

NB-IRDT CHRONIC OBSTRUCTIVE PULMONARY DISEASE RESEARCH PROGRAM

REPORT ONE: INVESTIGATION OF
STATISTICS CANADA PUBLIC USE MICRODATA FILES



Ted McDonald, PhD

Kyle Rogers, MSc

Bethany Daigle, PhD

Anat Ziv, PhD



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NB-IRDT Chronic Obstructive Pulmonary Disease research program – Report one: investigation of Statistics Canada Public Use Microdata Files

PRINCIPAL INVESTIGATOR

Ted McDonald, Director, NB-IRDT

RESEARCH TEAM

Kyle Rogers, Data Analyst, NB-IRDT
Bethany Daigle, Scientific Writer, NB-IRDT
Anat Ziv, Postdoctoral Fellow, UNB

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Executive Summary

This report examines the utility of existing and easy-to-access data in the form of Statistics Canada's Canadian Community Health Survey public use microdata files (CCHS PUMF).

These data sources allow for easy presentation of Chronic Obstructive Pulmonary Disease (COPD) at the New Brunswick level, as well as partial presentation at the health zone level. Because the CCHS is an annual national product, we will be able to continually update the data presented herein following the trends over time and can compare NB values against other Canadian jurisdictions for benchmarking. Further, the CCHS PUMF data include a variety of items for examination rarely available in administrative data sources—items like:

- Blood Pressure
- Body Mass Index
- Difficulty with Activities
- Education
- Life Stress
- Needed Help with Instrumental Activities of Daily Living
- Physical Inactivity
- Self-Perceived Health
- Type of Smoker
- Working Status

However, while the breadth of data available via the CCHS PUMF is impressive and allows insights into a variety of topics, these data lack depth. Statistics Canada removes identifying information from the CCHS PUMF data before release. As such, we cannot link CCHS data to other data sources such as census responses, records of health service use, etc.

Further, the survey nature of the CCHS leads to sample size issues that present difficulties when there is interest in presenting values at smaller geographies—in many cases, it simply isn't possible. Finally, due to the nature of self-reporting, the CCHS data run the risk of biases typically associated with survey data (such as social desirability bias), potentially leading to lower counts of COPD cases when self-report estimates are compared to administrative data case identification estimates. For example, research that linked self-report data to administrative data in Ontario demonstrated this trend in several chronic health conditions (including COPD¹), a finding consistent with research from the US.^{2, 3}

The self-report data contained in the CCHS PUMF may be imperfect, but they nonetheless represent one avenue for obtaining useful insights into COPD in New Brunswick. Alongside the Public Health Agency of Canada's administrative data approach in the Canadian Chronic Disease Surveillance System, and NB-CHIP, they will help us develop better understanding of COPD in New Brunswick. These insights will ultimately allow the New Brunswick health system and care providers to provide improved care to New Brunswickers living with COPD while simultaneously striving to prevent future cases of COPD.

Introduction

“Breathing is something many people take for granted. However, in Canada, 3.8 million people over the age of one are living with asthma and 2.0 million are living with chronic obstructive pulmonary disease (COPD), both of which can affect a person's ability to breathe. Individuals living with asthma or COPD may experience impaired participation in daily life, school, work, and social activities.”⁴

In 2016, the New Brunswick Department of Health utilized the Canadian Chronic Disease Surveillance system (CCDSS) to estimate that approximately 57,000 New Brunswickers over the age of 35 had been diagnosed with COPD.⁵ In contrast, Statistics Canada's estimates for the same year show only 24,800 prevalent cases.⁶ This sizable discrepancy is due to the different methodologies used in each case; and it highlights not only the existence of alternative methods for identifying cases of COPD, but also the impact methodological approaches can have on study outcomes.

Developed by the Public Health Agency of Canada (PHAC),⁵ the Canadian Chronic Disease Surveillance System (CCDSS) uses disease case definition algorithms applied to government administrative health databases.⁴ Meanwhile, Statistics Canada (StatCan) uses self-report surveys to identify cases. The difference between the two results is considerable, and it highlights how different methodological approaches affect the development of population health indicators, and, subsequently, governmental responses. From the lens of a healthcare system planner, the strategy for ensuring care for 24,800 New Brunswickers with COPD is likely different than the strategy for caring for 57,000. Understanding how and why these methodologies differ will allow New Brunswick to better plan health promotion and healthcare provision in the future, and more accurate/precise estimates allow for better plans.

The CCDSS and survey methodologies mentioned above are not the only approaches for identifying COPD. In New Brunswick, a third COPD case identification approach exists: the New Brunswick COPD Health Information Platform (NB-CHIP). When used in conjunction with the CCDSS and survey methodologies, an independent third case identification method allows researchers and policy makers to more accurately triangulate the true extent of COPD in NB and plan accordingly.

NB-CHIP is a collaboration between the New Brunswick Institute for Research, Data and Training (NB-IRDT), the province's Regional Health Authorities (Horizon and Vitalité), and the Government of New Brunswick's (GNB) Department of Health. Developed with funding from the New Brunswick Health Research Foundation (NBHRF) and AstraZeneca, NB-CHIP contains pulmonary function testing (PFT) data from RHA-administered PFT labs throughout the province. PFT is a key component in the diagnosis of both COPD and asthma. As such, one use of the province-wide PFT results contained in NB-CHIP is to identify any records that meet the clinical criteria for the COPD, providing a third method of case identification that can be partnered with StatCan's surveys and PHAC's administrative data algorithms, giving us a clearer picture of the extent of COPD in NB.

The various case identification methodologies: surveys (StatCan), physician/hospital claims, administrative data (PHAC), and provincially collated clinical data are distinct but complementary methods with unique strengths and weaknesses outlined in Table 1. One nuanced but important distinction worth exploring here is the sample universe to which the estimate from each case identification methodology applies. The sample universe each

methodology aspires to describe is a count of individuals in New Brunswick living with COPD. However, the seeming simplicity of the task of identifying and counting COPD cases belies the underlying complexity of the task: multiple practicalities can prevent that perfect value from being discerned (or ever even actually existing).

For example, when does a COPD case actually begin?

1. When a patient reports COPD symptoms to their physician? [CCDSS]¹
2. When a PFT indicates COPD? [NB-CHIP]
3. After a patient has learned they have COPD? [StatCan surveys]

The case identification methods described above answer the different questions above to serve as imperfect proxies of the perfect value. However, each in fact has a slightly different sample universe:

- CCDSS: All individuals in NB who visit a physician with COPD-related symptoms
- NB-CHIP: All individuals who meet the clinical PFT criteria for COPD in NB
- Surveys: All individuals who report a COPD diagnosis in NB

The CCDSS requires an individual visit their physician once within a single year⁷ with symptoms that align with COPD, and have their physician bill the healthcare system for both services associated with the visit, while noting COPD symptoms in their physician notes. NB-CHIP requires an individual to have received a pulmonary function test and meet the clinical criteria of COPD according to that test. Finally, the CCHS requires individuals diagnosed with COPD to report it when surveyed.

The current report focuses on survey data as the first step in describing the COPD data ecosystem in New Brunswick, and on defining the ways in which we can harness data sources available here to provide a better understanding of the strengths and limitations of each approach (self-report, NB-CHIP, CCDSS) for describing COPD in New Brunswick.

This report focuses on StatCan PUMF data for several reasons. First, it is the most readily accessible of the various data sources and allows researchers to access the data with minimal wait time. Second, StatCan survey data is annually and nationally consistent. As such, any estimates generated from the PUMF data are comparable with other Canadian jurisdictions over time. Third, the survey data have an extensive list of information (personal history, symptom information, health behaviours, etc.) not available in administrative data sources like NB-CHIP and the CCDSS. Finally, of the three approaches, the survey approach is the only approach that is explicitly and exclusively made up of New Brunswick residents. When StatCan designs these surveys, the sampling frame they use ensures that *only* New Brunswickers contribute to New Brunswick data. The structure of both the CCDSS and NB-CHIP include *anyone* receiving treatment at an NB hospital or facility as data. For example, Campbellton facilities often treat Quebec patients, and those individuals may contribute to any NB values generated from the CCDSS/NB-CHIP.

Table 1. Comparison of data sources available for COPD case identification

Source	StatCan surveys (CCHS)	CCDSS	NB-CHIP
	Self-report	Physician and hospital billing claims	Pulmonary function test lab results
Estimate describes	All individuals who report a COPD diagnosis in NB	All individuals with a physician diagnosis of COPD in NB.	All individuals who meet the clinical PFT criteria for COPD in NB.
Source strengths	<ol style="list-style-type: none"> 1. Annually updated 2. Rigorous data collection, standardization, and quality 3. Nationally consistent, allowing for inter-provincial comparisons 4. Describes multiple factors of interest such as personal history, symptom information, health behaviours, etc. 5. Linkable to other data in Statistics Canada Research Centres 	<ol style="list-style-type: none"> 1. Annually updated 2. Rigorous data collection, standardization, and quality 3. Nationally consistent, allowing for inter-provincial comparisons 4. System-generated data, minimal effort required for data collation 5. Large amount of NB data allows small area comparisons 	<ol style="list-style-type: none"> 1. Annually updated 2. Describes multiple factors of interest such as personal history, symptom information, health behaviours, etc. 3. In depth descriptions of symptoms and clinical data 4. Large amount of NB data allows small area comparisons
Source weaknesses	<ol style="list-style-type: none"> 1. Vulnerable to social desirability biases 2. Vulnerable to individual reporting errors 3. Small NB sample sizes prevent small area comparisons 	<ol style="list-style-type: none"> 1. Lacks important information such as personal history, symptom information, health behaviours, etc. 2. Draws from health service use for definition, as such does not necessarily describe ALL cases at time of estimate generation 	<ol style="list-style-type: none"> 1. Not nationally consistent, preventing inter-provincial comparisons 2. Draws from health service use for definition, as such does not necessarily describe ALL cases at time of estimate generation 3. Data collected for clinical purposes are difficult to translate into meaningful research or population health info

Methods

The current report utilizes data from the Canadian Community Health Survey (CCHS) public use microdata files (PUMF).^{8,9} The CCHS is a cross-sectional survey from StatCan that provides self-reported estimates of health determinants, health status, and health care utilization. The CCHS comprises two types of surveys: an annual component on general health and a component that focuses on different health topics with each new iteration. The CCHS covers approximately 98% of the Canadian population aged 12 or older living in the ten provinces and three territories, excluding those living on First Nations reserves or Crown land, full-time members of the Canadian Forces, institutional residents, and some residents of remote areas of Canada.

We accessed the CCHS PUMF data via the University of New Brunswick's Data Liberation subscription^{10,11} and pooled data from the CCHS PUMF¹² for the years 2000 through 2013/2014 to create a sample of 154,395 respondents aged 35 and over when surveyed. Finally, we utilized StatCan weighting schemes to ensure the sample reflected the New Brunswick population. However, several issues prevent the CCHS from providing complete coverage of the time period of interest. First, the CCHS PUMF data is not annual: following 2006, StatCan completed the CCHS on a biennial basis. Hence, the CCHS combines the years 2007-2008, 2009-2010, 2011-2012, and 2013-2014. Second, the 2002 data did not include health zones, so we excluded it from analysis. Finally, StatCan did not release a large component of the data from 2004, or any of the 2006 CCHS, as PUMF. As such, this report does not include 2002, 2004, or 2006 CCHS data.

The CCHS PUMF contains hundreds of items, many of which may not have an immediate relevance to understanding COPD in New Brunswick. Thus, the research team selected 17 measures believed to be of particular relevance. We present the measures below in graph form at the New Brunswick level and at the health zone level for the seven health zones in the province (shown in Figure 1). We aggregated zones 4/5 and 6/7 into larger geographies to address sample size issues.

Figure 1. New Brunswick health zones



Results

This section contains graphs describing the basic descriptive statistics generated from the available StatCan PUMF. We separated the 17 items into four categories:

1. Demographic information (Sex, Age, Marital Status, Education)
2. Quality of life (Self-Perceived Health, Life Stress, Difficulties with Activities, Needed Help with Instrumental Activities of Daily Living, Work Status)
3. Health behaviours (Smoker Type, Physical Inactivity)
4. Health conditions (BMI, Blood Pressure, Asthma Dx,² Diabetes Dx, Heart Failure Dx, Cancer DX)

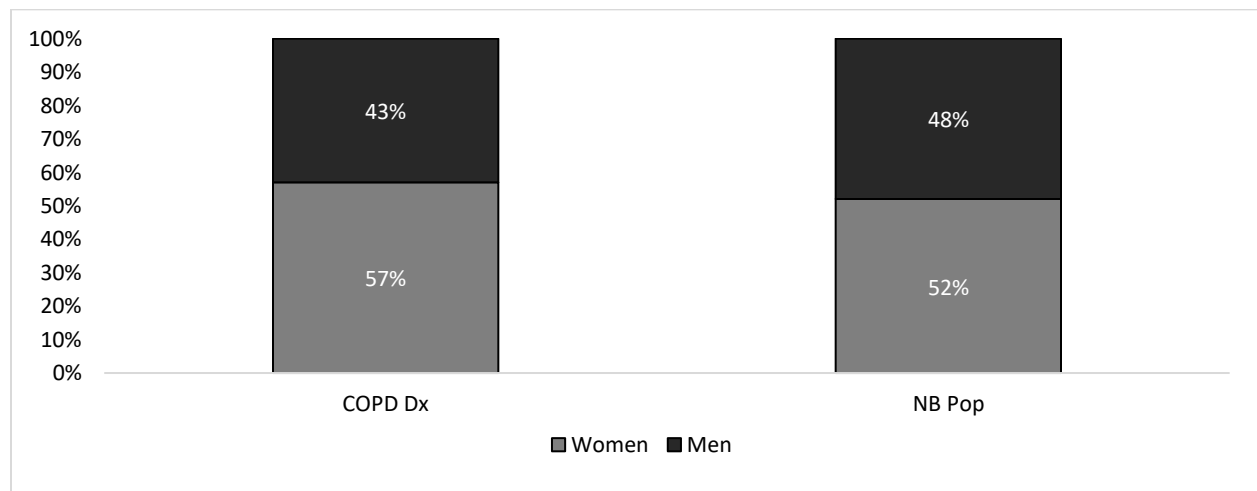
Demographic Information

The demographic information reported below presents the sex, age, marital status, and education levels of individuals with COPD compared to the New Brunswick population more generally.

Sex

Figures 2 and 3 depict the relationship between sex and COPD. At the provincial level, women represent a greater proportion (57%) of individuals who reported a diagnosis of COPD than they do the New Brunswick population (52%). This trend is continued, and often more pronounced, when we disaggregate the statistics to show health zone trends (Figure 3). However, the trend is not universal across the smaller geographies, as health zone 6/7 demonstrates the reverse trend, with men over-represented among individuals who report a COPD diagnosis.

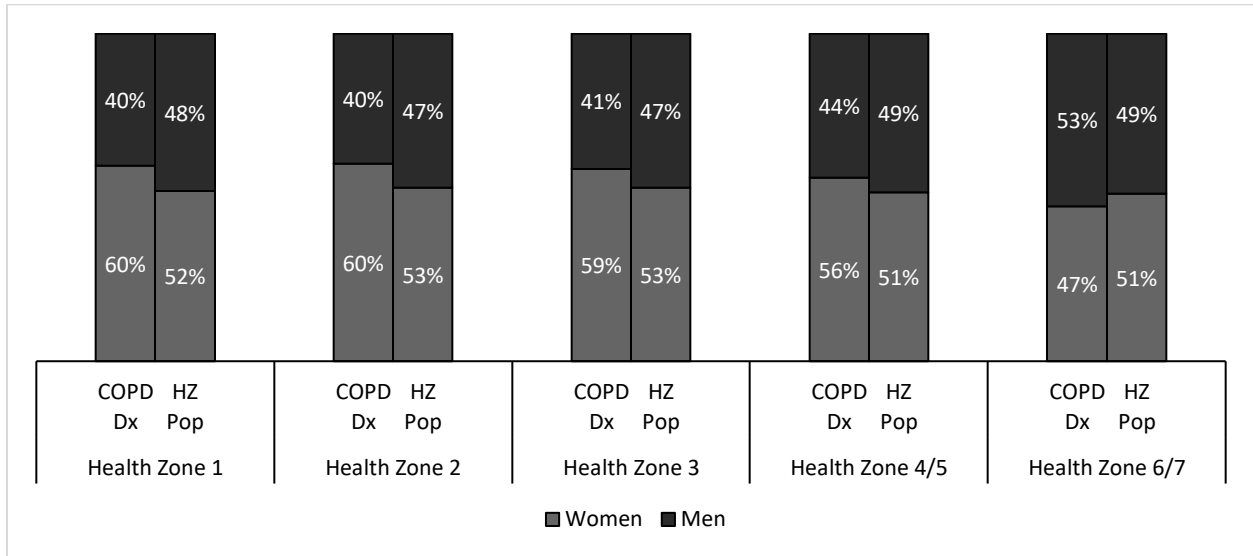
Figure 2. Provincial presentation of sex among individuals with COPD vs. sex among all individuals over the age of 35³



² Dx = diagnosis

³ NB Pop = NB Population throughout the graphs in this report.

Figure 3. NB health zone breakdown of men and women with COPD vs. the distribution of sex for all individuals over the age of 35



Age

Figure 4 describes the relationship between COPD and age distribution in New Brunswick. A primary trend to note is that individuals with COPD are over-represented in the 60-69 (25% vs. 19%) and 70-79 (20% vs. 11%) age categories and are correspondingly under-represented in the 40-49 (17% vs. 28%) category. Figure 5 breaks down the age distribution in the health zone geographies, but there exist no obvious differences from the provincial values.

Figure 4. Provincial presentation of age distribution (35+) among individuals with COPD vs. the age distribution among all individuals over the age of 35

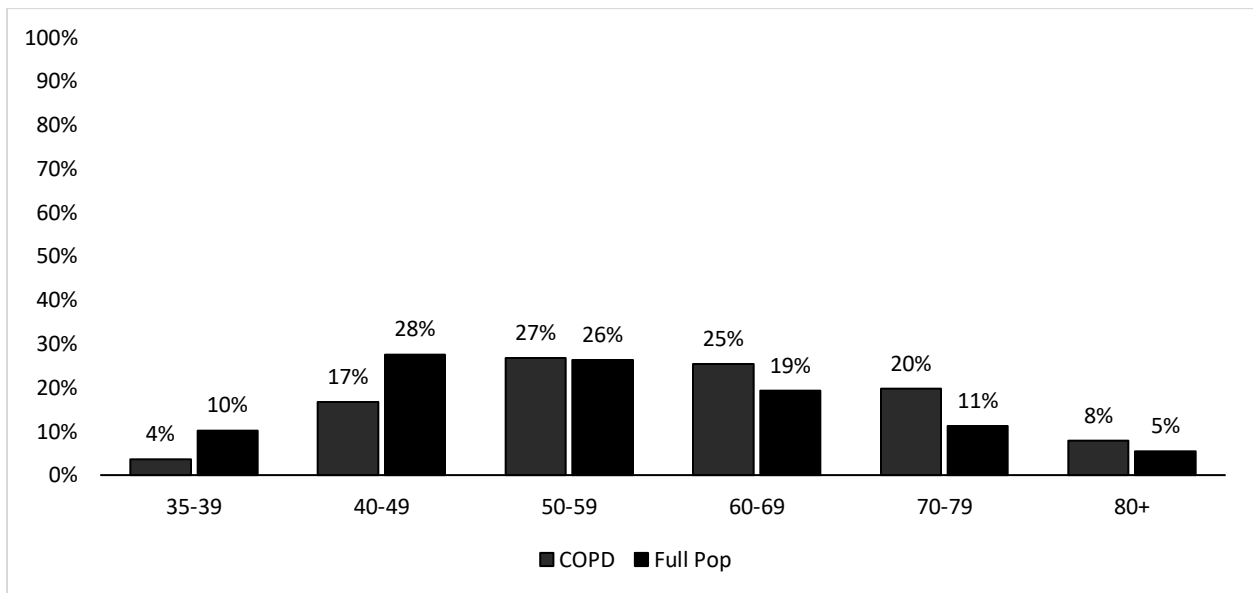
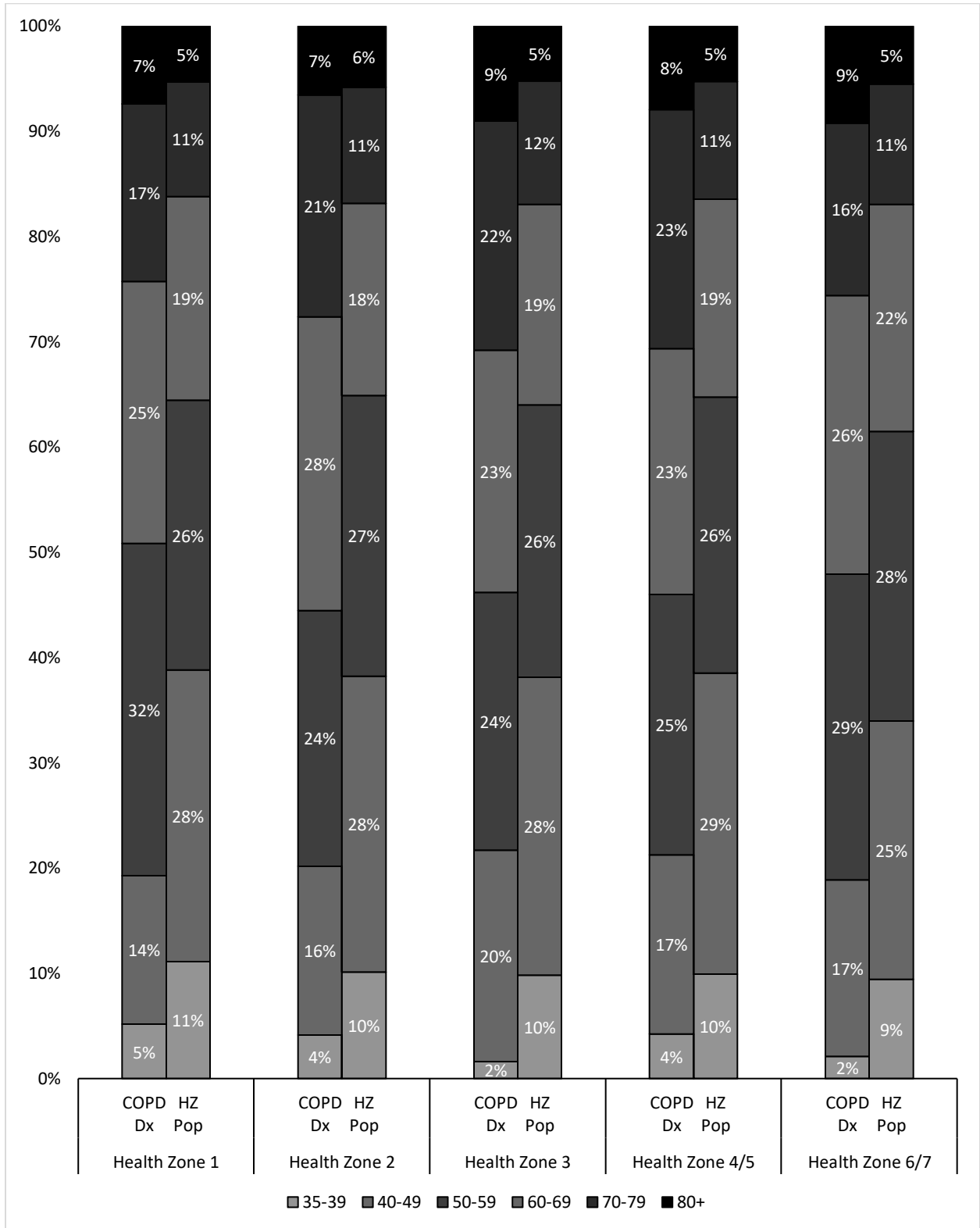


Figure 5. Health zone breakdown of age distribution (35+) among individuals with COPD vs. the age distribution (35+) among the health zone population



Marital Status

Figures 6 and 7 depict the relation between COPD and marital status. At the provincial level, the proportion of individuals (28%) with COPD who have been widowed/separated/divorced is greater than the provincial proportion (17%) with the same marital status. At smaller geographies, the relationship between COPD and marital status mirrors the one seen at the provincial level.

Figure 6. Provincial presentation of marital status among individuals with COPD vs. marital status among all individuals over the age of 35

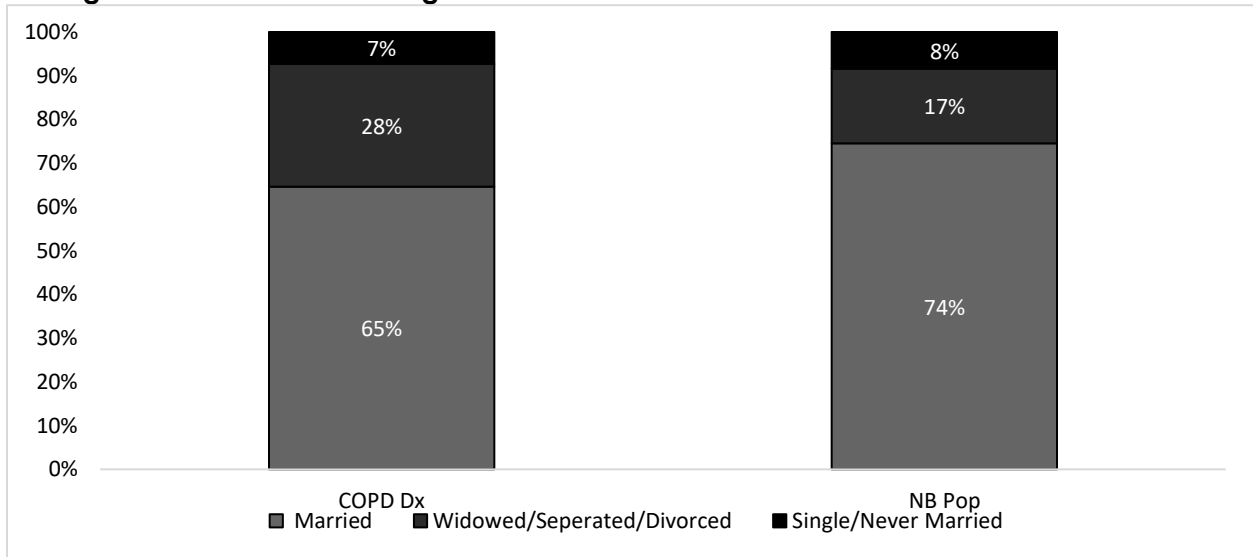
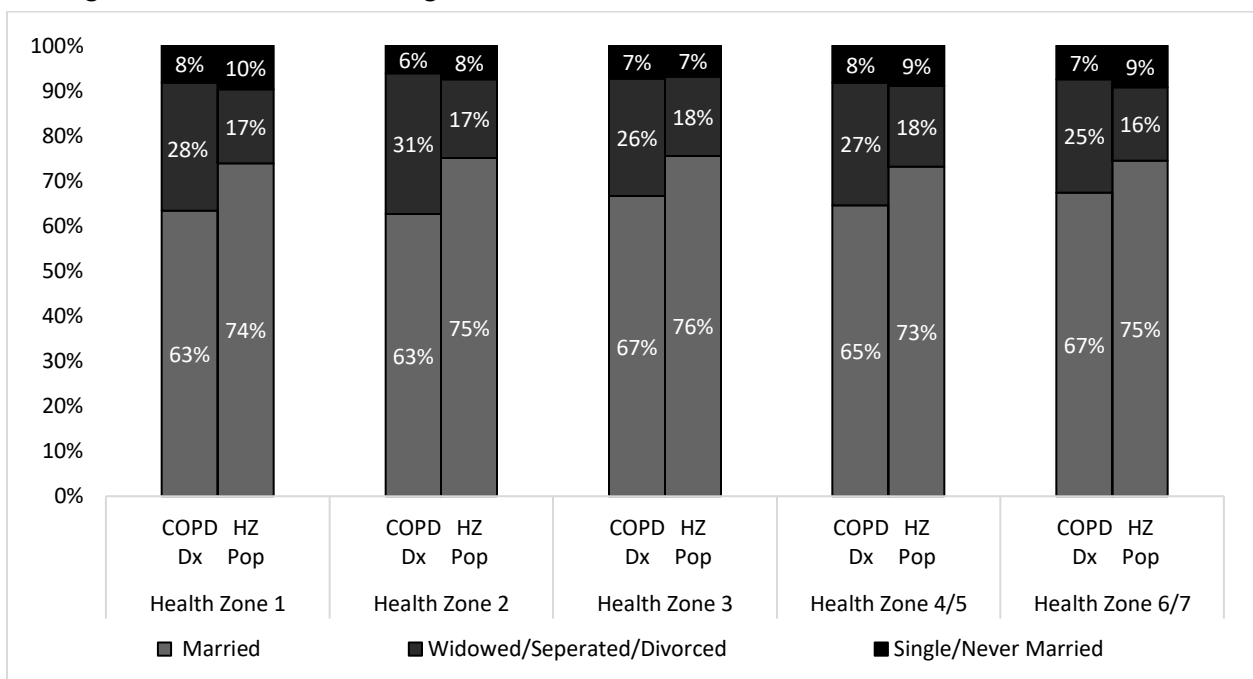


Figure 7. Health zone breakdown of marital status among individuals with COPD vs. marital status among all individuals over the age of 35



Education

Figures 8 and 9 describe the highest level of education obtained by survey respondents. At the provincial level, fewer individuals with COPD attained a post-secondary degree (54%) in comparison to the entire population of NB (64%). Correspondingly, a greater proportion of individuals with COPD attained less than secondary graduation (28%), which is lower than the proportion of the NB population who attained an educational level lower than secondary graduation (17%).

In Figure 9, health zone 4/5 represents a major deviation from provincial trends, with 35% of the population diagnosed with COPD having attained a post-secondary degree, in contrast to the 54% of New Brunswick's population with COPD who attained a post-secondary degree—a difference of 19%. Further, the proportion of the entire population in health zone 4/5 that attained a secondary degree is 11% lower (53% vs. 64%) than the provincial average.

Figure 8. Provincial presentation of educational attainment among individuals with COPD vs. educational attainment among all individuals over the age of 35

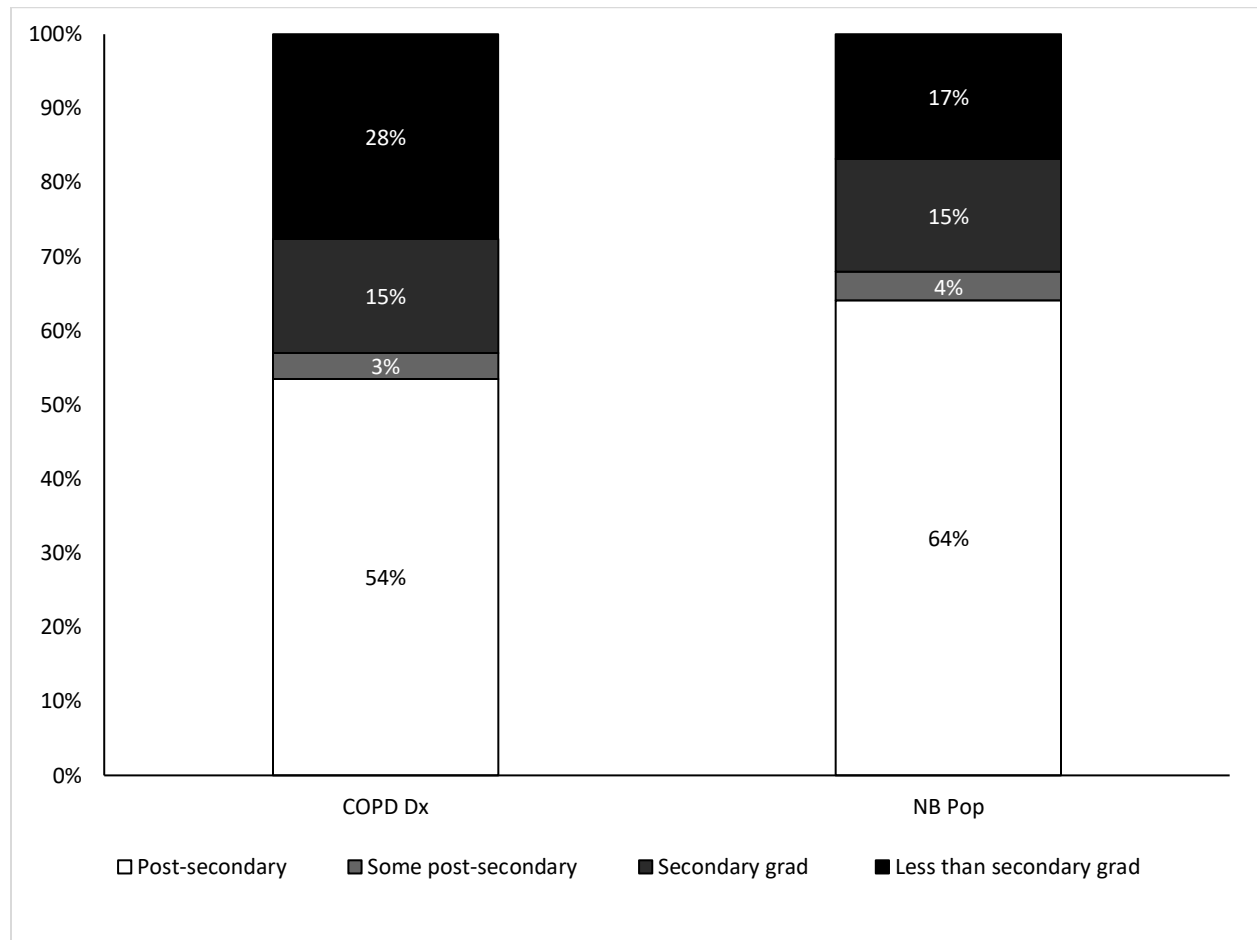
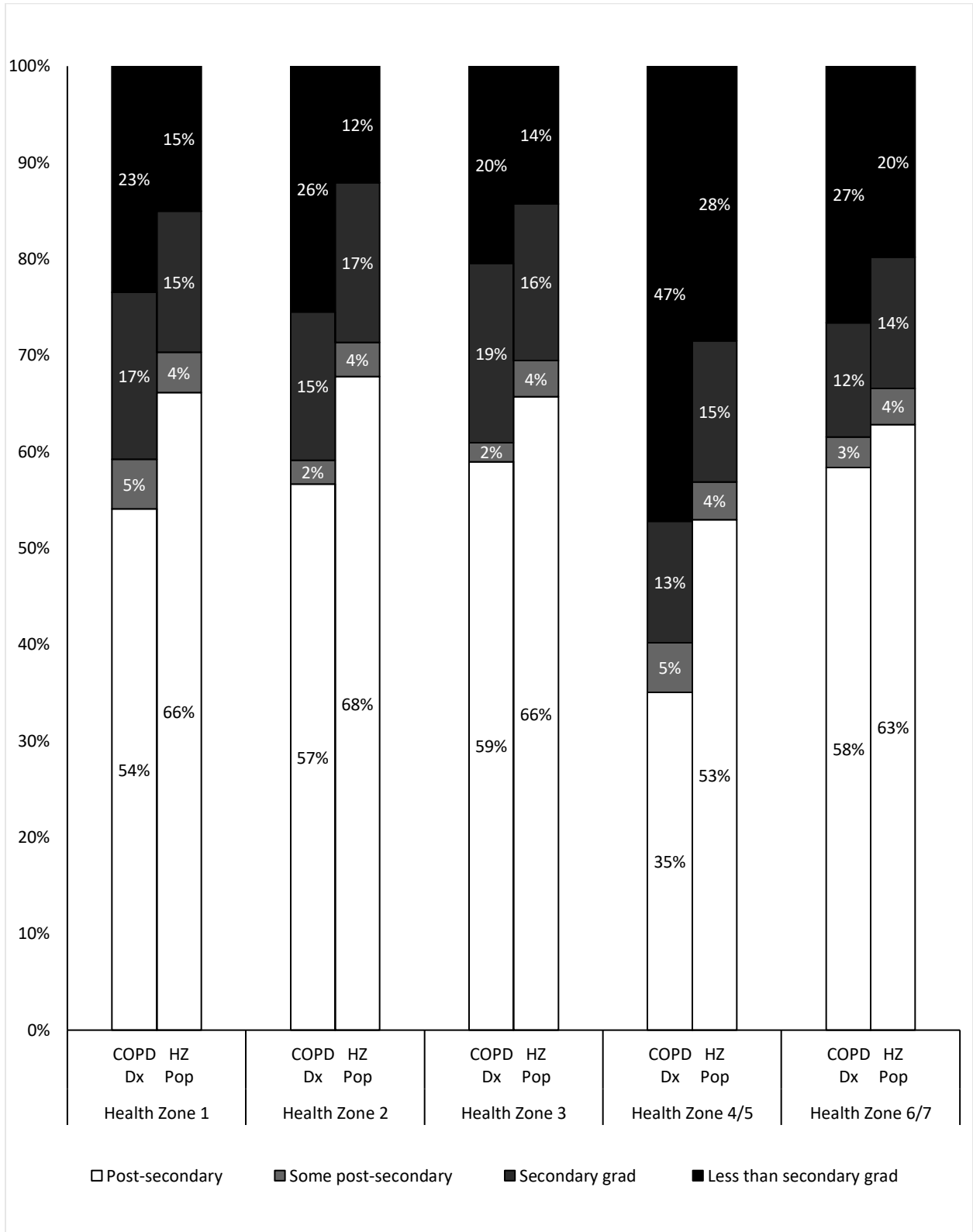


Figure 9. Health zone breakdown of educational attainment among individuals with COPD vs. the educational attainment among all individuals over the age of 35



Quality of Life Information

Quality of life items reported here include self-perceived health, life stress, difficulty with activities, needing help with instrumental activities of daily living, work status in the previous week, and type of work.

Self-Perceived Health

Figures 10 and 11 describe self-perceived health. At the provincial level, 80% of the general respondents in NB reported excellent/very good/good self-perceived health, while only 47% of individuals in NB diagnosed with COPD reported excellent/very good/good self-perceived health.

At the health zone level, two areas deviated observably from provincial values. In health zone 4/5, fewer individuals diagnosed with COPD (41%) reported excellent/very good/good self-perceived health in comparison to the average reporting (47%) of New Brunswickers. Health zone 3 demonstrated the opposite trend, with a higher number of individuals with COPD reporting excellent/very good/good self-perceived health (53% vs. 47%).

Figure 10. Provincial presentation of poor self-perceived health among individuals with COPD vs. poor self-perceived health among all individuals over the age of 35

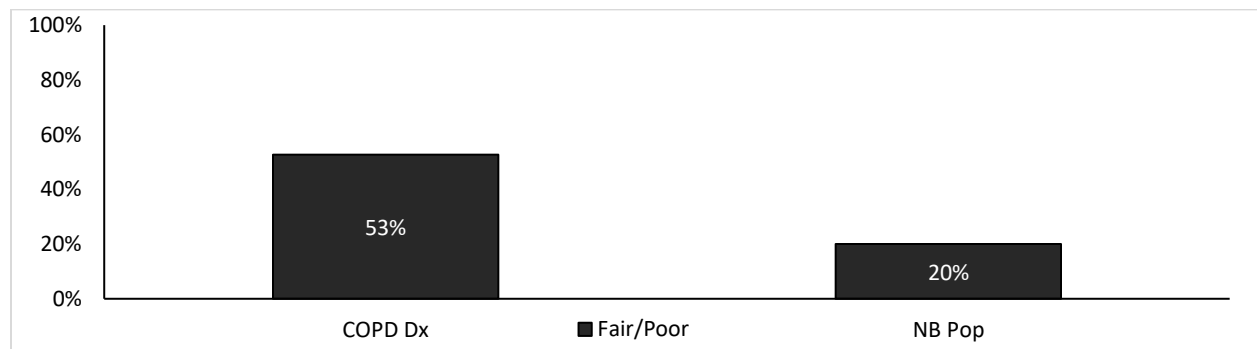
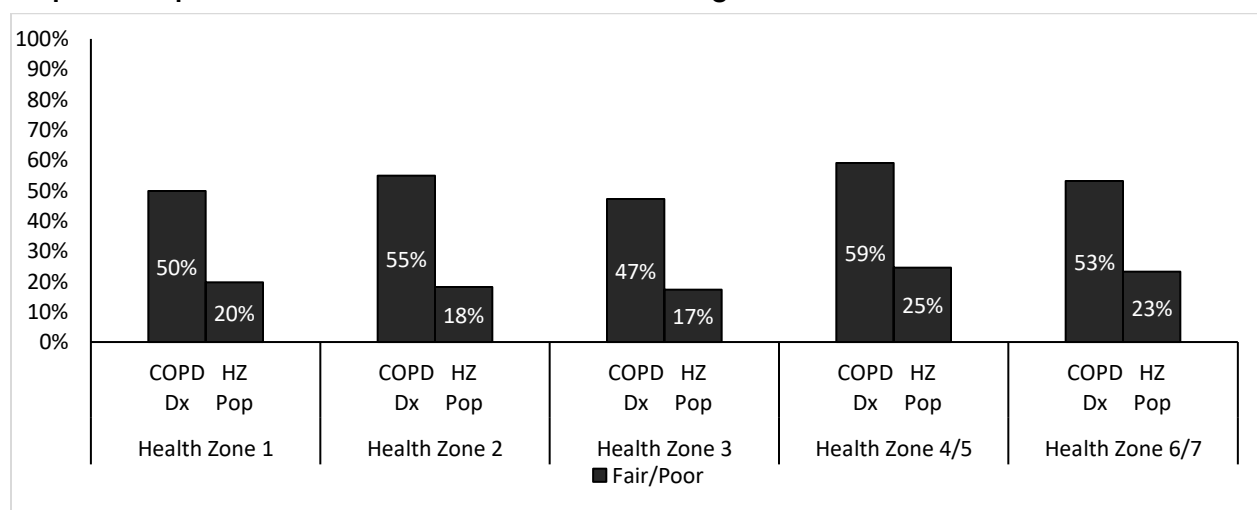


Figure 11. Health zone breakdown of poor self-perceived health among individuals with COPD vs. poor self-perceived health of individuals over the age of 35 in each health zone



Life Stress

Figures 12 and 13 present the relation between COPD and life stress. At the provincial level, more individuals living with COPD (29%) report quite a bit/extreme levels of life stress than seen in the general population (21%). This trend is generally replicated at the health zone level, though health zone 6/7 differs, as more individuals who reported COPD (36%) reported quite a bit/extreme levels of life stress in comparison to the provincial value (29%).

Figure 12. Provincial presentation of the proportion of NBers with COPD reporting quite a bit/extreme levels of life stress vs. the proportion of individuals over the age of 35 reporting quite a bit/extreme levels of life stress

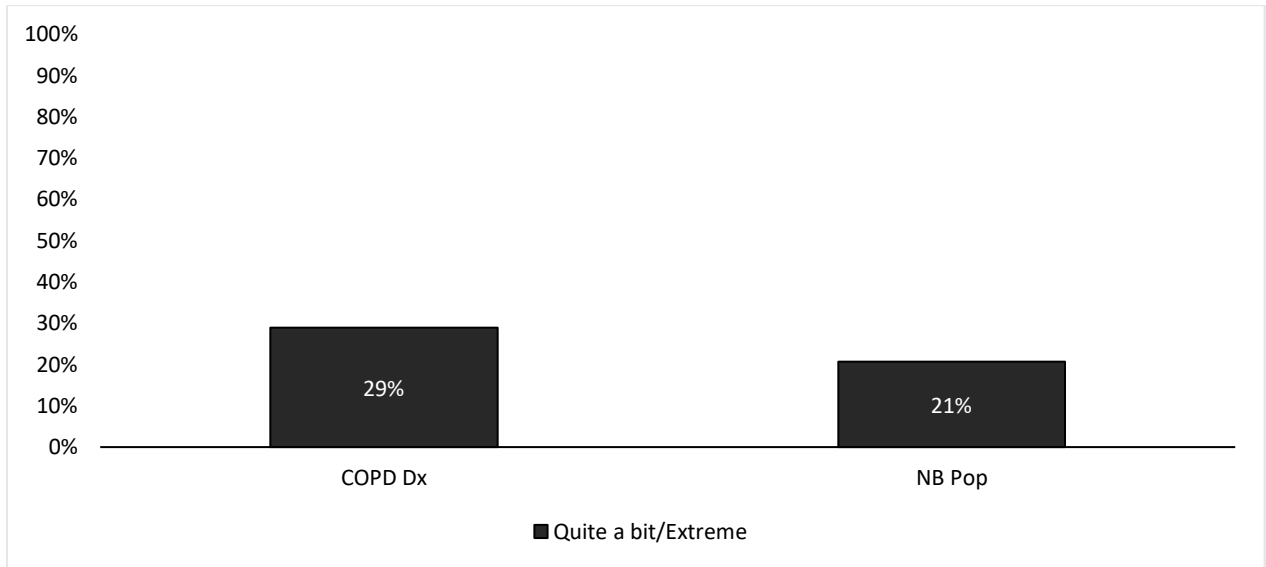
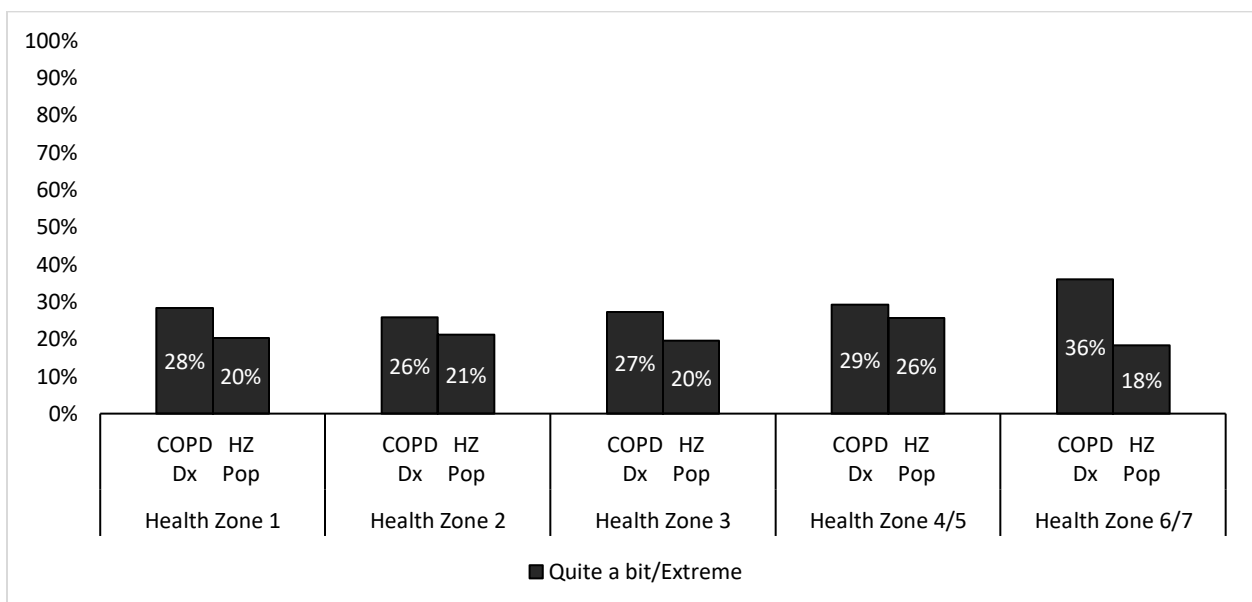


Figure 13. Health zone breakdown of the proportion of individuals with COPD reporting quite a bit/extreme levels of life stress vs. the proportion of individuals over the age of 35 reporting quite a bit/extreme levels of life stress



Difficulty with Activities

Figures 14 and 15 describe the breakdown of individuals having difficulties performing activities. Among all NBers, 67% of individuals reported never having difficulty with activities. In contrast, 36% of individuals who reported a COPD diagnosis reported never having difficulty with activities. Correspondingly, while 16% of individuals in NB reported often having difficulties with activities, 38% of individuals who reported a COPD diagnosis described often having difficulties. These trends were repeated at the lower geographies generally, with health zone 6/7 having a greater proportion (42%) of individuals living with COPD who reported often having difficulties in comparison to the provincial response (36%).

Figure 14. Proportion of individuals with COPD who report sometimes/often having difficulty with activities vs. the proportion of all individuals over the age of 35 who report sometimes/often having difficulty with activities

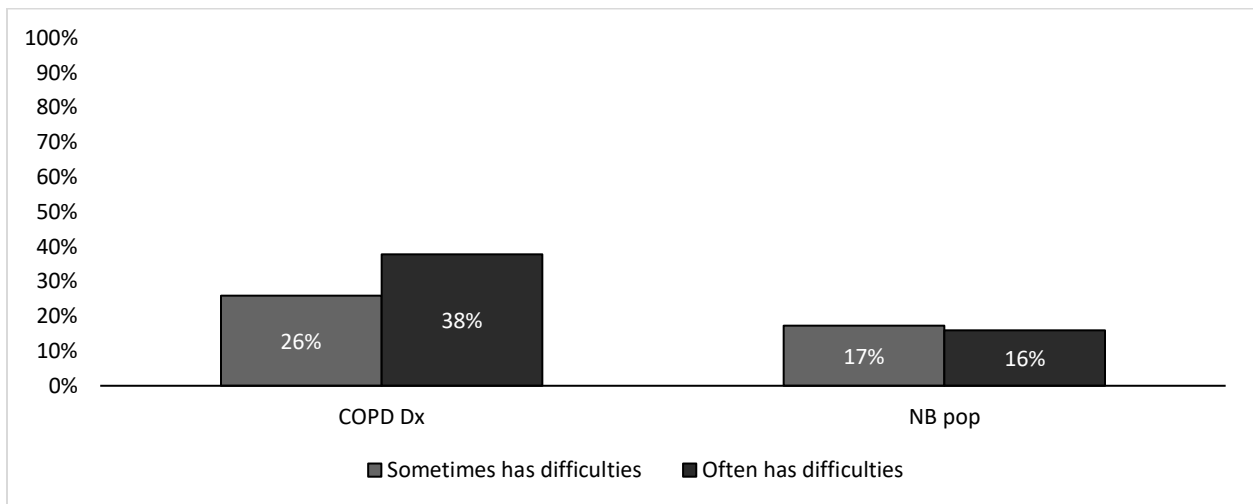
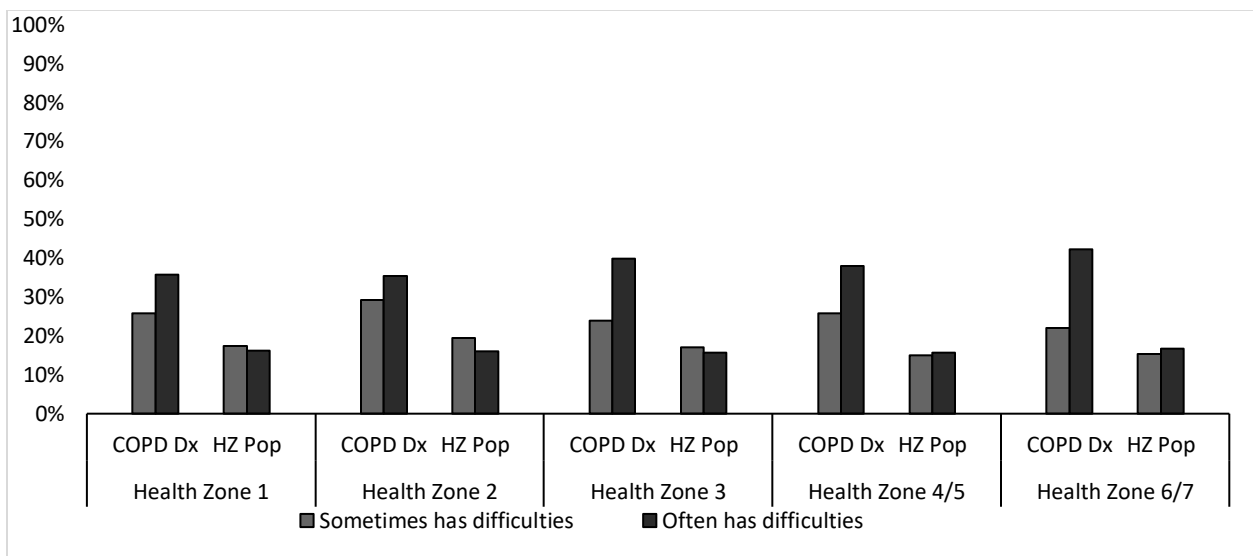


Figure 15. Health zone breakdown of the proportion of individuals with COPD who report sometimes/often having difficulty with activities vs. the proportion of all individuals over the age of 35 who report sometimes/often having difficulty with activities



Needed Help with Instrumental Activities of Daily Living (IADL)

Figures 16 and 17 describe whether individuals needed help with instrumental activities of daily living (IADL). IADLs include activities like preparing meals, getting to and from appointments, doing housework, personal care, moving about inside the house, and looking after finances. Among the entire population surveyed, only 17% of individuals reported needing help with IADLs. In contrast, 41% of individuals with COPD reported needing help. This trend continues in the health zone geographies, though zone 6/7 shows some discrepancy from provincial values.

Figure 16. Proportion of individuals with COPD who reported needing help with instrumental activities of daily living vs. the proportion of all individuals over the age of 35 who reported needing help with instrumental activities of daily living

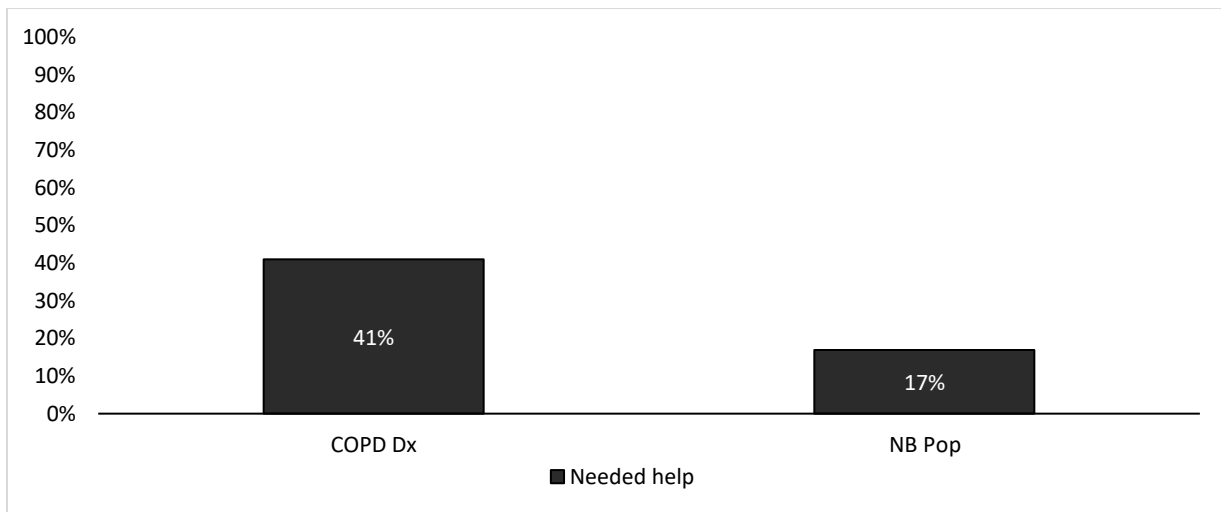
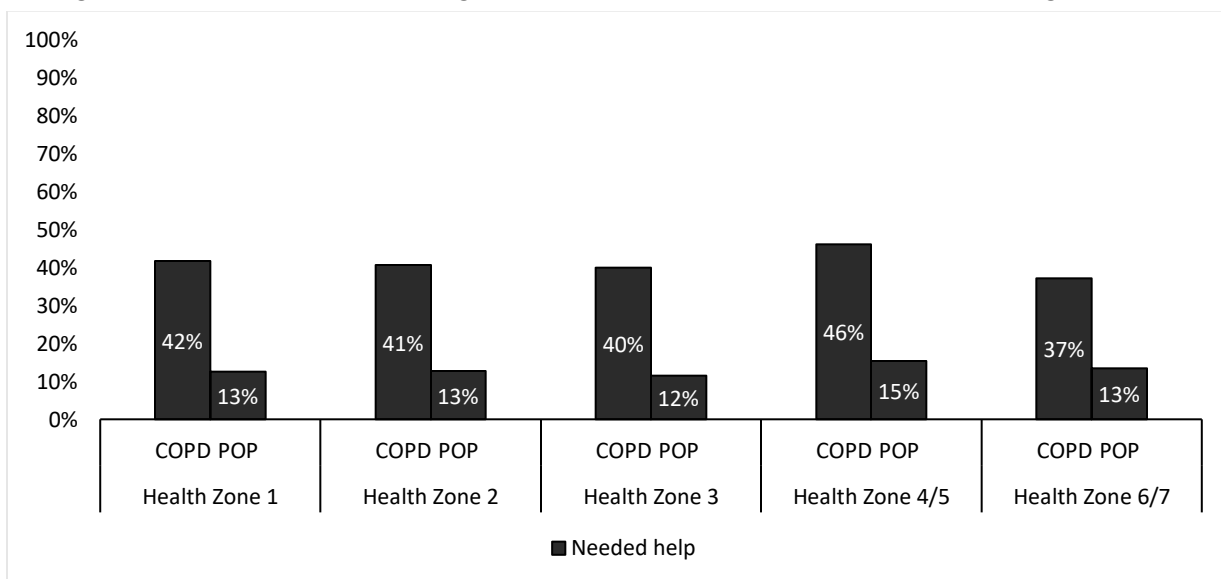


Figure 17. Health zone breakdown of the proportion of individuals with COPD who reported needing help with instrumental activities of daily living vs. the proportion of all individuals over the age of 35 who reported needing help with instrumental activities of daily living



Working Status Last Week

Figures 18 and 19 describe survey respondents' work status during the week prior to their completion of the survey. Across NB, more individuals who reported COPD reported being unable to work/being on permanent disability (16%) compared to the proportion of NBers who reported being unable to work (5%). At the health zone level, few of the health zones had numbers that matched provincial values. In particular, in health zone 4/5, a larger proportion of individuals with COPD (24%) indicated they were unable to work, in contrast to 8% of all NBers in the region.

Figure 18. Proportion of individuals with COPD who reported being unable to work/being on permanent disability vs. the proportion of all individuals over the age of 35 who reported being unable to work/being on permanent disability

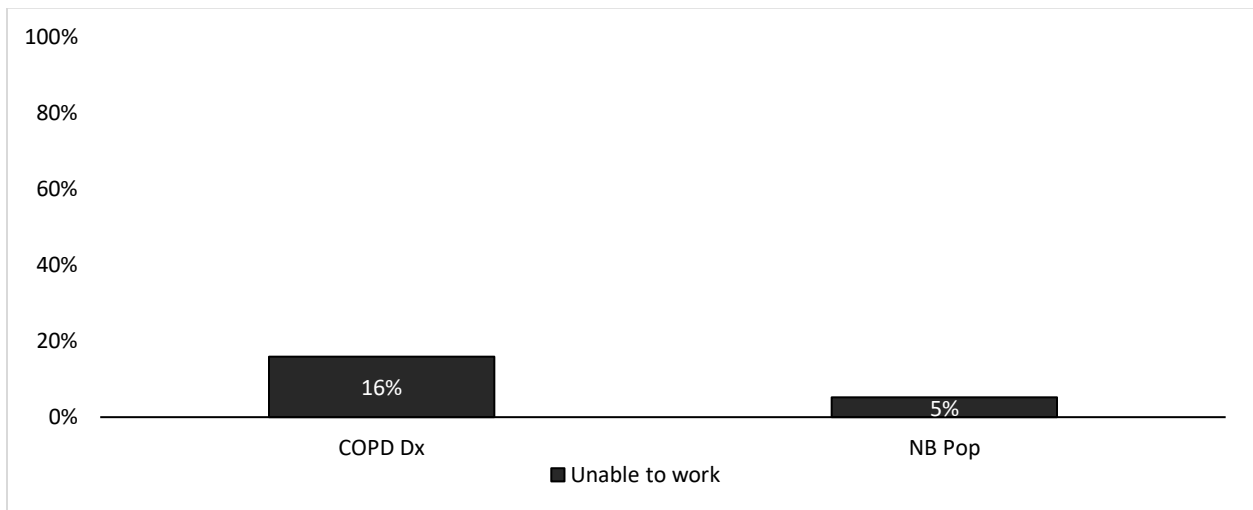
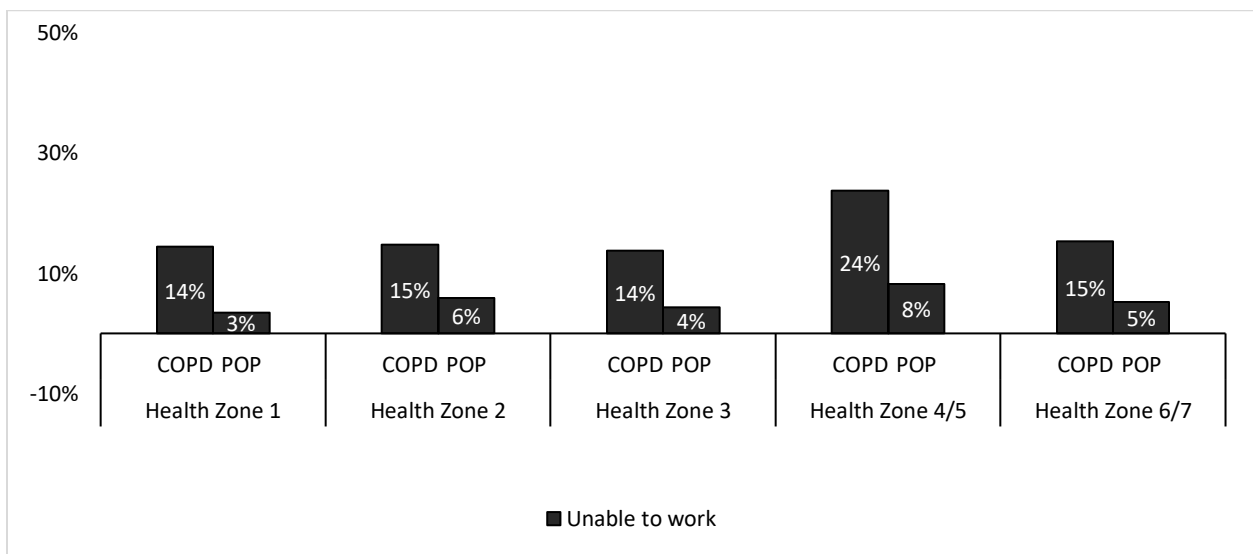


Figure 19. Health zone breakdown of the proportion of individuals with COPD who reported being unable to work/being on permanent disability vs. the proportions of all individuals over the age of 35 who reported being unable to work/being on permanent disability



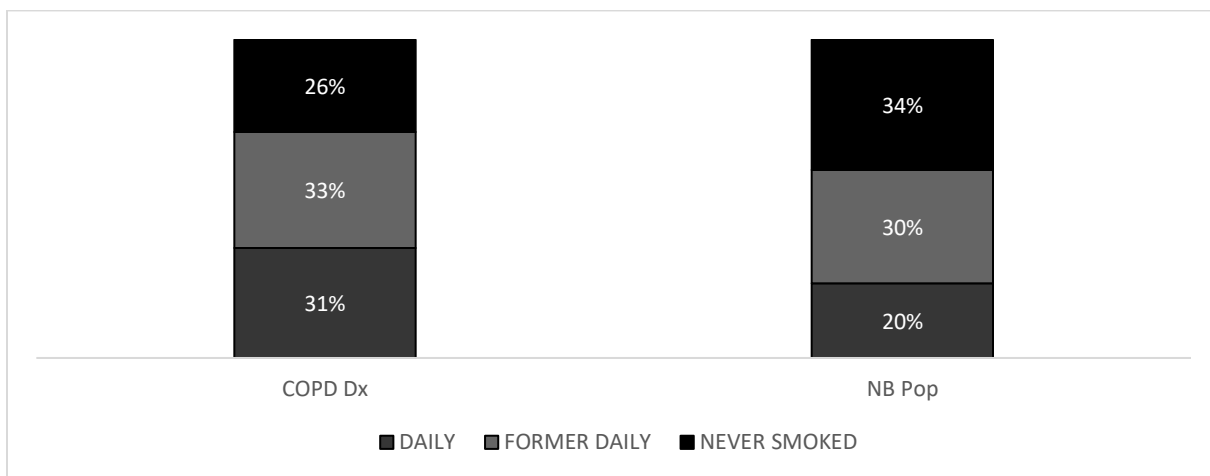
Health Behaviours

Health behaviour items included below account for the relation between COPD and type of smoker and degree of physical activity.

Type of Smoker

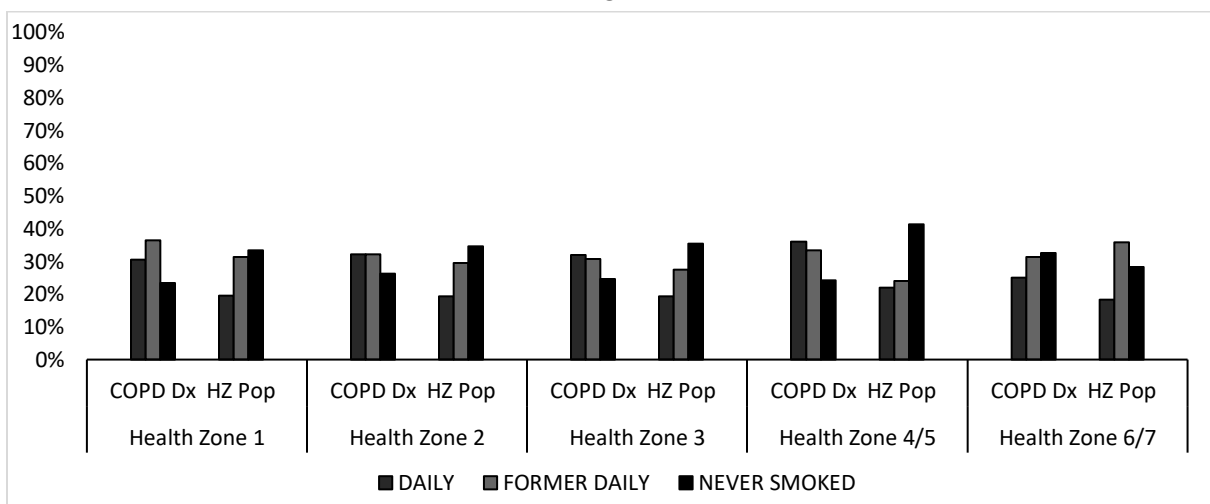
Figures 20 and 21 describe the smoking activity of survey respondents. At the provincial level, daily and former daily (31% vs. 20%) smoking patterns are over-represented among individuals who reported COPD, with never smoking patterns making up a smaller proportion (26% vs. 34%). Similar trends occur at the health zone level.

Figure 20. Proportion of individuals with COPD by reported smoker type vs. proportion of all individuals over the age of 35 by reported smoker type



Note: values will not sum to 100%. We suppressed the "always occasional", "former occasional", and "occasional" smoker categories to facilitate graph legibility.

Figure 21. Health zone breakdown of the proportion of individuals with COPD by reported smoker type vs. proportion of all individuals over the age of 35 by reported smoker type



Note: values will not sum to 100%. We suppressed the "always occasional," "former occasional," and "occasional" smoker categories to facilitate graph legibility.

Physical Inactivity

Figures 22 and 23 describe physical activity levels. At the provincial level, there was a greater proportion (70%) of individuals who reported COPD and reported being inactive (average daily physical activity over the previous three months) compared to the proportion of the general population who reported being inactive (58%). Among the health zones, only 6/7 showed a strong deviation from the provincial values: 63% of the individuals who reported COPD reported being inactive, compared to the provincial value of 70%.

Figure 22. Proportion of individuals with COPD who reported being inactive vs. proportion of all individuals over the age of 35 who reported being inactive

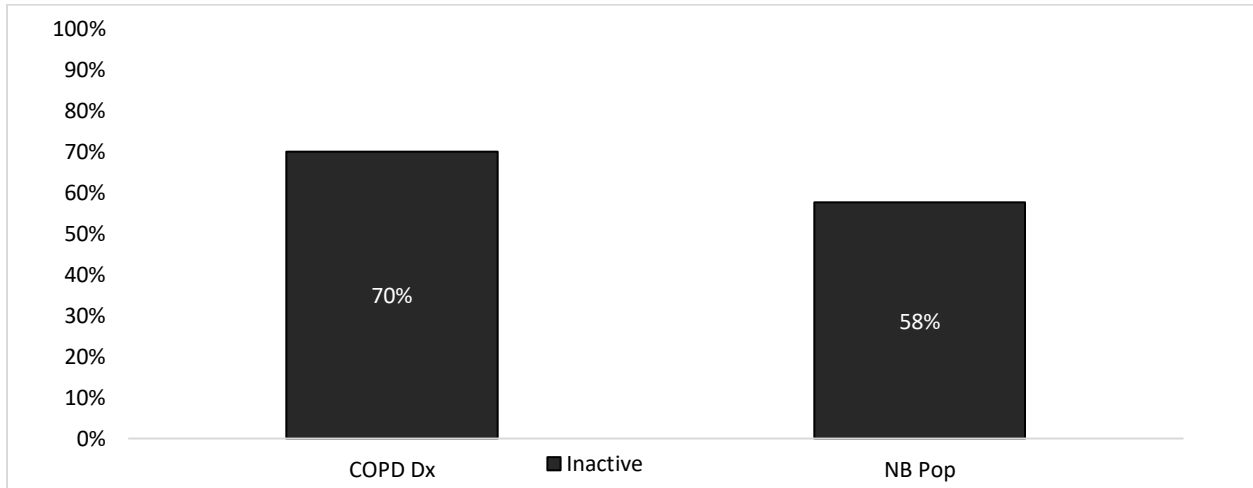
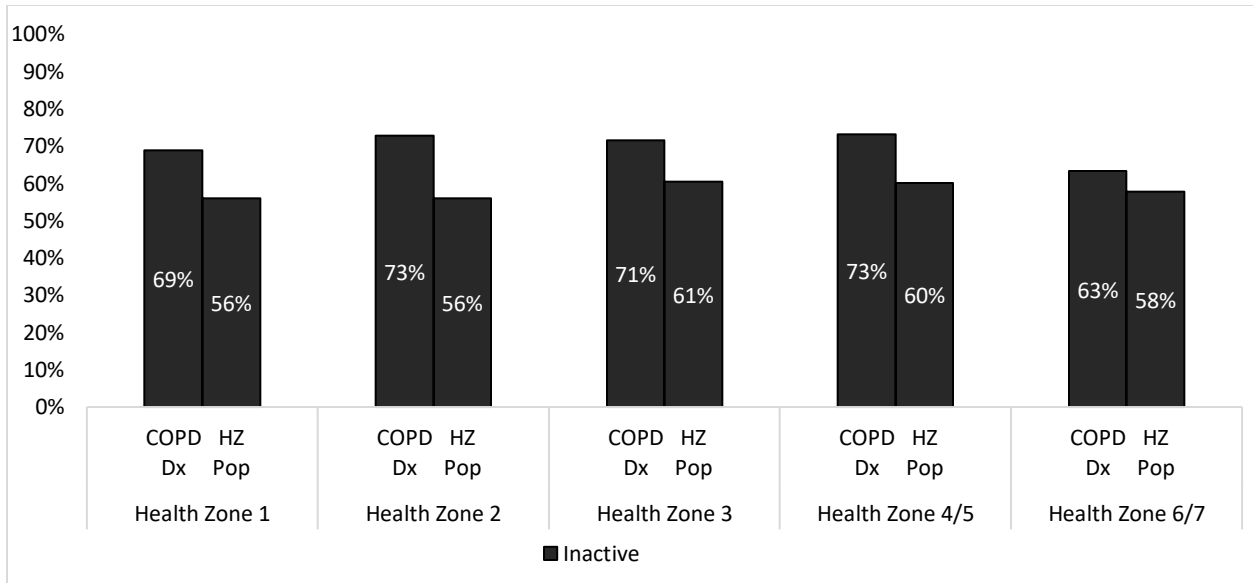


Figure 23. Health zone breakdown of the proportion of individuals with COPD who reported being inactive vs. proportion of all individuals over the age of 35 who reported being inactive



Health Conditions

The health condition items discussed below in relation to COPD include body mass index (BMI), blood pressure, asthma, heart disease, diabetes, and cancer.

Body Mass Index

Figures 24 and 25 describe the distribution of reported BMI. At the provincial level, a greater proportion (51%) of individuals living with COPD reported BMI values that would classify them as overweight or obese, while only 44% of individuals in NB reported BMI values that would classify them as overweight or obese. Among the health zones, while most show similar trends as those observed at the provincial level, health zone 3 has an interesting trend. The proportion of individuals with a BMI that classifies them as overweight or obese is lower than the provincial average among individuals with a diagnosis of COPD (both are 46%) and shows parity to both the health zone and provincial proportions of the entire population.

Figure 24. Provincial presentation of BMI for individuals with COPD vs. BMI for all individuals over the age of 35

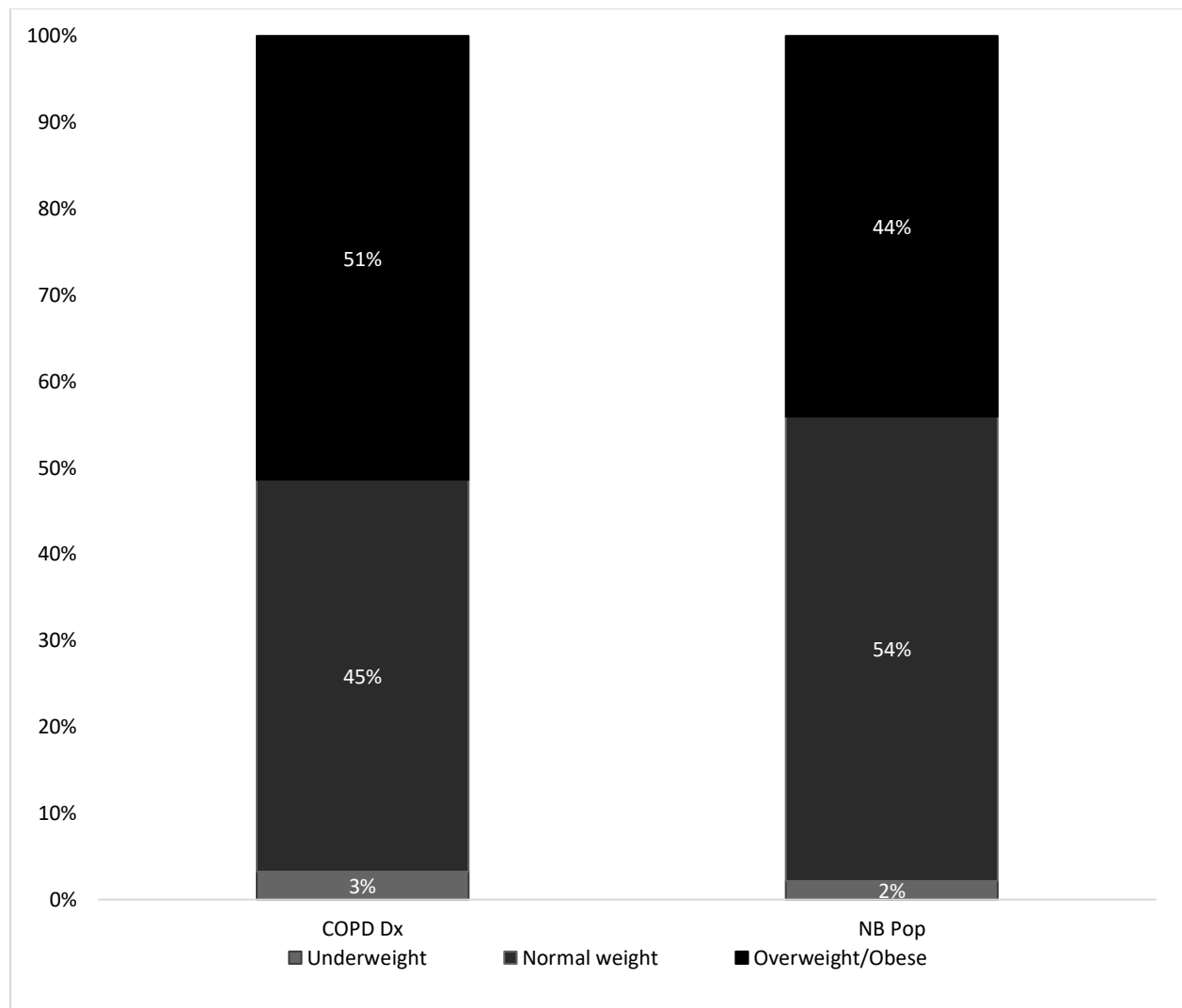
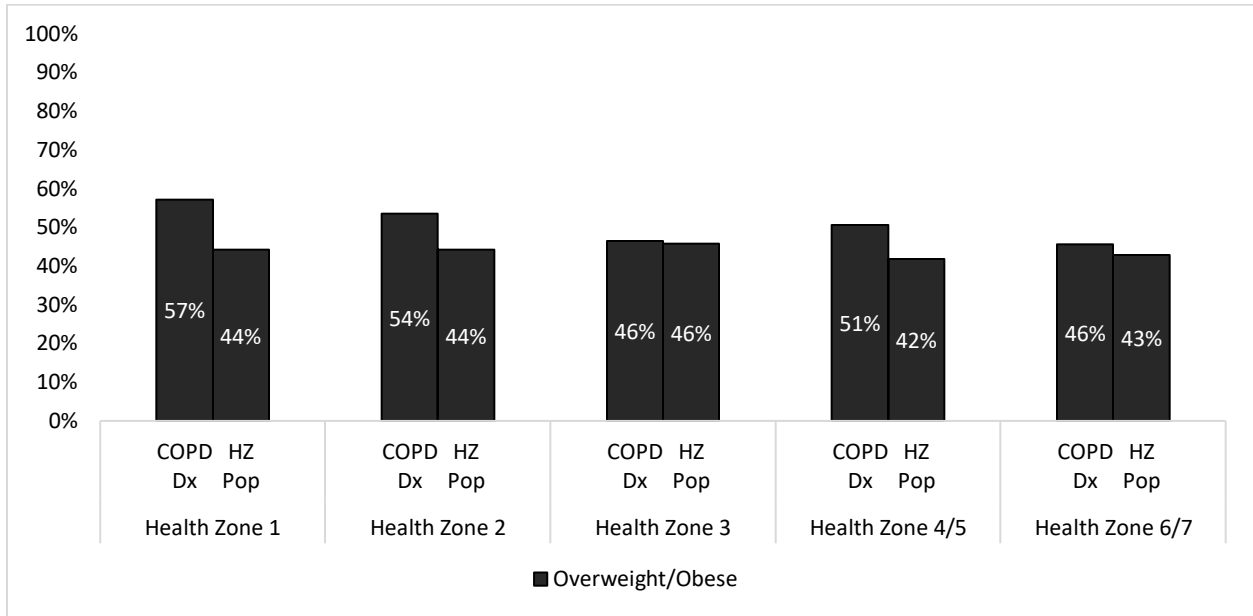


Figure 25. Health zone breakdown of proportion of individuals with COPD whose BMI would classify them as overweight/obese vs. proportion of all individuals over the age of 35 whose reported BMI would classify them as overweight/obese



Blood Pressure

Figures 26 and 27 describe high blood pressure among sample respondents. Provincially, 46% of individuals with a diagnosis of COPD reported high blood pressure, while only 28% of the entire population reported high blood pressure. Similar trends occur among the health zones.

Figure 26. Proportion of individuals with COPD who reported high blood pressure vs. proportion of all individuals over the age of 35 who reported high blood pressure

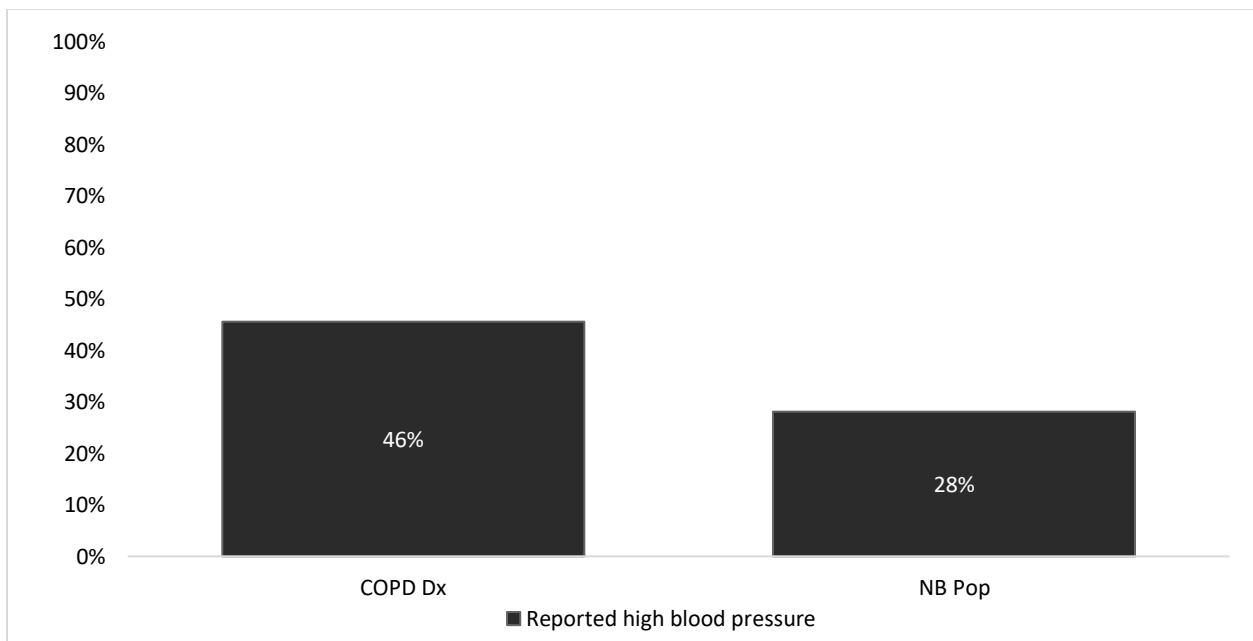
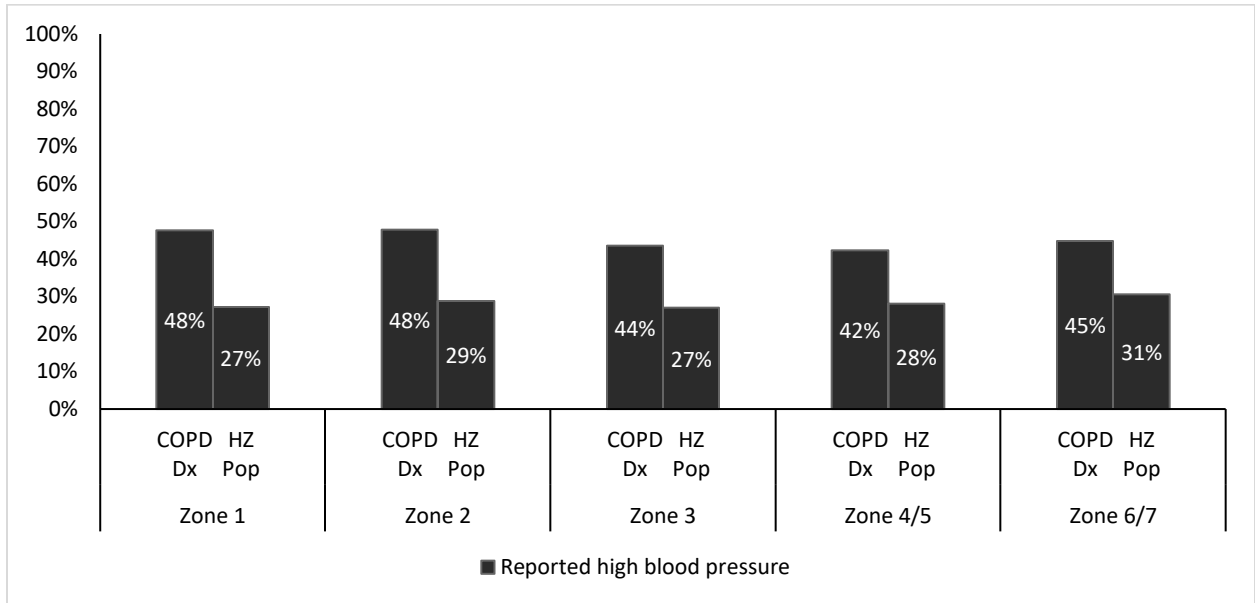


Figure 27. Health zone breakdown of the proportion of individuals with COPD who reported high blood pressure vs. proportion of all individuals over the age of 35 who reported high blood pressure



Asthma

Figures 28 and 29 describe the prevalence of asthma diagnoses. Provincially, 34% of individuals with a diagnosis of COPD also had a diagnosis of asthma, while only 7% of individuals in the full population had a diagnosis of asthma. The health zone geographies demonstrated a great deal of variation from the provincial values. In particular, COPD/asthma comorbidity was higher than the provincial value (34%) in health zones 1 (38%), 4/5 (39%), and 6/7 (40%). Conversely, it was lower in health zone 2 (26%).

Figure 28. Proportion of individuals with COPD who reported an asthma diagnosis vs. proportion of individuals over the age of 35 who reported an asthma diagnosis

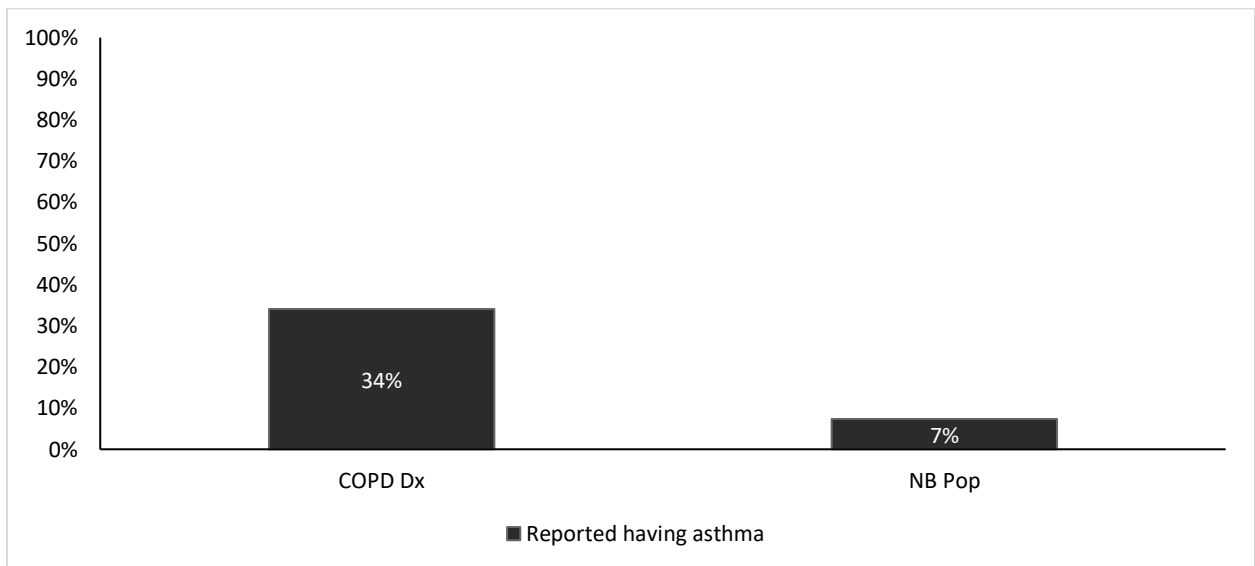
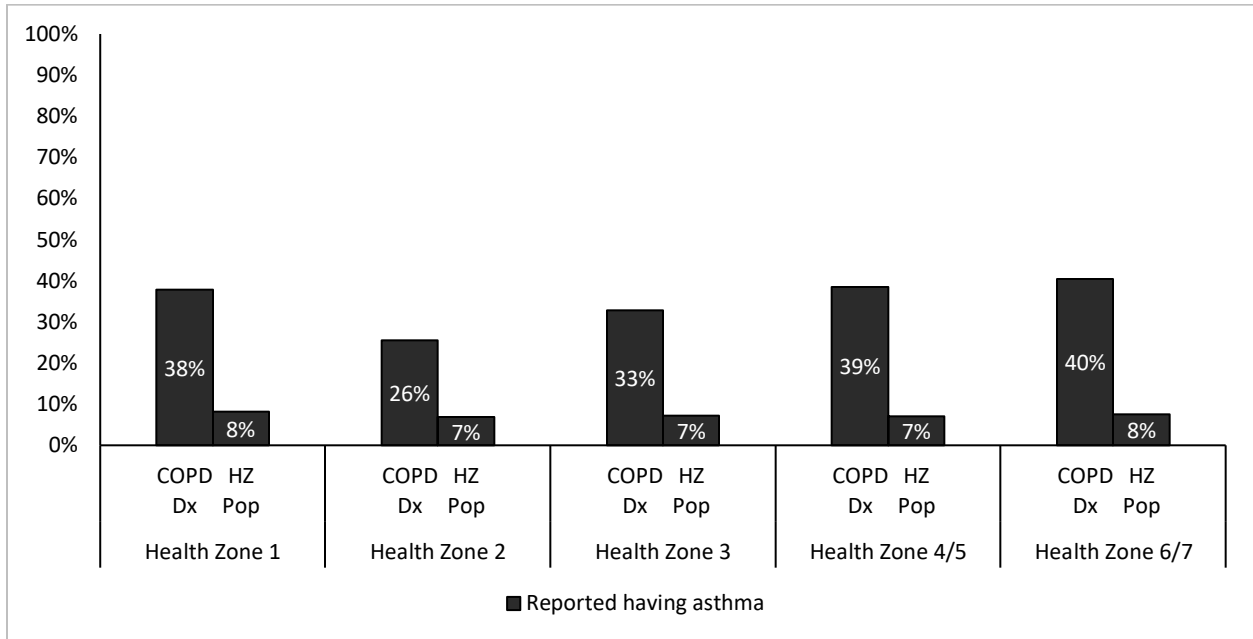


Figure 29. Health zone breakdown of the proportion of individuals with COPD who reported an asthma diagnosis vs. proportion of individuals over the age of 35 who reported an asthma diagnosis



Heart Disease

Figures 30 and 31 describe the prevalence of heart disease diagnoses. Provincially, the comorbidity of COPD and heart disease was 22%. In contrast, the proportion of heart disease diagnoses among the entire population was 10%. The health zones share a similar trend.

Figure 30. Proportion of individuals with COPD who reported a heart disease diagnosis vs. proportion of individuals over the age of 35 who reported a heart disease diagnosis

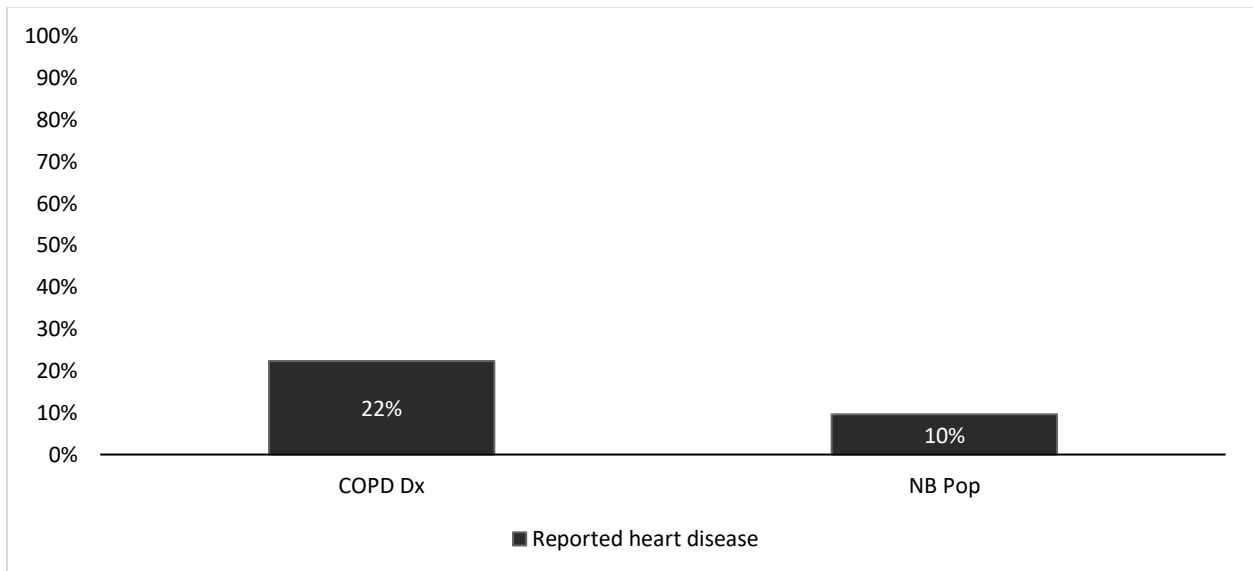
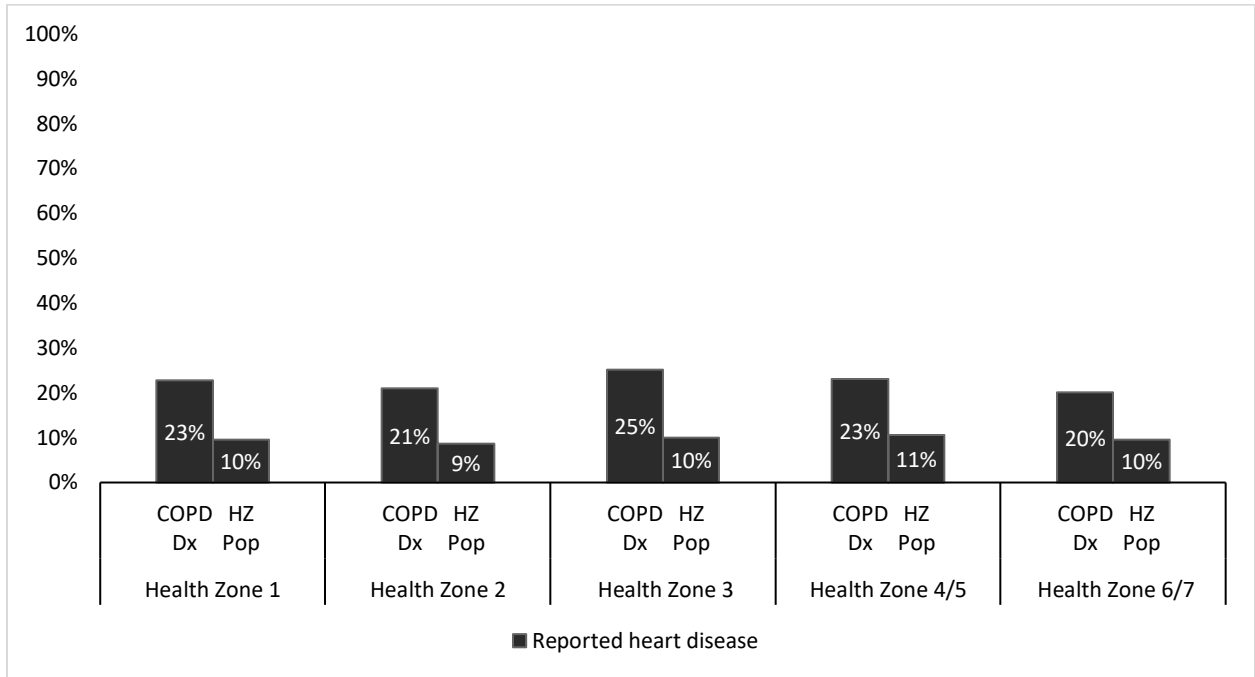


Figure 31. Health zone breakdown of the proportion of individuals with COPD who reported a heart disease diagnosis vs. proportion of individuals over the age of 35 who reported a heart disease diagnosis



Diabetes

Figures 32 and 33 describe the prevalence of diabetes. Provincially, the comorbidity of COPD and diabetes is 15%, while the proportion of diabetes among the entire population is 10%. The health zones share a similar trend.

Figure 32. Proportion of individuals with COPD who reported a diabetes diagnosis vs. proportion of individuals over the age of 35 who reported a diabetes diagnosis

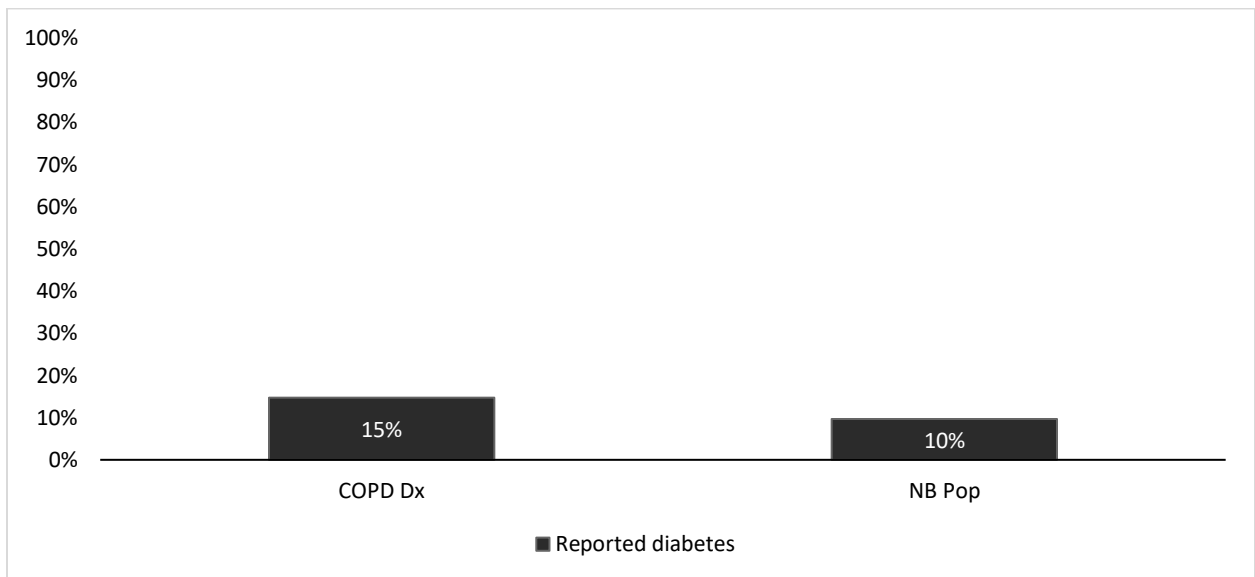
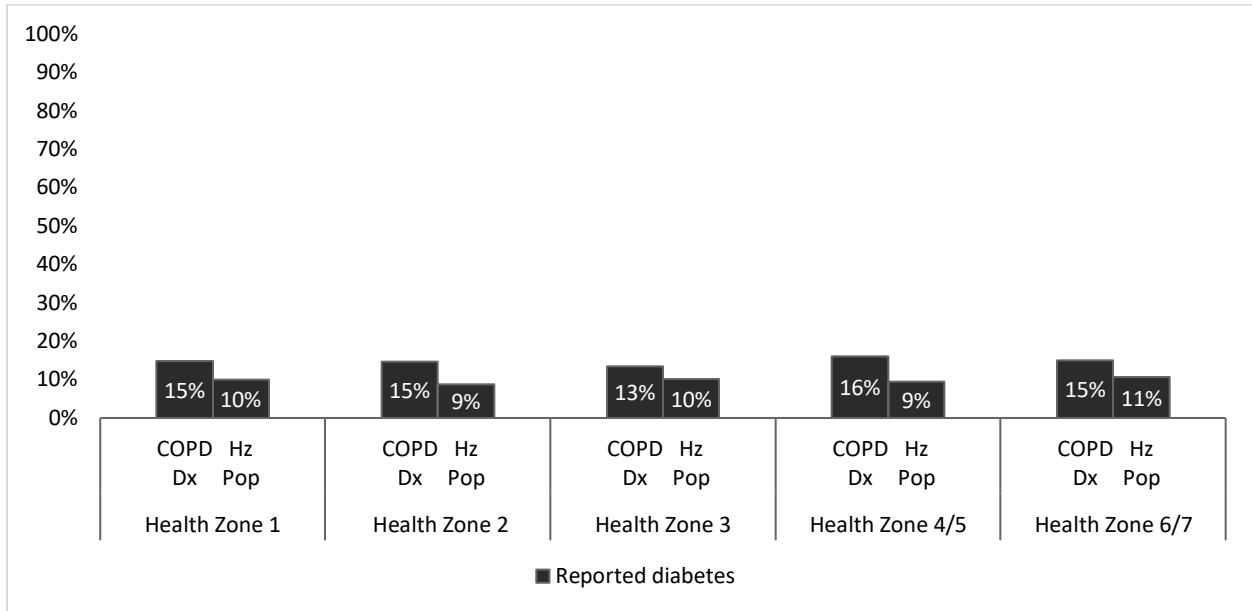


Figure 33. Health zone breakdown of the proportion of individuals with COPD who reported a diabetes diagnosis vs. proportion of individuals over the age of 35 who reported a diabetes diagnosis



Cancer

Figures 34 and 35 describe the prevalence of cancer diagnoses. Provincially, the comorbidity of COPD and reporting ever having cancer is 13%, while the prevalence of cancer among the entire population is 7%. Among the health zones, health zone 1 has a comorbidity rate of COPD and ever having cancer of 18%, while the rates in health zones 2 (11%), 3 (10%), and 4/5 (9%) are all lower than the provincial value.

Figure 34. Proportion of individuals with COPD who reported ever having cancer vs. the proportion all individuals over the age of 35 who reported ever having cancer

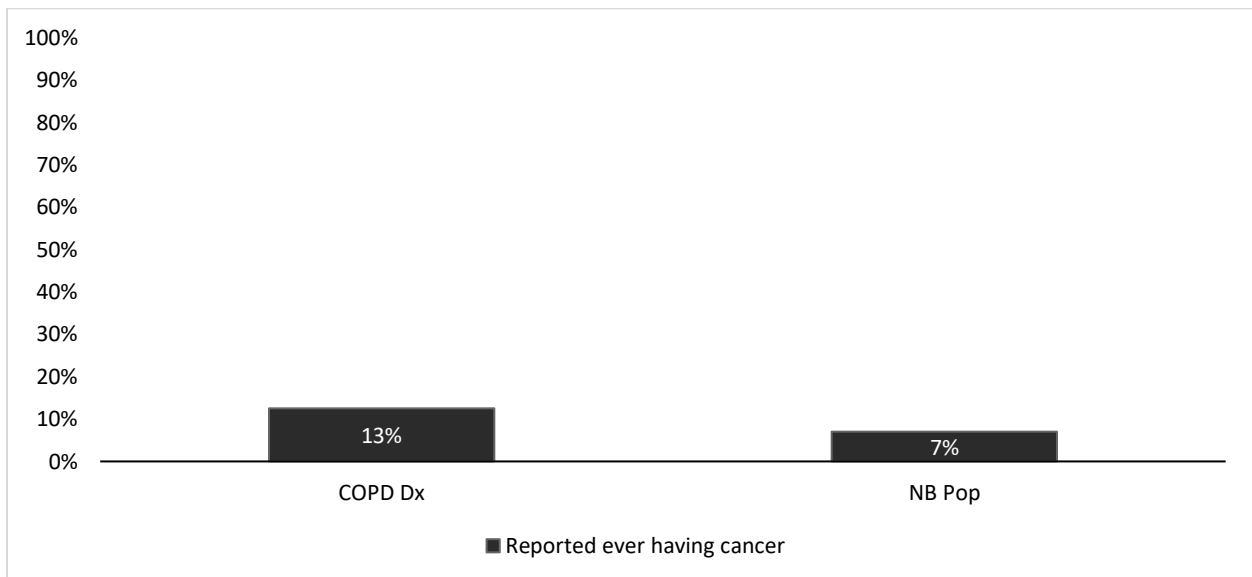
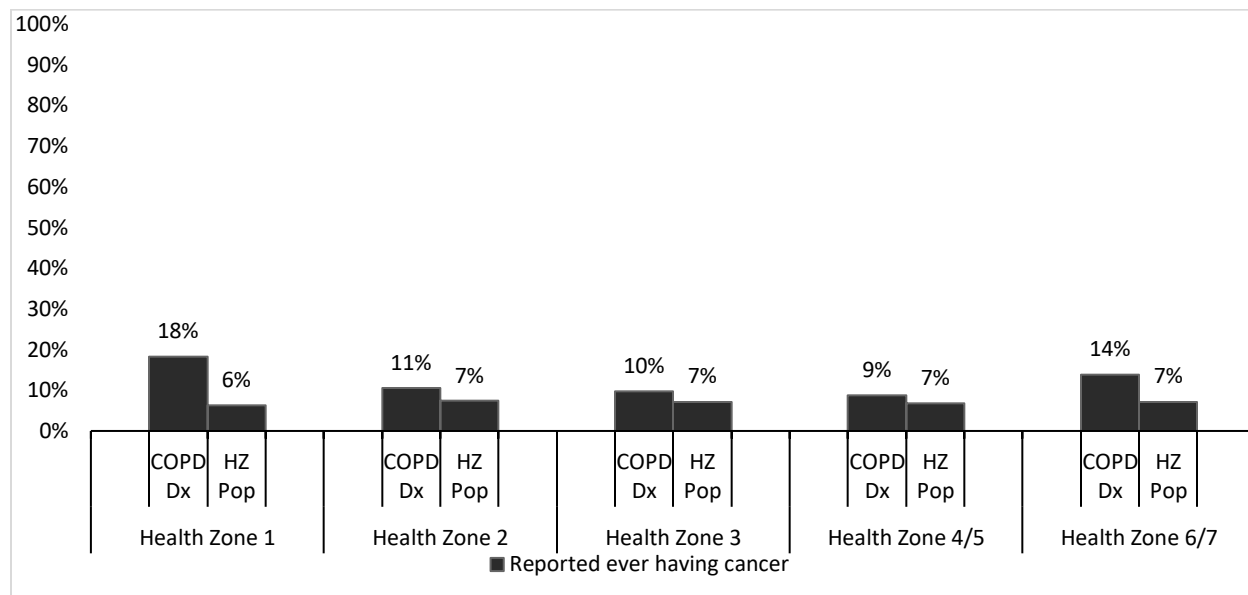


Figure 35. Health zone breakdown of the proportion of individuals with COPD who reported ever having cancer vs. the proportion all individuals over the age of 35 who reported ever having cancer



Summary of Select Results

The findings in this report demonstrate the efficacy of the CCHS, and in particular the CCHS PUMFs for exploring aspects of everyday life often not captured in administrative data systems such as the CCDSS and NB-CHIP—such as social determinants of health, health behaviours, and health status. Broadly, quality of life and health conditions are universally worse among NBers living with COPD, provincially and regionally. Further, specific social determinants of health (marital status of separated/divorced/ widowed, low education, job loss) often associated with poor health outcomes are strongly associated with a COPD diagnosis in New Brunswick.

Table 2 describes a select set of results from the previous section, including both provincial and health zone level findings. Finally, the availability of both provincial and health zone level geographical information allows us to identify the instances when observed health zone level trends deviate from the provincial level trends. These comparisons can allow for more detailed planning and targeted interventions where possible and necessary.

Table 2. Select findings from provincial and health zone comparisons between individuals with a COPD diagnosis and the full population of the area

Covariate	NB level	Health zone level
Marital status	28% of NBers with a COPD diagnosis are “widowed/ separated/divorced,” in contrast to 17% of all NBers	Trend also observed in all health zones
Education	28% of NBers with a COPD diagnosis are “less than secondary grad,” in contrast to 17% of all NBers	Trend observed in HZs as well, but health zone 4/5 has a much larger proportion of adults over the age of 35 reporting an education level “less than secondary grad”:

		<p>28% (in contrast to 17% across NB) for residents of the health zone.</p> <p>The high proportion of adults reporting lower levels of education extends to the population living with COPD, where 47% of individuals reported having an education level “less than secondary grad”</p>
Quality of life	54% of NBers with COPD indicate their “ <i>quality of life is poor,</i> ” while only 20% of all NBers said the same	Similar trend observed in the health zones
Life stress	29% of NBers with COPD indicate experiencing “ <i>quite a bit/ a lot of life stress</i> ”, in contrast to 1/5 of all NBers	Similar trends observed in health zones, except health zone 6/7 , where 36% of residents reporting “ <i>quite a bit of life stress,</i> ” compared to only 18% of all residents of that zone
Difficulties with activities	64% of NBers with COPD indicate they “ <i>sometimes/ often have difficulties with activities,</i> ” in comparison to 33% of all NBers	Similar trend observed in all the health zones, with health zone 6/7 appearing particularly affected
Needed help with IADLs	41% of NBers living with COPD “ <i>needed help with activities,</i> ” in contrast to 17% of the full population	Similar trend observed in the health zones
Working status	16% of NBers with COPD and 5% of the full population indicate they were unable to work	Similar trends in the health zones, except for health zone 4/5 , where almost a quarter of individuals living with COPD were unable to work
Type of smoker	71% of NBers with COPD smoked at some point in their lives, compared to 63% of all NBers	Similar trends in health zones
Blood pressure	46% of NBers living with COPD had <i>high blood pressure,</i> compared to 28% of all NBers	Similar health zone trends
Asthma	37% of NBers living with COPD had <i>asthma,</i> compared to 7% of all NBers	Similar health zone trends
Heart disease	22% of NBers living with COPD had <i>heart disease,</i> compared to 10% of all NBers	Similar health zone trends

CCHS PUMF Limitations

The PUMF data have several limitations worth noting. First, privacy concerns limit the detail of the data available in the PUMF. Often, StatCan aggregates their microdata into larger geographies and categories to address privacy and sample size issues. While we could easily analyze and communicate New Brunswick trends, disaggregating to any lower geography requires compromises in data analysis and presentation.

For example, to present the health zone information included in this report, we had to combine health zones 4 and 5 and 6 and 7 into single units (4/5 and 6/7) to be able to meet the disclosure requirements to report relevant results. While smaller than the province, health zones are still fairly large geographies and, as such, have a greater risk of succumbing to the ecological fallacy—the risk of attributing area-level effects to individuals within an area.

Unfortunately, due to sample size issues and privacy concerns in the PUMF, it was not possible to look at smaller geographies. The collapsing of detail within the PUMF data also prevents us from undertaking complex statistical approaches. For example, to reduce identifiability of the data as described above, the PUMF presents age as a pre-existing categorical variable of ten-year age groupings. This prevents us from fully controlling for age as a confounding variable when looking at the relationship between COPD and other variables.

Another issue associated with CCHS PUMF data is that the data are not complete over the course of the time period we are considering. As noted in the methodology section, this report does not include CCHS PUMF data for 2002, 2004, and 2006. The major issue with this is that it prevents researchers from fully describing the annual incidence of COPD in NB. Finally, due to the cross-sectional nature of the CCHS, it is not possible to follow the experiences of individual respondents over time. Every survey implemented is done with a new cohort of individuals not associated with respondents from previous survey iterations.

CCHS Research Data Centre Access

There are multiple ways to access StatCan data. PUMF is more accessible but has several restrictions in place to protect respondent confidentiality. In instances when CCHS PUMF limitations prove too restrictive to answer research questions, another option is available. StatCan makes available the CCHS microdata files to researchers through their Research Data Centre program. Data available in the RDC have different restrictions in place to protect the confidentiality of respondents. For example, unlike its PUMF counterpart, CCHS data in the RDC can be looked at in much smaller geographies. Further, there are more opportunities for more complex statistical investigation—unlike the PUMF data, where levels variables are collapsed to protect respondent confidentiality, the RDC CCHS permits detailed examination of variables. For example, age can be examined as a continuous variable, rather than as age categories. Further, within the RDC environment, StatCan has linked the CCHS with various other data products such as the Census, Vital Statistics, Taxfiler information, and multiple health service use datasets, allowing even more complex questions to be answered.

The RDC data centres provide increased analytical opportunities at the expense of ease of use, immediate and timely access, and administrative processes associated with accessing the data. Since PUMF data have several built-in methods of protecting confidentiality, they are more readily and immediately available without any administrative requirements. By contrast, accessing data in the RDC requires that interested parties complete an application process and undergo a screening process to increase the safety of the less confidential data.

Conclusion

While the CCHS PUMF data have several limitations, they prove useful in developing a basic understanding of COPD trends in NB, allowing us to examine the relationship between a variety of variables and COPD at both the provincial and health zone levels. Further, the CCHS PUMF has a large number of items to choose from to explore their role in COPD, many of which are not available in other data sources. Finally, the CCHS is a nationally weighted representative sample with relative ease of access compared to other data sources. These strengths allow us to create a detailed report of COPD trends in NB, while the identified limitations provide us with a starting point for future iterations of research.

In particular, the CCHS data allow us to understand how COPD is associated with an individual's quality of life. These are important elements of the burden of COPD that are rarely captured in administrative data sources, and they describe in detail the devastating effects COPD can have on an individual beyond their immediate health. For example, the fact that a much higher proportion of individuals with COPD (Figures 18/19) reports an inability to work in comparison to the general population suggests they may represent a good population to target with some sort of financial aid. It is insights like this that demonstrate the value of the CCHS data.

References

1. Muggah E, Graves E, Bennett C, Manuel DG. Ascertainment of chronic diseases using population health data: a comparison of health administrative data and patient self-report. *BMC Public Health*. 2013;13:16.
2. Singh JA. Accuracy of Veterans Affairs databases for diagnoses of chronic diseases. *Prev Chronic Dis*. 2009;6(4):A126.
3. Lix LM, Yogendran MS, Shaw SY, Burchill C, Metge C, Bond R. Population-based data sources for chronic disease surveillance. *Chronic Dis Can*. 2008;29(1):31-8.
4. Public Health Agency of Canada. Report from the Canadian Chronic Disease Surveillance System: Asthma and Chronic Obstructive Pulmonary Disease (COPD) in Canada, 2018. 2018.
5. Government of New Brunswick Department of Health. Profiles on Health: Chronic obstructive pulmonary disease (COPD) in New Brunswick. 2016.
6. Statistics Canada. Health characteristics, annual estimates 2018 [Available from: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1310009601>]
7. Public Health Infobase. Summary Table: Chronic obstructive pulmonary disease, age-standardized incidence rate, per 100,000, age 35 years and older, Canada. In: PHAC_Infobase_CCDSS_-8585885357273050366, editor. Excel: Public Health Agency of Canada,; 2018.
8. Statistics Canada. Canadian Community Health Survey - Annual Component (CCHS) 2020 [Available from: <https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226>].
9. Statistics Canada. Public Use Microdata File (PUMF) Collection 2011 [Available from: <https://www150.statcan.gc.ca/n1/pub/11-625-x/11-625-x2010000-eng.htm>].
10. University of New Brunswick. Data Services [Available from: <https://lib.unb.ca/gddm/data>].
11. Statistics Canada. Data Liberation Initiative: Nestar.
12. Statistics Canada. Canadian Community Health Survey: Public Use Microdata File. Government of Canada; 2020.
13. Patterns and health effects of caring for people with dementia: the impact of changing cognitive and residential status. *Gerontologist*. 2002;42(5):643-52.