2 major problem areas associated with the current QBP funding definition:

- **The COPD QBP should include funding for COPD-related emergency department and outpatient activity.**

The expert panel strongly recommends that the ministry provide QBP funding to hospitals not only for admitted COPD cases but also for cases that can be successfully treated and discharged from the ED. Including only admitted COPD cases under the COPD QBP funding model may financially penalize hospitals able to implement best practices for treating and discharging patients without requiring an inpatient admission.

Therefore, consistent with the cohort definition recommended in the 2013 Clinical Handbook for COPD, the ministry should amend its QBP funding definition to include ED discharges as part of the COPD cohort criteria. QBP funding should also be expanded to include COPD-related outpatient activity, such as rapid access clinics for COPD, which some hospitals have implemented to prevent admissions, as well as pulmonary rehabilitation clinics, which patients access in the postacute phase of care.

Virtually no patient-level data on COPD-related outpatient clinic services are currently collected or reported in Ontario. The ministry should adopt this as a priority area for new data collection, starting with the collection of activity data from outpatient pulmonary rehabilitation clinics.

- **The COPD QBP should include funding for cases assigned a most responsible diagnosis of acute respiratory failure if they also have a COPD comorbidity diagnosis (Type 1, W, X or Y).**

While the expert panel understands the challenges, from a case-mix classification perspective, created by this broader recommended cohort definition, the narrower definition adopted by the ministry for QBP funding excludes patients who have underlying COPD but are assigned a most responsible diagnosis of acute respiratory failure (ARF) by the hospital. These are typically patients who present to hospital in severe respiratory distress as a result of their COPD. According to CIHI coding standards, such cases should be assigned a most responsible diagnosis of ARF with a preadmit comorbidity diagnosis of COPD.

The expert panel reviewed data suggesting wide variation among Toronto-area hospitals in the proportion of patients coded to COPD versus ARF diagnoses. The panel noted that hospitals that tend to code a higher proportion of cases as COPD would be financially advantaged, while those that (appropriately) code a higher proportion of cases as ARF would conversely be financially penalized, particularly if their percentage of ARF cases has increased since their original QBP funding “carve-out.”⁴

Therefore, the expert panel recommends that the ministry amend its COPD QBP definition to include cases with a most responsible diagnosis of ARF if they also have a COPD comorbidity diagnosis recorded as either a Type 1, W, X or Y diagnosis type.

COPD Cohort Inclusion/Exclusion Criteria

The expert panels recommend the following age range, diagnostic codes, and diagnosis types to define the COPD population for this episode-of-care analysis:

- **Age:** Persons aged 35 years and older.

Rationale: The 35-year age threshold is used in the COPD cohort definition adopted for use by the Institute for Clinical Evaluative Sciences (ICES) (13) and a wide range of COPD-related studies. COPD is a progressive disease that generally manifests itself after a person is exposed to risks for a number of years. Few people younger than 35 years are diagnosed with COPD (only 67 cases were admitted to acute inpatient care in Ontario in 2010/2011) and their disease most likely results from congenital factors. The care pathways and treatment protocols for these younger patients are likely to be substantially different from the vast majority of COPD patients and are not practical to consider within the same episode-of-care analysis.

- **Diagnosis codes:** ICD-10-CA codes J41-J44, with the exception of panlobular emphysema (J43.1), centrilobular emphysema (J43.2), and Macleod syndrome (J43.0).

Rationale: The diagnoses included in the ICES COPD cohort (ICD-10-CA codes J41-J44) (13) have been adopted for this handbook, with the exception of 3 very rare, low volume diagnoses (each were the most responsible diagnosis for only 1 inpatient acute admission in Ontario in 2010/2011); these rare diagnoses have significantly different care pathways than the general

⁴Carve-out is the ministry term for the baseline global budget funding reduction that is applied to each hospital when a new QBP funding model is introduced. The funding subtracted from the hospital through the carve-out is based on the estimated costs of historical volumes in that QBP population. The hospital is then reimbursed for that population moving forward using the QBP pricing model.

COPD population, and the expert panel did not consider them as practical to attempt to address them in their work.

It should also be noted that 2 diagnosis codes included in the HIG and Case Mix Groups+ (CMG+) methodologies are not included in this cohort definition: bronchitis, not specified as acute or chronic (J40) and chronic respiratory conditions due to chemicals, gases, fumes, and vapours (J68.4). These diagnoses are seldom found in COPD cohorts in the literature and the expert panel did not regard these cases as part of the general COPD population.

- **Diagnosis types**

Acute inpatient cases: Patients with any of the included diagnosis codes (specified above) present as one of the following diagnosis types:

- **Most responsible diagnosis (MRD_x):** The diagnosis determined by the coder as having the greatest contribution to the patient’s utilization and/or length of stay. This is most often—but not always—the same as the admitting diagnosis.
- **Admitting diagnosis:** An optional diagnosis type coded in cases where the most responsible diagnosis differs from the original diagnosis the patient was admitted for.
- **Pre-admit comorbidity:** Coded in a case where a patient has multiple recorded diagnoses, where the preadmit comorbidity is seen to have contributed to at least an additional 24 hours of the patient’s stay, but not seen to have been the primary contributing diagnosis to a patient’s utilization or length of stay.

Emergency department cases: Included diagnosis codes (described above) present as one of the following diagnosis types:

- **Main problem:** Similar to MRD_x for inpatient, the diagnosis determined by the coder to have had the greatest contribution to patient utilization and/or length of stay.
- **Other problem(s):** Similar to preadmit comorbidity, a diagnosis existing in combination with the main problem that is seen to have contributed to utilization and/or length of stay.

Rationale: The expert panel felt that cases where a COPD-related diagnosis was not recorded as MRD_x (inpatient acute) or main problem (ED visit) but recorded as admitting diagnosis or preadmit comorbidity (inpatient care), or other problem (ED visit) would still be likely to benefit from at least a subset of the recommended interventions in the COPD pathway. Additionally, due to the uncertainty around COPD diagnosis and coding, it was thought there are likely to be a number of cases where COPD might be considered the true “most responsible” condition or the etiological disease behind a presenting condition such as chronic obstructive pulmonary disease, but was not attributed as MRD_x. Narrowing the cohort definition to only include cases with a COPD MRD_x excludes more than 50% of the total population of admitted cases coded with COPD diagnoses contributing to their hospital utilization, as illustrated in Table 2 (complete cohort) and Table 3 (MRD_x of COPD only). Table 4 shows volumes of ED visit by COPD diagnosis for 2013/2014.

Table 2: COPD Episode-of-Care Cohort – Acute Inpatient Discharges (Ontario, 2012/2013 and 2013/2014)

| Admission Fiscal Year | | 2012/2013 | | | 2013/2014 | | | | |
|-----------------------|--|---------------|---------------|------------|-----------|---------------|---------------|------------|------|
| COPD Diagnosis Code | Cases, n | Avg LOS, days | Med LOS, days | Avg HIG wt | Cases, n | Avg LOS, days | Med LOS, days | Avg HIG wt | |
| J410 | Simple chronic bronchitis | 6 | 4.7 | 4.00 | 1.10 | 6 | 6.0 | 5.00 | 2.02 |
| J411 | Mucopurulent chronic bronchitis | 9 | 12.6 | 21.00 | 1.95 | 0 | N/A | N/A | N/A |
| J418 | Mixed simple and mucopurulent chronic bronchitis | 0 | N/A | N/A | N/A | 1 | 10.0 | 10.00 | 0.45 |
| J42 | Unspecified chronic bronchitis | 70 | 7.7 | 4.00 | 2.02 | 62 | 14.4 | 7.00 | 2.59 |
| J438 | Other emphysema | 10 | 11.2 | 4.00 | 3.31 | 12 | 16.5 | 6.00 | 5.96 |
| J439 | Emphysema unspecified | 350 | 12.0 | 7.50 | 3.05 | 339 | 11.7 | 8.00 | 2.92 |
| J440 | COPD with acute lower respiratory infection | 15,980 | 11.5 | 13.00 | 2.43 | 14,877 | 10.1 | 12.00 | 2.21 |
| J441 | COPD with acute exacerbation unspecified | 17,375 | 8.1 | 10.00 | 1.56 | 16,470 | 7.4 | 8.50 | 1.53 |
| J448 | Other specified COPD | 677 | 11.3 | 7.00 | 2.27 | 730 | 10.1 | 8.00 | 2.05 |
| J449 | COPD unspecified | 4,245 | 12.2 | 8.50 | 2.35 | 4,372 | 10.6 | 7.00 | 2.16 |
| Total cases | | 38,716 | | | | 36,863 | | | |

Abbreviations: avg, average; COPD, chronic obstructive pulmonary disease; HIG, health-based allocation model inpatient group; LOS, length of stay; med, median; n, number; N/A, not available; wt, weight.

Data source: Canadian Institute for Health Information, Discharge Abstract Database.

Table 3: COPD Episode-of-Care Cohort – Acute Inpatient Discharges, Using Most Responsible Diagnosis of COPD Only (Ontario, 2012/2013 and 2013/2014)

| Admission Fiscal Year | | 2012/2013 | | | 2013/2014 | | | | |
|---------------------------------|--|---------------|---------------|------------|-----------|---------------|---------------|------------|-----------|
| ICD-10-CA Diagnosis Code (MRDx) | Cases, n | Avg LOS, days | Med LOS, days | Avg HIG wt | Cases, n | Avg LOS, days | Med LOS, days | Avg HIG wt | |
| J411 | Mucopurulent chronic bronchitis | 4 | 5.0 | 4.0 | 1.12 | 3 | 6.7 | 5.0 | 1.40 |
| J418 | Mixed simple and mucopurulent chronic bronchitis | 5 | 4.0 | 4.0 | 0.84 | 0 | N/A | N/A | N/A |
| J42 | Unspecified chronic bronchitis | 24 | 5.7 | 3.0 | 1.1 | 14 | 4.9 | 4.0 | 1.03 |
| J438 | Other emphysema | 5 | 8.6 | 4.0 | 2.99 | 5 | 27.6 | 7.0 | 11.7 4 |
| J439 | Emphysema unspecified | 103 | 10.5 | 6.0 | 3.91 | 101 | 11.2 | 6.0 | 3.31 |
| J440 | COPD with acute lower respiratory infection | 11,146 | 8.8 | 6.0 | 1.78 | 10,400 | 8.0 | 6.0 | 1.68 |
| J441 | COPD with acute exacerbation unspecified | 12,998 | 6.5 | 4.0 | 1.26 | 12,325 | 6.1 | 4.0 | 1.25 |
| J448 | Other specified COPD | 289 | 9.0 | 4.0 | 1.91 | 289 | 6.6 | 4.0 | 1.52 |
| J449 | COPD unspecified | 695 | 6.8 | 4.0 | 1.48 | 621 | 6.7 | 4.0 | 1.47 |
| Total cases | | 25,269 | | | | 23,758 | | | |

Abbreviations: avg, average; COPD, chronic obstructive pulmonary disease; HIG, health-based allocation model inpatient group; ICD-10-CA, International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada; LOS, length of stay; med, median; MRDx, most responsible diagnosis; n, number; N/A, not available; wt, weight.

Data source: Canadian Institute for Health Information, Discharge Abstract Database.

Table 4: COPD Episode-of-Care Cohort – Emergency Department Visits (Ontario, 2012/2013 and 2013/2014)

| All Problem ICD-10-CA | | Number of Cases |
|-----------------------|--|-----------------|
| J410 | Simple chronic bronchitis | 52 |
| J411 | Mucopurulent chronic bronchitis | 5 |
| J418 | Mix simple and mucopurulent chronic bronchitis | 10 |
| J42 | Unspecified chronic bronchitis | 290 |
| J438 | Other emphysema | 5 |
| J439 | Emphysema unspecified | 232 |
| J440 | COPD with acute lower respiratory infection | 6,894 |
| J441 | COPD with acute exacerbation unspecified | 28,498 |
| J448 | Other specified COPD | 1,008 |
| J449 | COPD unspecified | 10,281 |
| Total cases | | 47,275 |

Abbreviations: COPD, chronic obstructive pulmonary disease; ICD-10-CA, International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Canada.

Data source: Canadian Institute for Health Information, Discharge Abstract Database.

Recommended COPD Patient Stratification Approach: Acute Care Phase

As described in the Methods section, the expert panel was asked to recommend an approach to stratifying patients hospitalized with exacerbations of COPD based on their clinical characteristics and expected resource utilization. The expert panel reviewed the ministry’s default HIG grouping logic for COPD and agreed that the 2 HIG groups for the cohort were not clinically meaningful; they appeared to be largely determined based on the coding of a concurrent lower respiratory tract infection in a patient, which would assign the case to HIG 139b (COPD) as opposed to HIG 139a (chronic bronchitis), a group that does not include cases with respiratory infection. Given that a high proportion of COPD admissions have lower respiratory tract infections in combination with COPD, with inconsistent diagnosis and coding, the expert panel agreed that it would be necessary to explore alternative grouping approaches.

Determining an appropriate approach for stratifying COPD patients for this task was challenging given the outcome of interest: resource utilization during the hospitalization episode. While a number of approaches have been developed to classify COPD patients by severity over the course of their disease—such as the GOLD Staging Criteria (Table 1) using FEV₁/FVC and the BODE Index (recommended by NICE, GOLD and CTS)—these are not intended to be applied to the stratification of particular COPD acute exacerbations. With that said, studies have found that COPD patients with lower FEV₁/FVC scores and more severe dyspnea tend to both have more frequent exacerbations and more severe exacerbations, contributing to higher costs. (14, 15) Routine collection of these types of clinical measures may assist the ministry in developing more accurate risk adjustment models for COPD patient groups.

In a review of studies examining the costs of COPD exacerbations, Toy et al (16) found that the majority of articles surveyed used retrospective utilization as a proxy for grouping exacerbations by severity—e.g., seen in primary care (typically classified as a mild exacerbation) versus admitted to hospital (typically a moderate or severe exacerbation).

Consistent with much of the literature, the expert panel recommended that, given the limitations of current administrative data sources, COPD exacerbation hospitalizations be classified into the following 3 groups for the purpose of QBP funding:

- **Mild exacerbation:** Patient is treated in the ED or in outpatient settings and discharged home without requiring an inpatient admission.
- **Moderate exacerbation:** Patient requires admission to inpatient care.
- **Severe exacerbation:** Patient requires ventilation (either noninvasive or invasive ventilation) and/or admission to an intensive care unit.

It is recognized that these 3 patient groups are largely based on disposition (or level of care received) rather than prospective clinical symptoms. While severe exacerbations may be defined by markers of acute respiratory failure or acidosis, the expert panel noted that there are few definitive measures to distinguish between mild and moderate exacerbations; these largely rely on clinical judgment and the availability of hospital resources. For example, it may be possible for the same patient to be treated in and discharged from a well-equipped ED in one hospital, and thus classified as mild, while they might be admitted in another hospital and be classified as moderate. The ministry should exercise extreme caution in designing funding methodologies based on these groups, paying particularly close attention to the possibility of creating perverse incentives for hospitals to admit borderline mild/moderate patients in order to claim a higher payment for the moderate group.

While the COPD care pathway (see Recommended Practices section) includes a list of criteria for consideration in determining whether to admit patients or to treat them in ED/outpatient settings, this there are no objective markers or thresholds defined in this list for a mild versus a moderate exacerbation; this may be a potential future area for research and/or evidence-based analysis.

Using the expert panel’s definitions, the ministry subsequently conducted analysis of the costs for the 2 COPD patient groups that require admission for moderate and severe exacerbations. Table 5 presents this analysis and demonstrates that the group definitions are highly predictive of cost: the severe group has a mean total cost nearly 3 times that of the moderate group (\$17,791.46 compared with \$6,101.81).

Table 5: Costs per Case for Moderate and Severe Exacerbation Groups for Patients With COPD (2010/2011 Acute Inpatient Discharges, Ontario Case Costing Initiative)

| Admitted COPD subgroup | Number of cases | Mean total cost, \$ | Median total cost, \$ |
|------------------------|-----------------|---------------------|-----------------------|
| All admitted cases | 17,916 | 7,569 | 4,925.4 |
| Moderate | 15,668 | 6,102 | 4,490.1 |
| Severe | 2,248 | 17,791.46 | 13,385.11 |

Abbreviations: COPD, chronic obstructive pulmonary disease.
Source: Ontario Ministry of Health and Long-Term Care.

Factors Contributing to Severity of Acute Exacerbations of COPD

Evidence shows that within the 3 major exacerbation severity groups defined above, there is considerable heterogeneity in patient clinical characteristics, utilization, and cost. The expert panel identified a number of markers that should be considered as potential complexity adjustment factors within the QBP funding model, in terms of their impact on the indicated interventions for a patient

and their expected utilization of health care resources.

The expert panel grouped these complexity factors for consideration into 3 broad categories:

Severity of disease

- O₂ dependence
- respiratory failure
- recent (e.g., within 30 days) discharge from ED/hospital
- frequency of acute exacerbations over previous 6 to 12 months
- oral steroid use/dependence
- functional ability (activity) on the Modified Medical Research Council (MMRC) dyspnea scale
- lung function (FEV₁/FVC)
- failed response to outpatient therapy
- delay in receiving medical attention for an exacerbation

Significant comorbidities

- bronchiectasis
- pneumonia
- co-infections (pseudomonas, mycobacterium, urosepsis)
- mental health (anxiety, depression, dementia, delirium)
- chronic obstructive pulmonary disease
- arrhythmia (including atrial fibrillation)
- diabetes
- tobacco dependence
- benzodiazepine dependence/chronic benzodiazepine use
- immunosuppressant disease
- lung cancer
- renal failure
- osteoporosis
- BMI (overweight or underweight)
- chronic pain
- sleep apnea
- myocardial infarction
- neuromuscular disorder
- gastroesophageal reflux disease
- musculoskeletal disorders
- asthma
- interstitial lung disease

Housing/supports/frailty

- homeless
- lack of support (isolation, lack of transportation)
- continuing care/nursing home
- access to primary care
- functional status (e.g., walking aids)
- drug plan
- access to pulmonary rehabilitation

Many of the factors identified here have also been substantiated in the scientific literature as being associated with higher costs for COPD exacerbations, including lower FEV₁/FVC, more severe dyspnea, underweight BMI, and comorbidity score.

The expert panel requests that the ministry conduct multivariate analysis on the impact of the identified factors above on COPD case cost, recognizing that not all of the factors above will be measurable through current provincial administrative data sets.

Further consideration of comorbidities: There has been some discussion that upon completion of the pathway for the “typical” COPD case, the expert panel may consider the implications of commonly occurring comorbidities such as pneumonia, diabetes and arrhythmia on the COPD pathway. While it is expected that the foundational pathway will remain the same, the inclusion of comorbidities may result in recommending additional interventions in each care module.

Recommended COPD Patient Stratification Approach: Postacute Care Phase

The expert panel noted that the original patient groups defined for the acute care phase COPD QBP—mild, moderate, and severe, based largely on disposition (discharged from ED, admitted to ward, or received ventilation or admitted to intensive care unit)—did not necessarily reflect patients’ complexity or risk of adverse outcomes in the postacute setting. A new risk stratification model may be required to assign patients appropriately based on differing levels of risk for the postdischarge period analyzed in this project. The expert panel discussed available approaches for stratifying patients by risk, including COPD-specific methods such as the GOLD COPD staging criteria, the BODE index (a grading system that uses body mass index, airflow obstruction, dyspnea, and exercise capacity) and the CAT index (COPD Assessment Test) as well as generic methods such as the interRAI (Resident Assessment Instrument) suite of tools and the LACE Index (L, length of stay; A, acuity of admission; C comorbidity, as measured by Charlson index; E, emergency department visits in the previous 6 months) (17).

After some discussion, the expert panel proposed the use of the LACE index as a risk stratification tool, as it captures a number of the key risk factors in COPD patients that, based on clinical experience, the panel members deemed important: inpatient length of stay, patients’ comorbidity level, and previous emergency hospitalizations (Table 6). Importantly, the LACE index has been adopted by a wide range of providers and is currently in use in many parts of Ontario.

The expert panel recommends that analysis be conducted to examine the utility of the LACE index as a tool for stratifying COPD patients based on their risk of postacute readmission and mortality following discharge from the ED or from inpatient care. The index should also be examined for application to case-mix adjustment for postacute costs.

Table 6: LACE Index Covariates and Weights

| Attribute | Value | Points |
|---------------------------------------|-------|--------|
| Length of stay | <1 | 0 |
| | 1 | 1 |
| | 2 | 2 |
| | 3 | 3 |
| | 4–6 | 4 |
| | 7–13 | 5 |
| | ≥ 14 | 7 |
| Acute (emergent) admission | Yes | 3 |
| Comorbidity (Charlson index score) | 0 | 0 |
| | 1 | 1 |
| | 2 | 2 |
| | 3 | 3 |
| | ≥ 4 | 5 |
| Visits to ED during previous 6 months | 0 | 0 |
| | 1 | 1 |
| | 2 | 2 |
| | 3 | 3 |
| | ≥ 4 | 4 |

Abbreviations: ED, emergency department.

Source: van Walraven et al, 2010. (17)

Additional Considerations Related to the COPD Cohort and Patient Grouping Approach

The expert panel highlighted the following considerations related to the COPD cohort and patient groups:

- Accuracy and consistency of current practices in COPD diagnosis, charting, and coding:** Expert panel members agreed that the diagnosis, charting, and coding of COPD in Ontario is likely to be inconsistent and unreliable. In many cases, COPD diagnoses are assigned based on symptoms or clinical intuition without objective confirmation through spirometry. The expert panel recommended that, in the future, any charting of a COPD diagnosis should be accompanied by confirmation through spirometry (either during the stay or reported in the patient’s history). In the absence of such confirmation, coders should assign a Q prefix (Query) to the COPD diagnosis.
- Meaningfulness of ICD-10-CA COPD-related diagnosis codes:** The expert panel felt that a number of the ICD-10-CA diagnosis codes for COPD-related conditions were not clinically meaningful. For example, some of the different specificities of bronchitis (e.g., mucopurulent vs. simple and mucopurulent) appeared to be nonexclusive, while, on the other hand, the 2 COPD

diagnosis codes (J44.0 and J44.1) that capture the vast majority of COPD-related cases are not specific enough to be meaningful.

- **Important unmeasured clinical variables:** There are a number of patient characteristics and clinical measures, such as FEV₁/FVC and MMRC, that studies have shown are associated with the severity and cost of COPD exacerbations but that are not captured in routine administrative data in Ontario. These variables may be important for adequately adjusting the COPD patient groupings for variation in patient complexity. The collection of these measures might be facilitated through creation of a COPD registry or piloted through chart review in a small number of hospitals.
- **Completeness of coding for COPD-related procedure codes:** Some interventions that play an important role within the COPD pathway are not routinely recorded in hospital data. For example, only 33 instances of spirometry testing were recorded in Ontario acute inpatient records in 2010/2011, while use of bronchodilators is not captured at all. The coding of other interventions, such as different modalities of ventilation, may also be inconsistent. Given that such missing data elements would invalidate attempts to estimate the costs of all interventions for these cases, the ministry should consider chart reviews of a COPD case sample to assess current hospital coding practices.
- **Consistency of diagnosis coding across ED and inpatient settings:** Given the importance of capturing both ED visits and inpatient admissions for COPD, the expert panel drew the scope of the COPD “bundle” to include both the ED visit and inpatient acute stay for admitted cases. From a payment perspective, COPD patients admitted to hospital under this model would be funded at a rate including both the ED visit and the inpatient hospitalization. The expert panel saw a challenge related to administrative data in this area: in 2010/2011, about 23% of inpatients with a COPD-related MRDx assigned for their inpatient stay were previously assigned a non-COPD-related MRDx for their ED visit. It can be assumed that the MRDx assigned based on the inpatient stay is likely the more accurate of the 2 diagnoses, given the greater amount of time and resources available to record this.

These data raise 2 considerations: 1) The bundled rate for the inpatient stay and ED visit would likely need to be grouped based on the inpatient MRDx and then linked backwards to the preceding ED visit. 2) If a similar proportion of “misdiagnosis” can be assumed for COPD cases discharged from the ED, then a substantial portion of COPD cases would not receive COPD QBP funding.

Continuum-of-Care Model

Health Quality Ontario developed the COPD continuum-of-care model in Figure 5 based on the previous work of the expert advisory panels. It 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 episode of care, the model has been modified to reflect the full range of elements of the episode-of-care pathway as determined by the expert advisory panels.

The following sections lay out the recommended practices for the modules in Figure 3 and divide the continuum into 2 episodes of care: acute care (Figure 4) and postacute community care (Figure 5).

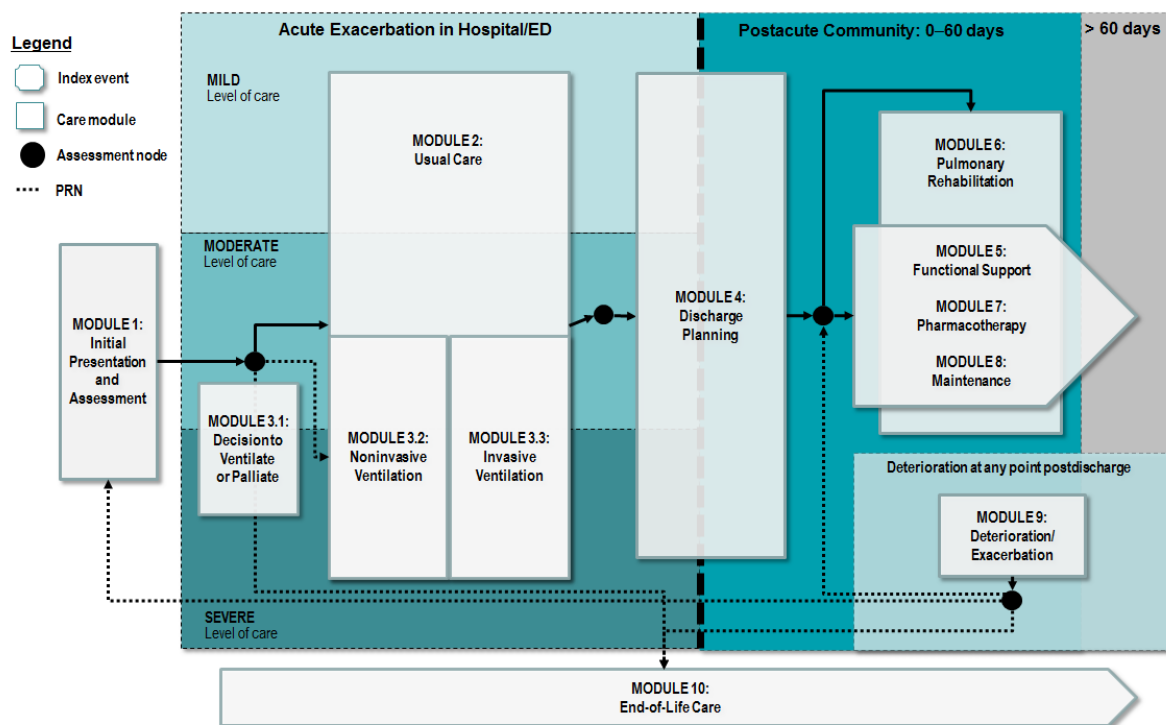


Figure 3: Continuum-of-Care Model for COPD

Abbreviations: COPD, chronic obstructive pulmonary disease; ED, emergency department; PRN, as needed.

Recommended Practices for Chronic Obstructive Pulmonary Disease

Sources Used to Develop Recommended Practices

OHTAC Recommendations

Acute Episode of Care

Several evidence-based analyses by Health Quality Ontario and the corresponding OHTAC recommendations were contributing sources for recommended practices in the acute episode of care:

- Noninvasive Positive Pressure Ventilation for Acute Respiratory Failure Patients with Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis⁵ (18)
- Preference for Ventilation among COPD Patients⁵ (19)
- Influenza and Pneumococcal Vaccinations for Patients with Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis⁵ (20)
- Pulmonary Rehabilitation for Patients with Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis⁵ (21)
- Experiences of Living and Dying With COPD: A Systematic Review and Synthesis of the Qualitative Empirical Literature⁵ (22)
- Discharge Planning in Chronic Conditions: An Evidence-Based Analysis⁶ (23)

Postacute Episode of Care

Several evidence-based analyses by Health Quality Ontario and the corresponding OHTAC recommendations were contributing sources for recommended practices in the postacute episode of care:

- Pulmonary Rehabilitation in Ontario: A Cross-Sectional Survey (24)
- Pulmonary Rehabilitation for Postacute Exacerbations of Chronic Obstructive Pulmonary Disease (COPD): A Cost-Effectiveness and Budget Impact Analysis (25)
- Community-Based Multidisciplinary Care for Patients with Stable Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis⁵ (26)
- Smoking Cessation for Patients With Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis⁵ (27)
- Influenza and Pneumococcal Vaccinations for Patients with Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis⁵ (20)
- Pulmonary Rehabilitation for Patients with Chronic Obstructive Pulmonary Disease (COPD): An Evidence-Based Analysis⁵ (21)

⁵ From the HQO mega-analysis on chronic obstructive pulmonary disease (2012). Available from: http://www.hqontario.ca/en/mas/tech/pdfs/2012/rev_COPD_compendium_March2012.pdf

⁶ From Optimizing Chronic Disease Management in the Community (Outpatient) Setting: An Evidentiary Framework (2013). Available from: <http://www.hqontario.ca/evidence/publications-and-ohat-recommendations/ontario-health-technology-assessment-series/optimizing-cdm-in-the-community-setting>

- Screening and Management of Depression for Adults With Chronic Diseases: An Evidence-Based Analysis⁶ (28)
- Experiences of Living and Dying With COPD: A Systematic Review and Synthesis of the Qualitative Empirical Literature⁵ (22)
- Health Care for People Approaching the End of Life: An Evidentiary Framework (29)

Clinical Handbooks

Acute Episode of Care

The previous HQO clinical handbook on COPD, published in 2013, was used as the primary source for the update to the acute episode of care:

- Quality-Based Procedures: Clinical Handbook for Chronic Obstructive Pulmonary Disease (1)

Postacute Episode of Care

Three HQO clinical handbooks containing recommendations relevant to the postacute, community-based episode of care for COPD were incorporated as sources of evidence:

- Quality-Based Procedures: Clinical Handbook for Chronic Obstructive Pulmonary Disease (1)
- Quality-Based Procedures: Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations (30)
- Quality-Based Procedures: Clinical Handbook for Heart Failure (Acute and Postacute) (31)

HQO Rapid Reviews

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

Acute Episode of Care

Two rapid reviews were conducted during the initial drafting of the acute episode of care, and 1 new rapid review (prophylactic antibiotics) was added for this update

- Inhospital Physiotherapy for Acute Exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD): A Rapid Review
- Action Plans for Individuals with Chronic Obstructive Pulmonary Disease (COPD): A Rapid Review
- Prophylactic Antibiotics for Individuals With Chronic Obstructive Pulmonary Disease (COPD): A Rapid Review

Postacute Episode of Care

In addition to informing the recommended practices for COPD, some of the following rapid reviews were also incorporated into the Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations (30):

- Pulmonary Rehabilitation in the Home Versus Other Settings for Individuals With Chronic Obstructive Pulmonary Disease (COPD): A Rapid Review
- Pulmonary Rehabilitation Setting for Individuals with Chronic Obstructive Pulmonary Disease (COPD): An Economic Rapid Review
- Exercise Programs After Pulmonary Rehabilitation for Individuals With Chronic Obstructive Pulmonary Disease (COPD): A Rapid Review

- Respiratory Therapy Services in Home Care for Individuals With Chronic Obstructive Pulmonary Disease (COPD): A Rapid Review
- Airway Clearance Techniques for Individuals With Stable Chronic Obstructive Pulmonary Disease (COPD): A Rapid Review
- Cognitive-Behavioural Therapy for Anxiety and Depression in Individuals With Chronic Obstructive Pulmonary Disease (COPD): A Rapid Review

The complete rapid reviews are available online and their conclusions are included within each of the modules. The GRADE quality scores in the modules can be interpreted using the following definitions established by the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) Working Group (19):

| | |
|-----------------|--|
| 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 |

Clinical Guidelines

Acute Episode of Care

The Canadian guideline used during the development of the original HQO clinical handbook on COPD was used as the reference standard due to its relevance and local context:

- Canadian Thoracic Society (CTS) 2007 Update (CA) (32)

Two additional international clinical guidelines encompassing the acute episode of care were identified and used for this update:

- National Institute for Health and Clinical Excellence (NICE) 2010 Update (UK) (33)
- Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2014 Update (International) (34)

Postacute Episode of Care

The guideline review process identified 1 Canadian guideline, and it was used as the reference standard due to its relevance and local context:

- Canadian Thoracic Society (CTS) 2007 Update (CA) (32)

Four additional international clinical guidelines encompassing the postacute episode of care were included:

- Department of Veterans Affairs (VA) and Department of Defense (DoD) 2007 (United States) (35)
- National Institute for Health and Clinical Excellence (NICE) 2010 Update (United Kingdom) (33)
- American College of Physicians (ACP)/American College of Chest Physicians (ACCP)/American Thoracic Society (ATS)/European Respiratory Society (ERS) 2011 Update (International) (36)
- Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2013 Update (International) (37)

Quality Assessment for Guidelines

Quality assessment using the AGREE II (5) domain scores for each of the included guidelines are presented in Table 6. Given the limited number of guidelines identified for each cohort, the expert advisory panel considered all the guideline recommendations.

Table 6: AGREE II Domain Scores for COPD Guidelines

| Guideline, Year | AGREE II Domain | | | | | |
|------------------------------------|-----------------|-------------------------|-----------------------|-------------------------|---------------|------------------------|
| | Scope & Purpose | Stakeholder Involvement | Rigour of Development | Clarity of Presentation | Applicability | Editorial Independence |
| Acute Period | | | | | | |
| CTS, 2007 (32) | 44% | 25% | 30% | 89% | 25% | 88% |
| NICE, 2010 (33) | 86% | 81% | 79% | 83% | 71% | 38% |
| GOLD, 2014 (34) | 44% | 36% | 61% | 64% | 13% | 50% |
| Postacute Period | | | | | | |
| CTS, 2007 (32) | 44% | 25% | 30% | 89% | 25% | 88% |
| VA/DoD, 2007 (35) | 86% | 50% | 66% | 78% | 40% | 4% |
| NICE, 2010 (33) | 86% | 81% | 79% | 83% | 71% | 38% |
| ACP/ACCP/ATS/ERS, 2011 (36) | 86% | 44% | 64% | 75% | 10% | 71% |
| GOLD, 2013 (37) | 42% | 33% | 61% | 58% | 13% | 50% |

Abbreviations: ACP, American College of Physicians; ACCP, American College of Chest Physicians; ATS, American Thoracic Society; CTS, Canadian Thoracic Society; DoD, Department of Defense; ERS, European Respiratory Society; GOLD, Global Initiative for Chronic Obstructive Lung Disease; NICE, National Institute of Health and Clinical Excellence; VA, Department of Veterans Affairs.

The guidelines supporting the expert panels' recommendations were summarized, along with the quality of evidence supporting individual guideline recommendations. The quality assessment tools used by each guideline are summarized in Table 7.

Table 7: Summary of Evidence Assessments Used by Included Guidelines

| Organization | Grade of Recommendation/Level of Evidence |
|-----------------------------------|--|
| Acute Period | |
| CTS, 2007 (CA) | <p>1: Evidence from 1 or more RCTs or MAs</p> <p>2: Evidence from 1 or more well-designed cohort or case-control studies</p> <p>3: Consensus from expert groups based on clinical experience</p> <p>A: Good evidence to support a recommendation for use</p> <p>B: Moderate evidence to support a recommendation for use</p> <p>C: Poor evidence to support a recommendation for use</p> <p>D: Moderate evidence to support a recommendation against use</p> <p>E: Good evidence to support a recommendation against use</p> |
| NICE, 2010 (UK) | <p>A: Based on evidence from SRs or MAs of RCTs or evidence from at least 1 RCT</p> <p>B: Based on evidence from at least 1 controlled study without randomization or evidence from at least 1 other type of quasi-experimental study</p> <p>C: Based on evidence from non-experimental descriptive studies, such as comparative studies, correlation studies, and case-control studies</p> <p>D: Directly based on evidence from expert committee reports or opinions and/or clinical experience of respected authorities</p> |
| GOLD, 2014 (International) | <p>A: RCTs, rich body of data</p> <p>B: RCTs, limited body of data</p> <p>C: Nonrandomized trials, observational studies</p> <p>D: Panel consensus judgment</p> |
| Postacute Period | |
| CTS, 2007 (CA) | <p>1: Evidence from 1 or more RCTs or MAs</p> <p>2: Evidence from 1 or more well-designed cohort or case-control studies</p> <p>3: Consensus from expert groups based on clinical experience</p> <p>A: Good evidence to support a recommendation for use</p> <p>B: Moderate evidence to support a recommendation for use</p> <p>C: Poor evidence to support a recommendation for use</p> <p>D: Moderate evidence to support a recommendation against use</p> <p>E: Good evidence to support a recommendation against use</p> |
| VA/DoD, 2007 (US) | <p>A: A strong recommendation that clinicians provide the intervention to eligible patients (Good evidence that the intervention improves important health outcomes and concludes that benefits substantially outweigh harm.)</p> <p>B: A recommendation that clinicians provide (the service) to eligible patients (At least fair evidence that the intervention improves important health outcomes and concludes that benefits outweigh harm.)</p> <p>C: No recommendation for or against the routine provision of the intervention is made (At least fair evidence was found that the intervention can improve health outcomes, but concludes that the balance of benefits and harms is too close to justify a general recommendation.)</p> <p>D: Recommendation is made against routinely providing the intervention to asymptomatic patients (At least fair evidence was found that the intervention is ineffective or that harms outweigh benefits.)</p> |

| Organization | Grade of Recommendation/Level of Evidence |
|---|--|
| | I: The conclusion is that the evidence is insufficient to recommend for or against routinely providing the intervention (Evidence that the intervention is effective is lacking or poor quality, or conflicting, and the balance of benefits and harms cannot be determined.) |
| NICE, 2010 (UK) | <p>A: Based on evidence from SRs or MAs of RCTs or evidence from at least 1 RCT</p> <p>B: Based on evidence from at least 1 controlled study without randomization or evidence from at least 1 other type of quasi-experimental study</p> <p>C: Based on evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case-control studies</p> <p>D: Directly based on evidence from expert committee reports or opinions and/or clinical experience of respected authorities</p> |
| ACP/ACCP/ATS/ERS, 2011 (International) | <p>Strong: Benefits clearly outweigh risks and burden or risks and burden clearly outweigh benefit</p> <p>Weak: Benefits finely balanced with risk and burden</p> <p>High: Very confident that the true effect lies close to that of the estimate of the effect</p> <p>Moderate: Moderately confident in the effect estimate; the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different</p> <p>Low: Confidence in the effect estimate is limited; the true effect may be substantially different from the estimate of the effect</p> |
| GOLD, 2013 (International) | <p>A: RCTs, rich body of data</p> <p>B: RCTs, limited body of data</p> <p>C: Nonrandomized trials, observational studies</p> <p>D: Panel consensus judgment</p> |

Abbreviations: ACP, American College of Physicians; ACCP, American College of Chest Physicians; ATS, American Thoracic Society; CA, Canada; CTS, Canadian Thoracic Society; DoD, Department of Defense (US); ERS, European Respiratory Society; GOLD, Global Initiative for Chronic Obstructive Lung Disease; MA, meta-analysis; NICE, National Institute of Health and Clinical Excellence; RCT, randomized controlled trial; SR, systematic review; US, United States; VA, Department of Veterans Affairs.

Other Contributing Sources

In addition to the evidence provided through OHTAC recommendations, HQO clinical handbooks, rapid evidence reviews, and international guidelines, the following sources of evidence were used to develop the practice recommendations for COPD.

Acute Episode of Care

- **Related reports and updates:** Important scientific reports identified by the expert advisory panel were incorporated into relevant recommendations, particularly if the evidence contextualized the recommendation for Ontario.
 - **Canadian Thoracic Society/American College of Chest Physicians:** Prevention of Acute Exacerbations of Chronic Obstructive Pulmonary Disease (updated guideline) (38)

At the time the acute episode of care was updated, this new guideline was anticipated but not yet published. Information from experts involved in the guideline update suggested general alignment with the recommendations in this clinical handbook. However, HQO may revise the handbook in the event that there are major discrepancies.
 - **Canadian Thoracic Society:** Alpha-1 Antitrypsin Deficiency Targeted Testing and Augmentation Therapy (2012)

(Available from: http://www.respiratoryguidelines.ca/sites/all/files/2012_CTS_Guidline_Alpha-1.pdf)

- **Ontario Drug Policy Research Network:** Drug Class Review Inhaled Corticosteroids (ICS) + Long-acting Beta2-agonists (LABA) for Treatment of Chronic Obstructive Pulmonary Disease (COPD) Consolidated Final Report (2014) (Available from: <http://www.odprn.ca/wp-content/uploads/2014/05/ICS-LABA-consolidated-report-may-9-final1.pdf>)
- **Expert consensus:** Where other forms of evidence were lacking, expert panel opinion and consensus were incorporated.

Postacute Episode of Care

- **Health Links:** Adopting a Common Approach to Transitional Care Planning: Helping Health Links Improve Transitions and Coordination of Care (Available from: <http://www.hqontario.ca/Portals/0/Documents/bp/bp-traditional-care-planning-1404-en.pdf>)
- **Ministry of Health and Long-Term Care:** Assistive Device Program Home Oxygen Therapy Policy and Administration Manual (2014) (Available from: http://www.health.gov.on.ca/en/pro/programs/adp/information/technology/docs/home_oxygen_manual.pdf)
- **Related reports and updates:** Important scientific reports identified by the expert advisory panel were incorporated into relevant recommendations, particularly if the evidence contextualized the recommendation for Ontario.
 - **Canadian Thoracic Society:** 2013 CTS COPD Action Plan (Available from: <http://www.respiratoryguidelines.ca/updated-cts-copd-action-plan>)
 - **Canadian Thoracic Society/American College of Chest Physicians:** Prevention of Acute Exacerbations of Chronic Obstructive Pulmonary Disease (updated guideline) (38)
At the time the postacute episode of care was undertaken, this new guideline was anticipated but not yet published. Information from experts involved in the guideline update suggested general alignment with the recommendations in this clinical handbook. However, HQO may revise the handbook in the event that there are major discrepancies.
- **Expert consensus:** Where other forms of evidence were lacking, expert panel opinion 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:

| | |
|---|--|
| <i>Taken from</i> | Recommendation was taken directly from another source |
| <i>Modified</i> | Minor modifications from the source materials were made to the recommendation |
| <i>Consistent with</i> | Recommendation was developed by the expert panel and was consistent with other sources |
| <i>Based on expert advisory panel consensus</i> | Recommendation was largely derived through expert panel consensus |

What's New?

During Phase 3 (this update and integration to include the postacute episode of care), recommended practices may have been added, amended (e.g., because modules have been reorganized or new evidence has changed an original recommendation), and/or deleted. Below is a summary of these changes, numbered according to the modules that follow.

Additions

- Recommendation E: diagnosis of COPD
- Recommendation 4a.3.5: transition to community-based care
- Modules 4b to 10: postacute, community-based episode of care

Amendments

- Recommendation D: diagnosis of COPD
- Recommendations 1.1.2, 1.1.5, 1.1.6, 1.1.7, 1.1.9, 1.1.10, and 1.1.13: patient presents with suspected COPD exacerbation
- Recommendation 1.2.1: assess level of care required
- Recommendations 2.1, 2.2, 2.3, and 2.6: usual medical care
- Recommendations 4a.2.3, 4a.2.5, 4a.2.7, 4a.2.8, and 4a.2.9: preparation for discharge
- Recommendations 4a.3.2, 4a.3.6, and 4a.3.7: transition to community-based care

Recommended Practices

While recommendations are presented within their respective modules according to the continuum-of-care model for COPD (Figure 5), they are not necessarily in the order in which they should be conducted. It is therefore important for readers to review the entire set of recommendations for COPD care and not isolated sections. The recommended practices for COPD diagnosis and the definition of an acute exacerbation of COPD applies to the full continuum of care.

| Diagnosis Recommended Practices | Contributing Sources of Evidence |
|---|---|
| Diagnosis of COPD | |
| A. Consider clinical diagnosis of COPD in any patient who has dyspnea, chronic cough, or sputum production, and/or a history of exposure to risk factors for the disease. | Taken from GOLD; consistent with CTS and NICE (level D evidence) |
| B. Spirometry is required to make clinical diagnosis: post-bronchodilator FEV ₁ /FVC < 0.70 confirms COPD. | Taken from GOLD; consistent with CTS (level 3A evidence) and NICE (level D evidence) |
| C. Spirometry need not be performed during the initial phase of an exacerbation when the patient is unstable, but should be performed once the patient has stabilized. | Based on CTS (level 3C evidence); modified by the expert advisory panel; consistent with GOLD and NICE (level D evidence) |
| D. Spirometry should be performed if the patient has no recent, reliable, objective documentation of COPD by spirometry. | Based on CTS (level 3C evidence); modified by the expert advisory panel |
| E. To ensure accurate diagnosis and optimal treatment, it is recommended that a case-finding strategy to identify alpha ₁ -antitrypsin deficiency; follow the Canadian Thoracic Society guidance on targeted testing. | Based on CTS clinical practice guideline on alpha ₁ -antitrypsin deficiency targeted testing and augmentation therapy ⁷ (level 2C evidence) |
| Acute Exacerbation | |
| F. An exacerbation of COPD is an acute event characterized by a worsening of the patient's respiratory symptoms (baseline dyspnea, cough, and/or sputum production) that is beyond normal day-to-day variations and leads to a change in medication. | Taken from GOLD; consistent with CTS and NICE |
| Abbreviations: COPD, chronic obstructive pulmonary disease; CTS, Canadian Thoracic Society; FEV ₁ , forced expiratory volume in 1 second; FVC, forced vital capacity; GOLD, Global Initiative for Chronic Obstructive Lung Disease; NICE, National Institute for Health and Clinical Excellence. | |

⁷Canadian Thoracic Society. Available from: http://www.respiratoryguidelines.ca/sites/all/files/2012_CTS_Guideline_Alpha-1.pdf

Acute Episode of Care

The diagram in Figure 4 has been adopted by the expert panel as a high-level functional model of the COPD acute exacerbation episode of care. The model framework was developed by Health Quality Ontario to structure its episode-of-care analyses in selected clinical areas. It includes 2 key components: *care modules* cluster recommended practices and interventions at each stage of the patient pathway, while *assessment nodes* provide patient-based criteria for a particular case proceeding down one branch of the pathway or another.

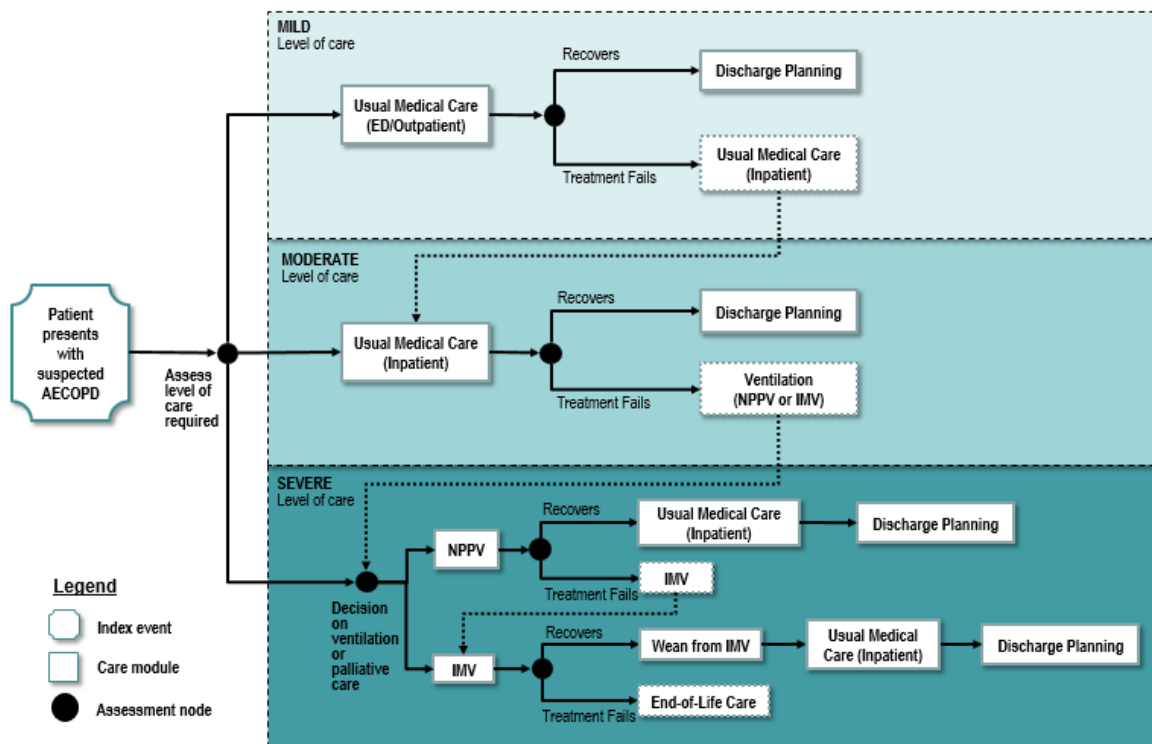


Figure 4: Episode-of-Care Model for Acute COPD

Abbreviations: AECOPD, acute exacerbation of chronic obstructive pulmonary disease; ED, emergency department; IMV, mechanical ventilation; NPPV, noninvasive positive pressure ventilation.

In the recommendations that follow, please refer to Figure 3, page 37, to locate the module numbers within the continuum-of-care model for COPD.

Module 1: Initial Presentation and Assessment

Recommendations for Modules 1 through 4 were originally developed by the Acute COPD Expert Advisory Panel in 2013 and have been updated in this clinical handbook by the Update and Integration COPD Expert Advisory Panel.

This module identifies recommended practices for patients presenting with suspected COPD to the ED or outpatient clinic or for patients who are admitted directly. This module also identifies recommended practices for assessing the level of care required. Many patients with COPD exacerbations do not present to the ED as patients with well-characterized COPD but as undifferentiated patients who could potentially be suffering from a variety of conditions (e.g., COPD, acute myocardial infarction or other cardiac conditions, pulmonary embolus, pneumonia, asthma, acute bronchitis). As the recommendations presented here focus on defining a COPD-specific care pathway, it is expected that additional diagnostic interventions not included here may be required based on clinical assessment. The type of tests performed may depend on the individual hospital's standard ED processes rather than COPD-specific guidelines.

| Module 1 Recommended Practices | Contributing Sources of Evidence |
|---|---|
| 1.1 Patient Presents With Suspected COPD Exacerbation | |
| 1.1.1 Check vital signs, including: <ul style="list-style-type: none"> • Assess for hypoventilation • Check level of consciousness/cognition • Check blood-oxygen saturation level via pulse oximetry • Assess whether patient has purulent sputum | Based on CTS, GOLD and NICE (level D evidence); modified by the expert advisory panel |
| 1.1.2 Perform a physical examination. | Based on CTS, GOLD and NICE; modified by the expert advisory panel |
| 1.1.3 Check patient history. | Based on CTS, GOLD and NICE; modified by the expert advisory panel |
| 1.1.4 Document and reconcile medications currently used by patient. | Based on GOLD and NICE (level D evidence); modified by the expert advisory panel |
| 1.1.5 Perform a chest x-ray: <ul style="list-style-type: none"> • posteroanterior and lateral • portable x-ray for patients who are too unwell to leave emergency department • expiratory view when concerned with pneumothorax | Based on CTS (level 2B evidence) and NICE (level D evidence); modified by the expert advisory panel; consistent with GOLD |
| 1.1.6 Conduct baseline blood work: <ul style="list-style-type: none"> • complete blood count • electrolytes • creatinine • blood urea nitrogen (if available) | Based on GOLD and NICE; modified by the expert advisory panel |
| 1.1.7 Perform an electrocardiogram to check for arrhythmias, myocardial ischemia, right ventricular strain, etc. | Based on GOLD and NICE (level D evidence); modified by the expert advisory panel |
| 1.1.8 If low oxygen saturation on oximetry and/or acute respiratory failure is suspected, check arterial blood gases where appropriate. | Based on CTS, GOLD and NICE (level D evidence); modified by the expert advisory panel |

| Module 1 Recommended Practices | Contributing Sources of Evidence |
|---|---|
| 1.1.9 If pneumonia or suspected sepsis, draw blood cultures. | Based on GOLD and NICE (level D evidence); modified by the expert advisory panel |
| 1.1.10 Examine cardiac markers for suspected cardiac disorders, if appropriate. | Based on GOLD; modified by the expert advisory panel |
| 1.1.11 Identify patient wishes with respect to goals of care and/or limitations of treatment (i.e., code status). | Based on expert advisory panel consensus |
| 1.1.12 Spirometry need not be performed during the initial assessment of an exacerbation, but should be performed once the patient has stabilized, if patient has no prior objective documentation of COPD through spirometry. | Based on CTS (level 3C evidence); modified by the expert advisory panel; consistent with GOLD and NICE (level D evidence) |
| 1.1.13 Perform other diagnostic interventions as appropriate to identify and/or rule out other suspected diagnoses or comorbidities. | Based on GOLD; modified by the expert advisory panel |
| 1.2 Assess Level of Care Required | |
| 1.2.1 The decision to admit relies largely on clinical judgment and availability of local resources. Use the NICE and/or GOLD criteria below as a guide: | Based on GOLD and NICE (level D evidence); modified by expert advisory panel |
| <ul style="list-style-type: none"> • failure of an exacerbation to respond to initial medical management • insufficient home support; inability to cope at home • breathlessness or marked increase in intensity of symptoms, such as development of resting dyspnea • general condition and severe underlying COPD • decreased level of activity • cyanosis • worsening peripheral edema or onset of new physical signs (e.g., cyanosis, fatigue, inability to stand) • decreased level of consciousness • already receiving long-term oxygen therapy • social circumstances, older age • acute confusion • rapid rate of onset or frequent exacerbations • significant comorbidity (e.g., heart failure, newly occurring arrhythmias) • arterial oxygen saturation (SaO₂) < 90%, pH level, and partial pressure of oxygen (PaO₂) • changes on chest x-ray | |
| 1.2.2 Trial immediate resuscitation on initial presentation at the ED; follow up with re-evaluation for admission. | Based on expert advisory panel consensus |
| Abbreviations: COPD, chronic obstructive pulmonary disease; CTS, Canadian Thoracic Society; GOLD, Global Initiative for Chronic Obstructive Lung Disease; NICE, National Institute for Health and Clinical Excellence. | |

| Module 1 Implementation Considerations |
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| <ul style="list-style-type: none"> • On a quarterly basis, hospital administration and admitting clinicians should be made aware of COPD admission rates benchmarked against similar hospitals in the province. • Emergency room staff should use a checklist for admission to hospital. In addition to the practices in the Module 1 table, the checklist should at a minimum include non-COPD concerns such as pain, anxiety, and comorbidities. |
| Abbreviations: COPD, chronic obstructive pulmonary disease. |

Module 2: Usual Medical Care

| Module 2 Recommended Practices | Contributing Sources of Evidence |
|--|--|
| <p>2.1 Short-acting bronchodilators are effective for treating a COPD exacerbation.</p> <ul style="list-style-type: none"> Beta-2 agonists with or without short-acting anticholinergics are recommended. If patient is already on long-acting anticholinergics, continue to administer in combination with beta-2 agonists. There is insufficient evidence to support the benefits of adding short-acting anticholinergics to long-acting anticholinergics. Metered dose inhalers with spacers are the preferred delivery vehicle; if metered dose inhalers are not appropriate and/or cannot be used, nebulizers should be considered second-line treatment, due to infection risk. Ensure continuous supervision of the patient during drug delivery, whether by metered dose inhaler or nebuliser, to ensure drugs are taken successfully. | <p>Based on CTS (level 2A evidence), GOLD (level C evidence) and NICE (level B evidence); modified by the expert advisory panel</p> <p>Based on CTS (level 3C evidence) and GOLD (level C evidence); modified by the expert advisory panel</p> <p>Based on CTS (level 3C evidence) and GOLD; modified by the expert advisory panel</p> <p>Based on expert advisory panel consensus</p> <p>Based on expert advisory panel consensus; consistent with GOLD and NICE (level D evidence)</p> <p>Based on expert advisory panel consensus</p> |
| <p>2.2 Corticosteroids are effective except for only very mild exacerbations, or if contraindicated.</p> <ul style="list-style-type: none"> Oral corticosteroids are preferred over intravenous corticosteroids. Manage corticosteroid-induced side-effects. Use a 10- to 14-day course of therapy Specific cautions and/or contraindications include: <ul style="list-style-type: none"> frequency of use (dependence or chronic use) chronic obstructive pulmonary disease diabetes osteoporosis avascular necrosis | <p>Based on CTS (level 1A evidence); modified by the expert advisory panel; consistent with GOLD (level A evidence) and NICE (level A evidence)</p> <p>Based on CTS (level 2B evidence), GOLD and NICE (level D evidence); modified by the expert advisory panel</p> <p>Based on expert advisory panel consensus</p> <p>Based on CTS (level 1A evidence) and NICE (level D evidence); modified by the expert advisory panel</p> <p>Based on GOLD and NICE (level D evidence); modified by the expert advisory panel</p> |
| <p>2.3 Antibiotics should be used for indications of infection (e.g., purulent or high-volume sputum)</p> <ul style="list-style-type: none"> Refer to Canadian Thoracic Society recommendations on antibiotic treatment (Table 8). Refer to institution-specific antimicrobial stewardship policies. Oral antibiotics are preferred. Intravenous antibiotics should be considered second-line therapy, used only when oral antibiotics are contraindicated or inappropriate (e.g., gastrointestinal issues). | <p>Based on CTS (level 1A evidence), GOLD (level B evidence) and NICE (level A evidence); modified by the expert advisory panel</p> <p>Taken from CTS</p> <p>Based on GOLD; modified by the expert advisory panel</p> <p>Based on GOLD; modified by the expert advisory panel</p> <p>Based on GOLD; modified by the expert advisory panel</p> |
| <p>2.4 Theophylline is not recommended unless the patient is already receiving it; if so, check levels.</p> | <p>Based on GOLD (level B evidence) and NICE (level D evidence); modified by the expert advisory panel</p> |

| Module 2 Recommended Practices | Contributing Sources of Evidence |
|--|--|
| 2.6 If necessary, deliver oxygen to maintain target oxygen saturation of ~ 90%. Assess risk of hypercarbia. | Based on GOLD; modified by the expert advisory panel |
| 2.7 Where appropriate, initiate bronchopulmonary (lung) hygiene physical therapy to clear mucus and secretion from the airway. | Based on Inhospital Physiotherapy for Acute Exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD) (low GRADE quality of evidence): There is low-quality evidence that certain airway clearance techniques have beneficial impacts on some outcomes; modified by expert advisory panel; consistent with NICE (level B evidence) |
| 2.8 If patient is admitted, use early ambulation therapy. | Based on Inhospital Physiotherapy for Acute Exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD) (poor quality of evidence): 1 small RCT found statistically significant improvements for a number of patient outcomes, including exercise capacity and lung function, for the walking program compared to standard care, but the quality of evidence is poor and not generalizable to the Ontario context; modified by expert advisory panel; consistent with GOLD |
| 2.9 Begin discharge planning, including referral to pulmonary rehabilitation. | Based on expert advisory panel consensus |

Abbreviations: COPD, chronic obstructive pulmonary disease; CTS, Canadian Thoracic Society; GOLD, Global Initiative for Chronic Obstructive Lung Disease; GRADE, Grading of Recommendations, Assessment, Development, and Evaluation; HQO, Health Quality Ontario; NICE, National Institute for Health and Clinical Excellence; RCT, randomized controlled trial.

Table 8: Canadian Thoracic Society Antibiotic Treatment Recommendations for Purulent Exacerbations of COPD

| Group | Basic Clinical State | Symptoms and Risk Factors | Probable Pathogens | First Choice |
|-------------|---------------------------|---|---|---|
| Simple | COPD without risk factors | Increased cough and sputum, sputum purulence, and increased dyspnea | <i>Haemophilus influenzae</i> , <i>Haemophilus</i> species, <i>Moraxella catarrhalis</i> , <i>Streptococcus pneumoniae</i> | Amoxicillin, doxycycline, trimethoprim/sulfamethoxazole, second- or third-generation cephalosporins, extended-spectrum macrolides |
| Complicated | COPD with risk factors | As in simple plus at least 1 of: <ul style="list-style-type: none"> • FEV₁ < 50% predicted • ≥ 4 exacerbations per year • ischemic heart disease • use of home oxygen • chronic oral corticosteroid use • antibiotic use in the past 3 months | As in simple, plus: <i>Klebsiella</i> species and other gram-negatives Increased probability of beta-lactam resistance | Beta-lactam/beta-lactamase inhibitor; fluoroquinolone (antibiotics for uncomplicated patients when combined with oral steroids may suffice) |

Abbreviations: COPD, chronic obstructive pulmonary disease; FEV₁, forced expiratory volume in 1 second.

Module 2 Implementation Considerations

- Daily physical inactivity is evident across the spectrum of COPD disease stages but particularly after acute exacerbations of the disease. Facilitating early ambulation contributes to improving long-term outcomes in COPD patients.
 - Standardized ambulation interprofessional team care pathway should be in place at all hospitals.
 - Early ambulation requires physiotherapy or nursing and/or nursing assistants available 7 days per week to accomplish early ambulation.
 - Anticipated numbers of patients should be determined for assessment, treatment, care coordination or case management, and home care and/or end-of-life care, accounting for the possibility of increased numbers of patients moving through the system during specific time periods (e.g., seasons).
- Documentation of ambulation should be readily accessible to other providers who need to know this information.
- Appropriate use of medication can diminish the frequency and effect of COPD exacerbations. Oral antibiotics encourage early ambulation. Hospitals should have a hospital-wide (including ED) drug therapy protocol that supports and details the clinical use, administration, and supply of the scheduled drugs. If not, it is recommended that the relevant interprofessional team be assembled to develop standardized drug therapy protocols to serve the hospitals' professional practices.
 - Printed or computerized order sheets should prioritize oral over IV antibiotics.
 - It is important to consider the potential implications on hospitals' antimicrobial stewardship policies.
 - Practitioners should know the contraindications, known side-effects, and drug interactions of each drug and advise patients accordingly.
 - Patients' drug allergies should be entered in the hospital's EHR.
 - Practitioners and patients should understand when to discontinue the use of oral corticosteroids (10–14 days).
 - Prior to patients' discharge from hospital, staff should ask the patient how they will pay for medications. Patients without insurance coverage for drugs may be at risk of non-compliance if they have difficulty affording their medications.
- Patient comorbidities can be a barrier to implementation.
- Depending on the clinical condition of the patient, an appropriate fluid balance with special attention to the administration of diuretics, anticoagulants, treatment of comorbidities, and nutritional aspects should be considered. (34)
- Pulmonary rehabilitation helps to decrease symptoms and improve the patient's quality of life, daily functioning, and ability to exercise.
 - Pulmonary rehabilitation must be accessible to all relevant individuals with COPD, including those who have had a recent hospitalization for an acute COPD exacerbation.
 - Criteria for referral to pulmonary rehabilitation should be developed if not already in place.
 - Hospitals should inform their LHINs about the pulmonary rehabilitation services they offer so that the LHINs know what services exist in their areas.
 - Hospitals should consider accessibility of pulmonary rehabilitation when referring COPD patients to other services, to reduce potential hospital admissions and length of hospital stay.
 - The Ministry of Health and Long-Term Care should accept and fund HQO's provincial implementation plan for pulmonary rehabilitation, submitted in September 2014.

Abbreviations: COPD, chronic obstructive pulmonary disease; ED, emergency department; EHR, electronic health record; HQO; Health Quality Ontario; IV, intravenous; LHIN, local health integration network.

Module 3: Ventilation and Palliative Care

| Module 3 Recommended Practices | Contributing Sources of Evidence |
|---|--|
| 3.1 Decision on Ventilation or Palliative Care | |
| <p>3.1.1 If possible, seek patient preferences for ventilation therapy before proceeding to ventilation interventions, consistent with OHTAC's recommendation:</p> <div data-bbox="245 443 829 548" style="border: 1px solid black; padding: 5px;"> <p>OHTAC recommends that patient preferences regarding mechanical ventilation be sought prior to acute respiratory decompensation, and should serve as a guide for the provision of this service.</p> </div> | <p>Based on GOLD and NICE (level D evidence); modified by the expert advisory panel</p> <p>Taken from OHTAC for HQO EBA, Preference for Ventilation Among COPD Patients</p> |
| <p>3.1.2 If ventilation is not desired, proceed to palliative care management of the patient, consistent with OHTAC's recommendation:</p> <div data-bbox="245 638 829 764" style="border: 1px solid black; padding: 5px;"> <p>In making palliative care services available, the fluctuating physical, psychosocial, spiritual, and information needs should be considered, without necessarily forgoing acute care or hope of improvement during and following severe exacerbations.</p> </div> | <p>Based on expert advisory panel; consistent with OHTAC for HQO synthesis of the qualitative empirical literature on palliative care for COPD and with GOLD</p> <p>Taken from OHTAC for HQO synthesis of the qualitative empirical literature on palliative care for COPD</p> |
| <p>3.1.3 Noninvasive positive pressure ventilation (NPPV) should be considered as part of first-line treatment for patients with acute respiratory failure and pH < 7.35, consistent with OHTAC's recommendation:</p> <div data-bbox="245 890 829 1016" style="border: 1px solid black; padding: 5px;"> <p>OHTAC recommends the use of NPPV as an adjunct to usual medical care as a first-line treatment for patients with acute respiratory failure due to acute exacerbations of COPD who do not require immediate access to invasive mechanical ventilation (IMV).</p> </div> | <p>Based on GOLD; modified by the expert advisory panel; consistent with NICE (level A evidence)</p> <p>Taken from OHTAC for HQO EBA on NPPV for acute respiratory failure (low to moderate GRADE quality of evidence)</p> |
| <p>3.1.4 NPPV should be trialed before proceeding to IMV for all patients with indications for ventilation, including severe patients (pH < 7.20), unless contraindications are present (including respiratory or cardiac arrest, loss of consciousness, craniofacial trauma, hemodynamic instability, impaired mental status).</p> | <p>Based on CTS (level 1A evidence); modified by the expert advisory panel; consistent with GOLD and NICE (level A evidence)</p> |
| <p>3.1.5 Where patients have expressed preferences against intubation, NPPV can still be considered but ensure that therapy does not progress to IMV in the case of failure to respond to NPPV.</p> | <p>Based on NICE (level D evidence); modified by the expert advisory panel; consistent with GOLD</p> |
| 3.2 Noninvasive Ventilation | |
| <p>3.2.1 Ensure continuous monitoring of patients receiving NPPV.</p> | <p>Based on CTS (level 1A evidence); modified by the expert advisory panel</p> |
| <p>3.2.2 Specialized respiratory teams and/or units are likely to be more effective in delivering NPPV, consistent with OHTAC's recommendation:</p> <div data-bbox="245 1499 829 1583" style="border: 1px solid black; padding: 5px;"> <p>NPPV should be made widely available, with appropriate support systems and human resources for this indication.</p> </div> | <p>Based on CTS (level 1A evidence), GOLD and NICE (level D evidence); modified by the expert advisory panel</p> <p>Taken from OHTAC for HQO EBA on NPPV for acute respiratory failure (low to moderate GRADE quality of evidence)</p> |
| 3.3 Invasive Ventilation/Weaning from Invasive Ventilation | |
| <p>3.3.1 Use NPPV to help wean patients from IMV when they fail spontaneous breathing tests. This is consistent with OHTAC's recommendation:</p> <div data-bbox="245 1709 829 1793" style="border: 1px solid black; padding: 5px;"> <p>OHTAC recommends the use of NPPV to wean COPD patients who have failed spontaneous breathing tests following IMV.</p> </div> | <p>Based on GOLD; modified by the expert advisory panel</p> <p>Taken from OHTAC for HQO EBA on NPPV for acute respiratory failure (low to moderate GRADE quality of evidence)</p> |

| Module 3 Recommended Practices | Contributing Sources of Evidence |
|--------------------------------|----------------------------------|
|--------------------------------|----------------------------------|

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|--|--|
| 3.3.2 A volume-outcome relationship at the hospital level associated with effectiveness of IMV should be considered. | Based on expert advisory panel consensus |
|--|--|

Abbreviations: COPD, chronic obstructive pulmonary disease; CTS, Canadian Thoracic Society; EBA, evidence-based analysis; GOLD, Global Initiative for Chronic Obstructive Lung Disease; GRADE, Grading of Recommendations, Assessment, Development, and Evaluation; HQO, Health Quality Ontario; IMV, invasive mechanical ventilation; NICE, National Institute for Health and Clinical Excellence; NPPV, noninvasive positive pressure ventilation; OHTAC, Ontario Health Technology Advisory Committee.

| Module 3 Implementation Considerations |
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NPPV has demonstrated benefits on mortality and intubation rates in patients with acute COPD exacerbations and may shorten hospital stay, in turn reducing costs.

- Hospitals should have a process for getting an advanced directive either from the patients' PCP or through the hospital regarding patient preferences for ventilation therapy.
- Hospitals should have standardized practices and protocols in place for the use of NPPV. These practices and protocols should be standardized and available throughout the hospital.
- NPPV should be used as the preferred treatment during COPD exacerbations resistant to medical therapy. NPPV should be provided by staff who are trained, experienced, and familiar with its limitations.
- Hospitals should carefully identify COPD patients for NPPV according to indications and contraindications.
- Using NPPV to wean COPD patients with acute respiratory failure who have failed spontaneous breathing tests from invasive mechanical ventilation should be the standard of care in hospitals. Hospitals should invest in the required equipment and human resources (e.g., registered respiratory therapists) to make this possible.
- The use of NPPV for chronic respiratory failure in stable COPD patients is not recommended due to its lack of clinical effectiveness.
- Hospitals should be appropriately resourced to offer NPPV not only in the intensive care unit but also in hospital wards.
- To ensure patients' wishes are followed, advance care planning discussions should take place at each transition point in the continuum of health care service provision.

Abbreviations: COPD, chronic obstructive pulmonary disease; NPPV, noninvasive positive pressure ventilation; PCP, primary care provider.

Module 4: Discharge Planning

This module contains recommendations for the preparation for discharge and transition from hospital to the community. As a result, there is overlap with recommendations in Module 4b in the postacute episode of care, which also supports a smooth transition and continuity of care.

| Module 4a Recommended Practices | Contributing Sources of Evidence |
|---|---|
| 4a.1 Clinical Assessment of Stabilized Patient | |
| <p>4a.1.1 Where a patient has no prior objective documentation of spirometry assessment, spirometry should be performed on the stabilized patient before discharge (as time and patient's condition allow) or arranged for following discharge.</p> | <p>Based on CTS (level 3C evidence) and NICE (level D evidence); modified by the expert advisory panel; consistent with GOLD</p> |
| <p>4a.1.2 In addition to classification of airflow limitation, patients should also be assessed for the severity of their symptoms and other risk factors (e.g., comorbidities), considering tools such as the MRC dyspnea scale and the CAT, BODE, and LACE indices.</p> | <p>Based on CTS (level 3A evidence), GOLD and NICE (level D evidence); modified by the expert advisory panel</p> |
| <p>4a.1.3 Perform a full clinical assessment on suspected COPD patients once their condition stabilizes, before they are discharged.</p> | <p>Based on GOLD; modified by the expert advisory panel; consistent with NICE</p> |
| 4a.2 Preparation for Discharge | |
| <p>4a.2.1 Patients should leave the hospital with an individualized discharge plan, consistent with OHTAC's recommendation:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>OHTAC recommends the implementation of individualized pre-discharge planning⁸ for chronic disease patients admitted to hospital, the primary responsibility for which resides with the hospital.</p> <p>OHTAC strongly recommends that the discharge plan be communicated and coordinated across relevant health care providers.</p> </div> | <p>Based on GOLD and NICE; modified by the expert advisory panel</p> <p>Taken from OHTAC for HQO EBA, Discharge Planning in Chronic Conditions (moderate GRADE quality of evidence)</p> |
| <p>4a.2.2 (Re-)establish patients on long-term COPD maintenance bronchodilator therapy before discharge, including continuing or resuming use of hand-held inhalers.</p> | <p>Based on GOLD and NICE (level D evidence); modified by the expert advisory panel</p> |
| <p>4a.2.3 As should be done at every transition, review and reconcile patients' full range of medications before discharge. Ensure that patients understand their medication therapy, including when to stop corticosteroids if prescribed.</p> | <p>Based on GOLD and NICE (level D evidence); modified by the expert advisory panel</p> |
| <p>4a.2.4 Assess the patient's inhaler technique before discharge.</p> | <p>Based on GOLD; modified by the expert advisory panel</p> |
| <p>4a.2.5 Provide a comprehensive self-management plan for patients, including education and case management,⁹ with or without a written action plan. Action plans¹⁰ in isolation cannot</p> | <p>Based on Action Plans for Individuals with Chronic Obstructive Pulmonary Disease (COPD) (moderate GRADE quality of evidence); modified by expert advisory panel</p> |

⁸Based on the included studies, individualized pre-discharge planning should be a multicomponent intervention, including some combination of the following: discharge assessment and planning (that commences as early during the admission as possible); patient education component; patient-centred discharge instructions; and coordination/communication with family physicians and other appropriate community-based services.

⁹Case management refers to structured follow-up and/or communication with health care professionals with a particular focus on changes to the patient's signs and symptoms, advising on appropriate interventions, referring to physicians and recommending the initiation of therapy to reduce or prevent the risk of serious acute exacerbations of COPD. Communication can be in person, telephone, or other technology not including biomonitoring or teletext technology.

¹⁰A written communication tool "to help those with COPD prevent and manage exacerbations in conjunction with the healthcare professional team (the physician, the certified respiratory educator and the pharmacist)." (Canadian Thoracic Society, 2013 COPD Action Plan)

| Module 4a Recommended Practices | Contributing Sources of Evidence |
|---|--|
| <p>be recommended at this time due to inconsistency in the evidence of safety and effectiveness. If used, action plans should be developed according to the Canadian Thoracic Society guidelines, with special attention to the cautions and warnings.</p> | <p>Based on CTS 2013 COPD Action Plan</p> |
| <p>4a.2.6 COPD patients with functional disabilities (e.g., shortness of breath when walking) should begin therapy in an evidence-based pulmonary rehabilitation program within 1 month following hospital discharge for an acute exacerbation of COPD, consistent with OHTAC's recommendations:</p> | <p>Based on OHTAC for HQO EBA on pulmonary rehabilitation for COPD; consistent with CTS (level 1A evidence), GOLD and NICE</p> |
| <div style="border: 1px solid black; padding: 5px;"> <p>OHTAC recommends the use of pulmonary rehabilitation in patients following an acute exacerbation (within 1 month of hospital discharge).</p> </div> | <p>Taken from OHTAC for HQO EBA on pulmonary rehabilitation for COPD (moderate GRADE quality of evidence)</p> |
| <p>4a.2.7 COPD patients who smoke should receive smoking cessation counselling while in hospital, with the goal of referral to longer-term, intensive smoking cessation counselling (including appropriate pharmacotherapy) in the outpatient setting. This may include providing information to patients with contact information/instructions for resources or other guidance. This is consistent with OHTAC's recommendation:</p> | <p>Based on CTS (level 1A evidence), GOLD (level A evidence), and NICE (level A evidence); modified by the expert advisory panel</p> |
| <div style="border: 1px solid black; padding: 5px;"> <p>OHTAC strongly endorses evidence-based strategies aimed at encouraging smoking cessation in patients with COPD. Intensive counselling (≥ 90 minutes) is the most effective and cost-effective strategy, and should continue to be encouraged.</p> </div> | <p>Taken from OHTAC for HQO EBA on smoking cessation for COPD patients</p> |
| <p>4a.2.8 If the patient does not have a regular PCP, ensure they are connected with one before discharge. If no PCP is available in the community, the patient may need support from hospitalists, specialists, or home care providers.¹¹</p> | <p>Based on expert advisory panel consensus</p> |
| <p>4a.2.9 Patients without up-to-date influenza (annual) or pneumococcal vaccinations should either be vaccinated before discharge or referred for vaccination following discharge, unless contraindications are present. This is consistent with OHTAC's recommendation:</p> | <p>Based on GOLD, CTS, and NICE; modified by the expert advisory panel</p> |
| <div style="border: 1px solid black; padding: 5px;"> <p>OHTAC recommends maximizing the use of pneumococcal and influenza vaccines in patients with COPD, ensuring that vaccination reflects the established guidelines and recommendations for immunization.</p> </div> | <p>Taken from OHTAC for HQO EBA on vaccination for COPD patients (high GRADE quality of evidence: influenza-related respiratory illness and incidence of pneumococcal pneumonia; low GRADE quality of evidence: hospitalizations, length of stay, need for ventilation, adverse reactions)</p> |
| <ul style="list-style-type: none"> • Annual influenza vaccination should be offered to all patients unless contraindicated. | <p>Based on expert advisory panel; consistent with OHTAC for HQO EBA on vaccination for COPD patients, CTS (level 2A evidence), GOLD (level A evidence), and NICE</p> |
| <ul style="list-style-type: none"> • A pneumococcal vaccine may be considered for all patients with COPD. | <p>Based on expert advisory panel; consistent with OHTAC for HQO EBA on vaccination for COPD patients, CTS (level 3C evidence), GOLD (level B evidence), and NICE</p> |
| <p>4a.3 Transition to Community-Based Care</p> | |
| <p>4a.3.1 All patients who qualify for home oxygen should be discharged on home oxygen.</p> | <p>Based on expert advisory panel consensus</p> |

¹¹Home care provider includes both community care access centres and independent home care agencies.

| Module 4a Recommended Practices | Contributing Sources of Evidence |
|--|---|
| <p>4a.3.2 Ensure that patients are supported by home care providers¹¹ with appropriate home care services in the community after discharge.</p> | <p>Based on expert advisory panel consensus; consistent with GOLD and NICE (level D evidence)</p> |
| <p>4a.3.3 Where appropriate, arrange for an assessment of the patient's home or living situation by an occupational therapist following discharge.</p> | <p>Based on expert advisory panel consensus</p> |
| <p>4a.3.4 Ensure patients have a follow-up appointment with a PCP, respirologist, or internist within 1 to 2 weeks of discharge.</p> | <p>Based on expert advisory panel consensus</p> |
| <p>4a.3.5 If prophylactic antibiotics are appropriate for a moderate-severe COPD patient who is at increased risk for future exacerbation despite optimal treatment, the potential benefit (for exacerbation rate and duration) and potential risks (gastrointestinal side effects, hearing impairment, and antibiotic resistance associated with a course of prophylactic azithromycin) should be discussed.</p> | <p>Based on Prophylactic Antibiotics for Individuals With Chronic Obstructive Pulmonary Disease (COPD) (very low to moderate GRADE quality of evidence): The evidence highlighted a general trend of beneficial effect on patients' COPD exacerbation rate and yielded uncertainty around risk of adverse events and antibiotic resistance associated with prophylactic azithromycin therapy.</p> |
| <ul style="list-style-type: none"> • In the event of bacterial infection in a patient on prophylactic azithromycin, assume that the bacteria will be resistant to all macrolides. | <p>Based on expert advisory panel consensus</p> |
| <p>4a.3.6 Ensure the patient's circle of care including PCP, home care providers¹¹ and pharmacist receive a copy of the care plan.¹²</p> | <p>Based on expert advisory panel consensus</p> |
| <p>4a.3.7 In some cases, direct communication between hospital staff and the PCP and/or home care coordinator¹³ is recommended.</p> | <p>Based on expert advisory panel consensus</p> |

Abbreviations: BODE, body mass index, obstruction, dyspnea, exercise capacity; CAT, COPD Assessment Test; COPD, chronic obstructive pulmonary disease; CTS, Canadian Thoracic Society; EBA, evidence-based analysis; GOLD, Global Initiative for Chronic Obstructive Lung Disease; GRADE, Grading of Recommendations, Assessment, Development, and Evaluation; HQO, Health Quality Ontario; LACE, length of stay in hospital, acuity of admission, comorbidities, emergency department visits during previous 6 months; MRC, Medical Research Council; NICE, National Institute for Health and Clinical Excellence; OHTAC, Ontario Health Technology Advisory Committee; PCP, primary care provider.

¹²*Discharge plan* refers to the official hospital documentation including the dictated details of the hospital episode and full care plan. *Care plan* refers to a package of information on the patient's condition and hospital episode including issues identified, medications related and unrelated to COPD, and all planned follow-up appointments and referrals.

¹³*Home care coordinator* refers to the person responsible for coordinating home care services through home care agencies.

Module 4a Implementation Considerations

- Encouraging patients to stop smoking should be one of the priorities of COPD management.
- Core hospital services should include smoking cessation counselling while patients are in the hospital.
- At admission, discussions with patients and caregivers regarding entry to the CAMH STOP smoking cessation program should be undertaken; the program provides smoking cessation counselling, drug therapy, and/or nicotine replacement therapy free of charge.
- Where a CAMH STOP smoking cessation program is not available, patients should be referred to a smoking program in a local community.
- To reduce ED visits and inpatient readmissions, hospitals should have a patient education and patient-centred health literacy program which includes, in plain language, how to live with COPD and smoking cessation.
- Education materials for patients and caregivers should be similar to the materials distributed in the community.
- Prior to patients' discharge from hospital, staff should ask the patient how they will pay for medications. Patients without insurance coverage for drugs may be at risk of noncompliance if they have difficulty affording their medications.
- Discharge planning aims to build a link between hospital and community care, with the potential to reduce hospital length of stay and unplanned readmissions. Service providers should do the following when undertaking discharge planning:
 - Confirm the preferred maintenance therapy and gauge patients' daily care practices and assess patients' knowledge of proper inhaler technique.
 - Arrange follow-up and home care.
 - Provide clear instructions about appropriate medication usage (including patients' knowledge of proper inhaler technique) and potential adverse effects.
 - Formally assess activities of daily living if concerns remain about how the individual will cope at home.
 - Ensure that hospitals identify or establish services to review people admitted to hospital with a COPD exacerbation within 1 to 2 weeks following discharge.
 - Ensure that discharge plans identify the cause of admission and treatment provided so that the PCP can assist in ensuring the appropriate community-based service.
- Medication reconciliation should take place on discharge. A copy of medications should be provided to patients and caregivers, sent to PCPs, and where known, to the community pharmacist.

Abbreviations: CAMH, Centre for Addiction and Mental Health; COPD, chronic obstructive pulmonary disease; ED, emergency department; PCP, primary care provider; STOP, Smoking Treatment for Ontario Patients.

Postacute, Community-Based Episode of Care

The model of the postacute, community-based episode of care for COPD in Figure 5 was developed by the Postacute, Community-Based COPD Expert Advisory Panel and served as a working model as the components of this episode of care were delineated. Beginning as a simplified sketch of key phases in the community-based COPD episode of care (e.g., discharge, follow-up, pulmonary rehabilitation, deterioration, maintenance), the model has been modified to reflect the elements of the pathway determined by the panel.

The Postacute, Community-Based COPD Expert Advisory Panel emphasized that it is essential that all members in the circle of care function in a holistic, integrated fashion. Community-based COPD care involves many providers and the goal is to provide multidisciplinary care. The expert advisory panel encourages providers to function as an interdisciplinary team with coordinated provision and integration of care and full communication across providers. The panel was challenged by separating the assignment of responsibility (e.g., registered respiratory therapist) from the settings where care activities take place (e.g., in a specialized COPD clinic). Given the complexity of care in the community, the expert advisory panel emphasized the required standard care activities, recognizing that they may be provided by various qualified professionals in a number of appropriate locations based on geography and resource availability.

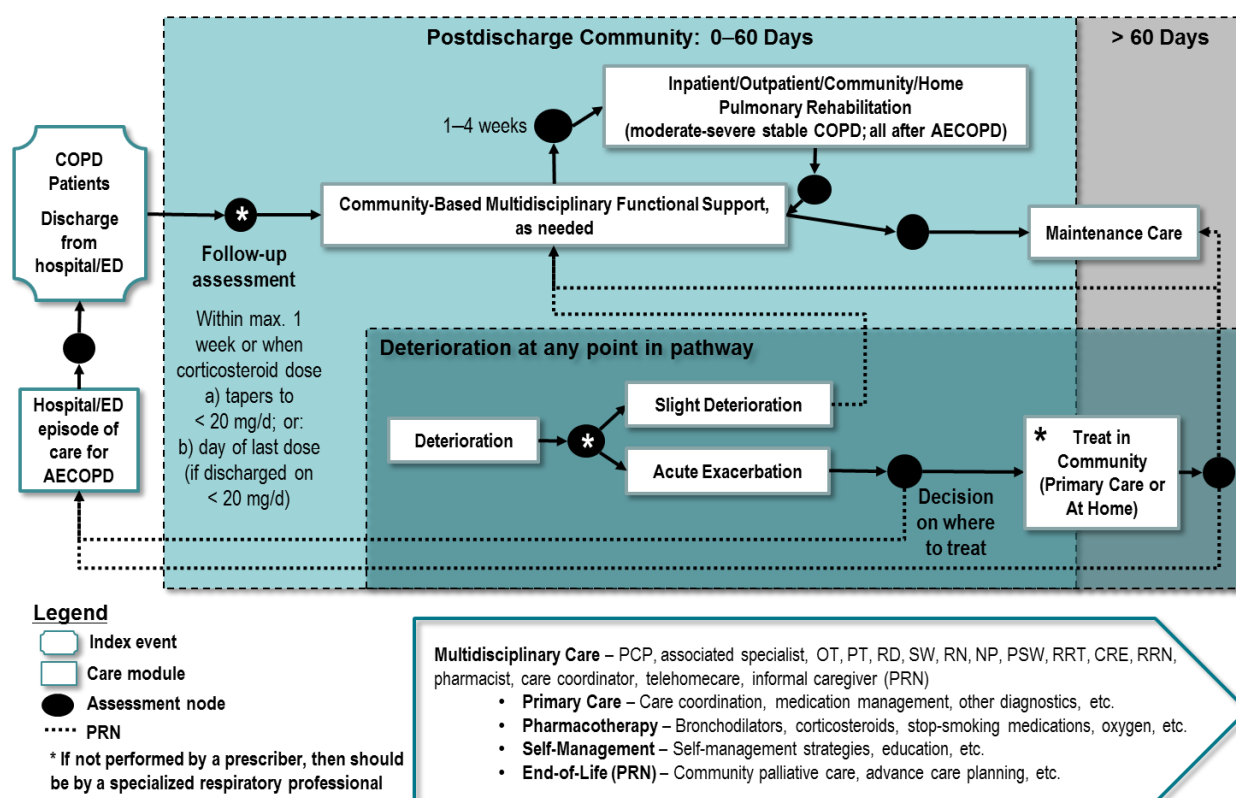


Figure 5: Episode-of-Care Model for Postacute, Community-Based COPD

Abbreviations: AECOPD, acute exacerbation of chronic obstructive pulmonary disease; COPD, chronic obstructive pulmonary disease; CRE, certified respiratory educator; ED, emergency department; NP, nurse practitioner; OT, occupational therapist; PCP, primary care provider; PT, physiotherapist; PRN, as needed; PSW, personal support worker; RD, registered dietitian; RN, registered nurse; RRN, rapid response nurse; RRT, registered respiratory therapist; SW, social worker.

In the recommendations that follow, please refer to Figure 3, page 37, for the module numbers within the continuum of care for COPD.

Module 4b. Transition to Postacute, Community-Based Care

As noted in Module 4a, there is overlap among the recommendations in Module 4 because 4a (Predischarge Planning) was used as basis for the development of the postacute COPD episode of care by the Postacute, Community-Based COPD Expert Advisory Panel. This module identifies recommended practices for the transition from hospital to community. The recommendations emphasize adhering to standard practices of transitional care planning to ensure patients are properly supported and followed after discharge.

| Module 4b Recommended Practices | Contributing Sources of Evidence |
|--|--|
| 4b.1 Predischarge | |
| 4b.1.1 Predischarge activities should include a full clinical assessment and individualized discharge plan ¹⁴ and should prepare patients with all appropriate skills and follow-up referrals in the community. | Taken from HQO Clinical Handbook for COPD (2013), Module 6 |
| 4b.2 Transitional Care Planning | |
| 4b.2.1 Transitional care plans are developed using a standardized approach. The plan: <ul style="list-style-type: none"> • includes essential education on health conditions, medications, and instructions to the patient • is easy to read (i.e., uses plain language and is available in multiple languages) • involves patients and families/caregivers in the development of the plan • includes a home care referral as appropriate | Based on Health Links; modified by the expert advisory panel |
| 4b.2.2 Standardized risk assessment tools should be used to assess and stratify complex patients. | Taken from Health Links |
| 4b.2.3 Each health care organization should put in place standardized processes to ensure that, prior to transition, a post-transition follow-up appointment(s) is scheduled for patients with their primary care provider accompanied by discharge communication. | Based on Health Links; modified by the expert advisory panel |

Abbreviations: COPD, chronic obstructive pulmonary disease; HQO, Health Quality Ontario.

¹⁴*Discharge plan* refers to the official hospital documentation including the dictated details of the hospital episode and full care plan. *Care plan* refers to a package of information on the patient's condition and hospital episode including issues identified, medications related and unrelated to COPD, and all planned follow-up appointments and referrals.

Module 4b Implementation Considerations

- PredischARGE planning should commence shortly after admission to hospital.
- Assessment for community-based home care, rapid assessment clinic, and rehabilitation services should commence while the patient is still in hospital. For patients who require home care services, early referral to a care coordinator through home care is essential.
- Follow-up care should ideally be with a prescriber or a health care provider who has expertise in COPD management or respiratory training.
- Assessment and referral to appropriate pulmonary rehabilitation services should be made (inpatient, outpatient, community-based, or home-based).
- A risk assessment should be performed and steps taken to reduce the risk of readmission or presentation to the ED.
- Ensure that the discharge plan identifies the cause for admission and treatment provided so that the PCP can assist in providing the appropriate community-based services.

Abbreviations: COPD, chronic obstructive pulmonary disease; ED, emergency department; PCP, primary care provider.

Module 5: Functional Support

This module identifies recommended practices for follow-up and functional support of community-dwelling COPD patients after discharge from hospital. The recommendations emphasize connecting patients with appropriate community resources and follow-up to maximize functional independence.

| Module 5 Recommended Practices | Contributing Sources of Evidence |
|--|---|
| 5.1 Postdischarge Follow-Up | |
| 5.1.1 Patients should leave the hospital with an individualized care plan, ¹⁵ and a copy should be faxed to the patient's pharmacy of choice. | Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel |
| 5.1.2 Ensure patients have a follow-up appointment with a prescriber or specialized respiratory professional within maximum 1 week of discharge, or a) when steroid dose tapers to < 20 mg/day or b) on day of last steroid dose (if discharged on < 20 mg/day); and complex patients receive a phone call within 48 hours. Both the arrangement of the follow-up appointment and care plan sent to next care provider should be done at time of discharge. | Based on HQO Clinical Handbook for COPD (2013) and Health Links; modified by expert advisory panel |
| 5.1.3 Ensure the patient, patient's PCP, associated specialist, and home care providers receive a care plan from the hospital at discharge, including full clinical assessment of the patient. | Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel |
| 5.1.4 In some cases, additional direct communication between hospital staff, associated specialist, and the PCP and/or home care coordinator is recommended. | Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel |
| 5.1.5 Follow-up appointment may include the following if not done in hospital before discharge: <ul style="list-style-type: none"> - smoking cessation counselling/pharmacotherapy (see Recommendation 5.3) - vaccination (see Recommendation 5.4) | Taken from HQO Clinical Handbook for COPD (2013) |
| 5.1.6 Review and reconcile patients' full range of medications before discharge. Ensure that patients understand their medication therapy, including the continuation of corticosteroids and antibiotics. | Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel |
| 5.1.7 Medication management including assessment of patient and medications should occur to ensure: <ul style="list-style-type: none"> - optimization of evidence-based/guideline-recommended medications - use of appropriate symptom-relief medications - adherence assessment (e.g., MMAS-4) - potential medication errors/misadventures | Based on expert advisory panel consensus; consistent with the HQO Clinical Handbook for Congestive Heart Failure (2014 Update) based on OHTAC heart failure clinic standards and the Canadian Cardiovascular Society guidelines |
| 5.1.8 Medication reconciliation should be performed at all transition points in care (e.g. referrals, consults) and is recommended to occur in accordance with the HQO community home care handbook. | Based on expert advisory panel consensus and HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations |

¹⁵Discharge plan refers to the official hospital documentation including the dictated details of the hospital episode and full care plan. Care plan refers to a package of information on the patient's condition and hospital episode including issues identified, medications related and unrelated to COPD, and all planned follow-up appointments and referrals.

| Module 5 Recommended Practices | Contributing Sources of Evidence |
|---|--|
| 5.2 Referrals, Multidisciplinary Care, and Home Care | |
| <p>5.2.1 The expert advisory panel recommends multidisciplinary care for COPD patients, consistent with OHTAC's recommendation:</p> | Based on expert advisory panel consensus |
| <div style="border: 1px solid black; padding: 5px;"> <p>OHTAC recommends ongoing access to existing community-based multidisciplinary care for the management of moderate to severe stable COPD.</p> </div> | Consistent with OHTAC for HQO EBA on community-based multidisciplinary care for COPD (moderate to very low GRADE quality of evidence) |
| <p>5.2.2 A care coordinator must ensure that the right services are provided to the right clients at the right time, working with relevant health care providers to deliver comprehensive care that addresses as many of the patient's health care and psychosocial needs as possible. The multidisciplinary team:</p> | Taken from HQO Community Home Care Handbook for Postacute Medical Discharge Short-Stay Populations and from HQO EBA on community-based multidisciplinary care for COPD (moderate to very low GRADE quality of evidence) |
| <ul style="list-style-type: none"> - may include (as needed) PCP, associated respiratory specialist or internist, occupation therapist, physiotherapist, registered dietitian, social worker, registered nurse, nurse practitioner, personal support worker, registered respiratory therapist, certified respiratory educator, rapid response nurse, pharmacist, care coordinator, telehomecare provider, and/or informal caregiver - should be responsible for assessment, care planning and treatment, advising on self-management, education, monitoring, and identifying high risk patients | Based on expert advisory panel consensus |
| <p>5.2.3 Refer patient/caregiver for consultation/social services as appropriate.</p> | Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel; consistent with NICE (level D evidence) and VA/DoD (level I evidence) |
| <p>5.2.4 Care coordination is recommended in accordance with the HQO community home care handbook.</p> | Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |
| <p>5.2.5 Nursing assessment and monitoring, wound care, intravenous therapy, incontinence, medication reconciliation, and nonpalliative pain management are recommended to occur in accordance with the HQO community home care handbook.</p> | Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |
| <p>5.2.6 Physiotherapy services are recommended to be provided in accordance with HQO community home care handbook. (See also Module 6, Pulmonary Rehabilitation.)</p> | Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |
| <ul style="list-style-type: none"> • There is insufficient evidence to recommend for or against airway clearance techniques to clear mucus and secretion in stable COPD patients. | Based on Airway Clearance Techniques for Individuals With Stable Chronic Obstructive Pulmonary Disease (COPD) (low quality of evidence): 13 of the 19 studies showed improvement through the use of airway clearance techniques for patients with stable COPD (for exacerbations, hospitalizations, health-related quality of life, pulmonary function, gas exchange, symptoms, sputum clearance, exercise tolerance, or antibiotic use), but with considerable study limitations and differences in techniques examined and of generally low quality; modified by expert advisory panel |
| <p>5.2.7 Home safety support services are recommended to be provided in accordance with the HQO community home care handbook. (See also Module 6, Pulmonary Rehabilitation.)</p> | Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |
| <p>5.2.8 Respiratory therapy services are recommended to be made accessible and be provided in accordance with HQO community home care handbook. (See also Module 6, Pulmonary Rehabilitation.)</p> | Based on Respiratory Therapy Services in Home Care for Individuals With Chronic Obstructive Pulmonary Disease (COPD) (moderate-serious risk of bias) COPD educational strategies did not have an effect on HRQOL, compared with usual care, whereas a community-based COPD-specific disease management program led by an RT reduced ED visits and hospitalizations and led to a smaller decline in HRQOL over a 1-year period, compared with usual care; consistent with HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |

| Module 5 Recommended Practices | Contributing Sources of Evidence |
|--|--|
| <p>5.2.9 Caregiver and family support interventions are recommended to be provided in accordance with the HQO community home care handbook.</p> | <p>Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations</p> |
| <p>5.2.10 Mental health support services are recommended to be provided in accordance with the HQO community home care handbook.</p> | <p>Taken from HQO Community Home Care Handbook for Short-Stay Post-Acute Medical Discharge Populations</p> |
| <p>5.2.11 Personal support services are recommended to be provided in accordance with the HQO community home care handbook.</p> | <p>Taken from HQO Community Home Care Handbook for Short-Stay Post-Acute Medical Discharge Populations</p> |
| <p>5.3 Smoking Cessation</p> | |
| <p>5.3.1 While in hospital, COPD patients who smoke should receive smoking cessation counselling and be considered for initiation of appropriate pharmacotherapy, with the goal of referral to longer-term, intensive smoking cessation counselling (including continuation of appropriate pharmacotherapy) in the outpatient setting. This must include providing information to patients with contact information/instructions for resources or other guidance. This is consistent with OHTAC's recommendation:</p> | <p>Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel</p> |
| <p>OHTAC strongly endorses evidence-based strategies aimed at encouraging smoking cessation in patients with COPD. Intensive counselling (≥ 90 minutes) is most effective and cost-effective strategy, and should continue to be encouraged.</p> | <p>Taken from OHTAC for HQO EBA on smoking cessation for COPD patients (moderate GRADE quality of evidence)</p> |
| <p>5.3.2 Smoking cessation counselling by physicians and other health professionals is recommended for all COPD patients. Even brief interventions (e.g., 3 minutes) should be offered at every opportunity.</p> | <p>Based on CTS (level 1A evidence), NICE (level A evidence), and GOLD (level A evidence); modified by expert advisory panel</p> |
| <p>5.3.3 All smokers should be considered for cessation medications (e.g., nicotine replacement therapy, bupropion, varenicline, as appropriate) to aid in maximizing quit rates, unless contraindicated, building on OHTAC's recommendation:</p> | <p>Based on VA/DoD (level A evidence) and NICE (level B evidence); modified by expert advisory panel</p> |
| <p>OHTAC recommends bupropion or nicotine replacement therapies for smoking cessation.</p> | <p>Taken from OHTAC for HQO EBA on smoking cessation for COPD patients (low GRADE quality of evidence)</p> |
| <p>5.3.4 All patients should be counselled not to smoke and to avoid second-hand smoke.</p> | <p>Based on VA/DoD (level A evidence); modified by expert advisory panel</p> |
| <p>5.3.5 Smokers should be assessed for willingness to quit at every health care encounter and then referred to formalized smoking cessation programs including programs that offer nicotine replacement therapy, when appropriate (i.e., contemplative and preparation stages).</p> | <p>Based on VA/DoD (level C evidence); modified by expert advisory panel</p> |
| <p>5.4 Vaccination</p> | |
| <p>5.4.1 Patients without up-to-date annual influenza or pneumococcal vaccinations should either be vaccinated before discharge or referred for vaccination following discharge, unless contraindications are present. This is consistent with OHTAC's recommendation:</p> | <p>Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel</p> |
| <p>OHTAC recommends maximizing the use of pneumococcal and influenza vaccines in patients with COPD, ensuring that vaccination reflects the established guidelines and recommendations for immunization.</p> | <p>Taken from OHTAC for HQO EBA on vaccination for COPD patients (high GRADE quality of evidence: influenza-related respiratory illness and incidence of pneumococcal pneumonia; low GRADE quality of evidence: hospitalizations, length of stay, need for ventilation, adverse reactions)</p> |

| Module 5 Recommended Practices | Contributing Sources of Evidence |
|--|---|
| <ul style="list-style-type: none"> Annual influenza vaccination should be offered to all patients unless contraindicated. | Based on expert advisory panel; consistent with OHTAC for HQO EBA on vaccination for COPD patients, CTS (level 2A evidence), VA/DoD (level A evidence), and GOLD (level A evidence) |
| <ul style="list-style-type: none"> – Inactivated influenza vaccines should be used | Taken from VA/DoD (level A evidence) |
| <ul style="list-style-type: none"> – Optimal vaccination time is October–November. | Taken from VA/DoD (level A evidence) |
| <ul style="list-style-type: none"> A pneumococcal vaccine may be considered for all patients with COPD. | Based on expert advisory panel; consistent with OHTAC for HQO EBA on vaccination for COPD patients and CTS (level 3C evidence) |

5.5 Management of Comorbidities

| | |
|--|---|
| <ul style="list-style-type: none"> 5.5.1 Comorbidities are common in COPD and may affect function and should be treated appropriately. The presence of comorbidities should trigger a referral to a specialist. | Based on expert advisory panel consensus |
| <p>5.5.2 Treat the following according to usual guidelines, unless contraindicated:</p> <ul style="list-style-type: none"> cor pulmonale ischemic heart disease, heart failure, and atrial fibrillation hypertension osteoporosis lung cancer infections metabolic syndrome/diabetes | Taken from GOLD (level D evidence) |
| <p>5.5.3 Further investigation into the role of cognitive-behavioural therapy among treatment options for anxiety and depression in COPD is needed. Health care providers should be aware of the high risk of these disorders in COPD patients and should follow OHTAC's recommendation:</p> | <p>Cognitive-Behavioural Therapy for Anxiety and Depression in Individuals With Chronic Obstructive Pulmonary Disease (COPD):</p> <ul style="list-style-type: none"> Cognitive-behavioural therapy did not significantly reduce symptoms of anxiety or depression in patients with mild to severe COPD, compared with usual care or education. (GRADE: Low) Based on 4 randomized controlled trials with considerable limitations due to risk of bias, cognitive-behavioural therapy had mixed effectiveness on improving the quality of life of patients with moderate to severe COPD, compared with usual care, wait list controls, or education. |
| <p>OHTAC does not recommend routine screening^{16,17} for depression among adults with chronic disease. Health care providers should be aware of the increased rates of depression in this population and should use a higher index of suspicion when assessing these patients.</p> | Taken from OHTAC for HQO EBA on screening and management of depression for adults with chronic diseases |

5.6 Self-Management and Education

| | |
|---|---|
| <p>5.6.1 Action plans¹⁸ in isolation cannot be recommended at this time due to inconsistency in the evidence of safety and effectiveness. This may be an area warranting reconsideration should new evidence become available. If used, action plans should be developed according to the Canadian Thoracic</p> | <p>Action Plans for Individuals with Chronic Obstructive Pulmonary Disease (COPD) (moderate GRADE quality of evidence); modified by expert advisory panel</p> |
|---|---|

¹⁶OHTAC recognizes the significant burden that depression places on affected individuals and the importance of treating this condition. OHTAC also recognizes the increased prevalence of depression among individuals with chronic diseases, such as heart disease, diabetes, chronic obstructive pulmonary disease, and stroke.

¹⁷Routine screening occurs at a specific frequency (e.g., annually).

¹⁸A written communication tool "to help those with COPD prevent and manage exacerbations in conjunction with the healthcare professional team (the physician, the certified respiratory educator and the pharmacist)." (Canadian Thoracic Society, 2013 COPD Action Plan)

| Module 5 Recommended Practices | Contributing Sources of Evidence |
|---|--|
| Society guidelines, with special attention to the cautions and warnings. | Based on CTS 2013 COPD Action Plan |
| 5.6.2 Self-management and education packages separate from pulmonary rehabilitation need to be provided at discharge or by the health care worker who sees them within 1 week and be disease-specific, including: | Based on expert advisory panel consensus |
| <ul style="list-style-type: none"> • skills training (e.g., breathing techniques) • education on medications, devices, and triggers • how to deal with acute exacerbations as well as other aspects of managing the disease • how to cope with comorbidities | <p>Taken from CTS (level 1A evidence); consistent with NICE (level A evidence)</p> <p>Taken from VA/DoD (level I evidence)</p> <p>Taken from NICE (level B evidence) and VA/DoD (level I evidence)</p> <p>Based on expert advisory panel consensus</p> |
| 5.6.3 Relevant components of self-management and patient education should be provided in accordance with the HQO community home care handbook. | Based on HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations; modified by expert advisory panel |
| 5.7 Nutrition, Weight Monitoring, and Lifestyle | |
| 5.7.1 Body mass index (BMI) needs to be monitored to determine if it is in the normal range (ideal range, 20–25). Large fluctuations in weight (e.g., 10% of body weight or 2.5 kg) should be investigated for alternative causes and referred to a registered dietitian for dietary evaluation and consultation if no other clear cause is found. | Based on VA/DoD (level B evidence) and NICE (level D evidence); modified by expert advisory panel |
| 5.7.2 Nutrition support and dietitian services are recommended to be provided in accordance with the HQO community home care handbook. | Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |
| 5.7.3 Healthy lifestyle should be encouraged and all patients should be provided with strategies to optimize exercise capacity. | Based on CTS (level 3A evidence); modified by expert advisory panel |
| 5.7.4 All stable COPD patients, regardless of severity of disease, should be physically active or engage in regular exercise. | Based on expert advisory panel consensus; consistent with HQO Clinical Handbook for Congestive Heart Failure (2013) (low GRADE quality of evidence) |
| 5.7.5 Physical activity counselling is recommended to be provided in accordance with the HQO community home care handbook. | Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |
| 5.7.6 Lifestyle modifications for primary and secondary prevention are recommended to be implemented in accordance with the HQO community home care handbook. | Taken from HQO Community Home Care Handbook for Postacute Short-Stay Medical Discharge Populations |

Abbreviations: CCS, Canadian Cardiovascular Society; COPD, chronic obstructive pulmonary disease; CTS, Canadian Thoracic Society; EBA, evidence-based analysis; GOLD, Global Initiative for Chronic Obstructive Lung Disease; GRADE, Grading of Recommendations Assessment, Development and Evaluation; HQO, Health Quality Ontario; MMAS-4, Morisky Medication-Taking Adherence Scale, 4-item; NICE, National Institute for Health and Clinical Excellence; OHTAC, Ontario Health Technology Advisory Committee; PCP, primary care provider; VA/DoD, Department of Veterans Affairs/Department of Defense.

Module 5 Implementation Considerations

Follow-Up Care

- Hospital-based staff should make follow-up contact with the patient within 48 hours of discharge.
- For patients without a PCP, consider referral to Health Care Connect prior to discharge to reduce postdischarge wait times. Where a patient's PCP is not known, follow-up should be expedited by referral, based on local resources, to a respirologist, walk-in clinic, new PCP for chronic care, or a nurse practitioner.
- If a home care nurse practitioner is available, a connection should be considered as a temporary measure, but only after patients have a referral to Health Care Connect and if they do not have access to a local walk-in clinic for follow-up.
- Medication reconciliation should be completed by the PCP and where possible by the appropriate home care provider in a patient's home. Results of the medication reconciliation should be shared between home care and PCP. In order to increase adherence to medication management, pharmacists should consider blister-packing medications and providing patient and caregiver importance of medication compliance education.
- The postdischarge care plan should include management of comorbidities. The care plan should be reviewed and updated by the patient's PCP.

The Toronto Health Economic and Technology Assessment (THETA) Collaborative evaluation of telehomecare will be reviewed after its completion, with recommendations to follow

Smoking Cessation

- Smoking cessation strategies specifically for patients with COPD should be developed and implemented. Targeted materials and messaging on smoking cessation should be stressed with all COPD patients who are current smokers, as smoking cessation has been shown to have a significantly positive and immediate clinical impact for these patients.
 - Patients and caregivers should be informed about the effects of second-hand smoke on the patient's health.
 - NRT should become a free benefit to any Ontario resident with an OHIP card.
 - Public health departments should provide free NRT under the STOP program; pharmacies should be permitted to do the same after screening patients.
 - Drug therapy for smoking cessation should be made available at no cost to all Ontarians with a prescription by a physician.
 - Patients covered by the Ontario Drug Benefit should be informed at discharge that they are entitled to a series of face-to-face smoking cessation sessions. (Smoking Cessation Task Force).
-

Screening and Education, Self-Management, and Lifestyle

- Standardized self-management education materials should be available and used both in the hospital and community to ensure consistent messages to patients and caregivers. At a minimum, patient education materials should include skills training (e.g., breathing techniques), education on medication, how to deal with acute exacerbations, and how to access care when intervention is required.
 - The CAMH behaviour modification program, which targets the "universal 6 pack" (smoking, diet, sleep, exercise, stress, and alcohol), should be explored for province-wide implementation.
 - The Ministry of Health and Long-Term Care and Public Health Ontario should widen public awareness programs on vaccination to increase immunization rates.
-

Abbreviations: CAMH, Centre for Addiction and Mental Health; COPD, chronic obstructive pulmonary disease; NRT, nicotine replacement therapy; OHIP, Ontario Health Insurance Plan; PCP, primary care provider; STOP, Smoking Treatment for Ontario Patients.

Module 6: Pulmonary Rehabilitation

This module identifies recommended practices for pulmonary rehabilitation (PR) programs for COPD patients. The recommendations emphasize access to a PR program, its components, and enabling patients to maintain the benefits over time.

| Module 6 Recommended Practices | Contributing Sources of Evidence |
|--|---|
| 6.1 Target Population | |
| <p>6.1.1 The expert advisory panel agrees with OHTAC's recent recommendations on pulmonary rehabilitation:</p> <div style="border: 1px solid black; padding: 5px;"> <p>OHTAC reaffirms the recommendations it made in 2012, namely:</p> <ul style="list-style-type: none"> • ongoing access to existing pulmonary rehabilitation for the management of moderate to severe chronic obstructive pulmonary disease (COPD) in stable patients, and • the use of pulmonary rehabilitation in patients following an acute exacerbation (within 1 month of hospital discharge). <p>Further, based on a field evaluation study, OHTAC recommends increased availability of resources for pulmonary rehabilitation following discharge for patients who have had an acute exacerbation of COPD.</p> </div> | <p>Based on expert advisory panel consensus</p> <p>Taken from OHTAC for HQO EBA on pulmonary rehabilitation for COPD (moderate GRADE quality of evidence)</p> <p>Taken from OHTAC for HQO Pulmonary Rehabilitation in Ontario: A Cross-Sectional Survey</p> |
| <p>6.1.2 Access needs be improved for all appropriate patients including:</p> <ul style="list-style-type: none"> • all patients with moderate to severe COPD • stable patients with dyspnea exercise limitation, fatigue, or functional disability • patients with recent acute exacerbation (PR should begin, within 1 to 4 weeks of discharge) | <p>Taken from CTS (level 2A evidence)</p> <p>Taken from GOLD (level A evidence); consistent with VA/DoD (level A evidence)</p> <p>Taken from CTS (level 1A evidence); consistent with VA/DoD (level A and B evidence) and ACP (moderate quality of evidence)</p> <p>Based on OHTAC for HQO EBA on pulmonary rehabilitation for COPD (moderate GRADE quality of evidence); modified by the expert advisory panel</p> |
| <p>6.1.3 Contraindications for pulmonary rehabilitation may include inability to walk, unstable angina, recent myocardial infarction, and reduced cognition.</p> | <p>Based on NICE (level D evidence); modified by the expert advisory panel</p> |
| 6.2 Pulmonary Rehabilitation Program | |
| <p>6.2.1 Pulmonary rehabilitation is recommended for COPD patients at an accessible and clinically appropriate location (inpatient, outpatient, community, or home).</p> | <p>Based on Pulmonary Rehabilitation in the Home Versus Other Settings for Individuals With Chronic Obstructive Pulmonary Disease (COPD) (very low GRADE quality of evidence): There were no significant differences between home versus outpatient pulmonary rehabilitation for the outcomes of exercise capacity and health-related quality of life for COPD; and only one published study compared the costs and quality-adjusted life years (QALYs) of pulmonary rehabilitation across different settings and showed that hospital-based pulmonary rehabilitation is more costly and more effective than community-based pulmonary rehabilitation (no reason for the difference in QALYs was proposed); consistent with HQO Clinical Handbook for COPD (2013)</p> |

| Module 6 Recommended Practices | Contributing Sources of Evidence |
|--|---|
| <p>Centre-based pulmonary rehabilitation is preferred for access to exercise equipment and additional psychosocial support provided in a group setting. Outpatient or community-based pulmonary rehabilitation is more cost-effective than home-based programs. Home-based pulmonary rehabilitation may be recommended for those with barriers to participation in centre-based programs, and the services can be consolidated under the role of a single health care professional with expertise in pulmonary rehabilitation. The components at a centre can be delivered by health care professionals trained in exercise and specialized in respiratory care.</p> | <p>Based on Pulmonary Rehabilitation for Postacute Exacerbations of Chronic Obstructive Pulmonary Disease: A Cost-Effectiveness and Budget Impact Analysis¹⁹</p> |
| <p>According to evidence-based COPD guidelines, components of pulmonary rehabilitation include supervised aerobic and resistance and strength training to increase exercise capacity and functional status; education and self-management components; nutrition, psychological, and behavioural interventions; and should be delivered in a multicomponent, multidisciplinary, and individualized program of at least 6 to 8 weeks in duration.</p> | <p>Based on NICE (level A) and Va/DoD (level A and B evidence); modified by expert advisory panel</p> |
| <p>A standardized pulmonary rehabilitation program is about 40 hours in total, with 3 sessions per week at 1.5 to 2 hours per session.</p> | <p>Based on expert advisory panel consensus</p> |
| <p>Optimal treatment improves the effectiveness of pulmonary rehabilitation, and maintenance of gains requires subsequent exercise training.</p> | <p>Based on GOLD (level B evidence) and VA/DoD (level B evidence); modified by expert advisory panel</p> |
| <p>6.2.2 The expert advisory panel recognizes uncertainty in the evidence and agrees with OHTAC's recommendation that:</p> | <p>Taken from OHTAC for HQO EBA on pulmonary rehabilitation for COPD (low GRADE quality of evidence)</p> |
| <p>There is insufficient evidence for maintenance pulmonary rehabilitation programs. Due to substantial uncertainty arising from low/very low quality of evidence of effectiveness and cost-effectiveness, but the potential for important health system and/or patient/clinical benefits, OHTAC recommends a field evaluation for pulmonary rehabilitation maintenance.</p> | |
| <p>6.2.3 COPD patients who have completed pulmonary rehabilitation are recommended to transition to an exercise program to support the maintenance of functional gains, but parameters of delivery still need to be decided.</p> | <p>Based on Exercise Programs After Pulmonary Rehabilitation for Individuals With Chronic Obstructive Pulmonary Disease (COPD) (low to very low GRADE quality of evidence): There was a significant benefit to exercise capacity for those enrolled in a maintenance exercise program compared to those in usual care at 6 months but not 12 months of follow-up. There was no difference in health-related quality of life at 6 months of follow-up or 12 months of follow-up.</p> |

Abbreviations: ACP, American College of Physicians; COPD, chronic obstructive pulmonary disease; CTS, Canadian Thoracic Society; EBA, evidence-based analysis; GOLD, Global Initiative for Chronic Obstructive Lung Disease; GRADE, Grading of Recommendations Assessment, Development and Evaluation; HQO, Health Quality Ontario; NICE, National Institute for Health and Clinical Excellence; OHTAC, Ontario Health Technology Advisory Committee; PR, pulmonary rehabilitation; VA/DoD, Department of Veterans Affairs/Department of Defense.

¹⁹Xie X, Wang M, Schaink A, Krahn M. Pulmonary rehabilitation for postacute exacerbations of chronic obstructive pulmonary disease (COPD): a cost-effectiveness and budget impact analysis. Toronto: Health Quality Ontario. In press.

Module 6 Implementation Considerations

- Pulmonary rehabilitation must be accessible to all appropriate individuals with COPD, including those who have had a recent hospitalization for an acute COPD exacerbation. A centre-based PR program is considered to be more efficient than home-based rehabilitation.
- Provincially standardized criteria for referral to pulmonary rehabilitation should be in place or developed.
- A provincial intensity or stratification tool for pulmonary rehabilitation should be developed (inpatient, outpatient, community, or home-based).
- Home-based pulmonary rehabilitation for COPD, when taught by a health care professional and properly conducted may be offered as an alternative to outpatient-based pulmonary rehabilitation to improve access in situations of limited resources and availability. All patients receiving home-based pulmonary rehabilitation should have a formal program of home exercise developed.
- Key components of pulmonary rehabilitation programs should be implemented province-wide and should, at a minimum, include aerobic and resistance training to increase exercise capacity and functional status, education and self-management components, nutrition, and psychological and behavioural interventions, and should be delivered in a multicomponent, multidisciplinary, and individualized program of at least 6 to 8 weeks duration.
- Consideration should be given to expanding existing volunteer driver programs to assist patients in travelling to a centralized rehabilitation program.
- All health care providers involved in the delivery of pulmonary rehabilitation programs should complete a certification course to ensure training in core competencies.
- The Ministry of Health and Long-Term Care should fund Health Quality Ontario's pulmonary rehabilitation implementation plan, submitted in September 2014.

Abbreviations: COPD, chronic obstructive pulmonary disease; PR, pulmonary rehabilitation.

Module 7: Pharmacotherapy

This module identifies recommended practices for the use of drugs in the treatment of COPD patients in the community. The recommendations emphasize optimizing pharmacotherapy treatment.

| Module 7 Recommended Practices | Contributing Sources of Evidence |
|--|---|
| 7.1 Inhaled Pharmacotherapy Delivery System | |
| 7.1.1 Treatment can be optimized with bronchodilation therapy, inhaled steroids, and/or oral steroids. | Based on expert advisory panel consensus |
| 7.1.2 (Re-)establish patients on their long-term COPD maintenance bronchodilator therapy before discharge, including continuing or resuming use of hand-held inhalers (metered dose inhalers or dry powder inhalers). | Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel |
| 7.1.3 A dedicated person such as a registered respiratory therapist or nurse or pharmacist should assess the patient's inhaler technique and ensure they can demonstrate proficiency before discharge. | Based on HQO Clinical Handbook for COPD (2013); modified by expert advisory panel |
| 7.1.4 Metered dose inhalers with spacers and/or dry powder inhalers are the preferred delivery systems; nebulisers should be considered second-line treatment. | Taken from HQO Clinical Handbook for COPD (2013) (expert opinion) |
| 7.1.5 The delivery method of inhaled therapy should be tailored to the patient's or caregiver's ability to use the inhaler. Provide necessary equipment, servicing (e.g., nebuliser, spacer cleaning monthly), advice, and support. | Taken from NICE (level D evidence) |
| 7.1.6 Inhalers | Taken from NICE (level D evidence) |
| <ul style="list-style-type: none"> Preferred delivery of bronchodilator therapy is by hand-held inhaler, with or without a compatible spacer as appropriate for each patient and dose of medication; patients should be trained on the specific device and assessed for proper technique. | |
| <ul style="list-style-type: none"> Patients should be changed to hand-held inhaler as soon as they are stabilized after acute exacerbations. | Taken from NICE (level D evidence) |
| <ul style="list-style-type: none"> Ensure continued supervision of the patient during delivery of the medication. | Taken from HQO Clinical Handbook for COPD (2013) (expert opinion) |
| 7.1.7 Both inhalers and, secondarily, nebulisers can be used to deliver inhaled therapy during acute exacerbations. | Taken from NICE (level A evidence) |
| 7.2 Pharmacotherapy Regimens | |
| 7.2.1 Patients should be treated with bronchodilators, corticosteroids, methylxanthines, antibiotics, phosphodiesterase-4 inhibitors and/or other necessary pharmacotherapy according to the Canadian Thoracic Society recommendations, as applicable. | Based on expert advisory panel consensus |

Abbreviations: COPD, chronic obstructive pulmonary disease; HQO, Health Quality Ontario; NICE, National Institute for Health and Clinical Excellence.

Module 8: Maintenance

This module identifies recommended practices for ongoing support and follow-up of patients after they have transitioned into the community. The recommendations emphasize reassessing patients to respond to any ongoing treatment needs and to monitor their overall status.

| Module 8 Recommended Practices | Contributing Sources of Evidence |
|---|--|
| 8.1 Ongoing Follow-Up | |
| 8.1.1 Treatment decisions should be individualized and guided by symptom severity and updated at follow-up. | Based on CTS (level 3A evidence); modified by the expert advisory panel |
| 8.1.2 Periodic follow-up should be conducted 1 to 2 times per year or more frequently if needed. | Taken from NICE (level D evidence); consistent with VA/DoD (level I evidence) |
| 8.1.3 Assessment components include symptoms, treatment (including proper inhaler technique), spirometry, smoking cessation, inquiring about ability to carry out ADLs and IADLs, assessing the need for occupational therapy (validated tools), and inquiring about the ability for patients to recognize the signs and symptoms of a flare-up or deterioration in condition. | Based on NICE (level D evidence); modified by expert advisory panel; consistent with VA/DoD (level I evidence) |
| 8.2 Oxygen Therapy | |
| 8.2.1 Patients who may need home oxygen should be tested to determine if it is required. All patients who have a clinical need should be discharged on home oxygen and be reassessed at a later date when clinically stable. | Based on expert advisory panel consensus |
| <ul style="list-style-type: none"> Assistive Device Program Medical Eligibility Criteria for home oxygen therapy include hypoxemia at rest, hypoxemia at exertion, bronchopulmonary dysplasia, and palliative care. | Taken from Ministry of Health and Long-Term Care, Home Oxygen Therapy Policy and Administration Manual (2014) |
| 8.2.2 Patients on oxygen therapy should be reassessed for ongoing need after 90 days. | Based on expert advisory panel consensus |
| 8.2.3 Patients should be treated with oxygen therapy according to the Canadian Thoracic Society recommendations, as applicable. | Based on expert advisory panel consensus |
| 8.3 Surgery and Transplantation | |
| 8.3.1 Patients with severe to very severe airway obstruction, as measured by FEV ₁ , who meet other clinical eligibility criteria should be referred to a specialist for surgical or transplant consultation. | Based on expert advisory panel consensus |

Abbreviations: ADL, activity of daily living; CTS, Canadian Thoracic Society; FEV₁, forced expiratory volume in 1 second; IADL, instrumental activity of daily living; NICE, National Institute for Health and Clinical Excellence; VA/DoD, Department of Veterans Affairs/Department of Defense.

Module 9: Deterioration/Exacerbation

This module identifies recommended practices for the decisions surrounding treatment of community-dwelling patients who experience a deterioration or an acute exacerbation of their condition. The recommendations emphasize assessing the patient and their circumstances to inform clinical decision-making on the most appropriate treatment trajectory.

| Module 9 Recommended Practices | Contributing Sources of Evidence |
|---|---|
| 9.1 Decision on Where to Treat | |
| 9.1.1 The decision to admit relies largely on clinical judgment and availability of local resources. Use the NICE and/or GOLD criteria below as a guide: <ul style="list-style-type: none">• failure of an exacerbation to respond to initial medical management• insufficient home support, inability to cope at home• breathlessness or marked increase in intensity of symptoms, such as development of resting dyspnea• general condition and severe underlying COPD• decreased level of activity• cyanosis• worsening peripheral edema or onset of new physical signs (e.g., cyanosis, fatigue, inability to stand)• decreased level of consciousness• already receiving long-term oxygen therapy• social circumstances, older age• acute confusion• rapid rate of onset or frequent exacerbations• significant comorbidity (e.g., heart failure, newly occurring arrhythmias)• arterial oxygen saturation (SaO₂) < 90%, pH level, and partial pressure of oxygen (PaO₂)• changes on chest x-ray | Taken from HQO Clinical Handbook for COPD (2013) (expert opinion) |
| 9.2 At-Home Management | |
| 9.2.1 Treatment approach and considerations are the same as for treatment in hospital. | Taken from NICE (level D evidence) |
| 9.2.2 For guidance on self-management and action plans, refer to Module 5.6. | Based on expert advisory panel consensus |

Abbreviations: COPD, chronic obstructive pulmonary disease; GOLD, Global Initiative for Chronic Obstructive Lung Disease; HQO, Health Quality Ontario; NICE, National Institute for Health and Clinical Excellence.

Module 9 Implementation Considerations

- As part of discharge education, patients and caregivers should be instructed on how to access care when required and where to present when experiencing symptoms of an acute exacerbation.

Module 10: End-of-Life Care

This module identifies recommended practices for end-stage COPD and palliative care. The recommendations emphasize advance care planning and comfort measures to support patients and informal caregivers.

| Module 10 Recommended Practices | Contributing Sources of Evidence |
|---|--|
| <p>The expert advisory panel supports OHTAC's recommendations:</p> <p>10.1 OHTAC recommends that all palliative care patients have access to interprofessional, team-based, integrated, and patient-centred care at the end of life, provided directly to them across multiple venues. Optimally and where feasible, OHTAC recommends that this care be provided by the same team. Specifically, OHTAC recommends that:</p> <ul style="list-style-type: none"> • Patient care planning, including advance care planning and goals of care, be discussed with patients and their informal caregivers early, frequently, and as circumstances change; • Evidence about the determinants of place of death be used to inform discussions among patients, informal caregivers, and health care providers regarding the feasibility of patients dying in their preferred location; • Patients and informal caregivers be provided education about symptom management and coping strategies, respectively; and • Education in EOL care for health care professionals be provided pre- and post-licensure, and include training on providing supportive care to informal caregivers. <p>10.2 OHTAC recommends that cardiopulmonary resuscitation (CPR) not be the default intervention for adults designated as palliative and for whom death is anticipated.</p> <p>10.3 OHTAC calls for public debate on the normalization and demedicalization of death and dying.</p> | <p>Taken from OHTAC for HQO Health Care for People Approaching the End of Life: An Evidentiary Framework</p> |
| <p>10.4 Symptom management with opioids, benzodiazepines, antidepressants, major tranquilizers, other non-opioid therapies, and oxygen when appropriate for breathlessness is recommended when patients are unresponsive to other therapies.</p> | <p>Based on NICE (level D evidence); modified by the expert advisory panel</p> |
| <p>10.5 If ventilation is not desired, proceed to palliative care management of the patient, consistent with OHTAC's recommendation:</p> <p>In making palliative care services available, the fluctuating physical, psychosocial, spiritual, and information needs should be considered, without necessarily forgoing acute care or hope of improvement during and following severe exacerbations.</p> | <p>Taken from HQO Clinical Handbook for COPD (2013) (expert opinion)</p> <p>Taken from OHTAC for HQO synthesis of the qualitative empirical literature on palliative care for COPD</p> |

Abbreviations: COPD, chronic obstructive pulmonary disease; EOL, end of life; HQO, Health Quality Ontario; OHTAC, Ontario Health Technology Advisory Committee; NICE, National Institute for Health and Clinical Excellence.

Module 10 Implementation Considerations

- The expert advisory panel fully endorses the OHTAC recommendations on end-of-life recommendations (June 2014) and encourages HQO to work with health system partners to develop a roll-out strategy for the OHTAC recommendations.
- Once completed, the Health Links Care Coordination Tool should be fully implemented. The HQO/Ministry of Health Transformation Secretariat care coordination initiative includes a section on advance care planning and advance directives.
- The Ministry of Health and Long-Term Care should fund expansion of an interdisciplinary, team-based approach to provision of end-of-life care.
- Standardized education materials on end-of-life care should be developed and used in hospitals, long-term care facilities, and home care.
- All health care professionals involved in the provision of end-of-life services should be appropriately trained and skill levels should be continually updated.

Abbreviations: HQO, Health Quality Ontario; OHTAC, Ontario Health Technology Advisory Committee.

System-Level Considerations

The 2 expert advisory panels on chronic obstructive pulmonary disease (COPD) agreed on the following sets of recommendations in 2 key areas: the need to expand pulmonary rehabilitation services in Ontario and the need to establish a provincial COPD network. Both are aimed at improving outcomes for patients with COPD and reducing the burden of this disease on provincial health care services.

Pulmonary Rehabilitation

Pulmonary rehabilitation (PR) refers to a multidisciplinary program of care that is designed and individually tailored to optimize physical and social performance and autonomy for patients with chronic respiratory impairment. Pulmonary rehabilitation is recommended as the standard of care in the treatment and rehabilitation of patients with COPD who remain symptomatic despite treatment with bronchodilators.

The current capacity of PR in Ontario can serve less than 2% of all COPD patients (including those classified as stable, moderate-to-severe, or post-exacerbation) who require such a program. (24) Pulmonary rehabilitation should be made available to all patients following an acute exacerbation (within 1 to 4 weeks of discharge from hospital). Patients should access the service once per year following an acute exacerbation, if needed. Focusing only on post-exacerbation patients, the expert advisory panel estimated that approximately 65% of postdischarge patients are eligible for PR. Standardized provincial criteria for referral to rehabilitation need to be developed and monitored.

Key components of a rehabilitation program should be standardized so that all patients receive access to high-quality rehabilitation regardless of the setting for delivery: in the patient's home, in an inpatient setting, or in an outpatient or community rehabilitation centre. Key components of pulmonary rehabilitation include supervised aerobic and strength training to increase exercise capacity and functional independence; education and self-management components; and nutrition, psychosocial support and behavioural interventions. They should be delivered in a multicomponent, multidisciplinary, and individualized program of at least 6 to 8 weeks in duration, with 2 to 3 sessions per week.

Program components at a centre can be delivered by health care professionals with certified expertise in the development of exercise programs and respiratory care. Consideration should be given to enhancing the existing Certified Respiratory Educator (CRE) to provide training in core competencies for all health care professionals involved in pulmonary rehabilitation. Certified health care providers can have interchangeable functional roles in the delivery of PR, except where there is a specific indication for particular expertise (e.g., respirologist).

An economic analysis of a standardized PR program may include the following main assumptions:

- The intensity and duration of PR programs are similar across outpatient hospital and community settings. Except for setting, outpatient hospital and community PR are equivalent.
- Home-based PR can be provided for select patients who cannot access centre-based PR programs due to potential barriers (e.g., accessibility, cognitive impairment, language). Home-based PR services can be consolidated under the role of a single health care professional with certified expertise in PR.

- For outpatient or community PR, exercise training and education are in group format.
- For their safety, patients are supervised for the entire PR program (i.e., no unsupervised components).
- Some core health care professionals involved in PR delivery have interchangeable functional roles (e.g., recreational therapist, physiotherapist, or kinesiologist for exercise, registered respiratory therapist or nurse/CRE for education components).

A centralized outpatient pulmonary rehabilitation clinic is preferred over home-based pulmonary rehabilitation for 2 reasons: a centralized clinic would have a multidisciplinary team and specialist access with in-depth knowledge of pulmonary rehabilitation, and program delivery in that setting has a lower cost compared to home-based pulmonary rehabilitation. (25) Transportation supports will need to be in place to support access to rehabilitation services, particularly when an outpatient or community-based rehabilitation program is the optimal model.

The expert advisory panel was in full support of OHTAC's updated (2014) recommendations on pulmonary rehabilitation:

- OHTAC reaffirms the recommendations it made in 2012, namely:
 - ongoing access to existing pulmonary rehabilitation for the management of moderate to severe COPD in stable patients, and
 - the use of pulmonary rehabilitation in patients following an acute exacerbation (within 1 month of hospital discharge).
- Further, based on a field evaluation study, OHTAC recommends increased availability of resources for pulmonary rehabilitation following discharge for patients who have had an acute exacerbation of COPD.

The pulmonary rehabilitation implementation plan that Health Quality Ontario submitted to the Ministry of Health and Long-Term Care in September 2014 should be fully funded and executed in 2015/2016.

COPD Network

The expert advisory panel strongly recommends the development of a provincial network on COPD (or, more broadly, lung health) that would be charged with improving patient outcomes and reducing the burden of COPD on provincial health care services. The newly established COPD network would provide clinical leadership, coordination, and support for provincial efforts including:

- COPD performance measurement and reporting, including the development of new indicators and data sources
- quality improvement efforts, supported by clinical leadership
- provincial expansion of pulmonary rehabilitation clinics, including data and reporting requirements
- development of patient and caregiver education materials for consistent use in all health care settings
- development of health professional education tools
- assessment in each local health integration unit (LHIN) of COPD needs and capacity building
- development of novel knowledge translation interventions to optimize inpatient, emergency department, and postacute care, with objective evaluation of their effectiveness

The Ontario Ministry of Health and Long-Term Care should provide funding for the establishment and ongoing operations of the network. Where feasible and appropriate, the network could be built on existing provincial infrastructure.

System-Level Considerations for the Acute Episode of Care

After formulating the majority of their recommendations, the expert advisory panel was asked by the ministry to provide high-level advice around implementation, including specific recommendations focused on the following areas:

- aligning the expert panel’s recommendations with the quality-based procedure (QBP) funding methodology
- implementation of recommended practice
- impact on multidisciplinary teams
- system program and capacity planning required
- change management and support for change required

Aligning Recommendations to Funding

Importance of a well-designed funding policy framework and methodology: Health Quality Ontario and the expert panel recognize that their mandate in developing this work was to provide evidence, analysis, and recommendations that would inform a separate process of costing, pricing, and payment methodology design to be led by the ministry. However, the expert panel continually emphasized that these recommendations will be inconsequential if they are not supported by a well-designed quality-based procedure funding system that takes into consideration issues such as the complexity and heterogeneity of the COPD patient population, avoids creating inappropriate incentives, and enables the extension of the funded episode into postacute and community care.

Consideration of patient heterogeneity and complexity: COPD patients are a very heterogeneous population characterized by varying levels of severity in their underlying COPD, high prevalence of comorbidities, and frequent presence of social issues and other factors that contribute to complexity. Ontario currently only captures a subset of the relevant variables necessary to account for COPD patient complexity in routine administrative data. Moving forward, effectively risk-adjusting QBP prices for justifiable cost variation across COPD patients will require collecting some of these variables and incorporating these into a costing analysis.

Variation in costs for COPD patients: While the recommended practices in this clinical handbook provide a core set of interventions that should be performed in the treatment of COPD patients, a large proportion of utilization and costs for these patients will also be attributable to other factors, such as the severity of their disease and the number of recent exacerbations, comorbidities, and tests performed to confirm their diagnosis. These factors contribute to variations in both cost and length of stay. As a result, it should be recognized that the recommended practices in this handbook capture only a fraction of the total costs of COPD patients. Design of the funding methodology should take this into consideration and incorporate suitable adjustments for cost variation and long-stay outliers.

Implications of COPD diagnosis issues on the ministry “carve-out” approach: The expert panel reinforced that the issues observed in current diagnosis and coding of COPD would have

profound implications on the ministry funding methodology if the same carve-out approach used for funding the 2012/2013 QBPs was applied for 2014/2015. While the carve-out is based on historical activity (2011/2012 activity for 2013/2014 carve-out), the expert panel will be making recommendations around standards for future COPD diagnosis and coding. Thus, the activity coded as COPD-related care in 2011/2012 may not align with what will be coded as COPD-related activity in 2014/2015 moving forward. This may also create considerable variability in an individual hospital's recorded COPD case mix from year to year.

Incentives for inappropriate utilization: The expert panel recognized that in defining COPD patient groups largely based on utilization and disposition (see Recommended COPD Cohort Definition and Patient Stratification Approach), there is the potential for perverse incentives to be created when these groups are assigned “prices” in a funding methodology. The cost of an average admitted COPD patient is often more than 10 times the cost of treating and discharging a COPD patient in the ED, while the cost of treating a COPD patient with ventilation is similarly much higher than treating them with usual medical care. If prices for the QBP funding system reflect these costs, care must be taken to ensure hospitals are not incentivized to admit greater proportions of patients for a higher payment or to make inappropriate use of ventilation. The QBP funding system can potentially mitigate these risks by bundling payment across the ED and inpatient settings and setting policies around appropriateness. In the longer term, the collection of new data elements capturing important patient complexity factors may allow for these groups to be redefined based on patient characteristics rather than utilization.

Opportunity areas for funding: Notwithstanding these challenges, the expert panel also discussed some of the key areas of opportunity for funding mechanisms to drive high-quality COPD care:

- supporting increased access to, and use of, pulmonary rehabilitation following an acute exacerbation by bundling rehabilitation into the hospital payment
- supporting improvements in objective diagnosis of COPD through spirometry by requiring confirmation of diagnosis as a condition of funding
- supporting more effective and efficient use of noninvasive ventilation, both in relation to its increased use where it is shown to be effective (i.e., in addition to usual medical care and as a first-line treatment before progressing to invasive ventilation) and its provision in more cost-effective settings (i.e., in respiratory wards instead of only in intensive care units)

Implementation of Recommended Practices

Provincial versus local care pathways: It should be recognized that the practices recommended in this clinical handbook have been defined at an aspirational level to guide all hospitals across the province. The handbook 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. For example, the expert panel discussed variation across the province in the provision of ventilation (while some hospitals provide noninvasive ventilation in a dedicated respiratory or general medical ward, others only provide it in intensive care units) as well as access to pulmonary rehabilitation, which is not available in many communities.

Adapting recommended practices to the local level: Implementing recommended services will require customization at the local level. For example, it was discussed that many communities should look at the possibility of delivering pulmonary rehabilitation out of local community centre gyms or YMCAs, given the lack of hospital outpatient capacity in many areas. Similarly, follow-up care for a

COPD patient after discharge may take place with a variety of different primary care providers or a respirologist, depending on local availability of services.

Implementation 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, and it should include the consideration of other non-COPD respiratory patient groups, such as asthma and other lung disorders, which may be managed with the same types of resources. The program should also span the improvement of COPD care across care settings, including the community, recognizing that hospitalization is only one part of the COPD continuum of care.

Tracking current practice against recommended practices: Many of the practices recommended by the expert 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 COPD practice and how much this gap varies across different organizations and parts of the province. A key objective of developing a COPD performance measurement strategy should be to enable organizations to track, audit, and evaluate the implementation of care pathways and recommended practices at the organization level. Through such monitoring, variances can be identified, progress monitored, and the pathway can be refined over time.

Roles of Multidisciplinary Teams

One of the important issues in COPD care discussed by the expert panel is the lack of dedicated teams and resources in Ontario for COPD. In stroke care, for example, the Ontario Stroke Strategy has led to the widespread use of dedicated stroke units and interdisciplinary stroke teams. Such dedicated units and teams are much less common for COPD and respiratory diseases. The expert panel discussed a promising area for further research in evaluating the difference in outcomes between COPD patients cared for in nonspecialized teams and/or units with those cared for by specialized respiratory teams and/or units. Further work is required to define what constitutes a specialized respiratory team and to assess the feasibility of establishing these teams in hospitals of different sizes across the province.

Service Capacity Planning

The ministry was interested in advice from the expert panel around capacity planning and shifts across care settings for COPD. The most important issue in this respect identified by the expert panel is the inconsistent capacity in, and access to, pulmonary rehabilitation across the province. This is a major opportunity area for the ministry, LHINs, hospitals, home care providers, and other providers to work together to improve outcomes for COPD patients and to also impact rates of unplanned readmissions. Current OHTAC-commissioned field evaluation work in this area, as well as the work of the OHTAC Implementation Subcommittee and Health Quality Ontario staff focusing on implementation of the OHTAC COPD recommendations, can support this area of focus.

System-Level Considerations for the Postacute Episode of Care

The Postacute, Community-Based COPD Expert Advisory Panel believes that implementation of best practices related to community-based COPD care will require significant investment. The following points highlight some of the key issues for and barriers towards the successful implementation of the community-based COPD 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 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, whether there is adequate outpatient pulmonary rehabilitation services post-discharge, and the best possible environment for providing rehabilitation to the patient.
3. Patient education materials should be standardized and available in multiple languages. Education materials for patients and 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 conflict with materials provided on discharge or are confusing. Caregivers should be conscious of patients' and caregivers' health literacy when distributing educational materials.
4. Pathways to the evidence-based recommendations made in this report should be adopted by all providers. Provincial guidelines and pathways should be available in electronic format for primary care providers.
5. All hospitals 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 the care plans. Monitoring of the self-management care plans is the responsibility of all health care providers. Barriers to communication that hinder multidisciplinary care provision should be removed.
10. The Health Quality Ontario/Health Links care coordination tool should be adopted by all primary care providers to facilitate greater coordination with community health services.
11. Once finalized, the Health Quality Ontario/Health Links care coordination tool's e-chart should be adopted by all primary care providers, home care providers, and their contracted service providers to improve communication on patient care.
12. Where appropriate, post-acute medical discharge care should be coordinated in the patient's home with a multidisciplinary team.

13. All home care contracted 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 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 LHINs 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 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 QBP recommendations.
17. Health care leaders should be involved in the development of implementation materials.
18. Primary care providers should have adequate decision support to respond to the increasing demand for data.
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.

Expert Advisory Panel Membership

Health Quality Ontario's Expert Advisory Panel on Episodes of Care for Acute COPD

| Panel Members | Affiliation(s) | Appointment(s) |
|---|--|--|
| Dr. Chaim Bell <i>Co-Chair</i> | Mount Sinai Hospital University of Toronto CIHR-CPSI | Clinician Scientist, Associate Professor Chair in Patient Safety & Continuity of Care |
| Dr. Charlie Chan <i>Co-Chair (*Co-Chair)</i> | University Health Network University of Toronto | Vice-President, Medical Affairs & Quality Professor & Vice-Chair of Medicine |
| Carole Madeley | Ontario Lung Association | Director of Respiratory Health Programs |
| Dr. Alan Kaplan <i>(*Co-Chair)</i> | Family Physicians Airway Group College of Family Physicians of Canada | Chair Chairperson, Respiratory Medicine Special Interest Group |
| Dr. Chris Allen | St. Joseph's Healthcare Hamilton | Director, Medical Chest Unit |
| Dr. Dina Brooks | University of Toronto | Professor, Department of Physical Therapy |
| Dr. Eddy Fan | Mount Sinai Hospital | Critical Care Unit, Respiriology |
| Dr. Eric Hentschel | St. Mary's General Hospital | Medical Director of the Chest Program |
| Dr. Lori Whitehead | St. Joseph's Healthcare Hamilton | Respirologist |
| Dr. Rob McFadden* | St. Joseph's Healthcare London | Chair, Medical Advisory Committee Director, Quality of Medical Care |
| Dr. Roger Goldstein* | West Park Healthcare Centre | Specialist, CAVC and Respiratory Rehabilitation |
| Lawrence Jackson* | Sunnybrook Health Sciences Centre | Clinical Coordinator, Veterans Centre, Department of Pharmacy |
| Lorraine Leblanc | Ontario Lung Association | Patient Advocate |
| Mark McIntyre | Mount Sinai Hospital | Clinical Pharmacist |
| Ann Bartlett* | St. Joseph's Healthcare Hamilton | Nurse Coordinator, Respiratory Rehabilitation |

| Panel Members | Affiliation(s) | Appointment(s) |
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| Debbie Coutts | Trillium Health Partners | Coordinator, Pulmonary Rehabilitation Program |
| Elizabeth Hill | Kingston General Hospital | Nurse Practitioner, Chronic Obstructive Pulmonary Disease |
| Filomena Travassos* | Trillium Health Partners | Manager, Case Costing |
| Sandra Nelson | Mount Sinai Hospital | Clinical Practice Leader, Pharmacy |
| Dr. Ian Fraser* | Toronto East General Hospital | Chief of Staff |
| Dr. Stewart Pugsley* | St. Joseph's Healthcare Hamilton | Head of Service, Respiriology |

*Also actively participated in the Update and Integration COPD Expert Advisory Panel in Phase 3, which involved updating the acute episode of care and integrating it with the postacute episode of care.

Health Quality Ontario's Expert Advisory Panel on Episodes of Care for Post-Acute Community-Based Care for COPD Patients

| Panel Members | Affiliation(s) | Appointment(s) |
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| Co-Chairs | | |
| Dr Chaim Bell | Mount Sinai Hospital University of Toronto | Clinician Scientist Associate Professor |
| Lisa Droppo | Ontario Association of Community Care Access Centers (OACCAC) | Chief Care Innovations Officer |
| Primary Care | | |
| Dr Kenneth Hook | Ontario College of Family Physicians STAR Family Health Team | Past-President Senior Physician |
| Dr Alan Kaplan | Family Physicians Airway Group of Canada | Chair, Family Physicians Airway Group of Canada |
| Dr Peter Selby | Department of Family and Community Medicine & Psychiatry and Dalla Lana School of Public Health University of Toronto Ontario Tobacco Research Unit | Associate Professor Principal Investigator |
| Respirology | | |
| Dr Samir Gupta | St Michael's Hospital | Adjunct Scientist, Keenan Research Centre |
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| Ivan Nicoletti | Erie St. Clair CCAC | Care Coordinator |
| Sara Han | Ontario Lung Association | PCAP Provincial Coordinator |

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| Physiotherapy | | |
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| Homecare | | |
| Daniel Ball | Central West CCAC | Director of Client Services |
| Josie Barbita | Toronto Central CCAC | Director Professional Practice |
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| Occupational Therapy | | |
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| Cardiovascular Services | | |
| Kori Kingsbury | Cardiac Care Network | Chief Executive Officer |

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