# REPORT FROM THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM:
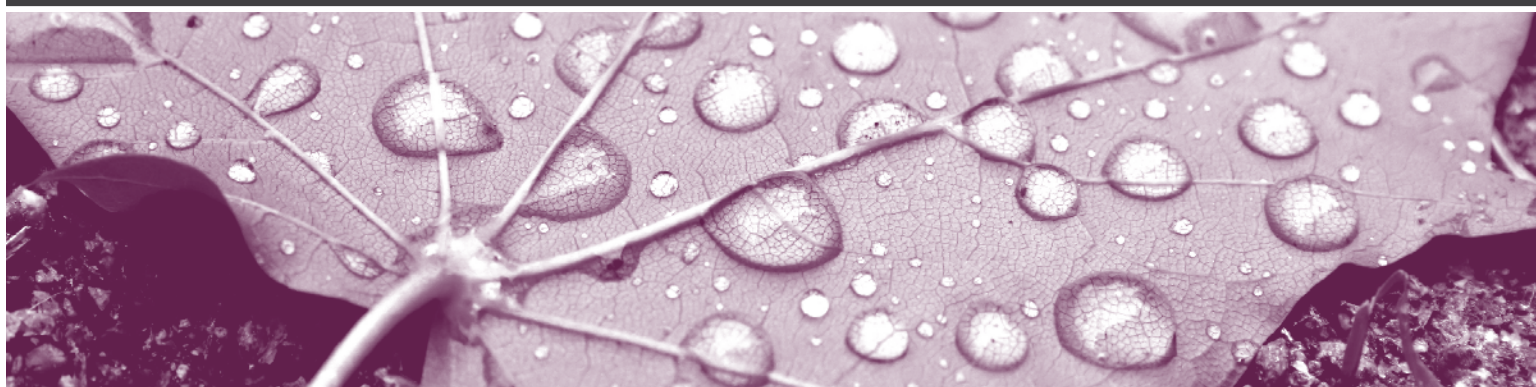
## MENTAL ILLNESS IN CANADA, 2015

Public Health Agency of Canada

Agence de la santé publique du Canada

Canada

**TO PROMOTE AND PROTECT THE HEALTH OF CANADIANS THROUGH LEADERSHIP, PARTNERSHIP, INNOVATION AND ACTION IN PUBLIC HEALTH.**

—Public Health Agency of Canada

# REPORT FROM THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM:

## MENTAL ILLNESS IN CANADA, 2015

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# REPORT HIGHLIGHTS

## PURPOSE OF THIS REPORT

This report, *Mental Illness in Canada, 2015* is the first publication to include administrative health data from the Canadian Chronic Disease Surveillance System (CCDSS) for the national surveillance of mental illness. It features the most recent CCDSS data available (fiscal year 2009/10), as well as trend data spanning over a decade (1996/97 to 2009/10). It is also the first national report to include children and adolescents under the age of 15 years. The data presented within this report and subsequent updates can be accessed via the Public Health Agency of Canada's Chronic Disease Infobase Data Cubes at www.infobase.phac-aspc.gc.ca. Data Cubes are interactive databases that allow users to create tables and graphs quickly using their Web browser.

## MENTAL ILLNESS

Mental illnesses are characterized by alterations in thinking; mood or behaviour associated with significant distress and impaired functioning. They result from complex interactions of biological, psychosocial, economic and genetic factors. Mental illnesses can affect individuals of any age; however, they often appear by adolescence or early adulthood. There are many different types of mental illnesses, and they can range from single, short-lived episodes to chronic disorders.

## CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM

The CCDSS is a collaborative network of provincial and territorial chronic disease surveillance systems, supported by the Public Health Agency of Canada. It identifies chronic disease cases from provincial and territorial administrative health databases, including physician billing claims and hospital discharge abstract records, linked to provincial and territorial health insurance registry. Data on all residents who are eligible for provincial or territorial health insurance (about 97% of the Canadian population) are captured in the health insurance registry; thus, the CCDSS coverage is near-universal. Case definitions are applied to these linked databases and data are then aggregated at the provincial and territorial level before being submitted to the Public Health Agency of Canada for reporting at the provincial, territorial and national levels.

In 2010, the Public Health Agency of Canada expanded the CCDSS to track information on mental illness in the Canadian population. The CCDSS identified individuals as having used health services for a mental illness case if they met a minimum requirement of at least one physician claim or one hospital discharge abstract in a given year, using the mental illness codes in the 9th or 10th edition of the International Classification of Diseases.

The CCDSS may capture individuals who do not meet all standard diagnostic criteria for a mental illness but were assigned a diagnostic code based on clinical assessment. Conversely, the CCDSS does not capture individuals meeting all standard diagnostic criteria for a mental illness who did not receive a relevant diagnostic code (includes those who sought care but were not captured in provincial and territorial administrative health databases and those who have not sought care at all). For these reasons, the CCDSS estimates represent the prevalence of health service use for mental illness rather than the prevalence of diagnosed mental illness.

## KEY FINDINGS

Approximately five million Canadians (or about one in seven people) use health services for a mental illness annually. Although high, the age-standardized proportion of people using health services for that purpose remained stable between 1996/97 and 2009/10 (13.2%-14.2%).

Canadian adults, particularly the elderly, are more likely than children and adolescents to use health services for a mental illness; however, the largest relative increase during the 14-year surveillance period occurred among young adolescents (aged 10 to 14). It should be noted that almost one in four people aged 80 and over use health services for a mental illness, though this trend is likely driven by the inclusion of dementias in the International Classification of Diseases under mental disorders.

Women are more likely than men to use health services for a mental illness, especially those between the ages of 25 to 39 years. A combination of genetic, biological, behavioural and sociocultural factors may explain this difference. On the other hand, boys (under 15 years of age) are more likely to use health services for a mental illness than girls; this is likely driven by certain disturbance of conduct disorders and attention deficit disorder which are known to occur more frequently among boys.

In 2009/10, the age-standardized prevalence of the use of health services for mental illness among those one year of age and older was highest in Nova Scotia (16.8%) and British Columbia (15.1%), and lowest in Newfoundland and Labrador (10.5%), Quebec (11.0%) and the Northwest Territories (11.0%). These jurisdictional variations may reflect differences in the distribution of factors known to affect mental health (from individual to society). However, differences in detection and treatment practices as well as, differences in data coding, database submissions, remuneration models and shadow billing practices may also play a role.

A higher prevalence of asthma and chronic obstructive pulmonary disease (COPD), and to a lesser degree ischemic heart disease, diabetes and hypertension, was observed among people using health services for a mental illness than among those using services for other diseases or conditions. While the relationship between mental illness and other chronic diseases and conditions remains poorly understood, it is well recognized that people with a mental illness such as depression or anxiety are more likely to have a comorbid chronic disease or condition such as cardiovascular disease, asthma or COPD, and that people affected by a chronic disease or condition, are more likely to experience depression and anxiety.

## FUTURE PLANS

Future CCDSS mental illness work includes but is not limited to: the ongoing collection and reporting of data on mental illness and mood and/or anxiety disorders; exploring the feasibility of developing case definitions for other mental illnesses, such as psychotic disorders; and the development of indicators of mortality.

# 1.   INTRODUCTION

## MENTAL ILLNESS

Mental illnesses are "characterized by alterations in thinking, mood or behaviour (or some combination thereof) associated with significant distress and impaired functioning."[1] They result from complex interactions of biological, psychosocial, economic and genetic factors.[2] Mental illnesses can affect people of all ages; however, they often appear by adolescence or early adulthood.[3] There are many different types of mental illness. In fact, the International Classification of Diseases (ICD), 10th revision identifies more than four hundred types.[4][i] These illnesses can range from single, short-lived episodes to chronic disorders, where symptom severity can fall within a continuum, and sub-clinical disorders are common.

## MENTAL HEALTH

According to the World Health Organization (WHO), "mental health is a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community."[5] Mental health and mental illness are not mutually exclusive concepts, i.e. someone with a mental illness can experience good mental health, while someone without a mental illness can experience poor mental health.[2] For this reason, mental health promotion initiatives that increase personal protective factors, such as resiliency and self-esteem, can help mitigate mental illness and improve quality of life among those living with a mental illness.[2]

## IMPACTS OF MENTAL ILLNESS

Mental illnesses have the potential to impact every aspect of an individual's life, including relationships, education, work, and community involvement. According to the 2010 Global Burden of Disease Study, mental and behavioural disorders account for almost a quarter (23%) of years of life lost due to disability and 13% of years of life lost due to disability and premature mortality (i.e. disease burden) in Canada.[6][ii] Furthermore, results from a North American survey of organizations that operate in all major industry sections found mental health issues (e.g. depression, anxiety and stress) to be the primary cause of short- and long-term disability in Canada.[7]

Mental illnesses also have substantial economic impacts, given their high prevalence and the associated impaired functioning. In 2008, the direct costs (i.e. hospital care, physician care and drug expenditures) associated with mental illness were estimated at approximately $8 billion in Canada.[8][iii] Indirect costs associated with mental illness, including costs associated with

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[i]   In Canada, ICD-10-CA implementation began in 2001 and was being used in all provinces and territories by 2006 (hospitalization data only). Available from: www.cihi.ca/cihi-ext-portal/internet/en/document/standards+and+data+submission/standards/classification+and+coding/codingclass_icd10status

[ii]  Estimates obtained from the Institute for Health Metrics and Evaluation interactive visualization tool are based on cause patterns in 2010 for Canada from the 2010 Global Burden of Disease Study.

[iii] Costs obtained from the EBIC online tool are based on a custom tabulation of the direct costs associated with mental illness and all its diagnostic subcategories using ICD-10-CA diagnostic codes.

disability claims, lost productivity at school and work due to absenteeism and presenteeism, and social and judicial services, are much higher than direct costs.[9,10] According to the WHO, "more working days are lost as a result of mental disorders than physical conditions".[11] Depending on the expenditures included, indirect costs related to mental illness in Canada have been shown to range from $11 to $50 billion.[8,9,12]

## COMORBIDITY OF MENTAL ILLNESSES

A mental illness frequently coexists with other mental illnesses, such as substance abuse and dependence,[13] as well as other chronic diseases or conditions. Many bidirectional associations have been observed although, these associations remain poorly understood. For instance, the early onset of depressive and anxiety disorders has been shown to be associated with an increased risk of developing other chronic diseases or conditions in adult life, such as heart disease, asthma, diabetes, arthritis, chronic back pain and chronic headaches.[14] In addition, mental illnesses can lead to unhealthy behaviours that increase the risk of developing or exacerbating chronic diseases or conditions.[1,15,16] For example, people who report having a serious mental illness are more likely to report being a current smoker, and are also more likely to have chronic bronchitis or emphysema.[16] Conversely, depressive and anxiety disorders may result from the burden of living with a chronic disease or condition.[1,15] For example, depression has been associated with various long-term medical conditions,[17] such as coronary heart disease.[18]

## TREATMENT

Most mental illnesses can be treated so that people can maintain day-to-day functioning and experience full, meaningful lives. Treatment comes in many forms, including psychotherapy, counselling, psychosocial intervention and medication.[19] Furthermore, community supports— such as outreach services and income (i.e. social assistance), vocational and housing-related supports—may be provided. In Canada, treatment and supports for mental illness are provided across many settings, including family physicians' and psychiatrists' offices, hospitals, outpatient programs and clinics, and community agencies. Many people pay out of pocket for treatment from private practitioners (e.g. psychotherapy by psychologists) or for private residential care.

## CHALLENGES FOR MENTAL IILNESS SURVEILLANCE

The surveillance of mental illness is particularly challenging compared with that of other chronic diseases or conditions because of varying diagnostic accuracy. Unlike diseases or conditions with established physiological markers, mental illnesses are like chronic pain, in that there are currently no objective tests with which to assign a diagnosis. A mental illness diagnosis is based on symptoms reported by the individual affected and signs observed by the physician or by relatives.[20]

The varying duration of mental illness episodes from one person to another poses another unique surveillance challenge, as measures of true incidence are difficult to estimate. However, it is possible to estimate various period prevalences for instance, the estimated lifetime prevalence of mental illness in Canada suggests that at least one in three Canadians will experience a mood disorder, generalized anxiety disorder or substance dependence in their lifetime.[21] Furthermore, among Canadian children and adolescents, the estimated six-month prevalence of mental illness may be as high as 18.1%.[22]

Many environmental, social and cultural factors may affect the rate at which people seek care for signs and symptoms associated with mental illness, and how physicians assess them. However, there have been efforts to increase awareness of the symptoms and impacts of mental illness, and to improve understanding and acceptance. Without fear of judgement or discrimination, more people might be open to seeking care for their symptoms or speaking more openly about their emotions.

## PURPOSE OF THIS REPORT

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The data presented within this report and subsequent updates can be accessed via the Public Health Agency of Canada's Chronic Disease Infobase Data Cubes at www.infobase.phac-aspc.gc.ca. Data Cubes are interactive databases that quickly allow users to create tables and graphs using their Web browser.

# 2. MENTAL ILLNESS IN THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM

## METHODS

The CCDSS is a collaborative network of provincial and territorial chronic disease surveillance systems, supported by the Public Health Agency of Canada. It identifies chronic disease cases from provincial and territorial administrative health databases, including physician billing claims and hospital discharge abstract records, linked to provincial and territorial health insurance registry. Data on all residents who are eligible for provincial or territorial health insurance (about 97% of the Canadian population) are captured in the health insurance registry; thus, the CCDSS coverage is near-universal. Case definitions are applied to these linked databases and data are then aggregated at the provincial and territorial level before being submitted to the Public Health Agency of Canada for reporting at the provincial, territorial and national levels. For information on the current scope of the CCDSS, refer to Appendix A.

The CCDSS identified individuals as having used health services for a mental illness if they met the following criteria: at least one physician claim listing a mental illness diagnostic code in the first field, or one hospital discharge abstract listing a mental illness diagnostic code in the most responsible diagnosis field using ICD-9 or ICD-9-CM codes, or their ICD-10-CA equivalents (Table 1). Using this "omnibus" case definition, individuals must qualify as a case in a given fiscal year to be counted in that fiscal year; therefore, estimates represent the annual prevalence. For information on the feasibility and validation work carried out to expand the CCDSS to include mental illness, refer to Appendix B.

**TABLE 1:** ICD codes included in the CCDSS case definition for the use of health services for mental illness

|  | ICD-9 or ICD-9-CM | ICD-10-CA |
|---|---|---|
| **Mental illness** | 290 to 319 | F00 to F99 |

The ICD codes included in the above CCDSS case definition are associated with the following disorders:

* mood disorders (e.g. major depressive disorder, bipolar disorder);
* anxiety disorders (e.g. agoraphobia, generalized anxiety disorder, obsessive-compulsive disorder);
* psychoses (e.g. schizophrenia);
* personality disorders (e.g. borderline personality disorder, antisocial personality disorder);
* psychosexual disorders;
* substance use disorders (e.g. dependent and non-dependent use or abuse of alcohol or drugs);

- other non-psychotic mental disorders diagnosed in adolescence and adulthood
(e.g. physiological factors arising from psychological malfunction, eating disorders,
sleep disorders);

- other non-psychotic mental disorders diagnosed in childhood (e.g. disturbance of conduct,
attention deficit disorder);

- mental retardation; and

- dementias (including dementia in Alzheimer's disease, but not including the broader codes
for Alzheimer's disease specifically).

The CCDSS may capture individuals who do not meet all standard diagnostic criteria for a
mental illness but were assigned a diagnostic code based on clinical assessment. Conversely,
the CCDSS does not capture individuals meeting all standard diagnostic criteria for a mental
illness who did not receive a relevant diagnostic code (includes those who sought care but
were not captured in provincial and territorial administrative health databases and those who
have not sought care at all). For these reasons, the CCDSS estimates represent the prevalence
of health service use for mental illness rather than the prevalence of diagnosed mental illness.

This report features data from all provinces and territories, except for Nunavut (NU)[iv] and
the Yukon Territory (YT)[v] which together represent approximately 0.2% of the total Canadian
population.[vi] Provincial and territorial health insurance registries are the source of each
individual's demographic information, and age is calculated as of mid-fiscal year, on October 1.
The population count consists of the total number of insured people in the provinces and
territories (excluding NU and YT) that are captured in the resident health insurance registry
in the specified fiscal year.

## LIMITATIONS

While the coverage for the CCDSS is near-universal, exclusions include Canadians covered
under federal health programs, such as refugee protection claimants, full-time members of
the Canadian Forces, eligible veterans, individuals in the Royal Canadian Mounted Police,
and federal penitentiary inmates.

Furthermore, the CCDSS does not capture eligible cases who: were seen by a salaried
physician who does not shadow bill; sought care from a community-based clinic or private
setting; received mental health services in a hospital that does not submit discharge abstract
data to the Discharge Abstract Database (or in the case of Quebec, the MED-ÉCHO) e.g.
dedicated psychiatric hospitals and some hospitals with dedicated mental health beds; sought
care but did not receive a relevant mental illness diagnostic code; or did not seek care at all.

For these reasons, the data in this report likely underestimate the use of health services for
mental illness in Canada. For more information on the population coverage for mental illness
in the CCDSS, refer to Appendix C.

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[iv] Data from NU were excluded as data prior to 2003 were incomplete (i.e. data from community health centres and some
hospital data were unavailable).

[v] Data from YT were excluded due to data quality issues.

[vi] Population and dwelling counts, for Canada, provinces and territories, 2011 and 2006 censuses, Statistics Canada. Available
from: www12.statcan.gc.ca/census-recensement/2011/dp-pd/hlt-fst/pd-pl/Table-Tableau.cfm?LANG=Eng&T=101&S=50&O=A

# 3.   KEY FINDINGS

> **REMINDER!**
>
> The CCDSS may capture individuals who do not meet all standard diagnostic criteria for a mental illness but were assigned a diagnostic code based on clinical assessment. Conversely, the CCDSS does not capture individuals meeting all standard diagnostic criteria for a mental illness who did not receive a relevant diagnostic code (includes those who sought care but were not captured in provincial and territorial administrative health databases and those who have not sought care at all). For these reasons, the CCDSS estimates represent the prevalence of health service use for mental illness rather than the prevalence of diagnosed mental illness.

## PEOPLE USING HEALTH SERVICES FOR A MENTAL ILLNESS

- In 2009/10, approximately five million (or 14.4%) Canadians aged one year and older received health services for a mental illness (almost 3.0 million females, and close to 2.1 million males; results not shown).

- Among children and adolescents (under the age of 20 years), the prevalence of the use of health services for mental illness increased between 1996/97 and 2009/10. The largest relative increase was observed among youth 10 to 14 years old (43.8%), followed closely by children five to nine years old (34.5%) (Figure 1).

**FIGURE 1:** Age-specific annual prevalence (%) of the use of health services for mental illness among people aged 1 to 19 years, Canada,* 1996/97 to 2009/10
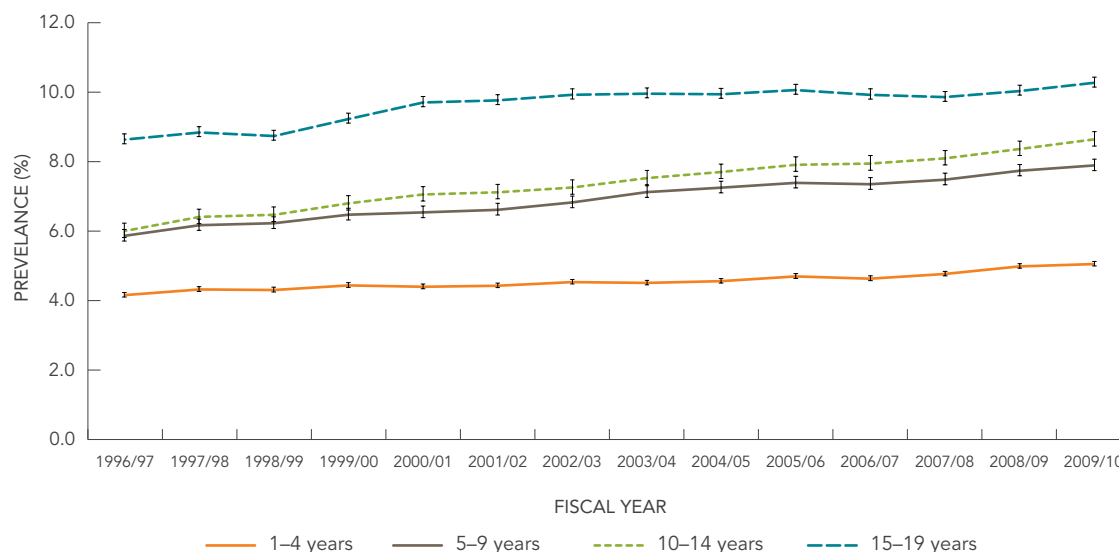


**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. * Data do not include NU and YT.

**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

The increase in the prevalence of the use of health services for mental illness among children and adolescents may be due to a real increase in the number of cases or, to an increase in awareness of mental illness among children, resulting in an increased rate of detection and treatment. For example, the diagnosis of certain disturbance of conduct disorders and attention deficit disorder may have increased due to heightened awareness among health professionals, parents and educators. Special educational programs and funding are often available to school boards with children and adolescents diagnosed with a mental illness,[14] and this may create an incentive to identify and report these conditions.

The observed increase among children and adolescents is consistent with findings from other research studies. A Quebec study demonstrated that the prevalence of attention deficit hyperactivity disorder among children and adolescents under 20 years of age has increased over the past several years.[23] Furthermore, in Alberta, researchers observed an increase in the number of children and adolescents presenting for emergency care with a mental illness, noting that a high proportion of these cases were for substance misuse or abuse.[24] Results from the nationwide Health Behaviour in School-aged Children study supports an association between frequency of smoking, cannabis use and binge drinking and emotional or behavioural problems.[25]

Changes in diagnostic criteria may also be responsible for the observed increase in the prevalence of the use of health services for mental illness among children and adolescents. For example, in the 1994 revision of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition the definition of autism was broadened to include Asperger syndrome. This change may have increased the number of people with a diagnostic code for an autism spectrum disorder which is included in the CCDSS case definition for mental illness.

- Among Canadian adults (20 years of age and older), the prevalence of the use of health services for mental illness was generally stable over the 14-year surveillance period, with those aged 80 years and older consistently demonstrating the highest prevalence (24.1% in 2009/10) (Figure 2).

**FIGURE 2:** Age-standardized[†] annual prevalence (%) of the use of health services for mental illness among people aged 20 years and older, Canada,* 1996/97 to 2009/10
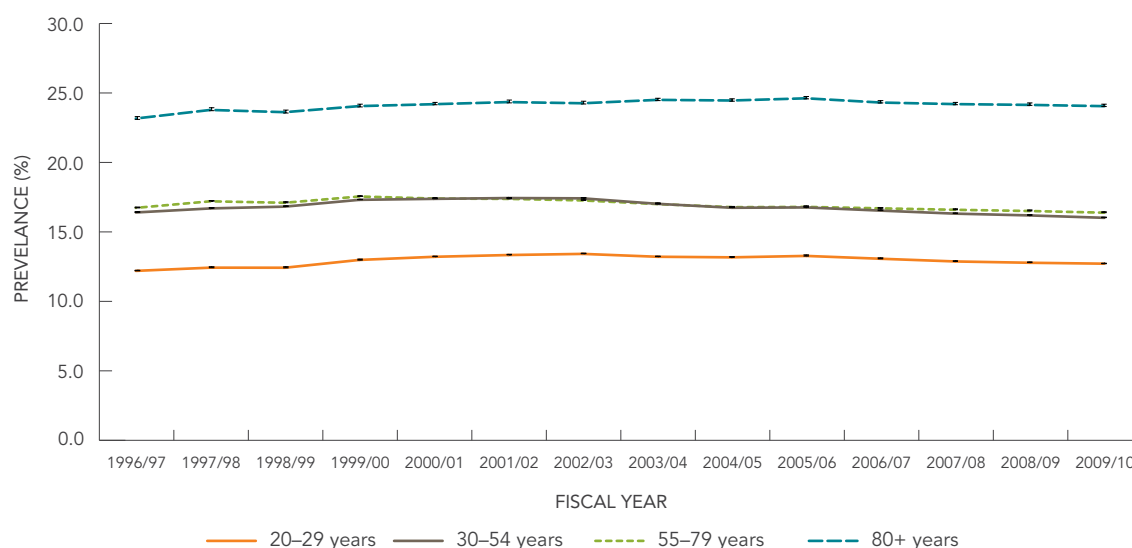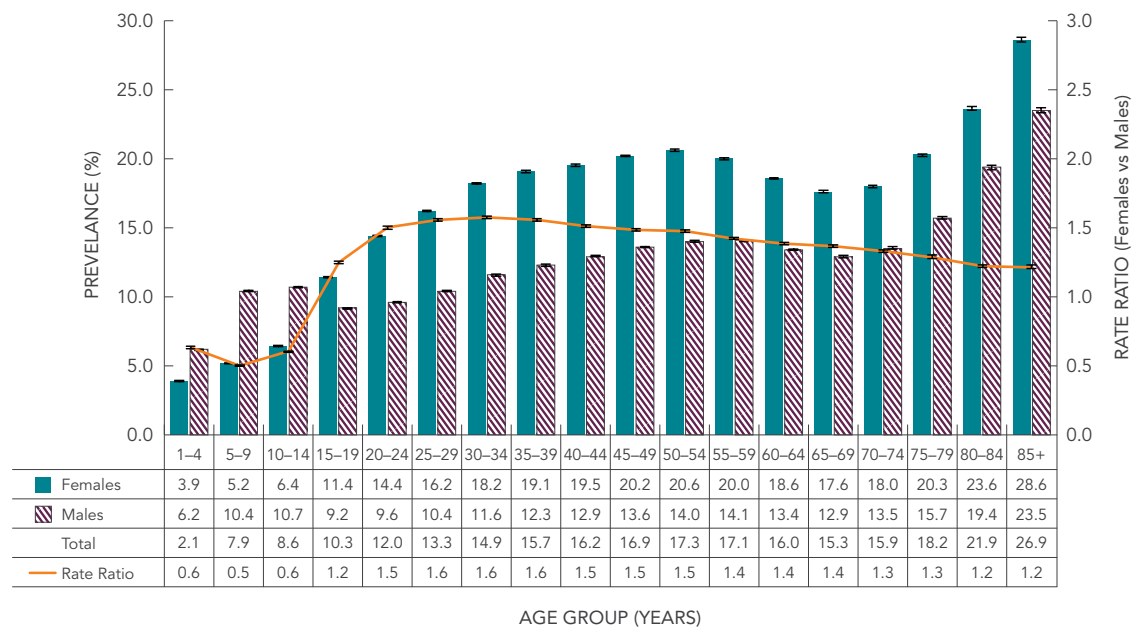


**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. [†]Age-standardized to 1991 Canada population. * Data do not include NU and YT.

**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

This finding may be the result of the inclusion of diagnostic codes for dementias in the CCDSS mental illness case definition (refer to Table 1 for the ICD codes included). While this has a significant impact on the rates among older people, feasibility studies showed that the inclusion of dementia has only a small impact on the overall rate (Appendix B).

- The age-specific prevalence rates for the use of health services for mental illness differed by sex in 2009/10 (Figure 3).
- While the age-specific rates among children and young adolescent boys was higher than girls (under 15 years of age), the age-specific rates were higher among older adolescent and adult females compared to males (15 years of age and older) (Figure 3).

**FIGURE 3:** Age-specific annual prevalence (%) of the use of health services for mental illness among people aged 1 year and older by sex, Canada,* 2009/10



| | 1–4 | 5–9 | 10–14 | 15–19 | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 | 45–49 | 50–54 | 55–59 | 60–64 | 65–69 | 70–74 | 75–79 | 80–84 | 85+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Females | 3.9 | 5.2 | 6.4 | 11.4 | 14.4 | 16.2 | 18.2 | 19.1 | 19.5 | 20.2 | 20.6 | 20.0 | 18.6 | 17.6 | 18.0 | 20.3 | 23.6 | 28.6 |
| Males | 6.2 | 10.4 | 10.7 | 9.2 | 9.6 | 10.4 | 11.6 | 12.3 | 12.9 | 13.6 | 14.0 | 14.1 | 13.4 | 12.9 | 13.5 | 15.7 | 19.4 | 23.5 |
| Total | 2.1 | 7.9 | 8.6 | 10.3 | 12.0 | 13.3 | 14.9 | 15.7 | 16.2 | 16.9 | 17.3 | 17.1 | 16.0 | 15.3 | 15.9 | 18.2 | 21.9 | 26.9 |
| Rate Ratio | 0.6 | 0.5 | 0.6 | 1.2 | 1.5 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 |

AGE GROUP (YEARS)

**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. * Data do not include NU and YT.

**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

The higher prevalence of the use of health services for mental illness among boys under 15 years of age than girls is likely driven by a higher prevalence of certain disturbance of conduct disorders and attention deficit disorder, in boys.[22,26] Whereas the higher prevalence among females 15 years of age and older than males, is likely due to a higher prevalence of mood and/or anxiety disorders in adolescent and adult females.[26]

- The largest relative differences in prevalence of the use of health services for mental illness by sex were observed among women in their peak childbearing and childrearing years, where the prevalence was at least 50% higher in women than in men (Figure 3).
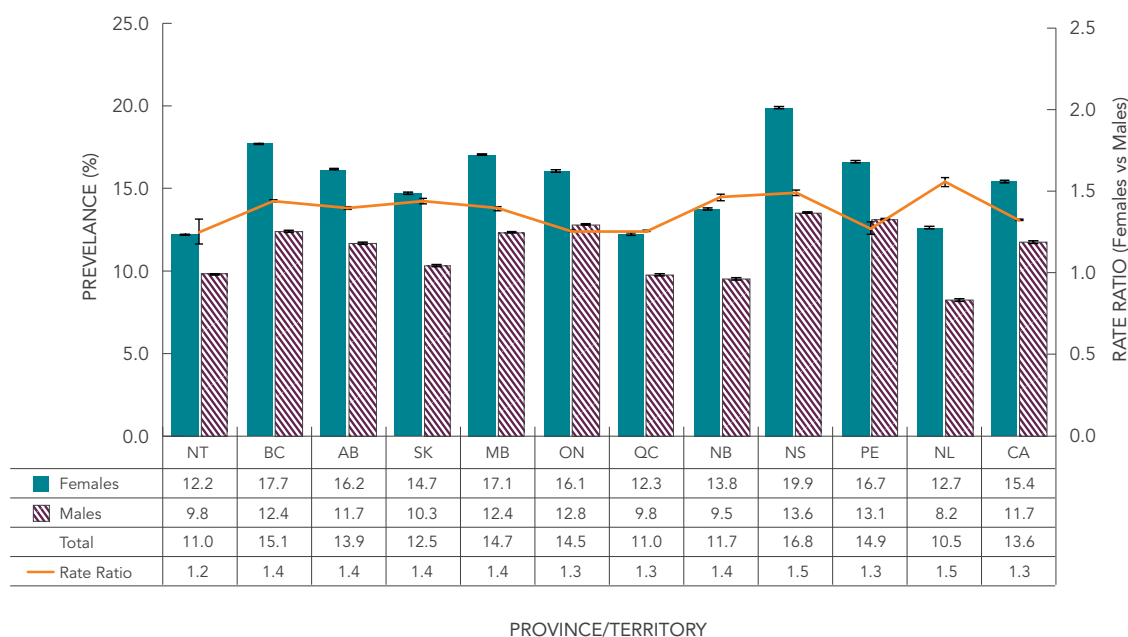
These sex difference findings are consistent with those in other reports.[1,27] For example, a study using administrative data from Manitoba demonstrated that women of childbearing age had higher health care expenditures for physician and acute hospital care services than men, suggesting higher health services use.[27]

The higher prevalence of health service use for mental illness observed among adolescent and adult women may be due to a number of factors including differences in help-seeking behaviours, as women have been shown to have more positive help-seeking attitudes related to mental health services than men.[28] In addition, several biological processes, including hormonal fluctuations related to various aspects of reproductive function which may affect certain neural processes that mediate depressive states, are thought to predispose women to depression more than men.[29,30] Finally, cultural/contextual determinants such as work and familial responsibilities may also play a role, as women report experiencing stress related to personal and family responsibilities more frequently than men.[31–33]

## PAN-CANADIAN PERSPECTIVE

- In 2009/10, the age-standardized prevalence of the use of health services for mental illness among those one year of age and older was highest in Nova Scotia (16.8%) and British Columbia (15.1%), and lowest in Newfoundland and Labrador (10.5%), Quebec (11.0%) and the Northwest Territories (11.0%) (Figure 4).

- Regardless of the location of residence, the age-standardized prevalence was 1.2 to 1.5 times higher for females than for males. The largest gender disparity was observed in Nova Scotia and Newfoundland and Labrador (Figure 4).

**FIGURE 4:** Age-standardized[†] annual prevalence (%) of the use of health services for mental illness among people aged 1 year and older, by province/territory* and sex, Canada,* 2009/10



| | NT | BC | AB | SK | MB | ON | QC | NB | NS | PE | NL | CA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Females | 12.2 | 17.7 | 16.2 | 14.7 | 17.1 | 16.1 | 12.3 | 13.8 | 19.9 | 16.7 | 12.7 | 15.4 |
| Males | 9.8 | 12.4 | 11.7 | 10.3 | 12.4 | 12.8 | 9.8 | 9.5 | 13.6 | 13.1 | 8.2 | 11.7 |
| Total | 11.0 | 15.1 | 13.9 | 12.5 | 14.7 | 14.5 | 11.0 | 11.7 | 16.8 | 14.9 | 10.5 | 13.6 |
| Rate Ratio | 1.2 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.4 | 1.5 | 1.3 | 1.5 | 1.3 |

PROVINCE/TERRITORY

**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. [†] Age-standardized to 1991 Canada population. * Data do not include NU and YT.

**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

- The Canadian age-standardized prevalence rate of the use of health services for mental illness remained relatively stable from 1996/97 to 2009/10. However, in 2001/02 and 2002/03, there was a small peak in the prevalence, after that the rate declined to a level similar to that in 1996/97 (Figures 5 and 6).

**FIGURE 5:** Age-standardized[†] annual prevalence (%) of the use of health services for mental illness among people aged 1 year and older, by province/territory,* where relative change was greater than 10%, Canada,* 1996/97 to 2009/10
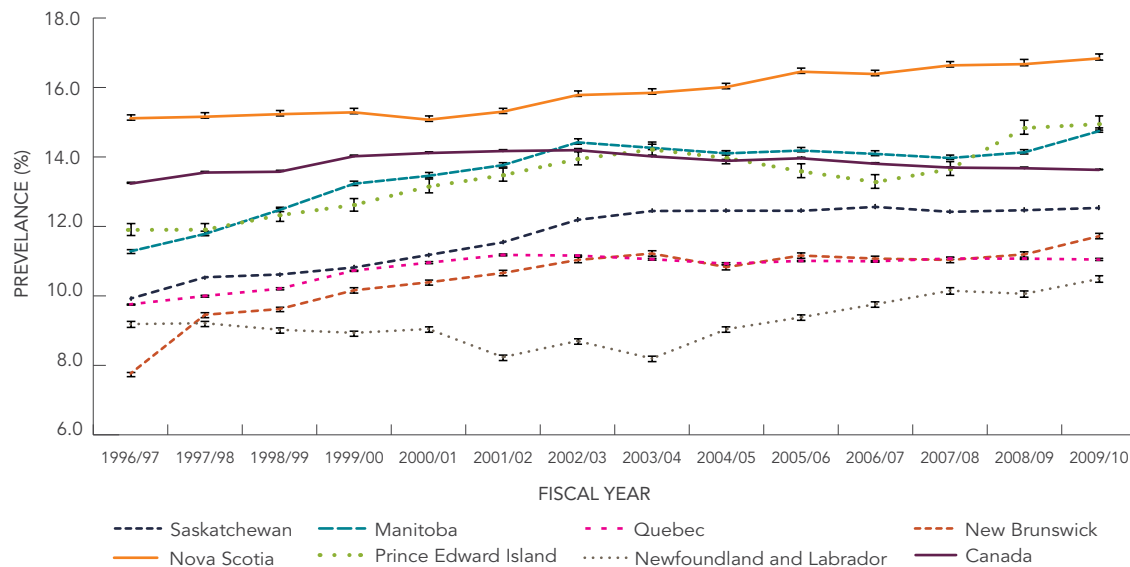


**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. † Age-standardized to 1991 Canada population. * Data do not include NU and YT.

**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

**FIGURE 6:** Age-standardized[†] annual prevalence (%) of the use of health services for mental illness among people aged 1 year and older, by province/territory,* where relative change was less than or equal to 10%, Canada,* 1996/97 to 2009/10
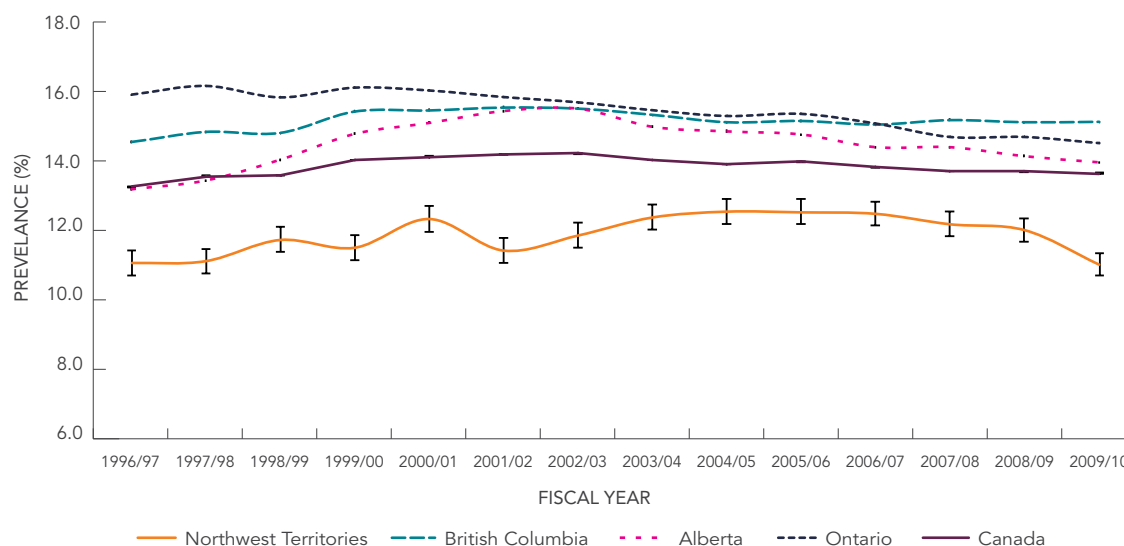


**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. [†] Age-standardized to 1991 Canada population. * Data do not include NU and YT.

**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

While this change in trend may reflect a slight reduction in the number of people seeking treatment for mental illness, it could also relate to new policies and changes in data coding. The introduction of ICD-10-CA in hospitals across Canada between 2001/02 and 2006/07 may have contributed to an underestimate of the number of individuals with mental illness who were admitted to hospital. In Alberta, Quan and colleagues found that ICD-10-CA was less sensitive than ICD-9-CM in capturing depression from hospital discharge abstract records.[34]

Furthermore, this change in trend may reflect changes in remuneration models. For instance, it is possible that an increasing proportion of physicians were paid by salary (rather than "fee-for-service") in the latter part of the surveillance period. In the absence of shadow billing, this shift in remuneration would reduce the number of physician billing claims submitted to provincial and territorial governments. Despite these changes in data coding and remuneration models, the overall absolute change in the prevalence of the use of health services for mental illness across the surveillance period was not substantial (less than one percent).

- From 1996/97 to 2009/10, Ontario and Nova Scotia had the highest age-standardized prevalence rates for the use of health services for mental illness (Figures 5 and 6).

- The age-standardized prevalence of the use of health services for mental illness increased in all provinces and territories over the surveillance period, with the exception of Ontario, where there was an 8.8% decrease. This may be explained, in part, by the fact that Ontario stopped submitting psychiatric hospital data to the Discharge Abstract Database in 2006. The largest increase in the age-standardized prevalence was observed in New Brunswick (Figures 5 and 6).

Provincial and territorial variations in the age-standardized prevalence of the use of health services for mental illness may relate to differences in the distribution of factors known to affect mental health such as financial situation, employment status, educational opportunities, social support and community engagement.[1] However, jurisdictional differences in detection and treatment practices as well as, differences in data coding, remuneration models and shadow billing practices may also play a role.

## COMORBID CHRONIC DISEASES AND CONDITIONS IN THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM

One of the advantages of the CCDSS methodology is that multiple chronic diseases or conditions can be identified in a comparable way. Cases are identified from the same source population and are linkable via a unique identifier (at the provincial or territorial level only). Therefore, the CCDSS offers the opportunity to calculate the prevalence of comorbid chronic diseases and conditions among people using health services for a mental illness. It is important to note that these data can only be used to describe the cross-sectional association between multiple diseases or conditions and cannot be used to describe the direction of this association (i.e. causation). In future CCDSS surveillance, we may be able to establish temporality for the diagnosis of chronic diseases and conditions. This information could provide insights regarding the extent in which mental illness is a risk factor for, and/or a complication of, other chronic diseases and conditions.

As a part of a pan-Canadian pilot conducted in 2012, the CCDSS captured information on five chronic diseases and conditions that may co-exist with mental illness. These included diabetes, hypertension, asthma, ischemic heart disease and chronic obstructive pulmonary disease (COPD). The results of this pilot work were used to calculate the prevalence of these comorbid chronic diseases or conditions among people who used health services for a mental illness compared with those who did not. For a summary of the case definitions used for these comorbid diseases and conditions, refer to Appendix D.

One limitation of this pilot was that the prevalence of the use of health services for a mental illness was calculated on an yearly basis (i.e. annual prevalence), while diabetes, hypertension, asthma, ischemic heart disease and COPD cases, once identified, were prevalent for life. In addition, some jurisdictions use only one diagnostic field in physician billing; therefore, if an individual presents with more than one disease or condition during a single health care encounter, all health issues will not be captured. This is increasingly problematic for older age groups, which are more likely to have multiple chronic diseases or conditions. Furthermore, certain diagnoses such as diabetes may be preferentially coded compared with others, resulting in under-reporting of mental illness.

Based on the results from this pan-Canadian pilot:

- The age-standardized prevalence of asthma, COPD, ischemic heart disease, diabetes and hypertension among people who used health services for a mental illness was higher than among those who did not use health services for a mental illness (rate ratios ranged from 1.2 to 1.6) from 2000/01 to 2009/10. The observed difference was fairly stable over the surveillance period except for asthma, for which the difference decreased slightly over time (Figure 7).

- Asthma and COPD more commonly existed among people having used health services for a mental illness than ischemic heart disease, diabetes or hypertension, compared to those that did not use health services for a mental illness (rate ratios greater than 1.5 and 1.2, respectively) (Figure 7).

**FIGURE 7:** Age-standardized[†] rate ratio for the prevalence of chronic diseases or conditions among people who used vs. did not use health services for a mental illness[‡], Canada,[*] 2000/01 to 2009/10
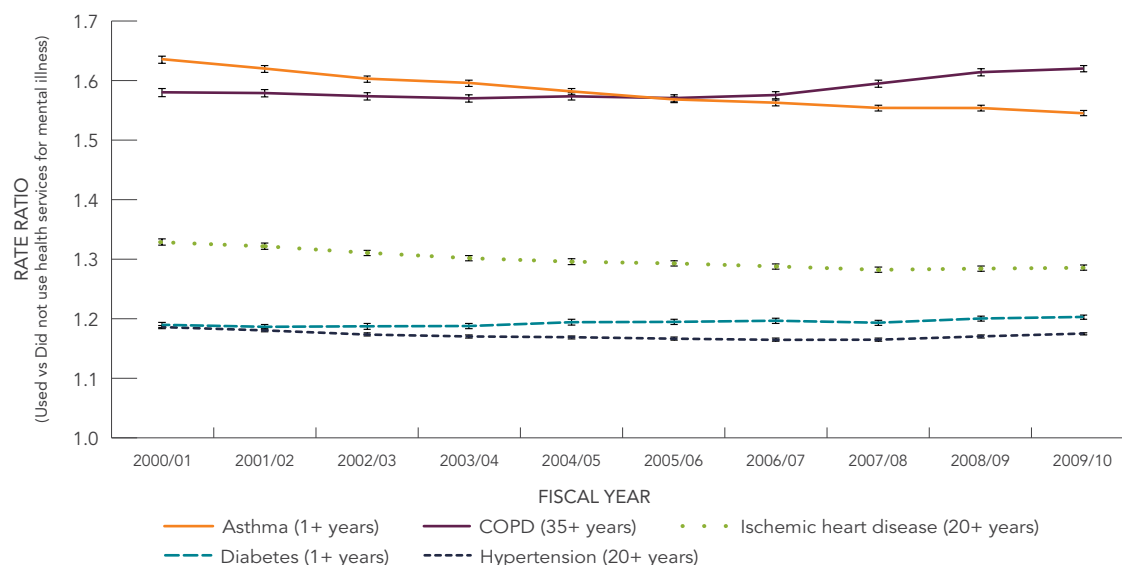


**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. [†] Age-standardized to 1991 Canada population (standard age groups depend on disease specific case definition age inclusions/exclusions). [‡] Age inclusions/exclusions are based on disease-specific case definitions. [*] Data do not include NU and YT; QC diabetes data were modelled using the Canadian aggregate age distributions.
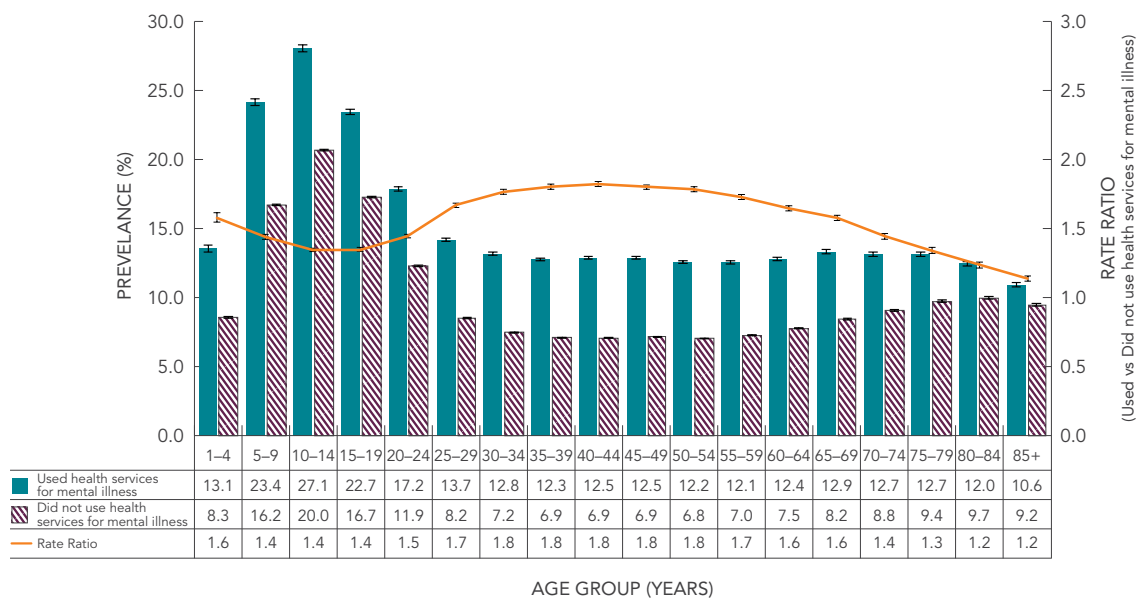
**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

The finding that asthma more commonly existed among people having used health services for a mental illness than ischemic heart disease, diabetes and hypertension, compared to those that did not use health services for a mental illness, likely relates to the severity of asthmatic episodes and the resulting anxiety and panic,[35,36] and/or the medications used to treat asthma, which can cause symptoms of anxiety.[35] Associations between poor asthma control and depression and/or anxiety are well known.[37]

Previous studies also offer insights regarding the higher prevalence of COPD observed among people having used health services for a mental illness. For example, people reporting having a serious mental illness were also more likely to report being a current smoker, a significant risk factor for COPD.[16,38] Furthermore, in the United States, it has been estimated that almost half of the cigarettes consumed were consumed by people with a mental illness.[38] Moreover, while smoking rates have decreased considerably over the past 60 years, findings from a longitudinal study found that the association between cigarette smoking and depression appeared only in recent decades, suggesting that people who continue to smoke are more likely to have depression.[39]

- Generally, the rate ratio for comorbid chronic diseases or conditions among people having used health services for a mental illness compared with those who have not declined steadily with age (results not shown). For asthma, however, the rate ratio peaked among young and middle-aged adults, before declining in older age groups (Figure 8).

**FIGURE 8:** Age-specific prevalence (%) of asthma among people who used vs. did not use health services for a mental illness, Canada* 2009/10



| AGE GROUP (YEARS) | 1–4 | 5–9 | 10–14 | 15–19 | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 | 45–49 | 50–54 | 55–59 | 60–64 | 65–69 | 70–74 | 75–79 | 80–84 | 85+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Used health services for mental illness | 13.1 | 23.4 | 27.1 | 22.7 | 17.2 | 13.7 | 12.8 | 12.3 | 12.5 | 12.5 | 12.2 | 12.1 | 12.4 | 12.9 | 12.7 | 12.7 | 12.0 | 10.6 |
| Did not use health services for mental illness | 8.3 | 16.2 | 20.0 | 16.7 | 11.9 | 8.2 | 7.2 | 6.9 | 6.9 | 6.9 | 6.8 | 7.0 | 7.5 | 8.2 | 8.8 | 9.4 | 9.7 | 9.2 |
| Rate Ratio | 1.6 | 1.4 | 1.4 | 1.4 | 1.5 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.4 | 1.3 | 1.2 | 1.2 |

**NOTES:** The 95% confidence interval shows an estimated range of values which is likely to include the true prevalence 19 times out of 20. * Data do not include NU and YT

**SOURCE:** Public Health Agency of Canada, using Canadian Chronic Disease Surveillance System data files contributed by provinces and territories, as of September 2013.

This may be due to the fact that asthma is more often diagnosed among children and adolescents than among adults. A case of asthma diagnosed in childhood may be well managed in adulthood and therefore not continue to receive a diagnostic code for asthma from a health professional later in life. Therefore, if the asthma diagnosis occurred before the surveillance period, the individual would not be captured by the CCDSS as a case. Consequently, these data may underestimate the prevalence of comorbid diseases or conditions among people who used (or did not use) health services for a mental illness.

# 4. CONCLUSION

A substantial segment of the Canadian population used health services for a mental illness during the surveillance period (1996/97 to 2009/10), with an annual age standardized prevalence ranging from 13.2% to 14.2% overall (results not shown). Special attention should be given to the increasing trend in the use of health services for mental illness among young adolescents, as well as to the very high prevalence of health service use among the elderly. More work is needed to understand which mental illnesses are driving these phenomena. These results highlight the high demands placed on the health care system for mental health services.

Akin to all surveillance data sources, administrative health data is not without limitations and the findings within this report should be interpreted in light of these. For instance, the CCDSS estimates do not include those who: sought mental health services from salaried physicians who do not shadow bill; exclusively sought privately funded care; received mental health services in hospitals that do not submit discharge abstract data to the Discharge Abstract Database (or in the case of Quebec, the MED-ÉCHO); sought care but did not receive a relevant mental illness diagnostic code; or have not sought care at all. In light of the above, results within this report likely underestimate the use of health services for mental illness in Canada.

This report is the first publication to present administrative data from the CCDSS for the national surveillance of mental illness. It describes the current status and trends on the use of health services for mental illness in Canada across the life span. The information within may help key stakeholders within all levels of government, non-governmental organizations, academic and industry sectors in their efforts to reduce the burden of mental illness in Canada.

## FUTURE PLANS

The CCDSS is a valuable source of information for the surveillance of health care contacts for mental illness in Canada. This information will be useful for increasing the collective understanding of mental illness and related health care utilization in the Canadian population.

Future work involving the CCDSS will include:

- collecting and reporting data on mental illness and mood and/or anxiety disorders on an ongoing basis;

- exploring the feasibility of developing case definitions for other mental illnesses such as psychotic disorders;

- developing an approach to study the chronicity of mental illness tracked via the CCDSS;

- exploring other comorbid diseases and conditions including but not limited to, stroke and other neurological conditions, since mental illness is common among those with these conditions;[40] and

- developing indicators of mortality.

# GLOSSARY

**Age-specific rate:** The rate calculated for each five-year age group.

**Age-standardized rate:** Rate adjusted for the differences in population age structure between the study population and a reference population. The age-standardized rates are commonly used in trend analysis or when comparing rates for different geographic areas or different subgroups.

**Agoraphobia:** An anxiety disorder that is characterized by experiencing anxiety in situations where there is a perception that escape may be difficult, or in which help may not be available.[1]

**Annual prevalence of health services use for mental illness (%):** The proportion of individuals who use health services for a mental illness during a one-fiscal-year period. This is represented by the number of individuals who have used health services for a mental illness, divided by the total population i.e. all individuals registered in provincial and territorial health insurance plans (approximately 97% of the Canadian population). The CCDSS identified individuals as having used health services for a mental illness if they met the following criteria: at least one physician claim listing a mental illness diagnostic code in the first field, or one hospital discharge abstract listing a mental illness code in the most responsible diagnosis field using the following ICD codes: ICD-9 or ICD-9-CM (290 to 319), or their ICD-10-CA equivalents (F00 to F99) during a one-fiscal-year period.

**Bipolar disorder:** A mood disorder that is characterized by at least one manic episode or mixed episode (mania and depression), with or without a history of major depression. Bipolar 1 disorder includes at least one manic episode, with or without depressive episodes. Bipolar 2 is characterized by major depressive episodes and less severe forms of mania (hypomanic episodes).[1]

**Chronicity:** The degree of persistence of a chronic disease or condition i.e. a disease or condition that is considered permanent once diagnosed or, is intermittent once diagnosed.

**Comorbidity:** Coexisting chronic diseases or conditions that are additional to a specific disease or condition under study.

**Confidence interval:** A 95% confidence interval is a range of values around the estimate that has a 95% probability of including the true value. The size of the confidence interval relates to the precision of the estimate.

**Depression:** A mood disorder that may involve a range of the following signs and symptoms: feelings of worthlessness; feelings of sadness that impair functioning; a loss of interest in usual activities; changes in appetite; disturbed sleep; and decreased energy. Children with depression may show signs of irritability, anxiety or behavioural problems that are similar to symptoms of oppositional defiant disorder or attention deficit disorder. Seniors may experience depression through symptoms of anxiety, agitation, and physical and memory disorders.[1]

**Dementia:** A group of disorders that are identified by a progressive decline in memory and thinking ability.[41]

**Feasibility study:** A study conducted to determine if data are appropriate to use for surveillance purposes.

**Fee-for-service:** Payment of claims based on submission of individual services.[42]

**Generalized anxiety disorder:** An anxiety disorder that involves excessive anxiety or worry that is difficult to control, and is often experienced together with fatigue and poor concentration. The clinical diagnosis involves symptoms that occur for more days than not over a period of at least six months.[1]

**International Classification of Diseases (ICD) code:** An international standard diagnostic classification for diseases and other health conditions for epidemiological, clinical and health management purposes. For example, it is used to monitor the incidence and prevalence of diseases and other health problems, proving a picture of the general health situation of countries and populations.[43]

**Incidence rate:** The rate of individuals who are diagnosed for the first time among those at risk during a specific time period.

**Major depressive disorder:** A mood disorder that is "characterized by one or more major depressive episodes", clinically defined by the occurrence of a minimum of "two weeks of depressed mood and/or loss of interest in usual activities accompanied by at least four additional symptoms of depression."[1]

**Manic episodes:** A symptom of mood disorders that involve displays of high energy and risk-taking behaviours, and often predispose an individual to engage in "out of character" actions, such as spending money freely, breaking the law or showing a lack of judgment in sexual behaviour.[1] Manic episodes can last from weeks to months. Both depressive and manic episodes change the way an individual thinks, feels and behaves, as well as influence the body's physical functioning.

**Mental illness:** Mental illnesses are "characterized by alterations in thinking, mood or behaviour associated with significant distress and impaired functioning".[1] They result from complex interactions of biological, psychosocial, economic and genetic factors.[2] Mental illnesses can affect individuals of any age; however, they often appear by adolescence or early adulthood.[3] There are many different types of mental illnesses, and they can range from single, short-lived episodes to chronic disorders.

**Obsessive-compulsive disorder:** An anxiety disorder that involves obsessions, such as "persistent thoughts, ideas, impulses, or images that are perceived as intrusive and inappropriate, and that cause marked anxiety or distress." Compulsions are thoughts or actions that occur as a response used to counteract obsessions.[1]

**Panic disorder:** An anxiety disorder that involves the "presence of recurrent, unexpected panic attacks" (a discrete period of intense fear), "followed by at least one month of persistent concern about having additional attacks", worry about the attacks, or a "significant change in behaviour related to the attacks."[1]

**Presenteeism:** Attending work when experiencing illness, with a resultant loss in productivity.[10]

**Protective factors for mental illness:** "Factors […] that help to reduce the probability of developing mental health problems and illnesses, aid in maintaining good mental health and assist in developing resilience in the face of adversity. They include having a sense of belonging, good relationships, and problem solving skills, and feeling in control of one's life; as well as structural factors in society that reduce adversity and promote a sense of security, such as safe housing and stable income."[2]

**Rate ratio:** the ratio of two related measures for example, the prevalence of the use of health services for mental illness among females, divided by the prevalence of the use of health services for mental illness among males.

**Risk factors for mental illness:** Aspects of life and/or genetic predisposition that increase the likelihood of developing a mental illness or the likelihood that an existing mental illness may be worsened. Risk factors can include a genetic predisposition, economic factors, social factors, psychological factors, childhood trauma, isolation, incarceration, personal or family drug or alcohol abuse, family conflict, and the experience of discrimination.[2]

**Shadow billing:** An administrative process whereby salaried physicians submit service provision information using provincial and territorial fee codes; however, payment is not directly linked to the service reported.

**Stigma:** "Beliefs and attitudes […] that lead to the negative stereotyping of people and to prejudice against them and their families. The individual and collective discrimination arising is often based on ignorance, misunderstanding and misinformation."[2]

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# APPENDIX A

## SCOPE OF THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM

The purpose of the CCDSS is to estimate and report on trends of chronic disease in Canada. Based on the model of the former National Diabetes Surveillance System, the CCDSS continues to track diabetes in Canada; however, it has broadened its scope to include other chronic diseases or conditions such as mental illness, mood and anxiety disorders, hypertension, asthma, chronic obstructive pulmonary disease, heart failure, ischemic heart disease, stroke, arthritis, osteoporosis, and neurological conditions. The CCDSS provides nearly complete coverage of Canada's population, including people who are often missed by other methods of data collection (e.g. surveys). It provides a more comprehensive picture of chronic diseases and conditions seen in the Canadian health care system than databases which track hospitalized conditions alone. It is guided by the expertise of the CCDSS Science Committee, with representatives from each province and territory.

# APPENDIX B

## MENTAL ILLNESS SURVEILLANCE USING ADMINISTRATIVE DATA: FEASIBILITY AND VALIDATION STUDIES

In 2006/07, feasibility studies were carried out to evaluate the usefulness of administrative data for the surveillance of all mental illnesses in Canada using data from five provinces (Ontario, Quebec, Nova Scotia, Alberta and British Columbia).[44]

Cases were captured using population-based record-linkage analysis with data from physician billings, hospital discharge abstracts, and community-based clinics. A person was identified as a case if he or she had at least one physician visit, or one discharge from any hospital, with a diagnosis in the first or most-responsible diagnosis field using the following codes: ICD-9 or ICD-9-CM (290 to 319), or their ICD-10-CA or the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition equivalents. Rates were calculated annually.[44]

Results from these feasibility studies demonstrated that the described "omnibus" case definition would be suitable for national monitoring of the treated prevalence of mental illness. This was based on the fact that the prevalence estimates were consistent with those from population based health surveys, similar across jurisdictions and demonstrated the expected sex and age patterns.[44]

Additional testing was carried out to assess the impact of excluding codes for dementias (ICD-9 or ICD-9-CM code: 290) and developmental delays (ICD-9 or ICD-9-CM codes: 315 to 319). Results showed very little difference to the overall prevalence in any province (less than 0.5%); as a result, all ICD codes were retained for national surveillance purposes.

Furthermore, an exploration of the impact of incorporating physician billing codes and hospitalization data beyond the first and most responsible diagnosis fields was carried out. In Ontario and Nova Scotia, it was possible to expand the case definition in hospital morbidity data to search for mental illness codes in fields other than the most-responsible diagnosis field. Results demonstrated that this increased the prevalence by only 0.3%, even when extended to 16 fields. In Alberta and Nova Scotia, it was possible to search for mental illness codes in up to two fields of physician billings. This resulted in less than a 0.5% increase in prevalence.[44] Therefore, restricting to the use of one diagnostic field only (common denominator across all provinces and territories) seems to have a marginal impact on case capture.

Lastly, British Columbia and Nova Scotia examined the effect of adding data from community based clinics which includes health care encounters with all mental health clinicians, not just physicians. Results demonstrated that the prevalence of treated mental disorders increased by only 1%.

Upon completion of the described feasibility work, the Agency funded a study titled "A case definition validation study for mental health surveillance in Canada" to determine the validity of CCDSS case definitions in their ability to capture prevalence of treated mental illnesses using administrative data in an adult population (validity was not assessed among individuals aged less than 20 years old). This study, conducted by the Institute of Clinical Evaluative Sciences (Ontario), demonstrated that the CCDSS case criteria for the annual prevalence may not correctly identify all diagnosed cases (sensitivity 53–71%, specificity 90–91%, positive predictive value 45–51%, negative predictive value 91–97%).[45]

One of the possible explanations for the low sensitivity includes difficulty in capturing a mental illness case in the presence of a competing diagnosis in physician billings, since many jurisdictions are limited to the use of one (i.e. the first) diagnostic field only. However, the impact of this restriction appeared to be marginal based on feasibility testing reported above. The low positive predictive value may be explained in part by limitations with the reference standard (i.e. family physician electronic medical records), since specialist consultation letters, and hospitalization and emergency room records are not completely captured in this data source. Another potential explanation for the low positive predictive value includes physicians assigning a diagnostic code for a mental illness when, in fact, the patient does not meet the diagnostic standard.[45]

Overall, results from this validation study demonstrated that the use of administrative data is limited in its ability to correctly identify individuals with a mental illness. As a result, it was recommended that the use of administrative data in examining mental illness be confined to describing an estimate of health care contacts for mental illness.

# APPENDIX C

## POPULATION COVERAGE OF MENTAL ILLNESS IN THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM

While the coverage for the CCDSS is near-universal, exclusions include Canadians covered under federal health programs, such as refugee protection claimants, full-time members of the Canadian Forces, eligible veterans, individuals in the Royal Canadian Mounted Police, and federal penitentiary inmates. First Nations, Inuit and Métis individuals are included in provincial and territorial health registries, therefore; physician and hospital services are captured for these particular populations.

Furthermore, the CCDSS does not capture all eligible cases including those:

- who were seen by a salaried physician (including psychiatrists) who does not shadow bill

Under traditional physician payment models in Canada, physicians are reimbursed on a "fee-for-service" basis. With the evolution of health care delivery models, there has been an increase in the number of alternative payment programs, where payments are salaried, sessional or based on capitation. Under these payment modes, diagnostic codes are not captured by physician billing[vii] data unless shadow billing is in place. In 2005/06, alternative payment programs totalled 21.3% of all clinical payments made to physicians in Canada.[42] The proportion of physicians receiving payments from alternative payment programs ranged from 10.3% in Alberta to 96.1% in the Northwest Territories.[42] Given that the majority of psychiatrists in several provinces and territories are remunerated under alternative clinical physician payment plans,[42] and that the shadow billing proportion of them is not known, an unknown quantity of these cases may be missing.

- who sought care from a community-based clinic or private setting

Many mental health services provided in community clinics and private settings (e.g., services from psychotherapists, psychologists, social workers, or counsellors) are funded through alternate payment arrangements and therefore, not captured in the CCDSS. For instance, psychologists who play a critical role in community based alcohol and drug addiction treatment centres[23] are often funded through alternate payment arrangements. Therefore, individuals with substance use disorders who seek care from these mental health professionals will not be captured in the CCDSS. However, results from a feasibility study that examined the effect of including data from community based databases in British Columbia and Nova Scotia demonstrated that the prevalence of treated mental disorders increased by only 1%.[44]

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[vii] Physician billings include general practitioners, psychiatrists and other specialist physicians.

- who received mental health services in a hospital that does not submit discharge abstract data to the Discharge Abstract Database (or in the case of Quebec, the MED-ÉCHO)

Some dedicated psychiatric hospitals (which account for approximately 11–16% of mental health discharges)[46] and some hospitals with dedicated mental health beds, do not submit discharge abstract data to the aforementioned databases). Therefore, data from psychiatric hospitalizations are not consistently captured in the CCDSS across jurisdictions.

- who sought care but did not receive a relevant mental illness diagnostic code

Since many jurisdictions are limited to the use of one (i.e. the first) diagnostic field only, capturing a mental illness case in the presence of a competing diagnosis may be difficult. For example, certain diagnoses such as diabetes may be preferentially coded compared with others, resulting in underreporting of mental illness. In addition, people for whom their health care provider is reluctant to assign a mental illness diagnostic code due to the associated stigma, may receive a non-mental illness diagnostic code and therefore, not be captured.

- who do not seek care at all

The identification of CCDSS mental illness cases depends on people seeking treatment for their symptoms. Estimates from population surveys suggest that while 1.9 million adults in Canada reported having a mental illness diagnosed by a health professional in 2003, an additional 1.6 million reported symptoms meeting the criteria for mental health problems, but had not sought care and therefore were not diagnosed.[9] Several explanations for the low rates of treatment-seeking among those with these disorders have been proposed including: fear of stigma from health professionals and society,[47] thinking the problem will go away on its own,[48] and low mental health literacy.[49,50]

# APPENDIX D

## CASE DEFINITIONS FOR COMORBID CHRONIC DISEASES AND CONDITIONS IDENTIFIED THROUGH THE CANADIAN CHRONIC DISEASE SURVEILLANCE SYSTEM

**Asthma:** Individuals aged one year and older, with at least one inpatient hospitalization listing a diagnostic code for asthma in any diagnostic field, or at least two physician billing claims listing a diagnostic code for asthma in the first diagnosis field, in a two-year period. Once identified, an individual is considered a prevalent case for life.

**Chronic obstructive pulmonary disease:** Individuals aged 35 years and older, with at least one inpatient hospitalization listing a diagnostic code for COPD in any diagnostic fields, or at least one physician billing claim listing a diagnostic code for COPD in the first diagnosis field, in a given year. Once identified, an individual is considered a prevalent case for life.

**Diabetes:** Individuals aged one year and older, with at least one inpatient hospitalization listing a diagnostic code for diabetes in any diagnostic field, or at least two physician billing claims listing a diagnostic code for diabetes in any diagnostic field, in a two-year period (with probable cases of gestational diabetes removed). Once identified, an individual is considered a prevalent case for life.

**Hypertension:** Individuals aged 20 years and older, with at least one inpatient hospitalization listing a diagnostic code for hypertension in any diagnostic field, or at least two physician billing claims listing a diagnostic code for hypertension in any diagnostic field, in a two-year period (with probable cases of pregnancy-induced hypertension removed). Once identified, an individual is considered a prevalent case for life.

**Ischemic heart disease:** Individuals aged 20 years and older, with at least one inpatient hospitalization listing a diagnostic or procedural code for ischemic heart disease in any diagnostic field or at least two physician billing claims listing a diagnostic code for ischemic heart disease in any diagnostic field, in a one-year period. Once identified, an individual is considered a prevalent case for life.

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