



Weighting for Navigation of Mental Health and Substance Use Services, and Early Intervention for Mental Health and Substance Use Among Children and Youth Indicators

Methodology Notes

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Measures calculation

See Appendix A: Survey development and data collection in the 2022 companion report [*Common Challenges, Shared Priorities: Measuring Access to Home and Community Care and to Mental Health and Substance Use Services in Canada — Volume 4*](#) for information on how the surveys were developed and how data was collected for the 2 Mental Health and Substance Use indicators published by the Canadian Institute for Health Information (CIHI):

- Navigation of Mental Health and Substance Use Services
- Early Intervention for Mental Health and Substance Use Among Children and Youth

Results are reported publicly in [Your Health System: In Brief](#).

See the [Indicators page](#) on CIHI's website for detailed information on how to calculate these indicators.

Indicator results were adjusted through a weighted approach to make the survey sample more representative of the Canadian target population. See the section below, Weighting of survey measures, for details.

Weighting of survey measures

For these indicators, data was collected using a combination of snowball and convenience sampling through outreach to partner organizations and social media with paid advertisements. A small proportion (<3%) of the sample was collected through mailouts and random digit dialing. Because most survey data was collected in a non-probabilistic (non-random) way, the demographic and jurisdictional representations in the final samples were not representative of the general population. A non-probabilistic weighting methodology using variables related to participation behaviour was applied to reduce the bias caused by the unknown sample inclusion or participation mechanisms. This methodology relies on 2 assumptions:

1. Participation in a non-random survey is characterized by a set of participatory variables (e.g., age, sex) that are collected as part of the survey.
2. There is a random survey sample, taken from the same target population with information on the same set of participatory variables.

Calculation of pseudo weights

Pseudo weights are weights used to reduce bias between the sample and the target population. Pseudo weights were calculated based on demographic strata from the CIHI surveys (non-random surveys) that match strata in the Canadian Community Health Survey (CCHS) (random survey). The 2017–2018 CCHS public-use microdata file was used because it contains similar demographic questions and a similar target population of individuals with perceived good, fair or poor mental health. Strata were chosen by examining participation behaviour (i.e., probability of accessing and completing a survey) of various demographic groups. A minimum of 10 respondents were needed for each stratum to calculate the pseudo weights. Demographic groups were limited by the number of respondents in the CIHI survey and in the CCHS.

It was possible to form only national-level strata for both surveys because breakdown at the provincial and territorial levels resulted in small strata sizes (<10) in both CCHS and CIHI survey data. Provincial and territorial target population sizes were accounted for in additional raking of the pseudo weights, applied as a final step in the adjustment methodology (see Table 2). Table 1 provides an example of the pseudo weight calculation.

Table 1 Process for pseudo weight calculation

Step	Notes
<p>1. Identify variables that impact participation in the non-probabilistic survey.</p>	<ul style="list-style-type: none"> • Age • Sex and sexual orientation • Education • Indigenous identity
<p>2. Identify a probabilistic survey that has the exact same variables with the same target population (if possible).</p>	<p>2017–2018 CCHS public-use microdata file</p> <p><i>Question GEN_015: In general, would you say your mental health is . . . ? (Answers: 1 Excellent; 2 Very good; 3 Good; 4 Fair; 5 Poor; Don't know; Refuse to answer)</i></p> <p>Participants who responded that their perceived mental health was good, fair or poor were used to identify the target populations for the Early Intervention (age 13 to 24) and Navigation (age 15+) surveys.</p>
<p>3. Categorize the variables in both the probabilistic and non-probabilistic surveys in the same way, aiming for strata counts over 10. This leads to stratifications by the combinations of different levels of the covariates.</p>	<p>Age: Navigation: 15 to 17; 18 to 24; 25 to 44; 65+ Early Intervention: 13 to 17; 18 to 24</p> <p>Sex and sexual orientation: Straight male; straight female; both sexes and gay, lesbian, bisexual; all people age 13 to 14 (due to the absence of sexual orientation data for 13- to 14-year-olds in CCHS)</p> <p>Education: High school and less; post-secondary</p> <p>Indigenous identity: Yes; no</p> <p>CCHS variables: Age (DHHAge), sex (DHH_Sex), sexual orientation (SDC_035), education (EHG2DVR3) and Indigenous identity (SDC_015)</p>
<p>4. Calculate the total stratum weight — summation of design weights of probabilistic samples (i.e., CCHS).</p>	<p>E.g., sum of CCHS design weights for individuals in a stratum: straight + female sex, 18 to 24 age, post-secondary education, non-Indigenous = 204,431.06</p>
<p>5. Apply the total stratum weight from CCHS to each combination/stratum in the non-probabilistic survey, such that each unit in the stratum is assigned equal weight.</p>	<p>CIHI pseudo weight = total stratum weight in CCHS ÷ number of respondents in CIHI survey per stratum</p>

Some regrouping and collapsing of the initial strata were done to ensure sufficient sample size per stratum. These were applied *only* for the weighting procedure and usually led to more reliable estimates. Due to the lack of weights for specific age groups, CCHS weights for the 13-to-14-year age group were derived from the weights for the 12-to-14-year age group on the assumption that ages 13 and 14 accounted for two-thirds of the total weight.

- Sexual orientation was incorporated with the sex variable to produce an additional level of granularity. CIHI survey data had very high participation of individuals who were not heterosexual, when compared with the general population distribution (e.g., less than 40% heterosexual in the Early Intervention survey).
 - Where sex at birth was not answered in CIHI's survey, gender identity was used to impute this where available. This did not cover all missing sex responses.
 - 13- to 14-year-olds were not asked their sexual orientation in the CCHS (valid skip) but were asked in CIHI surveys. When breaking down the weight categories, we assigned all 13- to 14-year-olds to their own subcategory due to this difference in survey methodologies. Sample size was not sufficient to break this down into further male and female groups.
- Education responses were adjusted to account for individuals in the 13-to-17-year age group responding with a post-secondary education. They were reassigned to less than high school or high school. For individuals who indicated they didn't know or preferred not to answer this question, responses were collapsed with a corresponding group using assumptions based on age. Individuals age 13 to 17 were grouped into less than high school/high school, while individuals age 18 to 24 years were assumed to have some form of post-secondary education.
- Indigenous identity was included in our weighting strategy due to a high representation of Indigenous Peoples in CIHI survey data, compared with the general population distribution. Responses of individuals indicating they didn't know or preferred not to answer were recoded and included with the Canadian-born/non-Indigenous group given the likelihood of this based on population prevalence.

Raking of pseudo weights

The first stage weighting procedures did not use provinces and territories in the development of the strata. To make the provincial pseudo weights from the CIHI surveys comparable with provincial target populations from the CCHS, a final calibration exercise, known as raking, was used. This was done by calibrating the pseudo weights in the survey based on provincial target populations in the CCHS. Weight raking was performed for reportable provinces only, with the goal being a ratio close to 100% (plus or minus 10%) between the sum of CIHI weights and the sum of CCHS weights for a given province. Raking provides consistency at the provincial and territorial levels without affecting the validity of the final estimates. Some reportable jurisdictions were not included in the raking process if their ratio became close to 100% after the raking of other jurisdictions. Multiple rounds of raking can be done to improve the raking results. For this survey, 2 rounds of raking were performed.

Table 2 Process for raking of pseudo weights

Step	Notes
1. Sum all design weights in a selected province in CCHS and sum all remaining design weights for the same target population in CCHS.	E.g., sum all Ontario weights in CCHS and sum all non-Ontario weights in CCHS
2. Do the same summation for the pseudo weights in the CIHI survey.	E.g., sum all Ontario pseudo weights in the CIHI survey and sum all non-Ontario weights in the CIHI survey
3. Determine separate multiplication factors for selected province and for all remaining provinces and territories combined.	Multiplication factor (or calibration adjustment) for province = Sum of the weight for province in CCHS ÷ sum of the pseudo weights for province in CIHI survey Multiplication factor for remaining provinces and territories = Sum of the weight for remaining provinces and territories in CCHS ÷ sum of the pseudo weights for remaining provinces and territories in the CIHI survey
4. Apply multiplication factors to both groups in the CIHI survey, so that the total weight in each group from the CIHI survey equals the total weight from CCHS in the same group.	Not applicable
5. Repeat for additional provinces using above process, using the newly calibrated pseudo weight for the CIHI survey as the pseudo weight for further calibration.	E.g., sum all British Columbia weights and sum all non-British Columbia weights
6. Once all relevant jurisdictions have been calibrated, repeat the entire process for multiple rounds.	Not applicable

Suppression rules

Denominator suppression

Results are suppressed if the denominator (total number of respondents) is less than 50. This rule is applied to ensure numerical stability of results.

Numerator suppression

Results are suppressed if the numerator (number of respondents who selected the most positive response[s]) is 1 to 4. This rule is applied to minimize the risk of identifiability and residual disclosure.

Limitations

- Incentives for participation were not available in Quebec.
- Selection and participation bias — characteristics of participants differ from those of non-participants.
- Coverage bias — those without ready access to the internet did not have the same opportunity to participate.
- Look-back period for presence of mental health or substance use issues may be affected by recall bias.

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