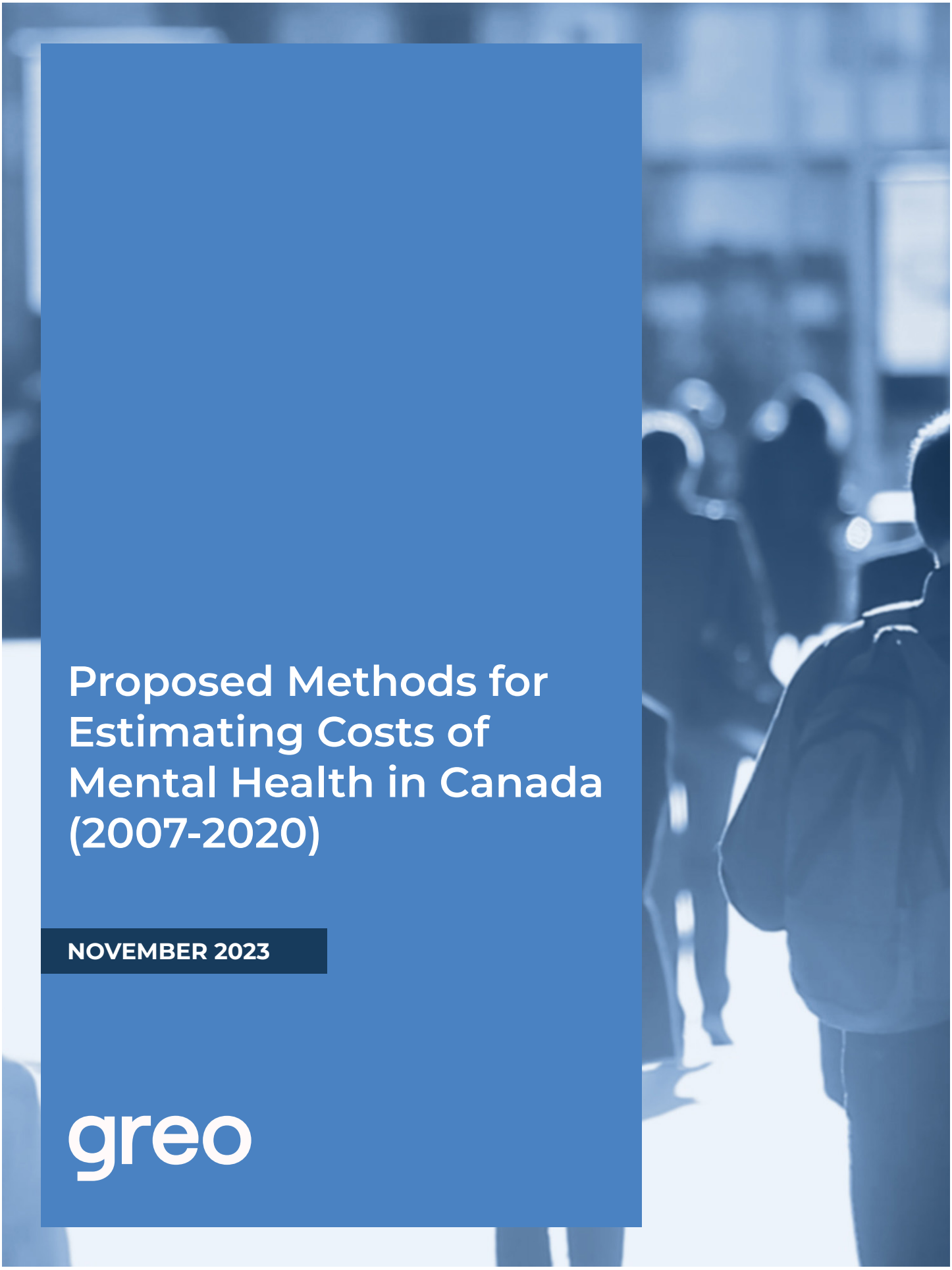

# Proposed Methods for Estimating Costs of Mental Health in Canada (2007-2020)

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## Other

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This document can also be downloaded as a PDF at:
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# BACKGROUND

The following report presents the results of an investigation by Greo Evidence Insights into how Canadian mental health (MH) costs could be estimated. It begins by conducting a review of studies estimating the costs of MH in Canada since 2010 and examines the various approaches employed. Based on this analysis the next section makes recommendations regarding cost types to include, the granularity of the estimates, and the approach to missing/incomplete data. The report then recommends a phased approach to estimating the cost of mental health: Phase I describes in detail the data sources and methods to estimate public, direct health care costs associated with general and psychiatric MH-related hospitalizations and emergency room visits and non-hospital-based interventions (i.e., physician costs, pharmaceutical costs, community MH services). Phase II describes methods for estimating social and income support payments and indirect costs. Finally, Phase III describes data sources and methods for estimating private health and lost productivity costs.

# REVIEW OF STUDIES ESTIMATING CANADIAN MENTAL HEALTH COSTS SINCE 2010

We began this project by first reviewing studies that have estimated expenditure on MH&SU services to assess the various approaches/estimation methods/modelling strategies employed.

## METHODS

The search was limited to economic studies investigating expenditure/cost[1] associated with MH&SU in Canada as well as large-scale, national-level international studies that included Canadian estimates that were conducted since 2010. We conducted electronic searches of relevant databases using the following search terms:

*("mental health" OR "mental illness" OR "substance use" OR "substance abuse" OR "addiction") AND ("economic burden" OR "economic cost*" OR "economic impact" OR "burden of disease" OR "cost study" OR "cost estimate" OR "financial impact" OR "financial burden" OR "cost of illness").*

Searches were conducted using the following databases: Web of Science, SCOPUS, PubMed, and PsycINFO. In addition, an informal search of the grey literature was also conducted. The results were compared to recent reviews in this area to ensure that relevant studies were not missed (Deraspe, 2013; Jacobs et al., 2017; Mental Health Commission of Canada, 2017). However, it is important to note that the purpose of this review was to examine how other studies assessing the cost of MH in Canada were conducted and this should not be understood to be a comprehensive systematic search/review.

## RESULTS

The search yielded 316 records. After removing 96 duplicates, 220 records remained, and their titles and abstracts were reviewed for relevance. At this stage another 173 studies were removed as they did not assess the cost of MH or SU. Full-text versions of the remaining 47 studies were downloaded and categorized. Among these studies there were:

- four reviews (Deraspe, 2013; Doran & Kinchin, 2019; Hassard et al., 2018; Jacobs et al., 2017);
- three policy papers (Bartram & Lurie, 2017; Mental Health Commission of Canada, 2013, 2017);
- 15 that assessed the cost of substance use only (Canadian Substance Use Costs and Harms Scientific Working Group, 2018b, 2020b; Enns et al., 2017; Gomes et al., 2014; Krebs et al., 2014; Krueger et al., 2016; Krueger et al., 2017; Lewis-Laietmark et al., 2017; Rehm et al., 2006b; Sanyal, 2021; Single et al., 2003b; Sorge et al., 2020; Wettlaufer et al., 2017; Willmore et al., 2017; Young & Jesseman, 2014);
- 10 studies that assessed the cost associated with specific MH conditions (Chisholm et al., 2016; Chiu et al., 2017; Chiu et al., 2020; Croteau et al., 2019; Evans-Lacko & Knapp, 2016; Gatner et al., 2022; McIntyre et al., 2020; Pelletier et al., 2017; Slomp et al., 2012; Tanner et al., 2020);
- one estimating costs among a specific population (Puri et al., 2017); and
- three that estimated return on investment associated with interventions (Béland et al., 2011; Deloitte Insights, 2019; Smetanin et al., 2012).

[1] In the studies assessed as well as elsewhere in the literature "expenditure" is frequently used interchangeably with "cost". In this report we primarily use the word "cost", but when "expenditure" is used it should be interpreted as a synonym.

In the end there were 9 relevant records (7 separate studies as three of these records/reports described the same study) remaining that assessed the cost of MH in Canada (Conference Board of Canada, 2012; Jacobs et al., 2010; Jacobs et al., 2016; Public Health Agency of Canada, 2018; RiskAnalytica, 2010; Smetanin et al., 2011; Smetanin et al., 2012; Wang et al., 2018; Zhang et al., 2016) (see Table 1) and 2 international comparison studies that included Canada (Vigo et al., 2020; Vigo et al., 2019).

## CANADIAN MENTAL HEALTH COSTING STUDIES

Among the seven identified studies assessing the cost of MH in Canada since 2010, there was considerable variability in the approach employed (see Table 1). By approach we mean types of costs included in the estimation methods, the granularity of the estimates, and approach to handling missing/incomplete data.

### Types of costs

Types of costs used to estimate costs of MH can be divided into four general categories (Jacobs et al., 2017; Public Health Agency of Canada, 2018).

1. Direct costs include expenditure on goods and services such as pharmaceuticals, physician services, or hospital care. These are usually associated with the provision of health care and can be public (from governments) or private (e.g., private insurance companies, etc.). However, direct costs can also occur in the criminal justice system when estimating direct costs associated with treatment or programming for incarcerated people or policing, court or corrections costs that could have been avoided with adequate advance prevention or treatment.
2. Social and income support payments that include social service supports such as assisted housing, employment programs, funds provided to non-profit organizations, or income support provided to people in need due to a MH condition.
3. Indirect costs include the value of the loss of labour production that can be attributed to MH-related morbidity (absenteeism, presenteeism, disability insurance costs, etc.) or mortality (removal from the workforce due to MH-attributable premature death).
4. Human costs represent an estimated cost associated with a loss of quality of life (e.g., cost estimates associated with years lived with disability or disability-adjusted life years. These are also known as intangible costs.

Among the seven studies that met our inclusion criteria (see Table 1),

- four estimated direct health care costs (Jacobs et al., 2010; Public Health Agency of Canada, 2018; Smetanin et al., 2011; Wang et al., 2018) and one assessed direct criminal justice-related costs (Jacobs et al., 2016);
- two included social and income support payments (i.e., social service supports) (Jacobs et al., 2010; Smetanin et al., 2011);
- four assessed indirect costs. Specifically, lost productivity costs due to morbidity or premature mortality (Conference Board of Canada, 2012; Public Health Agency of Canada, 2018; Smetanin et al., 2011; Zhang et al., 2016); and
- no studies examined the human costs associated with MH.

It is worth noting that when assessing direct healthcare costs and social and income support payment expenditures, Smetanin et al. (2011) relied on costs generated by the 2010 IHE study (Jacobs et al., 2010).

## Granularity of the estimates

Another way that approaches to estimating the costs of mental health differ is the granularity of the estimates produced. Studies can vary in terms of the:

- timeframe assessed;
- whether estimates are generated such that inter provincial /territorial comparisons are possible;
- whether estimates are presented separately by type of cost or data source;
- whether estimates are presented by mental disorder (e.g., can costs of depression be compared to costs associated with anxiety); and
- whether cost estimates are presented by age and sex.

In terms of the granularity of the cost estimates produced, most studies estimated the cost for a single year (Jacobs et al., 2010; Jacobs et al., 2016; Wang et al., 2018; Zhang et al., 2016). In contrast, Smetanin et al. (2011) calculated one year (2011), then projected to 2041 and Wang et al. (2018) estimated costs in 2013 and compared them to 2003 estimates (Jacobs et al., 2008). Three studies presented estimates by province/territory (P/T) (Jacobs et al., 2010; Public Health Agency of Canada, 2018; Wang et al., 2018), three studies presented the estimates by MH disorder (Conference Board of Canada, 2012; Smetanin et al., 2011; Zhang et al., 2016), and only one study reported all estimates by age and sex (Public Health Agency of Canada, 2018). See Table 1.

## Approach to missing/incomplete data

Closely related to granularity, another way studies differed was in their approach to missing/incomplete data. Specifically, whether data imputation or estimation was used to derive cost estimates when data is either unavailable, partially available, inconsistently collected across P/Ts, or not available at the desired level of granularity. When relying on national databases that have been aggregated and standardized nationally, such as hospitalization data collected by the Canadian Institute for Health Information (CIHI), missing data may not be an issue of concern. However, when attempting to estimate costs that are not collected and standardized in a national database, there are frequently problems associated with inconsistency and heterogeneity in the type/ comprehensiveness of data. In these cases, to conduct meaningful comparisons across geography, time, or populations, imputation or estimation procedures may be necessary. Similarly, if available data are not disaggregated by P/T, disorder, sex, or age, it may be necessary to use some estimation strategies (sometimes referred to as modelling) using complementary inputs in order to derive estimates at the desired level of granularity. This can be done using other data inputs. Specifically, high-quality datasets such as hospitalization data (e.g., Canadian Substance Use Costs and Harms Scientific Working Group, 2020b) or other inputs (e.g., Jacobs et al., 2010). It is also important to note that should such imputations/estimations be conducted, it is not necessary or even appropriate to report the estimates at the level of granularity imputed. However, it may be important in generating meaningful estimates of overall cost (when collapsing across cost types). For example, in the CSUCH project, though estimates of

specialized treatment events (community-based SU treatment) were generated by year, P/T, substance, age, and sex, these estimates were only reported when summed with all other cost categories and never reported separately. This strategy results in more comprehensive estimates of the overall cost, use but avoids presenting estimates for which the granular estimates may not be reliable enough to report with confidence.

Among the studies assessed in the review, some did not impute/estimate and relied on national level data only (Conference Board of Canada, 2012; Jacobs et al., 2016; Wang et al., 2018; Zhang et al., 2016). However, Jacobs et al., (2010) employed a mixed approach. Sometimes they would estimate missing data (e.g., counselling costs for physicians who were under alternative payment schemes) and sometimes they included data provided by P/Ts with no attempt to account for the heterogeneity of data (e.g., community mental health services). In the Smetanin et al., (2011) and The Economic Burden of Illness in Canada (The Public Health Agency of Canada, 2017) missing data cells were estimated using available data. See Table 1.

## International studies that include Canada

In our review two international comparison studies (that included Canada) emerged that assessed the burden of disease associated with MH (Vigo et al., 2020; Vigo et al., 2019). Both studies extracted data on years lived with a disability (YLDs) and years of life lost (YLLs) due to premature mortality from the Global Health Data Exchange. The one study that included cost data (Vigo et al., 2019) relied on the estimates developed by Jacob et al. (2010).

## Summary

Since 2010, there have been three studies that have estimated the direct health costs associated with MH in Canada (Jacobs et al., 2010; Public Health Agency of Canada, 2018; Wang et al., 2018). Other studies that have reported updated estimates have relied on Jacobs et al (2010) as a foundational input then projected/estimated costs (Mental Health Commission of Canada, 2017; Vigo et al., 2019). The variability in the types of included costs, the time frames covered by the estimates, the granularity of estimates, and the approach to dealing with missing/incomplete data has made it challenging for those who wish to point to a singular estimate of the cost of MH in Canada (Deraspe, 2013; Jacobs et al., 2017; Mental Health Commission of Canada, 2017). The next section presents an approach designed to address these issues.

**Table 1. Summary of Canadian mental health costing studies since 2010**

| Study | Summary | Types of Costs included | Granularity |
|---|---|---|---|
| The cost of mental health and substance abuse services in Canada (Jacobs et al., 2010) | Where possible accessed national datasets. Relied on provincial level expenditures when national data were unavailable.<br><br>**Approach to missing/ incomplete data:** Mixed. Sometimes missing data were estimated (e.g., GP counselling costs) and sometimes simply excluded from analysis (e.g., CMH services). | **Direct costs:** Healthcare (physician payment; hospitalizations; emergency department visits; pharmaceuticals; CMH; First Nations MH and addictions services).<br><br>**Social and income support payments:** Housing; employment programs; non-profit organizations; income support; private EAP programs.<br><br>**Indirect costs:** Not assessed.<br><br>**Human costs:** Not assessed. | **Timeframe assessed**: One year assessed (2007/2008)<br><br>**Jurisdiction**: Estimates presented by P/T<br><br>**Cost type:** Estimates presented by cost types assessed.<br><br>**Disorder:** Undifferentiated by MH or SU disorder<br><br>**Age:** Undifferentiated<br><br>**Sex**: Undifferentiated |
| The life and economic impact of major mental illnesses in Canada: 2011 to 2041 (RiskAnalytica, 2010; Smetanin et al., 2011; Smetanin et al., 2012) | Costs drawn from IHE 2010 study then modelled based on prevalence estimates.<br><br>"Life at RisK®" modelling framework – a proprietary analytic tool that simulates the changes in population characteristics over time.<br><br>**Approach to missing/ incomplete data:** Missing data cells were estimated | **Direct costs:** Healthcare (physician payment; hospitalizations; pharmaceuticals; support staff) Note. cost estimates drawn from IHE study.<br><br>**Social and income support payments:** Income support; social services (from IHE 2010).<br><br>**Indirect costs :** Absenteeism; presenteeism. No premature mortality.<br><br>**Human costs:** Not assessed. | **Timeframe assessed**: Multiyear 2011 and projected to 2041<br><br>**Jurisdiction**: Undifferentiated by P/T<br><br>**Cost type:** Estimates presented by cost type assessed.<br><br>**Disorder:** Estimates presented by following disorders: mood; anxiety; schizophrenia; attention deficit/hyperactive; conduct; oppositional defiant; substance use; dementia; depression; dysthymia; bipolar; social phobia; panic; and agoraphobia<br><br>**Age:** Estimates presented by age in some instances<br><br>**Sex**: Estimates presented by male/female in some instances |
| Mental health issues in the labour force: Reducing the economic impact on Canada (Conference Board of Canada, 2012) | Weighted debilitation due to MH applied to Statistics Canada survey data (disability questions asked in the Canadian Community Health Survey).<br><br>Weights derived by clinical assessments (opinions; n=15) regarding the degree of (work-related) debilitation associated with six mental illnesses.<br><br>**Approach to missing/ incomplete data:** Not applicable | **Direct costs:** Not assessed<br><br>**Social and income support payments:** Not assessed<br><br>**Indirect costs:** Absenteeism; Presenteeism.<br><br>**Human costs:** Not assessed. | **Timeframe assessed**: 2007-2010<br><br>**Jurisdiction**: Undifferentiated.<br><br>**Cost type:** Undifferentiated.<br><br>**Disorder:** Estimates presented by following disorders: depression; dysthymia; bipolar; social phobia; panic; agoraphobia<br><br>**Age:** Undifferentiated.<br><br>**Sex**: Undifferentiated. |

| | | | |
|---|---|---|---|
| Mental health services costs within the Alberta criminal justice system (Jacobs et al., 2016) | Probabilistic model of trajectory in the criminal justice system based on data from Statistics Canada, Alberta Solicitor General, and Alberta Health services<br><br>**Approach to missing/ incomplete data:** Not applicable | **Direct costs:** Criminal justice (policing; prosecution; courts; corrections)<br><br>**Social and income support payments:** Not assessed<br><br>**Indirect costs:** Not assessed<br><br>**Human costs:** Not assessed. | **Timeframe assessed**: 2013<br><br>**Jurisdiction**: Alberta only<br><br>**Cost type:** Estimates presented by criminal justice cost category<br><br>**Disorder:** Undifferentiated.<br><br>**Age:** Undifferentiated.<br><br>**Sex**: Undifferentiated. |
| The relationship between chronic conditions and absenteeism and associated costs in Canada (Zhang et al., 2016) | Compared number of days absent attributable to various chronic health conditions including "mood disorders<br><br>including depression, bipolar disorder, mania or dysthymia; and anxiety disorders such as phobia,<br><br>obsessive-compulsive disorder or panic disorder" using missed workdays as self-reported in CCHS.<br><br>**Approach to missing/ incomplete data:** Not applicable | **Direct costs:** Not assessed<br><br>**Social and income support payments:** Not assessed<br><br>**Indirect costs:** Absenteeism<br><br>**Human costs:** Not assessed.<br><br>**Criminal justice:** Not assessed | **Timeframe assessed**: 2010<br><br>**Jurisdiction**: Undifferentiated.<br><br>**Cost type:** Undifferentiated.<br><br>**Disorder:** Estimates presented for several chronic health conditions including anxiety disorders and mood disorders.<br><br>**Age:** Undifferentiated.<br><br>**Sex**: Undifferentiated. |
| Public expenditures for mental health services in Canadian Provinces (Wang et al., 2018) | Government or public MH costs only. Obtained from national databases. Compared these costs to those assessed in 2010 by Institute for Health Economics<br><br>**Approach to missing/ incomplete data:** Not applicable | **Direct costs:** Healthcare (physician payment; hospitalizations; pharmaceuticals).<br><br>**Social and income support payments:** Not assessed.<br><br>**Indirect costs:** Not assessed.<br><br>**Human costs:** Not assessed.<br><br>**Criminal justice:** Not assessed. | **Timeframe assessed**: 2013 (compared to 2003)<br><br>**Jurisdiction**: Estimates presented by P/T<br><br>**Cost type:** Estimates presented by cost type assessed.<br><br>**Disorder:** Undifferentiated.<br><br>**Age:** Undifferentiated.<br><br>**Sex**: Undifferentiated. |
| The Economic Burden of Illness (EBIC) in Canada, 2010 (The Public Health Agency of Canada, 2017) | Assessed cost of illness in general. MH included with other health conditions.<br><br>Employed a top-down approach where total health expenditures are allocated across diagnostic categories (ICD-10)<br><br>**Approach to missing/ incomplete data:** Missing data cells were estimated | **Direct costs:** Healthcare (physician payment; hospitalizations; pharmaceuticals).<br><br>**Social and income support payments:** Not assessed.<br><br>**Indirect costs:** Lost production due to morbidity and premature mortality.<br><br>**Human costs:** Not assessed.<br><br>**Criminal justice:** Not assessed. | **Timeframe assessed**: 2010<br><br>**Jurisdiction**: Estimates presented by P/T<br><br>**Cost type:** Estimates presented by cost type assessed.<br><br>**Disorder:** Estimates presented for "mental health disorders" (undifferentiated).<br><br>**Age:** Estimates presented by age.<br><br>**Sex**: Estimates presented by male/female. |

# CHOOSING AN APPROACH TO ESTIMATING THE COST OF MENTAL HEALTH IN CANADA

According to Jacobs et al. (2017), in Canada, "there are no agreed-upon standard methods for undertaking aggregate-level analyses in the field of mental health, as is the case in the field of disease costing in general." (p. 128). The result is that over time there have been several estimates of the cost of MH that have been developed in Canada - described in the review above. The challenges associated with interpreting estimates that diverge in types of costs included, year(s) assessed, and granularity of reported estimates have been described elsewhere (Deraspe, 2013; Jacobs et al., 2017; Mental Health Commission of Canada, 2017).

Similar challenges existed among those attempting to understand the cost of substance use in Canada. For several years there were multiple, "one-off" studies assessing the cost of substance use in Canada that employed a range of different approaches (e.g., Rehm et al., 2006a; Single et al., 1998; Xie et al., 1998; Young & Jesseman, 2014).

In 2017, the Canadian Centre on Substance Use and Addiction (CCSA) in collaboration with the Canadian Institute for Substance Use Research (CISUR) at the University of Victoria received multi-year funding from Health Canada to conduct a systematic assessment of the cost of SU in Canada. To do so, this consortium relied on international guidelines for estimating the costs of substance use (Single et al., 2003a) and consulted with an advisory group that included authors of the most recent cost study at the time (Rehm et al., 2006a) as well as representatives from the Public Health Agency of Canada [authors of the Economic Burden of Illness in Canada study (Public Health Agency of Canada, 2018)] and other national organizations.[2] The first estimates emerging from this work (Canadian Substance Use Costs and Harms Scientific Working Group, 2018a) were based on the methods used by Rehm et al (2006a). Since 2018, the methods used have improved, the data sources used have expanded, and the estimates made more comprehensive (Canadian Substance Use Costs and Harms Scientific Working Group, 2020a).

To avoid the problem of multiple competing estimates of substance use costs over time (i.e., "one-off" studies), the CSUCH project estimates the direct and indirect costs associated with substance use in Canada over multiple years (2007-2017) and presents these estimates by cost type; substance; P/T; age group (where data were applicable and available); and sex (where data were applicable and available). These estimates have been made available to the public via a suite of knowledge mobilization products. Specifically, national-level data have been made available via two national reports (Canadian Substance Use Costs and Harms Scientific Working Group, 2018a, 2020a) and an infographic.[3] Provincial/territorial estimates have been made available via separate infographics[4] for each P/T (excluding Quebec due to data availability), and infographics for males[5] and females.[6] The full granularity of

[2] Institut national de santé publique du Québec, University of Montreal, Health Canada, University of Guelph, Statistics Canada, Institute for Clinical and Evaluative Sciences, Canadian Institute for Health Information (CIHI), University of Toronto, and Correctional Service of Canada
[3] https://csuch.ca/publications/CSUCH-Canadian-Substance-Use-Costs-Harms-Infographic-2020-en.pdf
[4] https://csuch.ca/resources/provincial-territorial/
[5] https://csuch.ca/publications/CSUCH-Canadian-Men-Unintentional-Deaths-Infographic-2021-en.pdf
[6] https://csuch.ca/publications/CSUCH-Canadian-Women-Alcohol-Attributable-Deaths-Infographic-2021-en.pdf

the estimates have been made available to the public via an online data visualization tool.[7] As methods improve and higher quality datasets emerge, updated estimates are recalculated for all years in the time series so trends remain valid as new estimates are released. The cost estimates generated via this project have emerged as the "gold-standard" for estimates of the cost of substance use in Canada and Health Canada continues to fund regular updates. The release of the next set of estimates is planned for early 2023.

Given the problems associated with multiple "one-off" studies estimating the cost of MH in Canada, it is recommended that an ongoing initiative to continually estimate, with improving comprehensiveness and reliability, be conducted for MH in Canada.

## Pros and cons of various approaches

As has been clear by the review above as well as other reviews of MH costing studies (Deraspe, 2013; Jacobs et al., 2017; Mental Health Commission of Canada, 2017), there is great diversity in the methods and data sources used to estimate MH costs. As described above there are three dominant ways approaches differ: **cost types** included, the **granularity** of the resulting estimates, and the **approach to missing/incomplete data**.

## Cost type

According to Jacob et al. (2017) the selection of cost types to include should be based on the purpose of the estimation exercise. If the main purpose is budgeting, then direct costs and social and income support payments should be included. However, if one is interested in resource usage then both direct and indirect costs should be estimated. If the estimation exercise is intended to enable benchmarking and international comparisons, then direct costs are necessary. In this regard, the study by the Institute of Health Economics provides a model (Jacobs et al., 2010) as it has been used to compare healthcare costs across countries. Finally, if the purpose of the estimation exercise is to assess economic burden, then all cost types should be included. Ideally a comprehensive study that includes all cost types would be most desirable. However, given restrictions on resources and data availability, this is not always possible.

## Granularity of the estimates

In essence the more granular the estimates produced, the more useful the resulting estimates. Being able to assess change in expenditure over time is meaningful and provides insight into how expenditures on MH change over time in response to various societal changes. Estimates by P/T are useful for those working in policy and practice in various P/T governments, not-for-profits, and other relevant organizations. Estimates disaggregated by mental disorder are valuable in understanding the differential societal impacts of MH disorders. Finally, cost estimates disaggregated by age and sex are valuable for planning and understanding the impact of MH among Canadians. For example, we know that in the emergency department young adults with MH and addiction challenges use more resources (Canadian Institute for Health Information, 2019). However, data are not always available that permit estimation at the desired level of granularity.

[7] https://csuch.ca/explore-the-data/

## Approach to missing/incomplete data

When deriving estimates of expenditure, one does not always have quality national-level datasets that have been painstakingly standardized, and quality assessed at the national level. Often, among administrative datasets that are available, data can be missing, heterogeneous (i.e., not standardized and not comparable), or data sources do not include a sufficient level of specificity to estimate at the desired level of granularity (e.g., relying on provincial/territorial ledgers or budget data to estimate expenditure on community MH treatment) then resulting estimates cannot be meaningfully compared across geography, time, or other levels of estimation. In these cases, one has three options:

1. **Leave the cost category or dataset out of the estimation.** This can be the best option when reliable, valid inputs or imputation methods do not seem reasonable or robust. The limitation of this approach is that the final aggregate estimates of cost will lack this cost estimate. This will reduce the final overall cost estimates. This may be declared as a limitation.
2. **Include the data as is without modification.** The result of this approach is a patchwork of estimates across levels of granularity and/or heterogeneous data that are not comparable across year, region, etc. For example, when calculating expenditures for supportive housing of people with MH disorders, Jacobs et al. (2010) only included costs for British Columbia as they were the only costs available at the time. The benefit of this approach is that known expenditures are not left out of cost estimates. However, the resulting estimates become incomparable across time and geography. For this reason, this approach is not recommended.
3. **Employ imputation/estimation (modelling) approaches to arrive at defensible estimates of costs.** In many cases, the problem of heterogeneous or incomplete data can be remedied using imputation/estimation strategies. These can be as simple imputations. For example, if there is a P/T with missing data for a specific cost category or dataset, costs can be imputed by calculating average per capita expenditure from available data and multiplying it by the population.[8] Imputations can also be more complex by using other reliable, robust datasets as inputs (e.g., prevalence of MH disorders or hospitalization counts) and conducting imputations using attributable proportions or distribution weights (described in more detail below). The advantage of employing imputation/estimation procedures to estimate missing or incomplete data is that estimates become comparable across geography, time and other levels assessed. The disadvantage of this approach is that the resulting estimates may be subject to criticism. However, when developing imputation/estimation methods one can protect against such criticisms by ensuring all imputations/estimates are clearly described in methods and can be defended. It is also important that limitations are clearly described. In addition, when decisions are made regarding the use of these techniques, estimates emerging from such procedures err on the side of being conservative. One should be able to make the argument that, if one could assess "true" costs they would certainly be more than what is estimated. Some specific recommended imputation/estimation strategies using attributable proportions and distribution weights are explained in detail below.

[8] This simple explanation is to describe the general approach. Such imputations can be more granular and per capita estimates can be calculated by age, sex, etc., then applied to census population data by the same stratifications.

## Recommended general approach

In an ideal world with unlimited resources, a comprehensive MH cost study would include all cost types, estimate costs across a large time frame, and provide detailed estimates at all levels of granularity. This is a substantial undertaking and, with appropriate resources, is certainly a viable long-term goal. The proposed methods described below offer a phased approach to ultimately achieving this goal.

One of the immediate interests is to generate estimates that can be used for international benchmarking to be able to calculate per capita MH expenditure and MH expenditure as a proportion of all health expenditure. In addition to these immediate needs, there is interest in developing estimates that are complementary to those generated by CCSA's CSUCH project. This would lay the foundation for a multi-year study that would replace Jacobs et al. (2010) study from 2010 as the "gold-standard" in MH cost studies in Canada and eliminate the need for future "one-off" studies assessing the cost of MH in Canada.

To accomplish these goals we propose an approach aligned with, and complementary to Jacobs (2010), Wang et al. (2018), the PHAC study (Public Health Agency of Canada, 2018) and the CSUCH study. Specifically, we recommend an approach with three phases:

- **Phase I: Estimating direct health care costs.** We recommend beginning the project by convening an expert advisory committee (as was done at the inception of the CSUCH project) and estimating direct healthcare costs (public only) for multiple years (ideally 2007-2020).
- **Phase II: Estimating social and income support payments and indirect costs.** In Phase II we recommend including social and income support payments and adding estimates of indirect costs by the same level of granularity described above.
- **Phase III: Estimating private health and lost productivity costs.** Finally in Phase III we recommend possibly including private health and lost productivity costs

During all phases of the estimation, we also recommend whenever possible generating estimates such that:

- inter provincial/territorial comparisons are possible;
- estimates can be presented separately by type of cost and/or by data source;
- estimated can be presented by mental disorder; and
- estimates may be presented by age and sex (when appropriate and possible)

In the following sections of this report, we describe in detail possible data sources, proposed estimation methods, and possible challenges/limitations associated with sources and methods for Phase I estimation. We then provide some ideas for generating estimates for Phase II and Phase II.

## Differentiating Mental Health and Substance Use Costs

Given there is another large-scale complementary project assessing substance use (SU) costs and harms (Canadian Substance Use Costs and Harms Scientific Working Group, 2020b), the methods described in this proposal do not include a detailed accounting of substance use costs. The methods described are careful to avoid double counting of costs so that when calculated, MH costs derived via the methods described below may be added to SU cost estimates generated via

CSUCH. Because the CSUCH project employs the attributable fraction methodology, the CSUCH project should generate estimates of fully attributable costs by substance. This will facilitate the summing of costs generated by the MH cost study project described in this report.

# PHASE I: ESTIMATING DIRECT HEALTH CARE COSTS

In Phase I we provide a detailed description of the methods that can be used to estimate direct healthcare expenditure.

## Convening an Expert Advisory Committee

We recommend convening an Expert Advisory Committee to oversee the project. The EAC should be composed of stakeholders working in mental health who have an interest in the outcomes of the project. The committee should also include individuals who are well-versed in the epidemiology of mental health and can therefore review proposed methods and offer constructive advice regarding how to improve them. The first role of the EAC should be to review and provide input on the proposed methods described in this report. Engaging an expert advisory committee early in the project will ensure that Phase I lays a solid foundation for all future work and encourages key stakeholders to be aware of, and support, the initiative.

## Determining specific cost categories to include

Having decided to limit the Phase I included cost types to public direct health care costs, we next needed to determine the methods and data sources that could be used to estimate these costs. To do so we needed to break each of these large cost types down into specific, measurable cost categories and associated data sources. For reference, we examined in greater detail, three key projects: the CSUCH Project (Canadian Substance Use Costs and Harms Scientific Working Group, 2020b), Jacobs et al. (2010) and recent work conducted by Rush (2022).

Each of these studies includes different services/interventions (i.e., possible direct healthcare cost categories) in their definitions of direct health care costs. Jacobs et al (2010) divides direct health care costs into inpatient hospitalizations (general hospitals, psychiatric hospitals, long-term care, and emergency rooms), physician costs (general practitioners, specialists, and psychiatrists), and pharmaceuticals. CSUCH assesses inpatient hospitalization, day surgeries, emergency department visits, specialized treatment events, physician time, and prescription drug costs. The core services framework (Rush, 2022), while not a cost study, provides a very detailed set of core MH and SU services which they refer to as the national core services framework. These are provided in detail in Table 2.

Table 2. Services identified by Rush et al. (2022) in the "Core Services Framework"

| |
|---|
| **Emergency and Crisis Response** |
| Emergency Department |
| Mental Health and Addiction Crisis Services |
| Urgent Care Clinic |
| Crisis Intervention/Mobile Crisis |
| Crisis Stabilization Units |
| Acute Intoxication Service |
| Distress/Crisis Phone/Digital Services |
| Other |
| Digital Services and Supports |
| **Community Treatment and Support Services** |
| Collaborating Partners |
| Primary Care Services |
| Public Health Services |
| Social Services |
| Family and Youth Services |
| Schools/Post-Secondary |
| Justice-related Services |
| Comprehensive MH/SU Services and Supports |
| Coordinated/Central Access and Navigation Services |
| Home/Mobile Withdrawal Management Services |
| Addiction Medicine Specialty Services (physician, psychiatrist, RAAM/RAAC, OAT, managed alcohol) |
| MH/SU Community Services (blended or independent) includes (counselling, clinical, psychosocial) |
| Peer and Family Support Services (blended or independent) MH/SU teams (include psychosocial) |
| Supervised/Safe Consumption Sites |
| Consultation and Liaison (ER, Hospital, LTC, Home Care, Schools, Police and Corrections-based) |
| Mental Health and Drug Court |
| Intensive MH/SU Services and Supports |
| Community Bed-based Withdrawal Management Services |
| Community Intensive SU Bed-based Treatment |

| |
|---|
| Intensive Case Management (MH, SU, CD) |
| SU-specific ICM |
| MH- specific ACT/FACT |
| Community-based Intensive Day or Evening Treatment Services (SU,MH or CD) |
| SU-specific |
| MH- specific |
| Bed-based Recovery Supports |
| Supported Housing-high and moderate support (e.g., Housing First) |
| SU-specific |
| MH-specific |
| SU Supportive Recovery Services |
| Multi-functional SU Transition Services |
| Transitional/Long-term bed-based Mental Health Recovery |
| Other |
| Digital Services and Supports |
| Private (e.g., EAP, therapist, Psychologist, residential treatment facility) |
| **Acute and Specialized** |
| Hospital Bed-based Acute Care |
| Hospital Bed-based Tertiary Care |
| Hospital Bed-based SU Withdrawal Management Services |
| Hospital Bed-based Intensive SU Treatment |
| Forensic Inpatient |
| Disorder-specific/Complex Tertiary Care |
| Other |
| Digital Services and Supports |
| Private (e.g., mental health and substance use facilities) |

In order to determine what cost categories we should include, we reviewed and analyzed the services/interventions itemized in these three projects. Included in Table 3 is a summary of how each of these projects itemized MH services/interventions and the larger categories that emerged as common to all three. The result of this analysis was the following cost categories:

- Direct health care costs (hospital-based interventions)
  - Hospitalizations (general)
  - Hospitalizations (psychiatric)
  - Emergency services
- Direct health care costs (non-hospital-based interventions)
  - Physicians
  - Pharmaceuticals
  - Community mental health services

These cost categories will be used to propose methods and data sources that will be used to estimate costs associated with MH-related direct healthcare costs.

**Table 3. Comparison of public, direct healthcare cost categories**

| Emergent cost category | Institute for Health Economics (Jacobs et al, 2010) | Core Services Framework (Rush, 2022) | Canadian Substance Use Costs and Harms (CSUCH) |
|---|---|---|---|
| **Direct health costs (hospital-based interventions)** | | | |
| **Hospitalizations (general)** | | | |
| | Inpatient (general hospitals) | Hospital Bed-based Acute Care | Inpatient Hospitalizations |
| | | Hospital Bed-based Tertiary Care | Day Surgery |
| **Hospitalizations (psychiatric)** | | | |
| | Inpatient (psychiatric hospitals) | Hospital Bed-based SU Withdrawal Management Services | |
| | Long-term Care | Hospital Bed-based Intensive SU Treatment | |
| | | Forensic Inpatient | |
| | | Disorder-specific/Complex Tertiary Care | |
| **Emergency Services** | | | |
| | Outpatient – Emergency Rooms | Emergency Department | Emergency Department Visits |
| | | Urgent Care Clinic | |
| | | Crisis Intervention/Mobile Crisis | |
| | | Crisis Stabilization Units | |
| | | Acute Intoxication Service | |
| | | Distress/Crisis Phone/Digital Services | |
| | | Digital Services and Supports | |

| | | | |
|---|---|---|---|
| **Direct health costs (non-hospital-based interventions)** | | | |
| **Physicians in community** | | | |
| | General Practitioners – fee for service | Primary Care Services | Physician Time |
| | Specialists – fee for service | Public Health Services | |
| | Psychiatrist – alternative payments | Addiction Medicine Specialty Services (physician, psychiatrist, RAAM/RAAC, OAT, managed alcohol) | |
| **Pharmaceuticals** | | | |
| | Pharmaceuticals – public | | Prescription drugs (public only) |
| | Pharmaceuticals- private | | |
| **Community mental health services** | | | |
| | Community Mental Health | Coordinated/Central Access and Navigation Services | Specialized Treatment |
| | Addictions services | Home/Mobile Withdrawal Management Services | |
| | First Nations – Mental Health and Addictions | MH/SU Community Services (blended or independent) includes (counselling, clinical, psychosocial) | |
| | | Peer and Family Support Services (blended or independent) MH/SU teams (include psychosocial) | |
| | | Supervised/Safe Consumption Sites | |
| | | Intensive MH/SU Services and Supports | |
| | | Community Bed-based Withdrawal Management Services | |
| | | Community Intensive SU Bed-based Treatment | |
| | | Intensive Case Management (MH, SU, CD) | |
| | | Community-based Intensive Day or Evening Treatment Services (SU, MH or CD) | |

# PROPOSED METHODS AND DATA SOURCES

## DIRECT HEALTH COSTS (HOSPITAL-BASED INTERVENTIONS)

### Hospitalizations (general and psychiatric)

#### Data sources

To estimate the costs associated with MH-related hospitalizations, we recommend a custom, de-identified record level data request[9] submitted to the Canadian Institute for Health Information (CIHI) for data included in the Hospital Mental Health Database (HMDB) (Canadian Institute for Health Information, 2022a) for all hospitalizations in which the primary diagnosis at separation (i.e., the diagnosis responsible for the largest contribution to the resources used during the hospital visit) includes one of the ICD-10 codes included in Table 4 taking place between 2007 and 2020 (FY 2006/07- 2019/2020).[10] Each record provided should include:

- Age
- Sex
- Province/territory of residence
- Province/territory of treatment
- Discharge date
- General Hospital or psychiatric hospital
- Length of stay, and
- Diagnosis information (at the four-digit ICD-10 level) of the hospitalized patient

[9] Alternatively, one could consider requesting aggregate data. This was done by Young and Jesseman (2014). There are pros and cons to this strategy. This would undoubtedly be more expensive and would be less amenable to changes in reporting and methods. However, it would likely require less time and would take advantage of the expertise of a CIHI analyst.

[10] Most data available from CIHI are available by Fiscal Year (FY). Is necessary, all data can be converted to calendar year.

**Table 4. ICD-10 codes used for Mental and Behavioural Disorders. Note that we recognize that stigmatizing language is used in the ICD-10 codes referred to in the table. The names of the ICD-10 codes were developed in 1994 and are still in use today. For the purposes of clarity and precision we have not changed these names. However, we wish to acknowledge these terms are problematic.**

| | | |
|---|---|---|
| Organic, including symptomatic, mental disorders | F00.x | Dementia in Alzheimer disease |
| | F01.x | Vascular dementia |
| | F02.x | Dementia in other diseases classified elsewhere |
| | F03.x | Unspecified dementia |
| | F04.x | Organic amnesic syndrome, not induced by alcohol and other psychoactive substances |
| | F05.x | Delirium, not induced by alcohol and other psychoactive substances |
| | F06.x | Other mental disorders due to brain damage and dysfunction and to physical disease |
| | F07.x | Personality and behavioural disorders due to brain disease, damage and dysfunction |
| | F08.x | |
| | F09.x | Unspecified organic or symptomatic mental disorder |
| Mental and behavioural disorders due to psychoactive substance use | F10.x | Mental and behavioural disorders due to use of alcohol |
| | F11.x | Mental and behavioural disorders due to use of opioids |
| | F12.x | Mental and behavioural disorders due to use of cannabinoids |
| | F13.x | Mental and behavioural disorders due to use of sedatives or hypnotics |
| | F14.x | Mental and behavioural disorders due to use of cocaine |
| | F15.x | Mental and behavioural disorders due to use of other stimulants, including caffeine |
| | F16.x | Mental and behavioural disorders due to use of hallucinogens |
| | F17.x | Mental and behavioural disorders due to use of tobacco |
| | F18.x | Mental and behavioural disorders due to use of volatile solvent |
| | F19.x | Mental and behavioural disorders due to multiple drug use and use of other psychoactive substances |
| Schizophrenia, schizotypal and delusional disorders | F20.x | Schizophrenia |
| | F21.x | Schizotypal disorder |
| | F22.x | Persistent delusional disorders |
| | F23.x | Acute and transient psychotic disorders |
| | F24.x | Induced delusional disorder |
| | F25.x | Schizoaffective disorders |
| | F26.x | |
| | F27.x | |
| | F28.x | Other nonorganic psychotic disorders |
| | F29.x | Unspecified nonorganic psychosis |
| Mood [affective] disorders | F30.x | Manic episode |
| | F31.x | Bipolar affective disorder |
| | F32.x | Depressive episode |
| | F33.x | Recurrent depressive disorder |

| | | |
|---|---|---|
| | F34.x | Persistent mood [affective] disorders |
| | F35.x | |
| | F36.x | |
| | F37.x | |
| | F38.x | Other mood [affective] disorders |
| | F39.x | Unspecified mood [affective] disorder |
| Neurotic, stress-related and somatoform disorders | F40.x | Phobic anxiety disorders |
| | F41.x | Other anxiety disorders |
| | F42.x | Obsessive-compulsive disorder |
| | F43.x | Reaction to severe stress, and adjustment disorders |
| | F44.x | Dissociative [conversion] disorders |
| | F45.x | Somatoform disorders |
| | F46.x | |
| | F47.x | |
| | F48.x | Other neurotic disorders |
| | F49.x | |
| Behavioural syndromes associated with physiological disturbances and physical factors | F50.x | Eating disorders |
| | F51.x | Nonorganic sleep disorders |
| | F52.x | Sexual dysfunction, not caused by organic disorder or disease |
| | F53.x | Mental and behavioural disorders associated with the puerperium, not elsewhere classified |
| | F54.x | Psychological and behavioural factors associated with disorders or diseases classified elsewhere |
| | F55.x | Abuse of non-dependence-producing substances |
| | F56.x | |
| | F57.x | |
| | F58.x | |
| | F59.x | Unspecified behavioural syndromes associated with physiological disturbances and physical factors |
| Disorders of adult personality and behaviour | F60.x | Specific personality disorders |
| | F61.x | Mixed and other personality disorders |
| | F62.x | Enduring personality changes, not attributable to brain damage and disease |
| | F63.x | Habit and impulse disorders |
| | F64.x | Gender identity disorders |
| | F65.x | Disorders of sexual preference |
| | F66.x | Psychological and behavioural disorders associated with sexual development and orientation |
| | F67.x | |
| | F68.x | Other disorders of adult personality and behaviour |
| | F69.x | Unspecified disorder of adult personality and behaviour |

| | | |
|---|---|---|
| **Mental retardation** | F70.x | Mild mental retardation |
| | F71.x | Moderate mental retardation |
| | F72.x | Severe mental retardation |
| | F73.x | Profound mental retardation |
| | F74.x | |
| | F75.x | |
| | F76.x | |
| | F77.x | |
| | F78.x | Other mental retardation |
| | F79.x | Unspecified mental retardation |
| **Disorders of psychological development** | F80.x | Specific developmental disorders of speech and language |
| | F81.x | Specific developmental disorders of scholastic skills |
| | F82.x | Specific developmental disorder of motor function |
| | F83.x | Mixed specific developmental disorders |
| | F84.x | Pervasive developmental disorders |
| | F85.x | |
| | F86.x | |
| | F87.x | |
| | F88.x | Other disorders of psychological development |
| | F89.x | Unspecified disorder of psychological development |
| **Behavioural and emotional disorders with onset usually occurring in childhood and adolescence** | F90.x | Hyperkinetic disorders |
| | F91.x | Conduct disorders |
| | F92.x | Mixed disorders of conduct and emotions |
| | F93.x | Emotional disorders with onset specific to childhood |
| | F94.x | Disorders of social functioning with onset specific to childhood and adolescence |
| | F95.x | Tic disorders |
| | F96.x | |
| | F97.x | |
| | F98.x | Other behavioural and emotional disorders with onset usually occurring in childhood and adolescence |
| **Unspecified mental disorder** | F99.x | Unspecified mental disorder |

As part of the hospitalization data request, two additional key variables should be requested:

1. **Cost of a standard hospital stay (CSHS)**[11] – describes the average cost of a hospital stay by jurisdiction.
2. **Resource intensity weight (RIW)**[12] – assigns a weight of 1.0 to an average hospital stay and a corresponding weight to other stays based on their relative predicted cost.

[11] https://www.cihi.ca/en/indicators/cost-of-a-standard-hospital-stay

[12] https://www.cihi.ca/en/resource-indicators-dad-resource-intensity-weights-and-expected-length-of-stay

These data elements should be available via the Discharge Abstract Database (DAD).[13] However, coverage for all extracted cases from the HMDB will need to be confirmed. The resulting cost estimates will include all costs associated with drugs dispensed in hospitals, medical supplies, therapeutic and diagnostic outpatient visits, hospital administration, some research costs, accommodation and meals for patients, maintenance of hospital facilities, and gross salaries and wages for all hospital staff (such as physicians on hospital payroll, nurses, technicians, and medical students).

### Estimation methods

By multiplying (1) and (2) together, a record-level cost can be calculated for each hospitalization.

If RIWs are not available for all extracted records, then a per diem method can be employed using length of stay as a key input (see Public Health Agency of Canada, 2018, p. 8). Average costs per day are available on p. 21 and 22 of Health Systems Resources for Mental Health and Addictions Care in Canada[14] and could be adjusted for inflation.

This data request will generate costs and counts associated with MH-related hospitalizations by MH disorder as defined by ICD-10 codes (see Table 4). Estimated hospitalization costs in this manner will permit direct comparison/addition with estimates generated via the CSUCH project for mental and behavioural disorders due to psychoactive substance use (F10-F19).

### Possible challenges/limitations

- Territories will require a special method for estimating distribution of hospitalizations. Due to the small number of inpatient hospitalizations occurring in the territories, CIHI groups territorial hospitalization data, i.e., it is not possible to assess which territory a patient received care. Estimation methods will need to be used to distribute hospitalizations across territories.
- Record level data from the province of Quebec requires special permissions. This can be a long arduous process. This may be avoided by requesting aggregate-level data.
- Inpatient hospitalization counts and costs for Ontario and Manitoba do not include hospitalizations recorded in the Ontario Mental Health Recording System (OMHRS) because this database does not use the ICD-10 classification system. Instead the OHMRS employs the grouping methodology referred to as the System for Classification of In-Patient Psychiatry (SCIPP). In Young and Jesseman (2014) crosswalks were developed so that the diagnostic criteria used in OMHRS could be mapped onto ICD-10 codes for mental and behavioural disorders due to psychoactive substance use (F10-F19). For this project new crosswalks would need to be developed.

## EMERGENCY SERVICES

### Data sources

To estimate the costs associated with MH-related emergency services, a similar methodology to that employed for assessing the cost of general and psychiatric hospitalizations should be used. Specifically, we recommend a custom, de-identified record level data request (or aggregate request)

[13] https://www.cihi.ca/en/discharge-abstract-database-metadata-dad

[14] https://www.cihi.ca/sites/default/files/document/mental-health-chartbook-report-2019-en-web.pdf

submitted to the CIHI National Ambulatory Care Reporting System (NACRS) for all MH-related emergency department visits in which the ED Discharge Diagnosis includes one of the ICD-10 codes included in Table 4) taking place between 2007 and 2020 (FY 2006/07- 2019/2020). Each record provided should include:

- Age
- Sex
- Province/territory of residence
- Province/territory of treatment
- Discharge date, and
- ED Discharge Diagnosis (at the four-digit ICD-10 level) of the hospitalized patient

## Estimation methods

Same as for hospitalization costs

## Possible challenges/limitations

- Same as for hospitalization costs
- There are three different levels of information provided to NACRS (Level 1,2,and 3). Level 3 information is associated with the most complete diagnostic information. Only Ontario and Alberta have reported at Level 3 information for the years spanning 2007 to 2020. Therefore, depending on the extent of missing data some imputation may be necessary.

**Table 5. Summary table: Recommended data sources to estimate direct health care costs (hospital-based interventions)**

| Data Source | |
|---|---|
| Hospitalizations - General | |
| | • Hospital Mental Health Database (HMDB)<br>• Discharge Abstract Database (DAD)<br>• CIHI: Cost of a Standard Hospital Stay<br>• Resource Intensity Weight |
| Hospitalizations - Psychiatric | |
| | • Hospital Mental Health Database (HMDB)<br>• Discharge Abstract Database (DAD)<br>• CIHI: Cost of a Standard Hospital Stay<br>• Resource Intensity Weight |
| Emergency response | |
| | • National Ambulatory Care Reporting System (NACRS)<br>• CIHI: Cost of a Standard Hospital Stay<br>• Resource Intensity Weight |

## Key data inputs that can be used to impute/estimate other costs

Acquiring counts and costs associated with MH-related hospitalizations will be valuable inputs we can use when imputing/estimating missing or incomplete data. Specifically, two key variables can be derived:

1. Attributable Proportions (APs)
2. Distribution weights (DWs)

## Attributable proportions

Attributable proportions (AP) can be calculated for counts by assessing the number of MH-related hospitalizations as a proportion of the total number of hospitalizations (for any reason). A count-based AP can be calculated at whatever level of granularity desired - by P/T, MH Disorder, age, or sex. For example, let's pretend that we know that in 2019 there were 5,000 hospitalizations for Mood [affective] disorders (F30-F39) in Saskatchewan (from a custom data request for record level data from CIHI). We also know that in 2019 there were a total of 122,526 hospitalizations in Saskatchewan for any cause (Canadian Institute for Health Information, 2022b). Therefore, we can calculate a count-based AP as follows: 5,000/122,526 = 0.041. This means that in this hypothetical example, in Saskatchewan in 2019, 4.1% of all hospitalizations were for Mood [affective] disorders. This proportion can be used to estimate the other counts that may lack sufficient granularity (see other cost categories below). In addition, to count-based APs, we can also calculate cost-based APs in a similar manner by using costs instead of counts in the numerator and total hospitalization costs in the denominator (from Table A.3.3.1 of National Health Expenditure Trends, 2022: Data Tables — Series A). Use of count-based vs. cost-based APs as relevant estimation inputs must be assessed on a case-by-case basis as each has pros and cons. Specifically, count-based APs assume that all hospitalizations place an equal burden on available hospital resources. Cost-based APs take the differential burden into account (by incorporating RIWs into the estimate).

## Distribution weights

In addition to APs, there are also cases we will encounter where data may be available, but not disaggregated at the desired level of granularity. In these cases, the distribution of hospitalization counts, or costs can be useful inputs in the form of count-based-distribution weights (DW) or cost-based-DWs. Included in Table 6 are fabricated data regarding the number of hospitalizations by disorder category – and the proportion of all MH-related hospitalizations attributable to specific disorders. In cases where quality cost or count data is available, but this level of granularity is not, these DWs can be used to estimate how to distribute counts or costs by disorder, P/T, age, or sex.

**Table 6. Made up data illustrating how to calculate distribution weights. Note that we recognize that stigmatizing language is used in the ICD-10 codes referred to in the table. The names of the ICD-10 codes were developed in 1994 and are still in use today. For the purposes of clarity and precision we have not changed these names. However, we wish to acknowledge these terms are problematic.**

| Disorder category | # Hospitalizations | Proportion (i.e., Distribution Weight) |
|---|---|---|
| Organic, including symptomatic, mental disorders | 3,500 | 0.0774 |
| Mental and behavioural disorders due to psychoactive substance use | 6,000 | 0.1327 |
| Schizophrenia, schizotypal and delusional disorders | 6,000 | 0.1327 |
| Mood [affective] disorders | 10,000 | 0.2212 |
| Neurotic, stress-related and somatoform disorders | 500 | 0.0110 |
| Behavioural syndromes associated with physiological disturbances and physical factors | 1500 | 0.0331 |
| Disorders of adult personality and behaviour | 2000 | 0.0442 |
| Mental retardation | 1600 | 0.0353 |
| Disorders of psychological development | 12000 | 0.2654 |
| Behavioural and emotional disorders with onset usually occurring in childhood and adolescence | 1800 | 0.0398 |
| Unspecified mental disorder | 300 | 0.0066 |
| Total | 45,200 | 1.0000 |

There are of course limitations associated with these estimation methods. The largest being that they rely on the assumption that the distribution of MH-related hospitalization counts and costs are comparable to the distribution of MH related service utilization in other contexts. This is clearly not completely accurate. However, in the absence of any better estimation procedure, this can be a defensible, reasonable strategy.

## Other possible important inputs: Prevalence based APs and DWs

Though hospitalization counts and costs can be valuable inputs to use when imputing missing or incomplete data, there are limitations associated with this method. For example, it assumes that proportions and distributions of hospitalizations are consistent with proportions or distributions in other data. However, we know that hospitalization only occurs among those most severely affected by MH disorders and therefore may not be the most appropriate input to use when imputing or distributing other health costs such as community MH services or social and income support payments. In these situations, it may be more appropriate to rely on other inputs. In 2022, Vigo et al (2022) used a number of different data sources to estimate the prevalence of ten categories of MH and SU disorders using the DSM-V disorder groupings. The intention of these prevalence estimates was to inform work being conducted by the needs-based planning project. The estimated prevalence rates presented in this paper could be used as prevalence-based APs or DWs as appropriate. However, one critical piece of work would need to be done before this could be successfully implemented. Thus far this exercise has identified three different MH categorization systems used in different datasets: the ICD-10 system (in most national hospitalization data), the SCIPP (used in the OMHRS reporting system) and the DSM-V (Vigo et al., 2022). The cost study EAC should be consulted to determine which classification system is most appropriate/useful. Once a final disorder categorization system has been decided upon, crosswalks will need to be developed so that systems can be mapped onto (i.e., data recoded) the chosen system.

# DIRECT HEALTH COSTS (NON-HOSPITAL-BASED INTERVENTIONS)

## Physician costs

### Data sources

The primary source of data to estimate physician costs will be the National Physician's Database (NPDB).,[17,18] Salaries for physicians employed by hospitals are included in hospitalization costs. Therefore, there will be no double counting of physician remuneration.

The NPDB is the same data used by Jacobs et al (2010), the EBIC study (Public Health Agency of Canada, 2018) and Wang et al. (2018). The NPDB contains information from two data sources -physician payment information and physician utilization information. This database includes "physicians' billings, including fee codes, which are submitted from provincial and territorial medical health care insurance plans". This information includes total clinical payments (i.e., the sum of the physicians' clinical payments from fee-for-service and alternative payments). Information regarding fee -for-service payments is available spanning the years 1999 to 2020 by P/T and by speciality (i.e., internal medicine, neurology, psychiatry, paediatrics, etc.).[19] From this we can acquire total clinical payments to physicians by P/T and fiscal year (2007-2008 to 2020-2021).

## Estimation methods

By selecting clinical payments from fee-for-service and alternative payments for psychiatrists included in this table, we can derive a floor estimate of the physician-related costs of MH. These estimates can then be distributed by disorder and by age and sex using DWs. Given these costs are incurred outside of a hospital setting it is perhaps best to use prevalence-based DWs in this instance.

## Possible challenges/limitations

Jacobs et al. (2010) note astutely in their assessment that including costs of psychiatrists only do not include the counselling and psychotherapy conducted by general practitioners. To estimate these costs they propose an imputation strategy that uses general physician payments and payment percentages to model the proportion of GP time spent on these activities. We investigated and it appears that the new iterations of the NPDB do not include data permitting this modelling to be replicated. Given that costs associated with GP counselling and psychotherapy costs are significant, it is recommended that methods to model this expenditure be investigated and included. It is possible this could be accomplished via a custom data request to CIHI.

## Pharmaceuticals

### Data sources

Both Jacobs et al. (2010) and the EBIC study (Public Health Agency of Canada, 2018) accessed the IMS (Canada) dataset  CompuScript (CS). This dataset was managed by a private corporation called IMS Brogan. It appears that IMS Brogan (Canada) has now been acquired by a company called IQVIA[20] and it was difficult to locate information regarding the current state of the dataset and their current holdings. According to the EBIC study, in 2010 the CS "contained information

[17] https://www.cihi.ca/en/national-physician-database-metadata

[18] https://www.cihi.ca/sites/default/files/document/national-physician-database-data-release-2020-2021-meth-notes-en.pd

[19] This information is included in Table D1. Payments of the data release "Canadian Institute for Health Information. National Physician Database Historical Payments — Data Tables. Ottawa, ON: CIHI; 2022".

[20] https://www.iqvia.com/locations/canada/canadian-pharmaceutical-trends

on total prescription drug costs [public and private] for nearly 70% of all pharmacies across Canada, including retail price and dispensing fees, and total volume of prescriptions sold in retail pharmacies across Canada, excluding the territories." (Public Health Agency of Canada, 2018, p. 12).

In contrast, the CSUCH project (Canadian Substance Use Costs and Harms Scientific Working Group, 2018a, 2020a) used The National Health Expenditure Database (NHEX)[21] data to produce cost estimates using SU-attributable hospitalization count APs to obtain estimates of SU-attributable pharmaceutical expenditure for P/T and year. However, the new update to the CSUCH will rely on updated methods. Specifically, using the following two databases: the National Prescription Drug Utilization Information System (NPDUIS),[22, 23] and the Canadian MIS Database (CMDB).[24] We recommend using a similar estimation procedure.

## Estimation Methods

The NPDUIS contains pan-Canadian prescription claims-level data from primarily publicly financed drug benefit programs. For each drug claim included in the NPDUIS, there is information on the drug's Anatomical Therapeutic Chemical (ATC) code and Drug Identification Number (DIN). The World Health Organization maintains a classification system called the Anatomical Therapeutic Chemical (ATC) classification system.[25] In this system, drugs are classified into different groups and assigned a code based on the organ or systems they act upon. Groups of these drugs, specifically the psycholeptics (N05, includes antipsychotics, anxiolytics, and hypnotics and sedatives), the psychoanaleptics (N06, includes antidepressants, psychostimulants, and antidementia drugs) are used to treat MH conditions.

To estimate the costs of MH associated with pharmaceuticals, this classification system should be examined by experts and all ATCs used to treat MH conditions should be selected. Once the set of ATC codes corresponding to drugs used to treat MH has been finalized, the list can be cross-referenced with Health Canada's Drug Product Database (HC-DPD)[26] to identify a defensible relatively comprehensive list of DINs approved by Health Canada that are used to treat MH. This list of DINs can then be used to query the NPDUIS database to retrieve all corresponding medications and costs. This data is available by year, P/T, age, and sex.

## Possible challenges/limitations

The NPDUIS does not include information regarding the diagnoses or conditions for which prescriptions were written. Pharmaceutical costs could also be estimable by MH disorder using the list of DINs used to query the NPDUIS by having experts indicate which MH disorders each drug is prescribed to treat. In cases where one drug treats more than one condition, prevalence based DWs can be used to allocate proportions of expenditure.

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[21] https://www.cihi.ca/en/national-health-expenditure-database-metadata
[22] https://www.cihi.ca/en/national-prescription-drug-utilization-information-system-metadata
[23] https://www.cihi.ca/sites/default/files/document/npduis_datadir_pub_en.pdf
[24] https://www.cihi.ca/en/canadian-management-information-system-database-metadata
[25] https://www.whocc.no/atc_ddd_index/
[26] https://health-products.canada.ca/dpd-bdpp/index-eng.jsp

## COMMUNITY MENTAL HEALTH SERVICES

### Data sources

Estimates on expenditure on community mental health services (CMHS) in Canada can be generated using data from CIHIs National Health Expenditure Database (NHEX)[27] or data from the Canadian Management Information System Database (CMDB).[28,29]

### Estimation methods

The easiest, most straightforward way of estimating expenditure on CMHS in Canada is using data from NHEX and the CMDB. According to a 2019 technical note published by CIHI,[30] in 2017-2018, 18.6% of public health spending went to CMHS.[31] Public (vs. private) spending on public health in Canada, as captured by the National Health Expenditure Database (NHEX) is available by province (1975-2022) in the following spreadsheet: *National Health Expenditure Trends, 2022: Data Tables — Series D3*.[32] We have connected with, and confirmed, that CIHI could (via a custom data request) calculate the proportion of public health spending dedicated to CMHS by P/T and by fiscal year. These proportions could simply be applied to public health spending as described in the NHEX tables to derive high-level (non-granular) estimates of CMHS spending.

However, with more time and resources there may be greater value in investing in a more extensive data request to acquire direct estimates of CMHS from the CMDB dataset. Documentation regarding the data standards used to develop indicators present in the CMDB are described as the Management Information System (MIS) Standards. Detailed descriptions of these standards were purchased and downloaded by the MHCC and provided for this report. The MIS Standards are "national standards that provide an integrated approach to managing financial and statistical data related to the operations of Canadian health service organizations." Included in the MIS Standards are descriptions of National Sector Codes that are used in the CMDB. These codes are used to identify expenditures of regional health authorities across Canada on:

- Community Mental Health Centres,[33]

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[27] https://www.cihi.ca/en/national-health-expenditure-database-metadata

[28] https://www.cihi.ca/en/canadian-management-information-system-database-metadata

[29] https://secure.cihi.ca/free_products/cmdb-user-guide-2019-2020-en.pdf

[30] https://www.cihi.ca/sites/default/files/document/nhex-ph-cmh-technical-note-2019-en-web.pdf

[31] According to this note, Community Mental Health and Addiction Services include the following: "support for those who have mental health issues and are living in the community. The health care professionals involved usually include occupational therapists, social workers, registered nurses, psychologists and psychiatrists. Services are provided in a variety of ways across provinces and territories but commonly include the following:

- Screening, assessment, early detection and intervention, short-term therapy, promotion, prevention, consultation, service delivery coordination, community support and treatment programs;
- Information and referral, advocacy, case management, housing advocacy, rehabilitation, employment assistance, counselling, mental health promotion and prevention, support groups and social and recreational opportunities, and peer support services for consumers and survivors; and
- Services and support to mental health patients discharged from hospitals to assist them in returning to the community.

By their nature, the community mental health and addictions services described above are one form of public health services. In many provinces and territories, community mental health and addictions services are an integrated part of community public health programs and the expenditure data is not explicitly identified."

[32] https://www.cihi.ca/sites/default/files/document/nhex-series-D3-2022-en.xlsx

[33] According to the MIS Standards Glossary, a Community Mental Health Centre is "A free-standing organization primarily engaged in providing client services related to the diagnosis and treatment of mental health disorders. These organizations generally treat clients who do not require inpatient treatment. They may provide a counselling staff and information regarding a wide range of mental health issues and/or refer clients to more extensive treatment programs, if necessary."

- Community Addiction Treatment Centres,[34] and
- Combined Community Mental Health and Addiction Treatment Centres.[35]

These centres are referred to by the MIS Standards as "Functional Centres." It is unclear how heterogeneous P/T data submitted to the CMDB are. We do know that there are some gaps (described below). However, it appears as though there may be great potential in this database. Estimates of spending on Community Mental Health and Addictions Services from the CMDB by fiscal year (2006/07- 2019/2020), P/T, and Functional Centre (i.e., Community Mental Health Centres, Community Addiction Treatment Centres, and Combined Community Mental Health and Addiction Treatment Centres) can be gathered via a custom data request. In addition to these there are likely other Functional Centres (such as "Social Services Program")[36] that have a portion of activities or budget allocated to providing services to support MH. Before submitting the data request, it is recommended that the entire list of functional centre codes be reviewed and those that may include MH services be included in the data request. Following this, methods for determining the proportion of expenditure on these other centres that goes to MH can be estimated via an appropriate AP or other estimation method. Having acquired these estimates, we could consider distributing them by mental disorder, age and sex using either hospitalization DWs or prevalence DWs.

## Possible challenges/limitations

- Estimates coming from the CMDB would include CMHS that are funded via P/T regional health authorities and therefore would not include P/T funded programs/services not administered via local regional health authorities. Therefore this method will be an underestimation of the "true" cost. Once receiving the data from CIHI, it would be valuable to attempt to estimate the magnitude of this underestimation.
- The CMDB does not include data from Quebec or Nunavut. In addition, because Ontario does not have regional health authorities, the CMDB data on CMHS in Ontario will be only a portion of data submitted in other provinces. Imputation/estimation (perhaps using average per capita expenditure) would need to be conducted to estimate expenditure in these regions.

[34] According to the MIS Standards Glossary, a Community Addictions Treatment Centre is "A free-standing organization primarily engaged in providing client services related to the diagnosis and treatment of alcohol, other substance abuse or other dependencies. These organizations generally treat clients who do not require inpatient treatment. They may provide a counselling staff and information regarding a wide range of alcohol, other substance abuse or other dependency issues and/or refer clients to more extensive treatment programs, if necessary."

[35] According to the MIS Standards Glossary, a Combined Community Mental Health and Addiction Treatment Centre is "a free-standing organization primarily engaged in providing client services related to the diagnosis and treatment of mental health disorders and alcohol, other substance abuse or other dependencies. These organizations generally treat clients who do not require inpatient treatment. They may provide a counselling staff and information regarding a wide range of mental health and alcohol, other substance abuse or other dependency issues and/or refer clients to more extensive treatment programs, if necessary."

[36] According to the MIS Standards Glossary, "Social Services Program" refers to: "An organization that administrates and provides programs of a social service nature such as child and youth welfare, infant or children's day care centres and other child, youth and family services".

**Table 7. Summary table: Recommended data sources to estimate direct health care costs (non-hospital-based interventions)**

| Data Source | |
|---|---|
| Physician Costs | |
| | • National Physician's Database (NPDB) |
| Pharmaceuticals | |
| | • National Prescription Drug Utilization Information System (NPDUIS)<br>• Canadian MIS Database (CMDB) |
| Community mental health services | |
| | • National Health Expenditure Database (NHEX)<br>• Canadian Management Information System Database (CMDB) |

## Advantages of proposed Phase I approach

There are several advantages of beginning the cost study in this manner: (1) Engaging an expert advisory committee early in the project will ensure that Phase I lays a solid foundation for all future work and encourages key stakeholder to be aware of, and support the initiative; (2) most of the data sources to calculate direct healthcare and social and income support payment costs are currently collected in national level datasets; (3) the resulting estimates will be somewhat comparable to previous studies; (4) the resulting estimates will be appropriate for international benchmarking (i.e., resulting estimates can be used to calculate per capita MH expenditure and MH expenditure as a proportion of all health expenditure).

# PHASE II: ESTIMATING SOCIAL AND INCOME SUPPORT PAYMENTS AND INDIRECT COSTS

In Phase I estimates of direct healthcare expenditure will be developed in consultation with the expert advisory committee. The goals of Phase II will be to:

1. review and improve sources and methods employed in Phase I estimations of direct healthcare costs (including possibly adding new cost categories identified as missing during Phase I release).
2. estimate costs associated with mental health-related social and income support payments
3. estimate indirect costs

In the following section we provide some suggestions regarding how Phase II estimation may proceed by providing suggested cost categories, data sources and methods that could be used to estimate MH-related social and income support payments and lost productivity costs.

## Social and income support payments

The only study examined in the review of Canadian costing studies (since 2010) that estimated social and income support payments was Jacobs et al (2010). Therefore, for this section we use this study as foundational and then suggest updated methods as appropriate. In general, it was challenging to find national level data to use to estimate expenditure in this area. Instead, Jacobs et al. (2010) frequently relied on custom requests sent to P/T regarding expenditure on employment programs or other government services. As noted above this approach, has limitations. Namely, that the resulting estimates become incomparable across time and geography. For this reason, this approach is not recommended.

## Direct social care (community support services)

### Supportive housing

To calculate costs of supportive housing Jacobs et al. (2010) relied upon a 2008 study assessing the cost of housing in British Columbia (Patterson et al., 2008) and only included supporting housing costs for this one province. We recommend a literature search to determine whether there have been any more recent studies that have calculated up-to-date estimates of supportive housing costs for those with severe addictions and/or MH disorders in any of the P/Ts. If so, and if this research is of sufficient quality, this new estimate could be used. If not, this BC estimate from 2006 could be transformed into per capita cost estimates, adjusted for inflation, and used to estimate costs across the other P/Ts.

### Publicly funded not-for-profit organizations and government funded programs

Publicly funded non-profit organizations provide a great many services to people with MH-related needs. To assess expenditures to non-profit organizations for addictions and mental health Jacobs et al (2010) obtained a list of organizations from the website of the Canada Revenue Agency. This list was searched using appropriate search terms (e.g., “mental health”, “depression”, etc.) to generate a list of possible organizations that provided MH and Addiction- related services. Subsequently, organizational websites were examined for relevancy. We are aware of no other relevant data sources or

methods that could be used to replace those of Jacobs et al. (2010). In addition, it is unclear at present whether some of the expenditures provided to non-profits for service delivery may be captured in the CMDB as CMHS. Answers to these questions could be generated during Phase I.

### Other direct social care cost categories

Other cost categories that could be considered for inclusion in Phase II include other housing services temporary housing, shelters, etc. The EAC should be consulted regarding additional cost categories to include in Phase II.

## Income Support Services – Public

### Canada Pension Plan – Disability

Canadians who contribute adequately to the Canada Pension Plan (CPP) qualify for the CPP disability benefit if their disability prevents them from being permanently employed. Data are regarding the number of individuals receiving disability benefits by class of diagnosis are available at the national level.[37] One of the categories included is "Mental Disorders". This data is available publicly from 2011 to 2021 by age of beneficiary. To estimate total cost associated with MH attributable CPP disability benefits one could look at the total MH beneficiaries by age group as a proportion of all beneficiaries for a given year. Then use these proportions and apply them to total CPP disability benefit payments issued by the government of Canada for that year.

### Workers Compensation

Both Jacobs et al (2010) as well as the CUCH project relied on P/T workers compensation board annual reports as well as the National Work Injuries Statistical program.[38] Upon investigation, we are aware of no other better method to estimate costs associated with workers compensation.

## Other income support cost categories

Other cost categories that could be considered for inclusion in Phase II include P/T income support. The EAC should be consulted regarding additional cost categories to include in Phase II.

**Table 8. Summary table: Recommended data sources to estimate MH-related social and income support payment costs.**

| Data Source |
|---|
| **Supportive Housing** |
| • Estimates derived from academic literature |
| **Publicly funded not for profit organizations and government funded programs** |
| • Canada Revenue Agency |
| **Canada Pension Plan – Disability** |
| • Canada Pension Plan (CPP) |
| **Workers Compensation** |
| • Provincial and territorial Workers Compensation Board annual reports.<br>• National Work Injuries Statistical program |

[37] https://open.canada.ca/data/en/dataset/2abf6a97-6c0e-473e-9976-dfa9aba831bf
[38] https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=2605

## Indirect costs

Assessing indirect costs is a complex exercise. First, there are differing methods that have been used to estimate lost productivity due to illness.[39] What we describe here is a high-level overview of an approach that could be used based on the EBIC study as well as the CSUCH project. Specifically, we present recommended methods for estimating lost productivity costs due to premature death, long-term disability, and short-term disability (absenteeism).

## Lost productivity costs due to premature death

To estimate lost productivity costs due to premature death, first an assessment of what constitutes a premature death that can be attributed to an MH disorder is needed. Data are available from Statistics Canada on the estimated number of deaths by suicide per year.[40] Extensive consultations with members of the EAC as well as other experts would need to be conducted to assess whether it is appropriate to include lost production due to death by suicide as an indirect cost estimate. Further, it should also be assessed whether there any other deaths that should be considered attributable to MH and included in lost productivity costs due to premature death. If premature mortality is included in MH-related lost productivity, estimates regarding deaths may be obtained from the Vital Statistics – Death Database (CSVD) operated by Statistics Canada.[41] Methods for allocating lost productivity costs associated with these deaths is described in detail in Sorge et al.(2020). Briefly, age of death may be obtained from the CSVD which permits the calculation of potential years of productive life lost. Following, yearly wage by study year and by P/T should be calculated using data from the Survey of Employment, Payrolls and Hours[42] in order to multiply this with the number of productivity years lost. The result is the cost associated with total projected future earning until retirement across all individuals who died due to the included causes of death.

## Lost productivity costs due to long-term disability

To assess the cost of lost productivity due to long-term disability, we recommend extending the method employed above to estimate the costs associated with MH-related CPP Disability payments. When estimating expenditure on social and income support payments for CPP disability, we described a method that would permit the calculation of the number of individuals receiving disability benefits by class of diagnosis.[43] One of the classes included was “Mental Disorders”. This would provide reliable data on the number of Canadians not participating in the workplace due to a “mental disorder”.[44] The next step is developing a method for estimating lost production due to the absence of these individuals from the community workforce. In order to do so we must obtain more granular details about the individuals on long-term disability in order to estimate lost wages. This will require a more in-depth exploration of what data is available from the CPP. However, like estimates of lost

[39] Human Capital Method (HCM) versus Friction Cost Method (FCM)
[40] https://www.canada.ca/en/public-health/services/publications/healthy-living/suicide-canada-key-statistics-infographic.html
[41] Human Capital Method (HCM) versus Friction Cost Method (FCM)
[42] https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=2612
[43] https://open.canada.ca/data/en/dataset/2abf6a97-6c0e-473e-9976-dfa9aba831bf
[44] This would, however, not include those Canadians who have not made enough contributions to the Canada Pension Plan (CPP) qualify for the CPP disability benefit. Therefore, this would be a conservative estimate.

production due to premature mortality, we will likely need to rely on estimates of lost wages from the Survey of Employment, Payrolls and Hours. In addition, some broad assumptions will likely need to be made such as: all individuals absent from the workplace due to a mental health-related disability remain alive until retirement and, once removed the individual does not return for the remainder of their potential working life. In sum, data are available to develop defensible, conservative estimates of lost productivity due to long-term disability.

## Lost productivity costs due to short-term disability

To estimate costs associated with MH-related short-term disability, we recommend using data from Statistics Canada that provides estimates of the total days lost per worker in a year due to illness and disability using Statistics Canada's Labour Force Survey questionnaire.[45] Methods using wages from the Survey of Employment, Payrolls and Hours and imputation/estimation strategies described throughout this report can then be used to estimate lost productivity costs due to MH-attributable short-term disability.

**Table 9. Summary table: Recommended data sources to estimate MH-related lost productivity costs.**

| Data Source | |
|---|---|
| **Premature mortality** | |
| | • Vital Statistics – Death Database (CSVD) operated by Statistics Canada<br>• Survey of Employment, Payrolls and Hours |
| **Long-term disability** | |
| | • Canada Pension Plan (CPP)<br>• Survey of Employment, Payrolls and Hours |
| **Short-term disability** | |
| | • Statistics Canada's Labour Force Survey questionnaire<br>• Survey of Employment, Payrolls and Hours |

[45] https://www.statcan.gc.ca/en/statistical-programs/instrument/3701_Q1_V6

# PHASE III: ESTIMATING PRIVATE HEALTH AND LOST PRODUCTIVITY COSTS

In Phase II estimates of direct healthcare expenditure, social and income support payments, and indirect costs will be produced in consultation with the expert advisory committee. The goals of Phase III will be to:

1. review and improve sources and methods employed in Phase I and Phase II estimations of direct healthcare expenditure, social and income support payments, and indirect costs (including possibly adding new cost categories identified as missing during Phase II release).
2. estimate private health and lost productivity costs such as private counselling/psychologist costs, private insurance disability payments, employee assistance programs, etc.

# DISCUSSION

This report describes a multi-year initiative to estimate, with improving comprehensiveness and reliability, the cost of mental health in Canada. As such, the methods described are meant to be iterative. Specifically, Phase I data sources and methods described in this report are better developed than Phase II which are better developed than Phase III. At the outset of each phase the Expert Advisory Committee should be presented with the data sources and methods for critique and improvement before analysis and estimation are conducted.

It is important to keep in mind that cost estimation projects such as those described in this report are just that - estimation exercises. There is no "perfect" method or set of data that if analysed will reveal the "true" cost of mental health in Canada. Instead, what we have is a set of imperfect national and P/T level datasets that can be used to generate defensible estimates of the cost of mental health in Canada.

Estimates generated via costing exercises such as those described in this report will always be subject to criticism for underestimating some costs and, perhaps, overestimating others. As long as methods, data sources, imputation/estimation strategies, and associated limitations are clearly described, then the estimates will be valuable to policymakers, researchers, people with lived experience, advocates, and other stakeholders. As the project progresses, invariably criticisms will be made. These critiques will provide valuable input and will contribute to the development of the estimations. Critics can be invited to collaborate or make suggestions regarding how to develop more robust estimates. As estimates become more scrutinized and sophisticated over time, it is anticipated there will be growing recognition and consensus among relevant stakeholders of the comprehensiveness and reliability of the cost estimates emerging from this project.

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