

## Profiles on Health

September 2016

### Chronic obstructive pulmonary disease (COPD) in New Brunswick

Chronic obstructive pulmonary disease (COPD) is a common chronic and progressive disease of the lungs. There are two main forms of COPD: chronic bronchitis and emphysema. The main physical symptoms include shortness of breath, long-lasting cough and sputum production. The disease is most commonly diagnosed in individuals 35 and older; however, damage to the airways and other parts of the lungs may begin years earlier.

More than 3 million people die of COPD each year worldwide, corresponding to 6 per cent of all deaths [1]. Known risk factors have substantial effects on years of life lost to ill health and disability [2]. In North America, tobacco smoking is the most important risk factor. While there is no cure, treatments such as drug therapy (often using inhalers), oxygen therapy or surgery as well as lifestyle changes can help manage the disease.

The leading cause of respiratory failure, COPD exerts a considerable impact on individuals, families and the health-care system. It is a major cause of morbidity and mortality in New Brunswick, Canada and around the world.

#### In this issue:

- Levels and trends of COPD in New Brunswick.
- Health implications of COPD.
- Tobacco use and other contributing factors.
- Opportunities for action.

#### Levels and trends of COPD

New Brunswick's chronic disease surveillance data indicate the incidence of COPD, or number of newly diagnosed cases, has experienced some year-to-year fluctuations during the past decade but has generally remained stable (Figure 1). In 2013-14 there were 4,450 new cases of physician-diagnosed COPD among New Brunswickers 35 and older, representing a three-per-cent overall change in the numbers compared to a decade earlier (4,320 new cases in 2003-04).

There were more new cases in men than women in 2013-14 (2,250 versus 2,200). The incidence rate has remained higher among men during the



An estimated **1 in 9** New Brunswickers 35 and older has been diagnosed with COPD.



COPD is more common in older age groups. Among those 65 years and older, **1 in 5** has the disease.

past decade although the gender gap is narrowing.

As people are living longer, the prevalence (or total number of cases) of COPD continues to increase. An estimated 57,340 (one in 9) New Brunswickers 35 and older are now living with diagnosed COPD. This represents a 45-per-cent increase in the numbers from a decade earlier (Figure 2).

Because COPD is a chronic disease, the proportion of people with COPD tends to increase with age, such that one in five persons 65 and older has the disease. The prevalence rate among individuals 85 and older is some

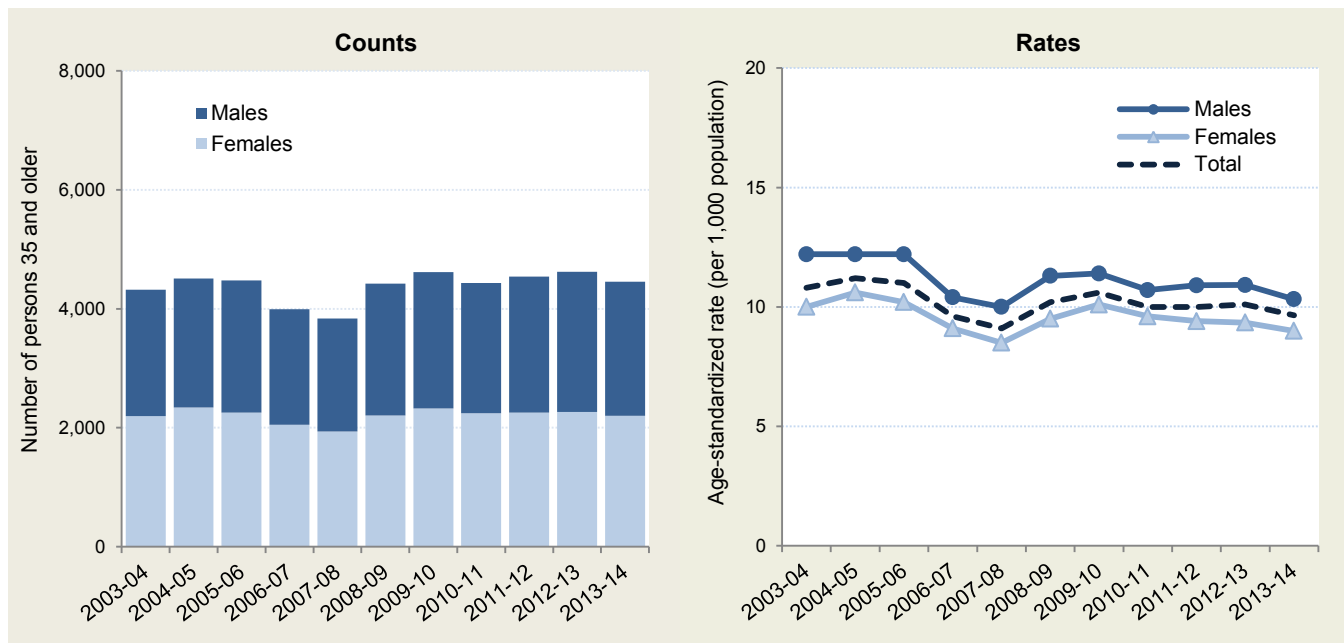
30 times higher than among those 35 to 39 (280 versus 9 per 1,000 population) (Figure 3) [3]. As the population ages, the number of New Brunswickers living with COPD is likely to continue to increase [4]. This includes moderate to severe cases of COPD as well as mild cases that are well managed.

COPD was once much more common among men than women; this is now changing. In 2013-14, more women in New Brunswick lived with the disease than men (29,630 versus 27,710), whereas a decade earlier prevalence counts had been lower among women than men (19,360 versus 19,640 in 2003-04).

Part of the change can be attributable to shifting demographics, given the aging of the population and women's greater longevity. Adjusting for population age structure to allow for meaningful comparisons over time, the prevalence rate of COPD is found to have increased faster among women in recent years such that the gender gap narrowed considerably, but it remains higher among men (Figure 2).

Data from the Canadian Community Health Survey (CCHS) on self-reported rates of having been diagnosed with COPD confirm the pattern of higher prevalence among male

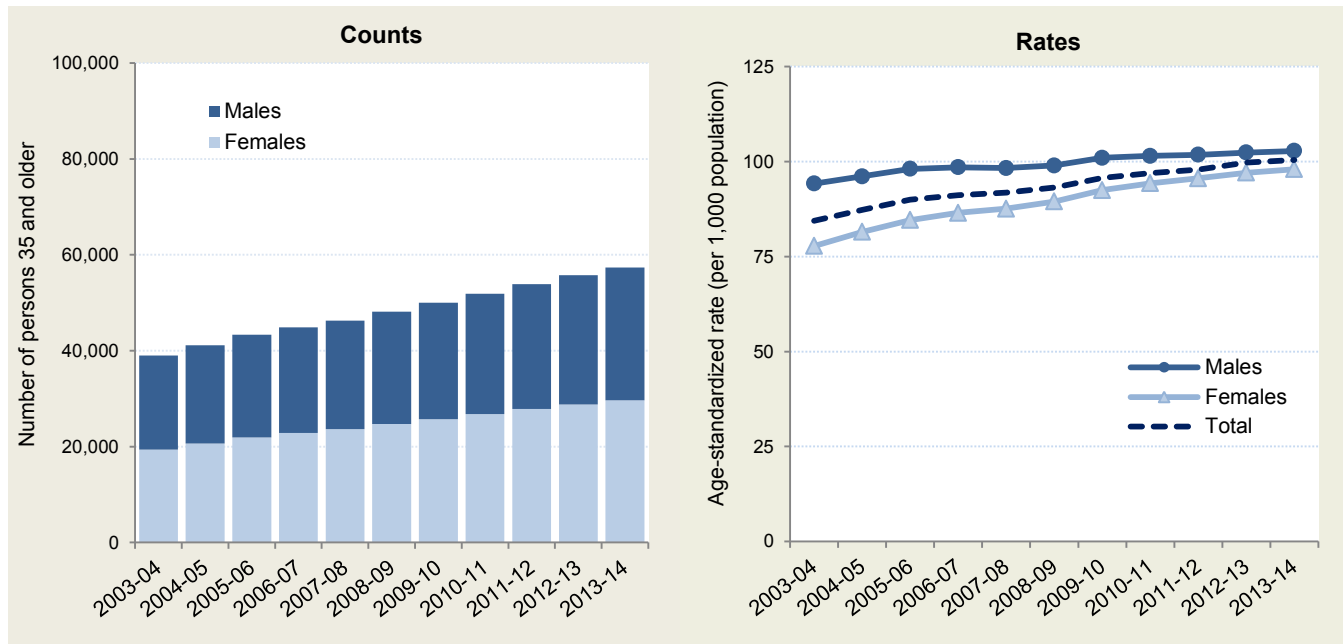
**Figure 1: Trends in the incidence (new cases) of COPD, by gender, New Brunswick, 2003-04 to 2013-14**



**Note:** Data on physician-diagnosed COPD among New Brunswick residents based on tracking of individuals' interactions with the health-care system integrating various health administrative databases. Rates for the population 35 and older are age-standardized against the 1991 Canadian Census demographic structure, to allow for meaningful comparisons across groups with different population age distributions.

**Source:** New Brunswick Department of Health, using the Canadian Chronic Disease Surveillance System infrastructure and case definitions.

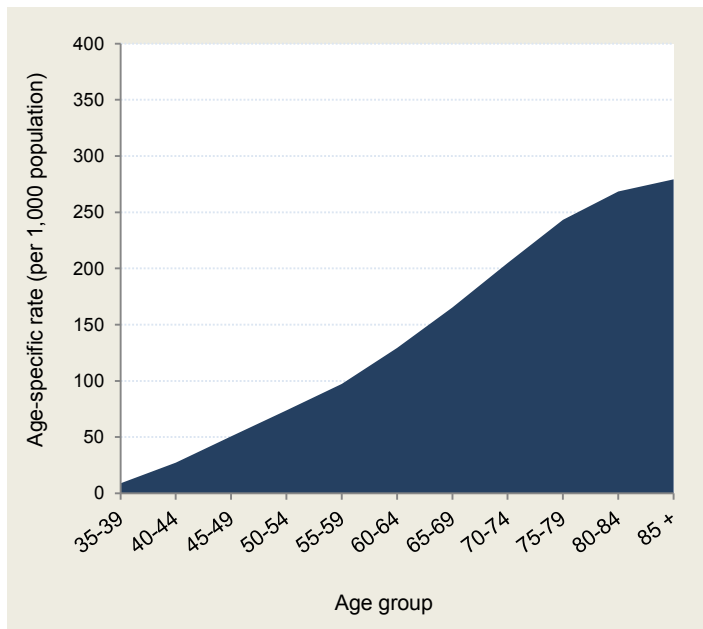
**Figure 2: Trends in the prevalence (total cases) of COPD, by gender, New Brunswick, 2003-04 to 2013-14**



**Note:** Data on physician-diagnosed COPD among New Brunswick residents based on tracking of individuals' interactions with the health-care system integrating various health administrative databases. Rates for the population 35 and older are age-standardized against the 1991 Canadian Census demographic structure, to allow for meaningful comparisons across groups with different population age distributions.

**Source:** New Brunswick Department of Health, using the Canadian Chronic Disease Surveillance System infrastructure and case definitions.

**Figure 3: Prevalence of COPD by age group, New Brunswick, 2012-13**



**Note:** Data on physician-diagnosed COPD among New Brunswick residents.

**Source:** New Brunswick Department of Health, using the Canadian Chronic Disease Surveillance System infrastructure and case definitions.

New Brunswickers compared to females (5.6 per cent versus 4.8 per cent of the population 35 and older in 2014, a difference of 0.8 percentage points) – but narrowing gender gap over time (the difference was 1.4 percentage points 10 years earlier) [5]. The survey data also indicate there was no significant difference between the provincial COPD rate and the Canadian average from 2012 to 2014. Self-reported prevalence rates tend to be lower than those calculated through objective clinical measures, as the symptoms of COPD are often under-recognized and survey respondents may be less likely to report mild or well-managed cases [6].

## Health implications of COPD

A disease that gets worse over time, COPD exerts important impacts on physical, mental and social health. Canadians 35 and older with COPD are more than three times as likely to report their overall health as fair or poor compared to those without COPD (45 per cent versus 13 per cent), and more than twice as likely to report their health as somewhat worse or much worse than a year earlier (33 per cent versus 13 per cent) [7].

One in five Canadians with COPD (21 per cent) reports that breathing problems affect his or her life quite a bit or extremely, causing a great deal of difficulty in participating in exercise/ sports, running errands, doing chores and other daily activities. People with COPD are one-and-one-half times more likely

to have a diagnosed mood or anxiety disorder compared to those without COPD [8].

COPD can affect work and participation in the community: 14 per cent of Canadians with the disease indicate they stopped working due to breathing problems, and 22 per cent changed the number of hours or type of volunteer work [7]. The economic burden of COPD is estimated at \$3.9 billion annually in direct costs to the Canadian health-care system and indirect costs associated with long-term disability and premature death [9].

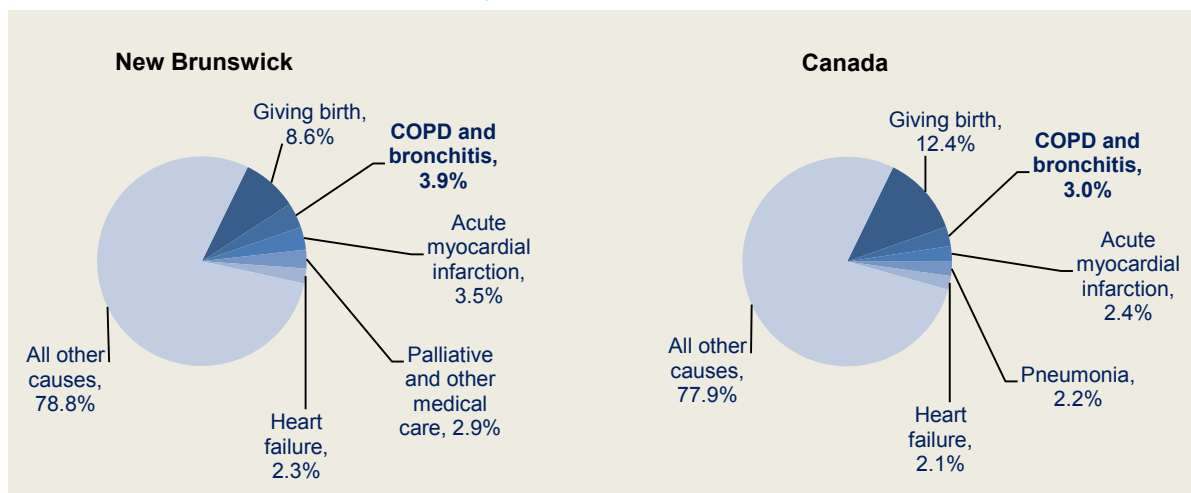
Individuals with COPD may need to be hospitalized, either for treatment of an acute exacerbation (flare-up) or in the

final stage of their disease.

Similar to the national trend, in New Brunswick COPD is the second-most responsible cause of hospitalization after childbirth (Figure 4) [10]. It is the cause of some 3,100 hospital admissions each year, of which 8 per cent result in death in hospital [3]. The 30-day readmission rate for COPD is 6 per cent. Hospital costs for inpatient care of acute exacerbation of COPD alone run at \$23 million annually [3].

Despite improved survival among persons with COPD, the disease remains an important cause of death in New Brunswick. It was the recorded cause for 180 deaths among men and 171 deaths among women in 2014 – for a total of 351 or 5.2 per cent of all deaths in the province (Figure 5) [11].

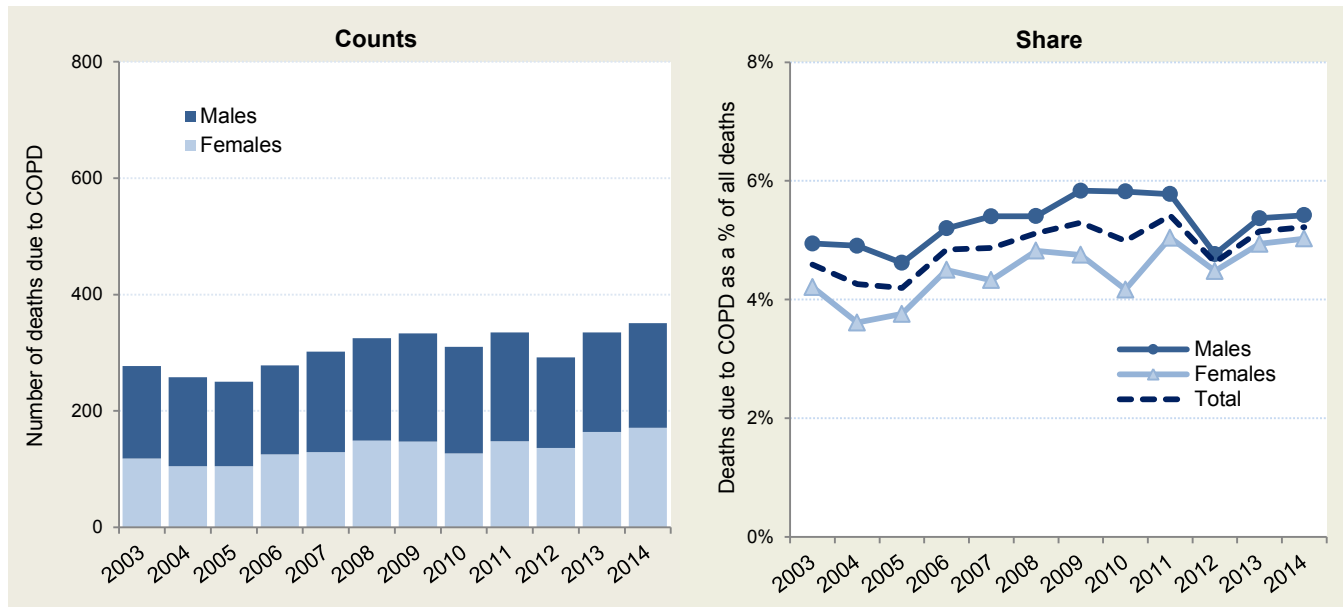
**Figure 4: Percentage distribution of acute-care hospitalizations by cause, New Brunswick and Canada, 2014-15**



**Note:** Data based on main diagnosis for acute inpatient hospitalizations, categorized according to the *International Classification of Diseases and Related Health Problems* (ICD-10-CA).

**Source:** Canadian Institute for Health Information, Hospital Morbidity Database.

**Figure 5: Trends in COPD mortality, by gender, New Brunswick, 2003 to 2014**



**Note:** Data on underlying cause of death among New Brunswick residents tabulated according to the *International Classification of Diseases and Related Health Problems, Tenth Revision*: ICD-10 codes J40-J44, J47 (chronic bronchitis, emphysema and other chronic lower respiratory diseases). The underlying cause of death is defined as the disease or injury which initiated the train of events leading directly to death.

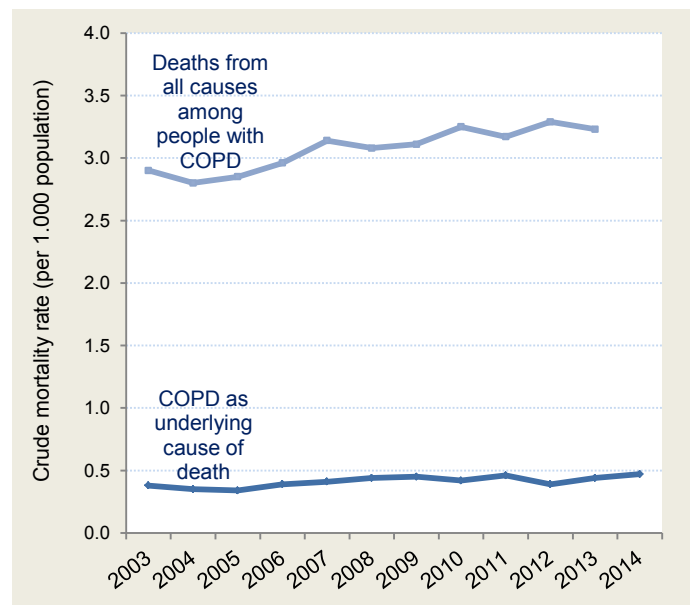
**Source:** Statistics Canada and Service New Brunswick, Vital Statistics.

While the numbers have fluctuated from year to year, generally speaking the mortality burden of COPD has remained stable during the last decade or so.

According to 2012 data, the share of COPD-attributable deaths in New Brunswick is comparable to the Canadian average (4.6 per cent versus 4.4 per cent of all deaths) [11].

At the same time, the true number of deaths is expected to be higher because two complications of COPD, pneumonia and heart failure, are often listed as the cause of death [4]. In New Brunswick, the number of deaths among individuals with diagnosed COPD is seven times higher than the number of deaths for which COPD was recorded as the underlying cause (2,440 versus 335 in 2013) (Figure 6). National data indicate COPD is a prevalent comorbid condition for individuals with diabetes and hypertension, and having COPD is associated with higher mortality from these conditions [8].

**Figure 6: Trends in the mortality rate among people with COPD, New Brunswick, 2003 to 2014**



**Note:** Data on cause of death among New Brunswick residents tabulated according to the *International Classification of Diseases and Related Health Problems*.

**Source:** Statistics Canada and Service New Brunswick, Vital Statistics; New Brunswick Department of Health, using the Canadian Chronic Disease Surveillance System infrastructure and case definitions.

## Contributing factors to COPD

The primary cause of COPD is tobacco smoke, mostly through personal smoking but also by exposure to second-hand smoke. It is estimated that 80 per cent to 90 per cent of cases of COPD are caused by smoking [4,12]. Typically smoking exposure must occur over many years before symptoms develop, and continued smoking affects prognosis. Other risk factors include heredity, exposure to air pollution at work and in the environment (e.g., chemical fumes and dust), and a history of childhood lung infections.

Tobacco use has been steadily declining in Canada and New Brunswick over several

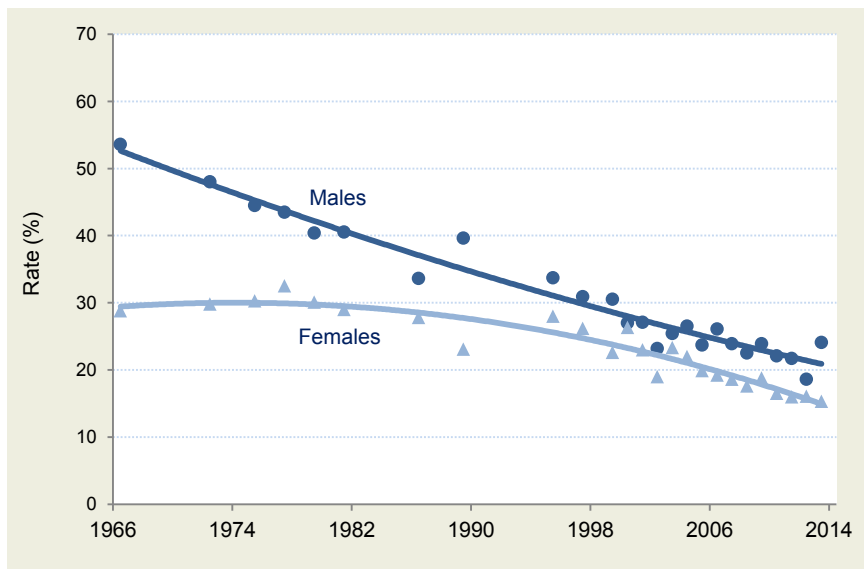
decades, but it continues to represent a considerable public health burden and driver of COPD [4,13]. Because COPD progresses slowly over a period of years, recent trends in disease incidence and prevalence, with narrowing gender gap over time, reflect historical changes in smoking behaviours. The rate of female New Brunswickers 15 and older who are current smokers is 8.8 percentage points lower than males (15.3 per cent versus 24.1 per cent in 2013), whereas five decades ago, the gender gap in the smoking rate was 24.8 percentage points (28.8 per cent versus 53.6 per cent in 1966) (Figure 7).

Despite significant declines in smoking rates, the New Brunswick population dynamics (age structure and population growth) combined with persistently high tobacco use among some segments of the population account for increasing numbers of people living with COPD. It is widely advocated that smoking prevention and cessation would have the greatest impact on reducing the rates and costs of COPD [4,9]. It would positively influence the burden of other smoking-attributable chronic respiratory diseases, notably lung cancer and asthma.

Reducing tobacco use would also affect the rate of exposure among non-smokers to second-hand smoke. In New Brunswick, reductions in smoking rates have been accompanied by important reductions in rates of exposure to second-hand smoke (Figure 8) [5]. According to data from the 2014 Canadian Community Health Survey, 4.6 per cent of New Brunswickers 12 and older reported exposure at home, a level statistically similar to the national average (3.9 per cent) [5].

The rate of exposure to second-hand smoke in public places decreased considerably in the year following the enactment of the provincial *Smoke-free Places Act* (2004), which prohibits smoking in certain

**Figure 7: Long-term trends in tobacco smoking by gender, New Brunswick, 1966-2013**



**Note:** Data since 1986 refer to daily and non-daily smoking among the population aged 15 and over. Prior historical data refer to daily smoking. Lines on the chart represent the best-fit trends in the data.

**Source:** New Brunswick Department of Health, using data from the Canadian Tobacco, Alcohol and Drugs Survey (CTADS), Canadian Tobacco Use Monitoring Survey (CTUMS), Survey of Smoking Habits and other official statistical sources.

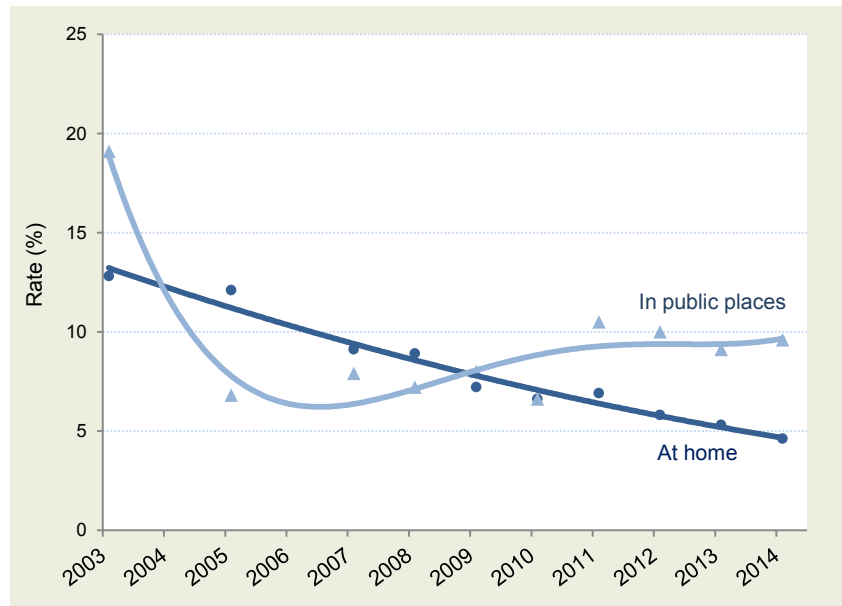
indoor public places. It has been slowly increasing in the last few years, albeit remaining significantly below the national average (9.6 per cent versus 13.5 per cent in 2014) [5].

In 2015, the *Smoke-free Places Act* was amended to prohibit smoking in certain outdoor public places. The CCHS questionnaire does not define precisely “public place” or distinguish between indoor versus outdoor places. It is possible that respondents’ perceptions of what constitutes a public place may change over time as attitudes toward smoking and perceptions of smoke-free policies change.

People typically begin smoking during their teenage years, so the percentage of youth who have not started smoking by age 20 is an indicator of future smoking rates [14]. Although smoking prevalence has fluctuated among New Brunswickers 12 to 19, overall the rate has declined significantly since 2003 (Figure 9) [5]. In 2014, the rate of youth smoking was lower in New Brunswick compared to the national average (4.8 per cent versus 7.7 per cent) [5].

Despite provincial legislative smoking bans and other student wellness initiatives, some 4,500 young New Brunswickers continue to smoke, half of whom smoke daily [15].

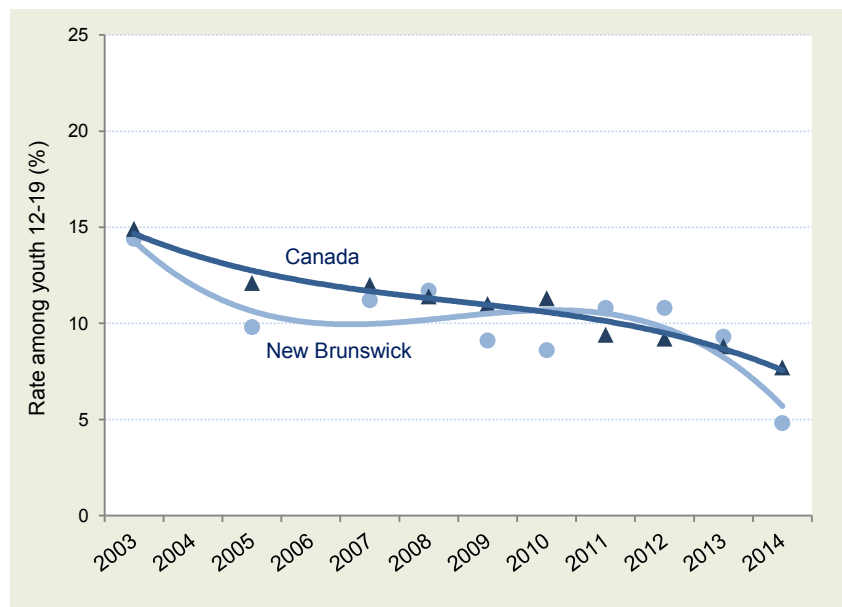
**Figure 8: Trends in exposure to second-hand smoke, New Brunswick, 2003 to 2014**



**Note:** Data based on the non-smoking population 12 and older who reported that at least one person smoked cigarettes inside their home (excluding the garage) and/or who reported being exposed to second-hand smoke in public places on every day or almost every day in the past month. Lines on the chart describe best-fit trends in the data.

**Source:** Statistics Canada, Canadian Community Health Survey.

**Figure 9: Trends in youth tobacco smoking, New Brunswick and Canada, 2003 to 2014**



**Note:** Data refer to the youth population 12-19 who reported smoking cigarettes every day or occasionally. Rates for youth smoking in New Brunswick since 2007 should be interpreted with caution, as they are subject to higher sampling variability associated with both lower numbers used to calculate the numerator and decreased size of the population group as basis for the denominator. Lines on the chart describe best-fit trends in the data.

**Source:** Statistics Canada, Canadian Community Health Survey.

The social and cultural conditions in which people are born, grow and age are also widely recognized as important determinants of health.

Evidence shows that New Brunswickers living in lower income households are significantly more likely to be daily smokers than those living in higher income households [16]. Concurrently, the prevalence of COPD is higher in New Brunswick's lowest income households compared to the most affluent households. Similar inequalities in health outcomes hold regarding cancer, heart disease and diabetes [16].

Some communities are more vulnerable to adverse health outcomes, notably First Nations

peoples who are significantly more likely to smoke compared to the non-Aboriginal population (40 per cent versus 22 per cent) and somewhat more likely to report having COPD or asthma (16 per cent versus 11 per cent) [17]. This pattern can be attributed to their socio-economic disadvantage compared to the rest of the population; the average income of Aboriginal persons is about 30 per cent less than the provincial average [18].

National data indicate that if all Canadians experienced the same lower rates of hospitalization for COPD as the highest income earners, the savings to the health sector would reach \$150 million annually [19].

More data on COPD, population aging, tobacco use and income inequalities across New Brunswick's seven health regions are in Figure 10.

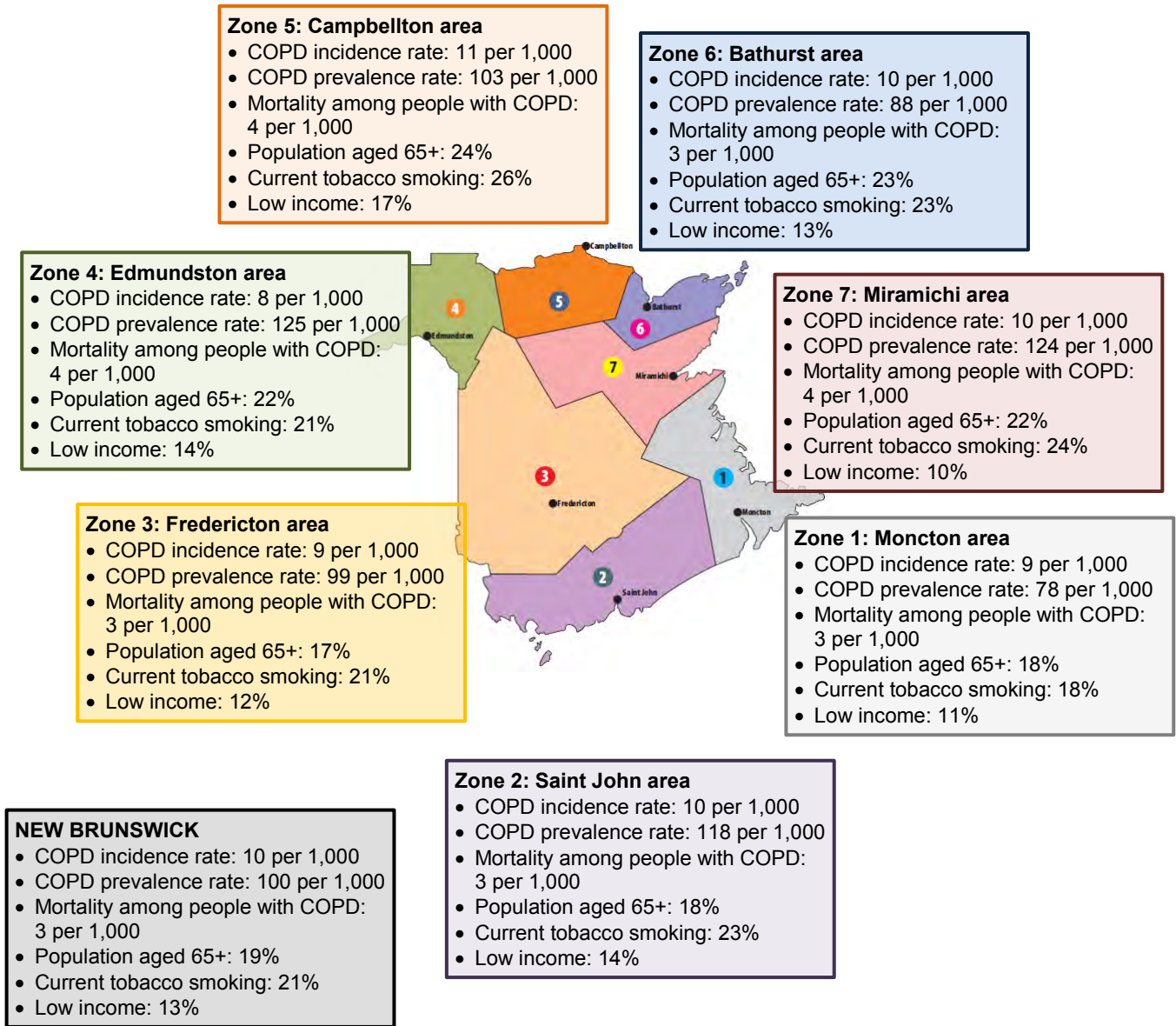


### Key points

- Chronic obstructive pulmonary disease is a lung disease that makes it difficult to breathe. One in 9 New Brunswickers 35 and older has been diagnosed with COPD. Among seniors 65 and older, the ratio is one in five. Often under-recognized, this disease is largely preventable and treatable.
- Some 4,450 New Brunswickers are diagnosed with COPD each year. More may not have yet been diagnosed. The number of new cases has remained relatively stable during the last decade, but there has been an important increase in prevalence as more people are living longer with the disease.
- COPD is usually progressive, advancing slowly over a period of years from mild to very severe. It causes increasing disability, lost work productivity and reduced quality of life, and it can be life-threatening. It is the primary cause of acute-care hospitalizations in New Brunswick (excluding childbirth). The number of deaths among New Brunswickers with COPD averages 2,440 each year.
- Tobacco smoking, the most important risk factor for COPD, has been decreasing but continues to represent a considerable public health burden. Changes in gender differences in tobacco use mean the impact of COPD has been shifting toward women.
- Effective clinical and public health strategies are needed to prevent COPD and manage the increasing number of people living longer with this disease. Smoking prevention and cessation would have the greatest impact on reducing the burden of COPD in the population. Actions to improve rates of COPD and its underlying social determinants are likely to have a positive impact on other prevalent health conditions.



**Figure 10: Selected indicators of the burden of COPD and associated factors in New Brunswick's health regions**



**Source:** New Brunswick Department of Health, Canadian Chronic Disease Surveillance System 2013-14 (age-standardized rates of COPD incidence/prevalence per population 35 and older; rate of all-cause mortality among people with COPD per total population); Statistics Canada, Estimates of Population 2015 (proportion of the population 65 and older); Statistics Canada, Canadian Community Health Survey 2013-2014 (prevalence of tobacco smoking among the population 12 and older); Statistics Canada, National Household Survey 2011 (prevalence of low income before tax for persons in private households).

## From evidence to action

COPD is one of the most prevalent diseases in New Brunswick and the leading cause of acute-care hospital admissions (excluding childbirth). The condition must be diagnosed early (through spirometry testing) and managed optimally to reduce complications and improve quality of life.

Increasing uptake of vaccinations against pneumonia and other respiratory infections is one cost-efficient approach to reducing the number of acute COPD-related flare-ups and hospitalizations [19,20]. Medicines and oxygen therapy can help relieve symptoms, while surgical treatments can benefit some patients.

But reducing tobacco smoking would have the single greatest impact on reducing morbidity and mortality associated with COPD [1,9,19-21]. It is the only evidence-based and most cost-effective intervention that reduces the risk of developing

COPD and slows worsening of the disease [22].

Patient smoking cessation counselling and exercise training enable better self-management of this chronic condition over extended periods. All people with COPD would benefit from regular physical activity [20]. Remaining active is a powerful indicator of health status and predictor of prognosis.

Policy and program decision-makers, health-care professionals, individuals and families, and other health system and community stakeholders all have an important role to play to reduce the burden of COPD. While comprehensive and coordinated programs to assess, monitor and manage the disease must be the standard of care for all patients with COPD, the most important action is to help people to stop smoking.

Prevention of exposure to tobacco smoke and protection of lungs is critical to health —

and a lifelong process [2]. Efforts to reduce tobacco use and to stay active also reduce other diseases, resulting in fewer premature deaths and more efficient use of health-care resources.

Against a backdrop of competing public health and clinical priorities, renewed efforts are needed to address both physical dependence and social contexts of tobacco use [18]. In New Brunswick, comprehensive tobacco control strategies address multiple facets:

- prevention: keep non-users from starting, especially youth;
- protection: protect the public from harmful effects of exposure to second-hand smoke and influences of tobacco industry marketing;
- cessation: help smokers quit and prevent relapse, with targeted programs among lower-income groups.

### For more information

- For resources and support to incorporate tobacco-free living at work, home and the community, visit the New Brunswick Anti-Tobacco Coalition at [www.nbatc.ca](http://www.nbatc.ca) or call the Smokers' Helpline, **1-877-513-5333** (toll-free).
- For information about the *Smoke-free Places Act* or to report a violation, call **1-866-234-4234** (toll-free).
- Health professionals are encouraged to review the latest practice guidelines and learning opportunities to inform provision of evidence-based smoking cessation care at [ottawamodel.ottawaheart.ca](http://ottawamodel.ottawaheart.ca).

## About the data

Measures of incidence and prevalence of COPD in New Brunswick were calculated using provincial administrative data from the health insurance registry, physician billing and hospital discharge abstract databases drawing on Canadian Chronic Disease Surveillance System infrastructure, privacy protocols and case definitions [23]. New Brunswick has a universal single-payer health system that covers all physician and hospital services for residents. Full-time members of the Canadian Forces and people in federal correctional facilities are not included in the provincial databases.

Information from the discharge abstract database includes clinical diagnoses for acute-care hospital stays, coded using the *International Classification of Diseases and Related Health Conditions* (ICD-10-CA). Data on COPD from the physician billing database are based on search patterns for “COPD” and related nomenclature, including all fee-for-service payments for services rendered as well as alternate payment structures using shadow-billing claims.

Trends in incidence rates may reflect true change in population health status, but may also be a function of change in administrative data characteristics or collection methods. Factors such as coding/classification systems, clinical practices or billing methods may influence the rates that are estimated from administrative data. Comparisons with previously published rates must be made with caution; rates in this report are definitive should a discrepancy exist.

Data from population health surveys and vital statistics provide additional information on COPD, its risk factors and complications. Since this report uses multiple data sources, estimates may be reported for different reference periods and age groups, and definitions may vary depending on the source. Specific conventions are used to distinguish between different

reference periods of data collection. The format “20XX-YY” indicates a fiscal year running from April 1, 20XX to March 31, 20YY; data spanning more than a year are reported as “20XX–20YY.”

In all cases, descriptions of COPD exclude cases of undiagnosed disease in the population. Important efforts within the health-care system to improve chronic disease detection and management means the number of individuals who are unaware of their condition is likely decreasing over time.

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**COPD is the primary cause of acute-care hospitalizations in New Brunswick (excepting childbirth).**

**Tobacco smoking is the main reason.**