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Optimizing In-Hospital Chronic Obstructive Pulmonary Disease (COPD) Care in Canada: Challenges, Evidence, and Future Directions

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Introduction

Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) represent the leading cause of hospital admissions in Canada, second only to childbirth, with recent data showing an upward trend in hospitalizations since 2010.^{1,2} A substantial proportion of patients are also readmitted for AECOPD within the first 3 months after discharge.^{3,4} National spending for hospital-based care for AECOPD is estimated to exceed 4 billion Canadian dollars annually.⁵ AECOPD therefore represent a significant burden on the Canadian healthcare system. These events, which may be referred to in lay terms as “lung attacks”, are associated with considerable patient morbidity, including a higher risk of recurrent AECOPD, accelerated lung function decline, poorer

quality of life, and increased mortality.⁶⁻⁹ Indeed, previous reviews have reported all-cause mortality rates of up to 20–25% one year after a severe AECOPD and approximately 50% at 5 years.^{10,11} This paper aims to identify key barriers to optimal chronic obstructive pulmonary disease (COPD) management within the Canadian healthcare system for hospitalized patients and for those treated in the emergency department (ED).

Confirming The Diagnosis of COPD With Spirometry

Many patients who present to hospital with suspected AECOPD have not previously undergone pulmonary function testing. As a result, these patients are often treated empirically without confirmation of the underlying diagnosis.

Several alternative conditions, including asthma, congestive heart failure, and pneumonia, can present with similar symptoms.¹² Consequently, an incorrect diagnosis of AECOPD at the time of hospital admission is likely a significant contributor to recurrent hospital readmissions. Furthermore, these patients may receive inappropriate therapies.¹³ Ontario data have shown that the majority of patients (59%) with a reported diagnosis of COPD had not undergone peridiagnostic pulmonary function testing. These individuals were less likely to be prescribed long-acting therapy and had a higher risk of death or hospitalization for AECOPD.¹⁴ Expanding access to pulmonary function testing is therefore imperative. For some patients, spirometry may be feasible during hospitalization, which may be particularly beneficial for individuals who face barriers to accessing outpatient pulmonary function testing laboratories. Otherwise, all patients admitted for suspected AECOPD should be referred for pulmonary function testing if a COPD diagnosis has not previously been confirmed.

Standardizing In-hospital COPD Care and Discharge Instructions

Most Canadian hospitals now use electronic medical records with computerized physician order entry, creating opportunities to implement standardized inpatient order sets for the management of patients with AECOPD. These care pathways help ensure that hospitalists and ED physicians consistently follow evidence-based practices aligned with current COPD treatment recommendations. Order sets can include standardized prescriptions for oral corticosteroids, antibiotics, and appropriate inhaler therapy during acute care. Canadian data from Alberta have demonstrated that implementing such order sets can reduce the hospital length of stay for patients with AECOPD, with a median decrease of 1.15 days overall, without increasing readmissions.¹⁵

Discharge bundles provide an additional opportunity to ensure that recommended interventions are implemented before hospital discharge, including optimization of maintenance inhaler therapy, referral to pulmonary rehabilitation, administration of appropriate vaccinations to prevent respiratory infections (COVID-19, influenza, pneumococcal disease, and respiratory syncytial virus), and smoking cessation support.¹² Discharge bundles can also facilitate communication with outpatient care

providers, including primary care physicians (PCP) and respirologists. Evidence from a separate study in Alberta has shown that implementation of hospital discharge bundles reduced the risk of hospital readmission by 83% within 7 days and by 26% within 30 days after discharge, representing another important strategy to maximize limited hospital resources.¹⁶

Optimizing Maintenance Inhaler Therapy at The Time of AECOPD

Current Canadian Thoracic Society (CTS) COPD guidelines recommend inhaled triple therapy comprising a long-acting muscarinic antagonist (LAMA), a long-acting beta-agonist (LABA), and an inhaled corticosteroid, preferably delivered in a single inhaler, as initial maintenance therapy for patients at an increased risk of future AECOPD. This includes individuals who have experienced an ED visit or hospitalization for AECOPD within the previous 12 months. Compared with LAMA/LABA therapy, maintenance inhaled triple therapy lowers mortality in patients with a prior history of AECOPD, while also reducing the risk of future AECOPD, improving lung function, and decreasing COPD-related symptoms.¹⁷

Recent Canadian studies have shown, however, that many patients treated for AECOPD are not prescribed guideline-recommended maintenance inhaler therapy at discharge.¹⁸⁻²⁰ In an Ontario review, only 20% of patients were discharged from the hospital with appropriate pharmacotherapy consistent with the CTS guidelines. Common deviations from guideline recommendations included failure to escalate inhaler therapy (48%), discharge without any long-acting therapy (18%), and discharge on LAMA monotherapy (10%). Furthermore, patients who were not prescribed recommended inhaler therapy had a significantly higher risk of readmission for AECOPD within the first month after discharge (19% versus 0%, $p=0.02$).¹⁹ Additional studies have also shown that delaying optimization to inhaled triple therapy as per treatment recommendations is associated with an increased risk of future AECOPD.^{21,22}

Perceptions of clinicians' roles in acute care settings may contribute to reluctance to intensify maintenance therapy. Some hospital-based physicians may assume that long-term COPD therapy can be adjusted by outpatient care providers shortly after hospital discharge. However, this approach has become increasingly

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CHALLENGES, EVIDENCE, AND FUTURE DIRECTIONS

5 STRATEGIC PILLARS FOR CARE IMPROVEMENT

1

DIAGNOSTIC ACCURACY

Confirm COPD diagnosis with spirometry and improve access to pulmonary function testing across clinical settings.

2

CARE STANDARDIZATION

Standardize in-hospital care and discharge instructions through the implementation of order sets and bundles.

3

THERAPEUTIC OPTIMIZATION

Prescribe guideline-recommended maintenance inhaler therapy at the time of AECOPD to improve patient outcomes.

4

ED CHALLENGES

Incorporate respiratory educators in the ED and provide specialized education for emergency physicians.

5

EMERGING THERAPIES

Raise awareness of advanced COPD therapies among hospitalists and ED physicians to improve future clinical outcomes.

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impractical because many patients lack access to a PCP and specialist wait times remain lengthy. Hospital presentation with AECOPD should therefore be viewed as a critical opportunity to optimize maintenance inhaler therapy. In addition, public medication coverage criteria should be reviewed regularly to maintain alignment with the latest clinical guidelines and to avoid creating barriers to evidence-based prescribing.

Addressing Challenges Specific to The ED Setting

Traditionally, COPD guidelines have defined an ED visit for AECOPD as a severe event, prompting escalation of therapy.^{12,17} However, many patients treated exclusively in the ED for AECOPD might otherwise have been managed in an outpatient setting and therefore would have been categorized as having a less severe event. For example, limited access to a PCP has previously been identified as a risk factor for ED presentation during an AECOPD.²³ Consequently, a physiology-based classification of AECOPD severity may be more clinically meaningful than one based solely on healthcare utilization. Consistent with this perspective, the revised Global Initiative for Chronic Obstructive Lung Disease COPD recommendations now favour the Rome proposal criteria for determining AECOPD severity.^{12,24} This approach also shows promise for predicting return to hospital among patients treated in the ED, although further prospective validation is still required.²⁵

Optimizing care for patients with AECOPD in the ED remains challenging due to high patient volumes, time constraints, and insufficient access to allied healthcare professionals such as respiratory therapists.²⁶ Recent data from an academic hospital in Ontario show that only 5–10% of patients treated for AECOPD in the ED setting receive appropriate optimization of inhaler therapy at discharge.^{19,20} Integrating dedicated certified respiratory educators in this care setting could help to address these gaps. In addition, ongoing education for ED physicians regarding the importance of optimizing maintenance COPD pharmacotherapy remains essential to reduce the burden of AECOPD in the ED and improve patient outcomes. Timely referral to a respirologist should also be emphasized for patients who continue to experience AECOPD despite optimal inhaler therapy, allowing further diagnostic evaluation and consideration of advanced COPD treatments.²⁷

Incorporating Emerging Advanced COPD Therapies

Therapeutic options for COPD patients with recurrent AECOPD despite maximal inhaler therapy have historically been limited. Prophylactic azithromycin may reduce AECOPD in selected individuals, although the potential for adverse effects and drug interactions limits its use.^{28–32} Patients with the chronic bronchitis phenotype may also be considered for roflumilast, which is frequently associated with significant gastrointestinal side effects, or N-acetylcysteine.^{33–39}

Up to 40% of patients with COPD have elevated blood eosinophil counts (BEC) ($\geq 0.3 \times 10^9/L$), although the reported prevalence estimates vary by study population and methodology. This finding suggests the presence of underlying type 2 inflammation.^{40–42} Elevated BEC have been associated with an increased risk of readmission for AECOPD and a greater decline of lung function.^{40,43} Two biologic therapies targeting type 2 inflammation have demonstrated significant reductions in AECOPD frequency among patients with $BEC \geq 0.3 \times 10^9/L$: dupilumab (an anti-interleukin (IL)-4/13 monoclonal antibody) and mepolizumab (an anti-IL-5 therapy).^{44–46} Raising awareness of these new advanced therapies among hospitalists and ED physicians may improve identification of patients who could benefit from biologic treatment. Additional biologic medications are also under investigation. Tozorakimab (an anti-IL-33 monoclonal antibody) appears promising, regardless of BEC.^{47,48} Tezepelumab (an anti-thymic stromal lymphopoietin medication) and depemokimab (an ultra-long-acting anti-IL-5 therapy) are also currently being evaluated in COPD.³⁹

Conclusions

AECOPD continue to impose a substantial clinical and economic burden on the Canadian healthcare system, while also presenting a pivotal opportunity to improve long-term patient outcomes. Hospital admissions and ED visits should be viewed not only as episodes requiring acute management, but also as critical opportunities to confirm the diagnosis of COPD, implement standardized evidence-based care pathways, optimize guideline-directed maintenance therapy, and facilitate appropriate follow-up after discharge. Practical

interventions such as improving access to spirometry, incorporating standardized order sets and discharge bundles, initiating recommended therapy in eligible patients, and strengthening communication between acute and outpatient care providers have the potential to reduce recurrent AECOPD, hospital readmissions, and mortality.

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