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Illustrating the COPD client's journey through the care continuum using PHC EMR data from The Alliance for Healthier Communities

Beginning in January 2018, CIHI and The Alliance for Healthier Communities embarked on a collaborative project focused on demonstrating the value of collecting structured linkable EMR data, especially for diagnosis and treatment data. In March 2018, The Alliance CHC members and CIHI reached an agreement to share 3 years of EMR data. The Alliance's Business Intelligence Reporting Tool (BIRT) was leveraged to minimize impact on clinicians and in July, The Alliance successfully shared with CIHI 3 years of data from 73 CHCs for 570,000 clients representing more than 8.5 million encounters.

Why COPD?

With this structured EMR data, this analysis aimed to illustrate a client's journey across the health care system, which frequently begins in Primary Health Care (PHC). The Alliance and CIHI mutually selected Chronic Obstructive Pulmonary Disease (COPD) as a topic of interest for this initial analysis given that it is a leading cause of morbidity and mortality impacting an estimated one in six Canadians aged 35 to 79 years. [1] People living with COPD are also frequent users of the health care system and it is estimated that COPD contributes to more than $1.5 billion annually to direct health care costs in Canada. [2] This analysis builds on and enriches CIHI's previous reports on COPD in 2014, 2015 and 2017 using physician billing data. [3,4,5]

Why is this important?

Standardized EMR data that is linkable fills an important data gap in PHC. It provides opportunities to examine the client's journey through the care continuum in an innovative way and complements physician billing data to provide a more comprehensive picture of client management. The rich data on risk factors, social determinants of health, vaccinations and non-physician providers, such as nurses and nurse practitioners, can not only help inform clinical decision making in PHC, but can also provide insight to supporting health system management. Ultimately, better management of COPD clients in the community is key to slowing down the progression of the disease and to preventing avoidable ED visits and hospital admissions. [6,7]

Key Findings

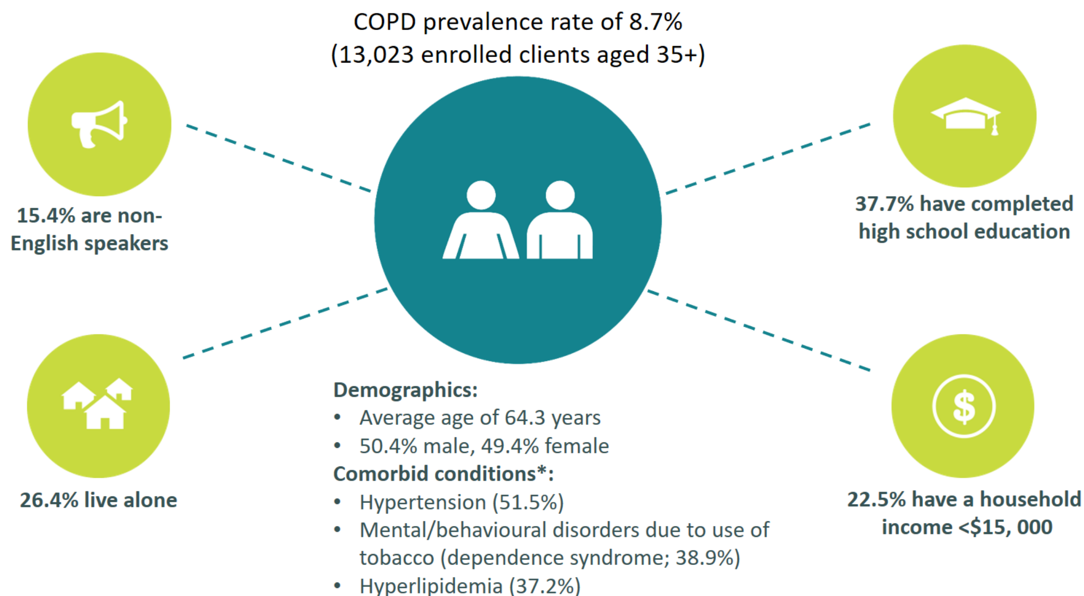
Profile of COPD Clients and Management in Primary Care

Based on Alliance PHC EMR data from 73 CHCs over a 3-year period (April 1, 2015 – March 31, 2018), 13,023 clients were identified as having COPD and the crude point prevalence[*] was 8.7%; which is roughly comparable to provincial and national prevalence estimates. [8] The average age of COPD clients was 64 years and equally affected males and females. COPD

[*] Point prevalence is defined as the number of COPD cases identified using EMR as the sole data source.

clients were most likely to have completed high school education or equivalent as their highest level of education, speak English, live alone, and have a household income less than $15,000.[†]

COPD clients often have multiple chronic conditions.[‡] Over half of COPD clients have one or two chronic conditions other than COPD and over a third of COPD clients have three of more other chronic conditions. Multi-morbidity also increases with age.



COPD clients most commonly had between 10 to 19 PHC encounters[§] a year receiving multi-disciplinary care provided mostly by physicians, nurse practitioners and nurses. COPD clients most commonly sought services for health advice/ instructions, to discuss their treatment plans and medication renewals [i]. They also had frequent referrals to other internal CHC providers such as other physicians and nurses as well as referrals to external providers such as surgeons and respirologists[**].

[†] Results from the data quality assessment indicate high completion rates for age and sex (100%) and language (99%); medium completion rates for education (75%), household composition (86%), and household income (85%).

[‡] Chronic conditions include asthma, coronary artery disease, diabetes, depression, hypertension and osteoarthritis, as identified in the 2014 Analysis in Brief *Chronic Disease Management in Primary Health Care: A Demonstration of EMR Data for Quality and Health System Monitoring.*[5]

[§] PHC encounters are for all causes and not limited to COPD-specific encounters.

[i] The variable "*Service Types for Encounters*" was used to describe common reasons for PHC visits as opposed to the "*Reason for Visit (ICD-10)"* variable due to its better specificity in capturing visit information.

[**] Note that these referrals are not limited to COPD-specific encounters.

Most clients had 10-19 PHC visits per year, with multi-disciplinary care:
- **Physician (29.0%)**
- **Nurse Practitioner (20.3%)**
- **Nurses (20.0%)**

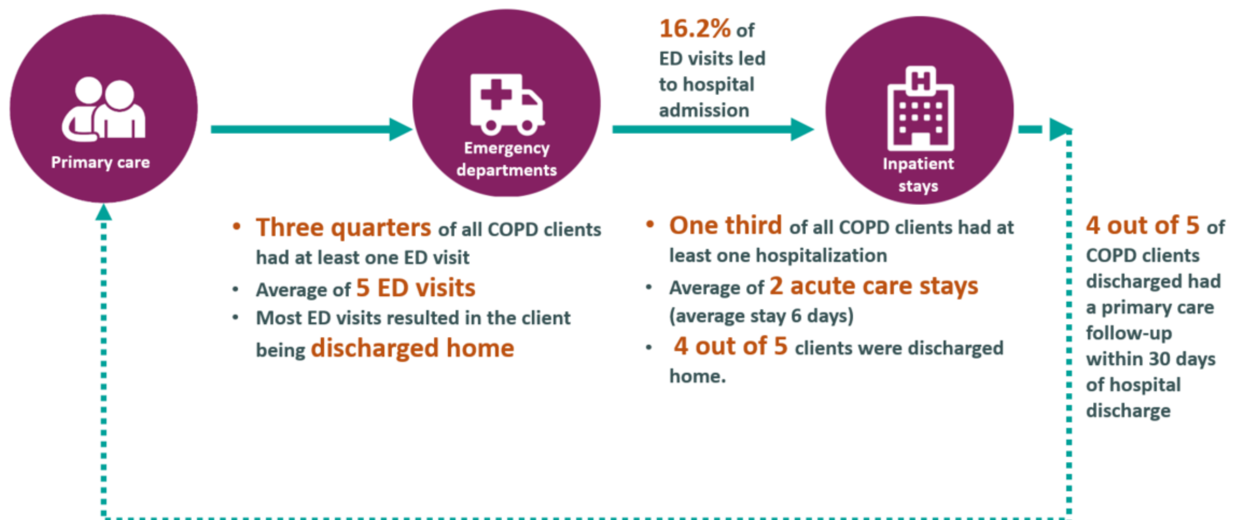
Top external referrals:
- **Surgeon-general (8.0%)**
- **Other (7.8%)**
- **Respirologist (5.8%)**

Common reasons for PHC visits:
- **Health advice/ instructions (12.8%)**
- **Discussion regarding the treatment plan (8.2%)**
- **Medication renewal (7.5%)**

Top internal referrals:
- **Physician (13.0%)**
- **Other (7.0%)**
- **Nurse (6.7%)**

COPD Client Journey through the Care Continuum

As a client's COPD progresses, they may begin to experience more severe exacerbations that require an ED visit or admission to hospital. [6,7] Over the 3-year period, three quarters of COPD clients had at least one ED visit. On average, each client had 5 ED visits and most visits resulted in the client being discharged home. Given that 26.4% of COPD clients live alone, this could have implications for a client's ability to manage their condition. Among all ED visits, 16% resulted in an acute care hospital admission, which is higher than the rate observed in the general Canadian population (10% of ED visits resulted in an acute care hospital admission in 2017, all ages and all diagnoses). [9] Overall, roughly one third of COPD clients had at least one hospitalization over the 3-year period and the majority of clients were discharged home. The average length of hospital stay was 6 days. After discharge, 80% of COPD clients had timely follow-up in primary care (within 30 days).



Implications and Future Work

This novel approach demonstrates that standardizing the EMR data is key to filling a key information gap in PHC as well as the overall client journey within Canada's health system.

In order to make additional improvements in COPD client care, it will be important to have data that are more complete on other patient risk factors such as smoking status as well as diagnostic data such as pre/post spirometry testing and intervention data such as prescribed medications. This data could help define spirometry confirmed COPD diagnosis and disease severity. [4,5]

CIHI and The Alliance for Healthier Communities are evaluating options to further refine the current analysis while exploring future topics related to COPD. If you have any questions about this report, please contact CIHI's Primary Health Care Information team at phc@cihi.ca .

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Methodology

COPD clients were identified from EMR data if they met the following inclusion criteria:

- Had at least one PHC encounter with an issue addressed/ health concern of COPD during the 3-year study period (ICD10 Codes: J41, J42, J43, J44, J47)
- Enrolled with a CHC
- Aged 35 years or older by the end of the study period (March 31, 2018)

Data sources included

- PHC EMR data from 73 CHCs over 3-year period (April 1, 2015 – March 31, 2018), Alliance for Healthier Communities
- Discharge Abstract Database (DAD) for information on acute inpatient hospitalizations (April 1, 2015 – March 31, 2018), Canadian Institute for Health Information
- National Ambulatory Care Reporting System (NACRS) for information on emergency department (ED) visits (April 1, 2015 – March 31, 2018), Canadian Institute for Health Information

Linkage of EMR data to CIHI's DAD for acute inpatient hospitalizations and NACRS for ED visits was performed using CIHI's standard client linkage methodology, which is based on encrypted Health Card Number (HCN). Of note, 83.5% of COPD clients included in the analysis had a valid HCN and thus were eligible for linkage to DAD and NACRS.

References

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