Public Data Sources for Monitoring Children's Mental Health:

What We Have and What We Still Need in British Columbia

A Research Report

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We celebrate the Indigenous Peoples on whose traditional territories we are all privileged to live and work.

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Executive Summary

Children's mental health is crucial for the wellbeing of individuals and of populations. Yet rigorous epidemiological studies show high disorder prevalence — with nearly 12.7% or 95,000 children aged 4–18 years being affected at any given time in British Columbia (BC). These studies also depict stark service shortfalls — with only 44.2% of children with mental disorders receiving any services for these conditions. Beyond epidemiological studies, improving children's mental health requires comprehensive ongoing population monitoring of determinants, status, interventions and service use across all age groups, from infancy through late adolescence, to assess public investments aimed at better meeting the needs. We conducted an audit of such sources with potential application in BC, applying a population health framework to ensure comprehensiveness.

We found 25 data sources. Several show potential — if used in aggregate — for ongoing monitoring:

1) For determinants and status: Canada Census and BC Education data (determinants; covering all ages); Early and Middle Years Development Instruments (status; covering younger and middle school-age children only); and Canadian Community Health, Health Behaviour in School-Age Children and McCreary Adolescent Health Surveys (status; covering adolescents only); and
2) For interventions and services: Brief Child and Family Phone Interview (BCFPI) combined with BC Medical Services Plan (MSP) diagnoses from fee-for-service practitioners (mental healthcare encounters; covering all ages).

None of these sources is adequate alone, however. They therefore should be used in aggregate — and benchmarked against rigorous epidemiological data on both prevalence and service use in the population. For example, combining BCFPI and MSP data can give a picture of children receiving mental healthcare, which can then be compared to population estimates — informing planning to address service gaps.

Monitoring is also just one component of a comprehensive population health strategy for children's mental health. Such a strategy includes:

1) Addressing social determinants and reducing avoidable childhood adversities that contribute to the development of mental health problems;
2) Providing effective prevention programs for children before disorders arise;
3) Providing effective treatments for all children with disorders; and
4) Monitoring needs and outcomes across the population.

Vigorous central leadership is required to ensure that such a plan is sustained over time, coordinated across all relevant sectors within government, and accompanied by adequate and dedicated children's mental health budgets. BC's children will benefit, as will everyone, if their mental health is made a high public policy priority. A monitoring system can contribute to this aim by enabling ongoing assessment and reporting on public investments designed to help all children flourish.

1. Background

1.1 Population Approach to Children's Mental Health Monitoring

Most mental disorders start in childhood and cause significant symptoms, distress and impairment — preventing many young people from flourishing and meeting their potential.[1] If not prevented or treated early, these disorders typically persist unnecessarily into adulthood, adding further to the individual and population burdens.[2-3] Chronic children's mental health service shortfalls exacerbate these issues.[4] (Throughout, "children" refers to those aged 18 years and younger.) This is despite strong research evidence describing effective interventions for preventing many childhood mental disorders and for treating all of the 12 most common ones.[5] Taking into account both high prevalence and low service reach, it is not surprising that mental disorders are now the leading cause of childhood disability globally.[6] At the same time, it is now recognized that avoidable childhood adversities contribute to the development of some of the most common mental health problems for young people. These adversities include socioeconomic disadvantage[7-10] and child maltreatment.[11-13]

A comprehensive population health strategy is an essential starting point in tackling these issues. Such a strategy includes: 1) addressing social determinants and preventing avoidable adversities for all children; 2) providing effective prevention programs for children before disorders arise; 3) providing effective treatments for children with disorders; and 4) monitoring needs and outcomes across the population over time.[1] Monitoring is the focus of this research report — addressing tracking of children's mental health determinants, status, interventions and services across all age groups to continually assess and improve public investments aimed at meeting the needs.

1.2 Epidemiological Studies on Disorder Prevalence and Service Use

Ideally, data estimating children's mental health needs are available from epidemiological studies that use rigorous diagnostic measures in large representative samples — providing "gold standard" prevalence benchmarks in the population at large.[14-15] Many such studies also assess service use by children with mental disorders. Systematic reviews and meta-analyses on data from these studies can yield robust estimates of the number of children with mental disorders in the population, and of service reach for these children.[16] A recent systematic review and meta-analysis of 14 such studies estimated that 12.7% of children aged four-to-18 years — or nearly 95,000 in British Columbia (BC) — are likely experiencing mental disorders at any given time.[4] According to this review, the 12 most common disorders ranged in prevalence from 5.2% for anxiety to 0.1% for schizophrenia.[4] Yet this review also found that only 44.2% of children with mental disorders receive any services for these condition, underscoring that service reach remains starkly limited.[4]

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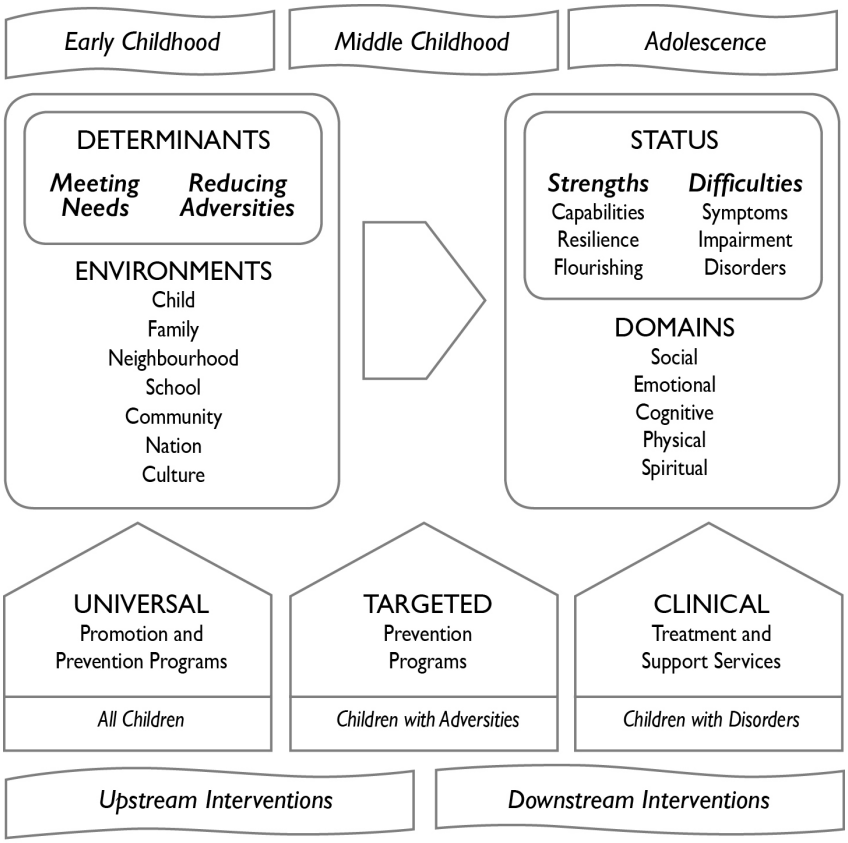
1.3 Using Public Data for Monitoring

Epidemiological studies provide rigorous data on the prevalence of childhood mental disorders. Yet to date, there are no high-quality BC epidemiological studies.[4] Therefore, a complementary approach to estimating ongoing needs may involve using epidemiological data in conjunction with public data sources, such as population-survey data or service-based administrative data collected for other purposes.[17-18]

In considering public data sources for children's mental health monitoring, it is crucial to first apply a comprehensive population health framework — to ensure that all data with policy salience are captured.[17] At a minimum data are needed on: determinants of mental health such as exposure to avoidable adversities; and mental health status across developmental stages from early childhood (birth through six years) through middle childhood (six through 12 years) and adolescence (12–18 years). As well, data are needed on a broad range of mental health interventions and services: universal promotion and prevention programs focussing on all children; targeted prevention programs focussing on children experiencing adversities; and clinical treatment and related interventions focussing on children with disorders. Such data could then potentially be used together with epidemiological data to permit comprehensive ongoing monitoring. (See Figure 1.)

Figure 1. Population Health Framework[a]



a. Adapted from Waddell et al., 2013 [17]

At the same time, when taken in aggregate, public data sources should provide information that is both meaningful and actionable — from both policy and research perspectives. *Meaningful* data are relevant to policy aims and are based on reliable and valid measures; *actionable* data reflect variables that can be modified through policy interventions and for which ongoing measures are available.[17] These criteria can inform guidelines for selecting children's mental health data sources. (See Table 1.)

Table 1. Guidelines for Selecting Children's Mental Health Data Sources[a]

	Policy Perspective	Research Perspective
Meaningful	Is conceptually coherent and relevant to public policy aims, including addressing inequities and gaps in status and services; includes BC children aged 18 years and younger	Uses generally accepted measures, information sources (e.g., children, parents, teachers) and robust sampling frames[b]; comprises original data on BC children rather than compilations of extant data
Actionable	Addresses variables that can be modified through public policy interventions, short- or long-term, i.e., relevant avoidable childhood adversities and/or child mental health/disorder status[c]	Permits/provides ongoing data collection/access, beyond one-time or cross-sectional data; is accessible at reasonable costs, within reasonable timeframes

a. Adapted from Waddell 2013[17]
b. While probabilistic sampling is ideal, this is not possible for public sources such as service use data
c. Substance use disorders are included within mental disorder status

1.4 Purpose of This Research Report

This report aimed to identify options for monitoring children's mental health determinants, status, intervention and service use in the BC population. Specifically, we: identify and describe existing public data sources with potential for use in monitoring children's mental health, in conjunction with data from child epidemiological studies; evaluate the strengths and limitations of these sources; and outline data gaps. We covered data sources depicting young people from age 18 years and younger, noting that prenatal data, while valuable, were beyond our scope. The overarching goals were to inform and facilitate new policy initiatives to better meet children's mental health needs, given severe documented service shortfalls. The policy context is that of the BC Government's ongoing commitment to enhancing children's mental health services and outcomes.

Improving children's mental health
requires comprehensive population monitoring of
determinants, status and service use across all age groups
to assess public investments aimed at better meeting the needs.

2. Methods

For this report, we built on an earlier analysis of BC and Canadian data sources for monitoring children's mental health in the population,[17] updating information on previous sources as well as identifying new sources. Datasets were identified by conducting online searches according to salient agencies (e.g., Statistics Canada or SC), database names (e.g., BC Medical Services Plan or MSP), and topics (e.g., early child development). All identified data sources were then screened for suitability and relevance and evaluated using the criteria outlined in Table 1. Sources had to meet all criteria to be included in the final shortlist. Finally, we prepared tables summarizing: 1) coverage of the population health framework; and 2) aims, strengths and limitations and access information for each data source. (However, accessing the actual datasets was beyond scope.)

At all stages, work was conducted and verified by two or more team members, resolving any differences by consensus. To ensure policy relevance, we also iteratively consulted with the project's Policy Advisory Committee to obtain suggestions and feedback throughout the process. This Committee included senior representatives from the BC Ministries of Children and Family Development (MCFD), Mental Health and Addictions, Health and Education, as well as the First Nations Health Authority and the Métis Nation of BC. Each of these organizations have children's mental health within their mandates, with the MCFD's Child and Youth Mental Health (CYMH) Policy Branch being BC's lead community-based children's mental service agency.

3. Findings

3.1 Summary

From our initial assessment of 58 possible data sources, we identified 25 that met criteria as having potential utility for monitoring children's mental health in BC, adjunctively with epidemiological studies. Regarding coverage of the population health framework (Figure 1), 11 population-survey sources provided data on determinants and/or status (eight for Canada, three for BC); while 14 provided service-based administrative data on prevention programs and/or clinical and related interventions (six for Canada, eight for BC). Regarding coverage of developmental stages, 11 sources covered multiple ages, one covered early childhood only, two covered middle childhood only, and three covered adolescents only. Meanwhile, eight of the 25 sources covered specialized topics or populations such as substance use or justice services or Indigenous children. (See Table 2.) Below we describe the population-survey and service-based data sources in more detail — noting aims, strengths and limitations, and access information. (We only report on coverage of populations aged 18 years or younger, noting that some datasets cover older populations as well.) (See Tables 3–6.)

Table 2. Coverage of Children's Mental Health Population Health Framework[a]

Topic	Data Sources					Total
	Multiple Ages[b]	**Early Childhood (0–6 years)**	**Middle Childhood (6–12 years)**	**Adolescence (12–18 years)**	**Specialized Topics[b]**	
Determinants and/or Status (Population-Survey Data)						
Determinants	**Canada** • Canada Census, SC			**Canada** • General Social Survey, SC	**Canada** • Aboriginal People's Survey, SC (adolescents) • First Nations Regional Health Survey, FNIGC	**4**
Status	**BC** • Education Data, MoE	**Canada** • Early Development Instrument, McMaster + UBC	**Canada** • Health Behaviour in School-Aged Children Survey, PHAC **BC** • Middle-Years Development Instrument, UBC	**Canada** • Canadian Community Health Survey, SC **BC** • Adolescent Health Survey, McCreary Centre	**Canada** • Canadian/Student Tobacco, Alcohol + Drugs Surveys, HC (adolescents)	**7**
Interventions (Service-Based Administrative Data)						
Prevention Programs	**BC** • MCFD					**1**
Clinical + Related Services[c]	**Canada** • DAD, CIHI + MoH • NACRS, CIHI + MoH **BC** • BC Employment + Assistance, MSDPR • BCFPI, MCFD • Child + Youth Mental Health, Child Protection + Children with Special Needs Reporting Portal, MCFD • MHMRR, MoH • MSP, MoH • Pharmanet, MoH				**Canada** • Corrections Key Indicator Report, SC (adolescents) • National Youth Homelessness Survey, COH (adolescents) • Uniform Crime Reporting Survey, SC • Youth Court Survey, SC (adolescents) **BC** • Student headcounts by special needs categories, MoE	**13**
Total	**11**	**1**	**2**	**3**	**8**	**25**

a. All listed Canadian sources include British Columbia (BC) data; b. All ages included unless otherwise noted; c. "Clinical" services include health + social services/programs where treatment + support are provided (vs. prevention); BCFPI = Brief Child + Family Phone Interview; CIHI = Canadian Institute for Health Information; COH = Canadian Observatory on Homelessness; DAD = Discharge Abstract Database; FNIGC = First Nations Information Governance Centre; HC = Health Canada; MCFD = BC Ministry of Children and Family Development; MHMRR = Mental Health Minimum Reporting Requirements; MoE = BC Ministry of Education; MoH = BC Ministry of Health; MSDPR = BC Ministry of Social Development + Poverty Reduction; MSP = Medical Services Plan practitioner diagnoses + payments; NACRS = National Ambulatory Care Reporting System; PHAC = Public Health Agency of Canada; SC = Statistics Canada; UBC = University of BC

Table 3. Canadian Sources — Population-Survey Data

	Name / Source	Description / Strengths / Limitations / Access / Coverage
1	**Aboriginal Peoples Survey** Statistics Canada	Survey on the social and economic lives of Indigenous (including First Nations young people living outside First Nations communities, Métis, and Inuit) young people aged 15 years and older; data collection cycles in 1991, 2001, 2006, 2012, and 2017
		Strengths: Detailed data on wellbeing and life satisfaction **Limitations**: Excludes First Nations youth living in First Nations communities and in some communities in the territories; excludes younger children **Access**: https://www150.statcan.gc.ca/n1/en/catalogue/89-653-X **Developmental Stage / Determinants / Status:** Adolescence (Indigenous children only) / Determinants **Service Settings:** NA
2	**Canada Census** Statistics Canada	Survey collected from random sample of 25% of population (long-form census); data on children collected from parents/caregivers every 5 years since 1956; representative of all children aged 0–18 years in private households; family income data included
		Strengths: Representative sample; data on socioeconomic characteristics and ethnicity **Limitations:** Incomplete data for children living in First Nations communities; excludes children living in institutions or homeless; excludes children in Canadian Forces families stationed outside of Canada **Access:** https://www12.statcan.gc.ca/census-recensement/index-eng.cfm; BC income data derived from federal sources also available at https://www2.gov.bc.ca/gov/content/data/statistics/people-population-community/income **Developmental Stage / Determinants / Status:** All / Determinants **Service Settings:** NA
3	**Canadian Community Health Survey** Statistics Canada	Survey on indicators such as health, behaviours and socioeconomic status of young people aged 12 and older; data collected every 2 years 2001–2005 and annually since 2007
		Strengths: Representative sample; data on mental health status **Limitations:** Excludes younger children; excludes young people living in First Nations communities, foster care and institutions **Access:** https://www150.statcan.gc.ca/n1/en/catalogue/82M0013X **Developmental Stage / Determinants / Status:** Adolescence / Status **Service Settings:** NA
4	**Canadian/ Student Tobacco Alcohol and Drugs Survey (formerly Youth Smoking Survey)** Health Canada	Survey on youth substance use; conducted in all provinces with youth in grades 7–12 every 2 years since 2004; Canadian Tobacco, Alcohol and Drugs Survey (a related survey) also conducted in 2013, 2015 and 2017 in all provinces with youth aged 15–18 years; both surveys cover tobacco/cigarette/nicotine/e-cigarette, alcohol, cannabis and other substance use
		Strengths: Representative sample; detailed substance use data and additional data e.g., on bullying **Limitations:** Excludes younger children, those living in selected remote and First Nations communities, those attending alternative schools or schools on military bases, and those not attending school **Access:** https://www.canada.ca/en/health-canada/services/canadian-student-tobacco-alcohol-drugs-survey/2018-2019-summary.html (current data); https://www150.statcan.gc.ca/n1/en/catalogue/82M0011X (archived data); see also University of Waterloo coordinating website for reports and tables by year and province at https://uwaterloo.ca/canadian-student-tobacco-alcohol-drugs-survey/; CTADS data can also be accessed at https://www.canada.ca/en/health-canada/services/canadian-tobacco-alcohol-drugs-survey.html **Developmental Stage / Determinants / Status:** Adolescence (substance use only) / Status **Service Settings:** NA

Table 3. Canadian Sources — Population-Survey Data (Continued)

	Name / Source	Description / Strengths / Limitations / Access / Coverage
5	**Early Development Instrument** Offord Center, McMaster University; and Human Early Learning Partnership (HELP), University of BC (UBC), with support from the BC Ministries of Health and Education	Survey on early child development; sample representative of all children aged 5–6 years enrolled in kindergarten (including public, independent, and Indigenous schools); all provinces and territories (except Nunavut) administered at regular intervals since 2004; data collected from teachers every 3 years in most BC schools since 2001, with public data available since 2004; BC data can be linked with other datasets, e.g., birth, income, Medical Services Plan; BC toddler and adolescent instruments in development, see also BC Middle-Years Development Instrument (below); has been administered in many countries
		Strengths: Rigorously normed high-level data; representative sample including Indigenous children (with data on Indigenous children available to non-Indigenous organization on request); broad indices including wellness; permits tracking of cohorts over time; permits regional comparisons within BC; permits provincial/national/ international comparisons **Limitations:** Excludes disorder measures; inconsistent administration in other provinces/countries could make comparisons challenging; excludes older children **Access:** https://edi.offordcentre.com; BC data available to UBC/HELP-affiliated researchers via Population Data BC at http://earlylearning.ubc.ca/edi/ **Developmental Stage / Determinants / Status:** Early childhood / Status **Service Settings:** NA
6	**First Nations Regional Health Survey** First Nations Information Governance Centre	Survey on socioeconomic status, general health and mental health (including substance use) for children living in First Nations communities and in Northern communities; collected approximately every 5 years since 1997; child surveys (aged 0–11 years) completed typically by primary caregiver, while youth surveys (12–17 years) are self-report
		Strengths: Detailed data on children living in First Nations communities and in Northern communities; survey design and implementation self-determined by First Nations Information Governance Centre; research goals determined by Indigenous Peoples **Limitations:** Limited mental health scope; excludes Métis and Inuit children; excludes children living outside of First Nations communities **Access:** http://fnigc.ca/dataonline/ **Developmental Stage / Determinants / Status:** All (Indigenous children only) / Determinants **Service Settings:** NA
7	**General Social Survey** Statistics Canada	Survey on social trends for Canadians aged 15 years and older; conducted annually since 1985, with "themes" repeated every 5 years; seven themes include home and community life, social identity, and victimization; all provinces included
		Strengths: Detailed information about social supports and social identity for Canadian youth **Limitations:** Limited mental health scope; excluded residents of institutions and territories; excluded those without phones; underrepresentation of First Nations people living on reserves **Access:** https://www150.statcan.gc.ca/n1/en/catalogue/89F0115X **Developmental Stage / Determinants / Status:** Adolescence / Determinants **Service Settings:** NA
8	**Health Behaviour in School-Aged Children Survey** Public Health Agency of Canada	Survey on child health in 50 countries/regions, sponsored by World Health Organization; data collected from children aged 11, 13, and 15 years every 4 years using school-based self-report surveys; implemented in Canada since 1989; questions cover healthy development, general health, and mental health including substance use
		Strengths: Mental health focus; representative sample; permits international comparisons **Limitations:** Excludes private schools, and schools in First Nations communities; inconsistent completion for some provinces in some cycles (BC included in most cycles) **Access:** https://www.canada.ca/en/public-health/services/health-promotion/childhood-adolescence/programs-initiatives/school-health/health-behaviour-school-aged-children/hbsc-publications-resources.html; complete open access via http://hbsc-nesstar.nsd.no/webview/ for survey cycles completed ≥3 years ago **Developmental Stage / Determinants / Status:** Middle childhood / Adolescence / Status **Service Settings:** NA

Table 4. Canadian Sources — Service-Based Administrative Data

	Name / Source	Description / Strengths / Limitations / Access / Coverage
1	**Corrections Key Indicator Report for Youth** Statistics Canada	Administrative probation and incarceration data for youth aged 12–18 years; data collected from corrections staff monthly since 1985
		Strengths: Includes youth convicted and/or incarcerated for criminal charges; permits provincial comparisons **Limitations:** Narrow justice focus; excludes younger children by definition **Access:** https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3313 **Developmental Stage / Determinants / Status:** Adolescence (youth justice only) / NA **Service Settings:** Justice system services
2	**Discharge Abstract Database** Canadian Institute for Health Information and BC Ministry of Health	Administrative data on hospital diagnoses and discharges; BC data collected annually since 1985; includes children aged 0–18 years receiving hospital services, including day procedures but excluding ER visits
		Strengths: All children aged 0–18 years receiving hospital care; mental health data included; permits provincial comparisons **Limitations:** Narrow focus on hospital services, excludes community-based mental healthcare **Access:** https://www.cihi.ca/en/discharge-abstract-database-metadata; BC data access granted to researchers and healthy authority staff with approved funding and ethics via Population Data BC at https://www.popdata.bc.ca/data/health/dad; access to de-identified linked online data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / NA **Service Settings:** Clinical hospital mental healthcare (but not ER)
3	**National Ambulatory Care Reporting System** Canadian Institute for Health Information and BC Ministry of Health	Administrative data on hospital visits and ambulatory care use, including ER visits; data collected annually from province/territories (BC included since 2012); includes children aged 0–18 years receiving services
		Strengths: All children aged 0–18 years receiving hospital care; mental health data included; permits provincial comparisons **Limitations:** Narrow focus on hospital/ER services, excludes community-based mental healthcare; not available in certain regions or geographical areas **Access:** https://www.cihi.ca/en/access-data-and-reports; BC data access granted to researchers and healthy authority staff with approved funding and ethics via Population Data BC: https://www.popdata.bc.ca/data/health/nacrs; access to de-identified linked online data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / NA **Service Settings:** Clinical hospital/ER mental healthcare

Table 4. Canadian Sources — Service-Based Administrative Data (Continued)

	Name / Source	Description / Strengths / Limitations / Access / Coverage
4	**National Youth Homelessness Survey** Canadian Observatory on Homelessness	Survey on housing conducted through 57 community organizations serving homeless youth; data collected in 2015 and 2019 with youth aged 12–18 years (and adults); data collected on exposure to adversities and mental health; data collected in 10 provinces and territories, including BC
		Strengths: Detailed housing data; some mental health data **Limitations:** Respondents reached through participating youth-serving organizations only; youth who did not access service were not included; separate youth (vs. adult) reports not always produced **Access:** https://www.homelesshub.ca/WAH2019 **Developmental Stage / Determinants / Status:** Adolescence (youth homelessness only) / NA **Service Settings:** Services for homeless youth
5	**Uniform Crime Reporting Survey** Statistics Canada	Administrative data on all criminal incidents reported to police; data collected from police since 1962 and reported annually, more detailed incident-based data gathered since 1988; includes children aged 0–18 years involved in incidents reported to police
		Strengths: Covers behaviour problems reported to police; permits provincial comparisons **Limitations:** Narrow focus on police contacts; reporting biases regarding who gets police attention **Access:** https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3302 **Developmental Stage / Determinants / Status:** All (youth justice only) / NA **Service Settings:** Justice system services
6	**Youth Component, Integrated Criminal Court Survey (formerly Youth Court Survey)** Statistics Canada	Administrative data on all criminal charges and convictions under Young Offenders' Act until 2003 and Youth Criminal Justice Act since 2003; data collected from court staff annually since 2000; includes all youth aged 12–17 years appearing in court
		Strengths: Covers youth criminal charges and convictions with court engagement; permits provincial comparisons **Limitations:** Narrow focus on justice system; excludes younger children **Access:** https://www150.statcan.gc.ca/n1/daily-quotidien/191030/dq191030c-eng.htm **Developmental Stage / Determinants / Status:** Adolescence (youth justice only) / NA **Service Settings:** Justice system services

Table 5. BC Sources — Population-Survey Data

	Name / Source	Description / Strengths / Limitations / Access / Coverage
1	**Adolescent Health Survey** McCreary Centre Society	Survey of adolescent health and wellbeing; data collected every 5 years in most secondary schools since 1992; 58 of 60 BC school districts participated in 2018 survey; typical reach is 90% of BC students; includes youth aged 12–18 years in grades 7–12, including Indigenous youth (excluding independent schools); *Ta Saantii Deu/Neso: A Profile of Métis Youth Health in BC* reports data from 2008, 2013, and 2018 on Métis youth
		Strengths: Representative sample; broad health approach including mental health and wellness measures; includes First Nations (1992, 1998, 2003, 2008, 2013, 2018) and Métis youth (2008, 2013, and 2018) **Limitations:** Excludes younger children; 19-year-olds included in analyses; excludes mental disorder measures; excludes children in independent schools, alternative schools or those who are home-schooled; excludes those not attending school **Access:** https://www.mcs.bc.ca/ahs **Developmental Stage / Determinants / Status:** Adolescence / Status **Service Settings:** NA
2	**Education Data** BC Ministry of Education	Administrative data reflecting standardized foundational skills assessments of literacy and numeracy (grades 4 and 7) collected since 2000; student satisfaction data (grades 4, 7, 10 and 12) collected since 2001
		Strengths: All children in the education system; covers core academic areas and related factors such as grade completion and demographics **Limitations:** Academic data limited for older children; limited mental health and special needs data **Access:** https://catalogue.data.gov.bc.ca/dataset/bc-schools-foundation-skills-assessment-fsa- and https://studentsuccess.gov.bc.ca/provincial-results and https://catalogue.data.gov.bc.ca/dataset/bc-schools-satisfaction-survey-consolidated; access to de-identified linked online data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / Status **Service Settings:** NA
3	**Middle Years Development Instrument** Human Early Learning Partnership, UBC	Survey on middle years development in BC; self-report questionnaire completed by children aged 10–13 years in grades 4 through 8; conducted every 1–2 years starting in 2010; as with the Early Development Instrument (see above), focuses on age-specific factors supporting and promoting healthy development and wellbeing; aggregate data at school district/community and provincial levels
		Strengths: Representative sample; broad indices including wellness; together with Early Development Instrument, permits longitudinal modeling (separate child cohorts); permits regional comparisons within BC; reports on languages spoken at home, including Indigenous languages **Limitations:** Excludes disorder measures **Access:** Available to UBC/HELP-affiliated researchers via Population Data BC at http://earlylearning.ubc.ca/mdi/ **Developmental Stage / Determinants / Status:** Middle childhood / Status **Service Settings:** NA

Table 6. BC Sources — Service-Based Administrative Data

	Name /Source	Description / Strengths / Limitations / Access / Coverage
1	**Brief Child and Family Phone Interview (BCFPI)** BC Ministry of Children and Family Development (MCFD)	Administrative data on MCFD-Child and Youth Mental Health (CYMH) intake assessments; data collected from children, parents and/or teachers since 2005; includes most children aged 6–18 years referred to MCFD-CYMH services; normed according to 1983 Ontario Child Health Survey
		Strengths: Captures data on main community-based children's mental health service for BC population; robust, comprehensive mental health data including symptoms, impairment and potential diagnoses; instrument has capability for cross-uses, e.g., prevention and treatment program evaluation; Indigenous adaptation available; Ontario data permit provincial comparisons **Limitations:** Only captures those seeking/receiving services with MCFD-CYMH **Access:** With MCFD permission: https://www2.gov.bc.ca/gov/content/health/managing-your-health/mental-health-substance-use/child-teen-mental-health **Developmental Stage / Determinants / Status:** Middle childhood / Adolescence / NA **Service Settings:** Clinical community-based mental healthcare
2	**British Columbia (BC) Employment and Assistance** BC Ministry of Social Development and Poverty Reduction	Administrative data on families/individuals receiving employment and other forms of assistance; provides number of recipients and dependents receiving disability assistance or temporary assistance each month by both program and family composition since 1995
		Strengths: Data can be linked to other sources **Limitations:** No mental health focus **Access:** https://catalogue.data.gov.bc.ca/dataset/bc-employment-and-assistance-program; access to BC Benefits (including BC Employment and Assistance) de-identified linked online data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / NA **Service Settings:** Financial assistance services
3	**Child and Youth Mental Health Prevention Program Reports** BC MCFD	Administrative data on targeted community-based program, Confident Parents, Thriving Kids, aimed at preventing anxiety and behaviour challenges, including BCFPI data on children aged 3–12 years; and administrative data on universal school-based Everyday Anxiety Strategies for Educators (EASE) program, aimed at preventing anxiety, for children aged 5–12 years (grades K–7)
		Strengths: Clear mental health focus; data cover targeted and universal prevention programs delivered in early and middle childhood; BCFPI data are a robust measure of child outcomes **Limitations:** EASE data provide teacher inputs only, not child outcomes **Access:** Contact MCFD-CYMH at MCF.ChildYouthMentalHealth@gov.bc.ca **Developmental Stage / Determinants / Status:** Early and middle childhood / NA **Service Settings:** Community/targeted and school/universal prevention programs
4	**Child and Youth Mental Health Services, Child Protection and Children and Youth with Special Needs Reporting Portal** BC MCFD	Administrative data on province-wide CYMH and child protection services for children aged 0–18 years and their families; includes special needs and early childhood programs, adoption services, and autism diagnoses
		Strengths: Data on BC's main community-based mental health services; child protection and children with special needs also covered; data on autism diagnoses relatively complete (cases registered and vetted by clinical specialists) **Limitations:** Only captures those seeking / receiving services; CYMH diagnoses are provisional (other than for autism); excludes Vancouver Coastal Health Authority **Access:** https://mcfd.gov.bc.ca/reporting/services; access to de-identified linked online child protection data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / NA **Service Settings:** Clinical community-based mental healthcare

Table 6. BC Sources — Service-Based Administrative Data (Continued)

	Name /Source	Description / Strengths / Limitations / Access / Coverage
5	**Medical Services Plan (MSP) Payments** BC Ministry of Health	Administrative data on physician and other fee-for-service billings, contacts and diagnoses; excludes 10% of physicians remunerated through "alternative payments"); data collected since 1985; includes all children aged 0–18 years receiving fee-for-service care in community or in hospitals
		Strengths: All children aged 0–18 years accessing public fee-for-service mental healthcare **Limitations:** Only captures children receiving fee-for-service healthcare; other mental healthcare service (e.g., MCFD-CYMH teams) and payment models (e.g., sessional or salaried) not captured **Access:** Data access granted to researchers and health authority staff with approved funding and ethics via Population Data BC at https://www.popdata.bc.ca/data/health/msp; access to de-identified linked online data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / NA **Service Settings:** Clinical fee-for-service mental healthcare
6	**Mental Health Minimum Reporting Requirements** BC Ministry of Health	Administrative data on health authority community and hospital mental health services, including substance use services, for children aged 0–18 years; includes services provided in hospitals, physicians' offices or through community health teams, as well as services not covered through MSP (e.g., physician services covered by sessional fees); data collected since 1986
		Strengths: All children aged 0–18 years receiving health authority mental health services, including substance use services, in various settings **Limitations:** Inconsistent use across health authorities; data not linked with other children's mental health sources, such as MCFD-CYMH BCFPI **Access:** Data access granted to researchers and health authority staff with approved funding and ethics via Population Data BC at https://www.popdata.bc.ca/data/health/mentalhealth **Developmental Stage / Determinants / Status:** All / NA **Service Settings:** Community and hospital mental health services, including substance use services, provided by selected health authorities
7	**PharmaNet** BC Ministry of Health	Administrative data on all prescriptions, including psychiatric medications, dispensed by pharmacists; data collected since 1996; includes children aged 0–18 years
		Strengths: Includes all children aged 0–18 years receiving psychiatric prescriptions **Limitations:** Excludes data on whether medications taken, or taken as directed; excludes information on diagnoses **Access:** Data access granted to researchers and healthy authority staff with approved funding and ethics via Population Data BC at https://www.popdata.bc.ca/data/health/Pharmanet; access to de-identified linked online data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / NA **Service Settings:** Clinical fee-for-service mental healthcare
8	**Student Headcount by Special Needs Category** BC Ministry of Education	Administrative data providing count of students per special needs funding code; reported by public schools annually since 1996
		Strengths: All children with special needs in the public education system; permits regional comparisons within BC **Limitations:** Independent school data only available since 2013 **Access:** https://catalogue.data.gov.bc.ca/dataset/student-headcount-by-special-needs-category; access to de-identified linked online data also granted to approved projects via BC Data Innovation Program at https://catalogue.data.gov.bc.ca/group/data-innovation-program **Developmental Stage / Determinants / Status:** All / Status **Service Settings:** NA

4. Discussion

4.1 Summary and Interpretations

4.1.1 Overview

To inform policymaking in BC, we identified and evaluated public data sources with the potential for monitoring children's mental health — in conjunction with "gold standard" estimates from rigorous epidemiological studies of disorder prevalence and service use in probabilistic population samples. We also applied a population health framework to ensure comprehensiveness, seeking data sources covering children from birth through 18 years, as well as data on determinants, wellness and illness, and service use. We found 25 potential sources — 11 covering determinants or status, and 14 covering service-based administrative data including prevention programs.

4.1.2 Data on Determinants and Status

For children's mental health determinants, we found four sources: SC's Canada Census and General Social Survey, and two surveys specific to Indigenous populations. For mental health status, we found seven sources: BC Education Data (covering all school-age children); Early and Middle Years Development Instruments (EDI and MDI, covering early and middle childhood only, respectively); surveys such as the Canadian Community Health Survey (CCHS), Health Behaviour in School-Aged Children (HBSC) and the McCreary Adolescent Health Survey (all three covering adolescents only); and a specialized federal survey focussing on substance use (covering adolescents only). Quality was reasonable, for example, with many surveys making use of representative samples. The EDI was also rigorously normed.[19–20] Taken in aggregate, these datasets provided reasonable coverage of general markers of social and emotional wellbeing, across multiple child age groups.

Yet our audit also pointed to data gaps regarding determinants and status. The Canada Census covers socioeconomic determinants, with broad population sampling, while the BC Education Data, EDI, MDI, HBSC, CCHS and McCreary provide age-specific data on status. But detailed BC socioeconomic data are missing. As well, CCHS, HBSC and McCreary provide coverage on adolescent mental health. But we did not identify ongoing surveys providing parallel, detailed mental health data for younger children, suggesting that new surveys are needed. (The EDI and MDI provide relatively high-level data only.) Data from a comprehensive 2019 SC survey covering a large, representative, national sample of children aged one through 17 years, the Canadian Health Survey on Children and Youth (CHSCY), have just been released, although plans for repeated data collection have yet to be announced.[21] But such a survey, if ongoing, could help fill existing data gaps. If the CHSCY is repeated, it may also be of interest for BC policymakers to consider contributing added resources to capture information on populations of special interest, as other provinces did in 2019.[21]

4.1.3 Service-Based Administrative Data

For children's mental health service-based data, we identified 14 community- and hospital- or institution-based sources — covering clinical or related services as well as prevention programs. These included six Canada-wide sources such as emergency room (ER) visits, hospital discharges and youth justice service encounters. These also included eight BC sources such as: family income assistance; children's mental healthcare community service encounters and diagnoses captured by the Brief Child and Family Phone Interview (BCFPI) through MCFD-CYMH, BC's lead agency for community-based children's mental healthcare; MCFD-CYMH prevention program data; fee-for-service mental healthcare diagnoses and prescriptions captured through BC's MSP and Pharmanet databases, respectively; selected health authority mental health services; and special education designations. No administrative-services data sources depicted the quality of care — that is, how services being provided compare with research evidence on effective interventions for childhood mental disorders.[5]

Data quality was highest for MCFD-CYMH's BCFPI, which is normed against a rigorous epidemiological population-based study.[22] Yet the BCFPI only captures those children receiving mental healthcare through MCFD-CYMH services. So it cannot provide accurate population estimates of prevalence or unmet needs. Notably, however, beyond intake assessments and tracking children's progress in treatment, the BCFPI has potential for population monitoring.[14] For example, its use in probabilistic samples could permit the efficient collection of new data on prevalence and service gaps over time. The BCFPI stands out, as well, for being relatively efficient to administer — involving a short (approximately 30-minute) telephone or in-person format with children, parents or teachers. Its use could therefore potentially be extended to other children's services, permitting common data collection on encounters and outcomes, for example, across the Ministries of Health and Education as well as across Health Authority services, in addition to MCFD. MCFD-CYMH has also employed BCFPI data in evaluating the impact of prevention programs, for example, in evaluating Confident Parents, Thriving Kids, a program for preventing childhood anxiety and behaviour disorders.[23]

MSP data cover all fee-for-service mental healthcare encounters for children of all ages — providing diagnostic information based on practitioner assessments. But MSP data exclude children seen by MCFD-CYMH teams, children seen by providers covered through alternative payment models, and children seen by private practitioners such as psychologists. So MSP data also cannot provide accurate population estimates of prevalence or unmet need. Pharmanet data cover all psychiatric prescriptions dispensed for children of all ages. Yet these data do not provide information on whether prescriptions were taken, or taken as directed. Data quality is also limited by physician misdiagnosing and misprescribing.[24] ER visits and hospital discharge data cover all ages, but only cover the minority of children with mental health problems who attend ERs and hospitals. As well, neither venue is optimal — given that childhood mental disorders are best treated in less intrusive community settings.[25] Meanwhile, other datasets, such as youth justice, are too specialized for use in general population monitoring.

There are also prevention programs not captured in our audit. For example, Nurse-Family Partnership is an early childhood program which aims to prevent avoidable adversities such as child maltreatment while also improving child mental health and development.[26–27] While this program is being offered in several BC regional Health Authorities, rigorous evaluation data are still being collected and will be available in 2021 and beyond.[28]

4.1.4 Combining Sources and Norming Against Epidemiological Studies

Absent new data collection, what can be achieved by combining extant public data sources to potentially yield more robust ongoing estimates of children's mental disorder prevalence, treated prevalence and unmet need? In the adult mental health field, methodologies have been developed to link data sources including CCHS, hospital discharges, Pharmanet and MSP, yielding reasonably accurate estimates of disorder prevalence and unmet need.[29–30] But such linkages are not possible in children's mental health because CCHS data only cover adolescents, not younger children. As well, MSP data only cover the minority of children who receive mental healthcare from fee-for-service practitioners, and Pharmanet data likely do not accurately reflect child diagnoses.[17]

Our audit suggests that no one — or even two or three — extant public data sources will suffice for comprehensive children's mental health population monitoring, as has been acknowledged in the past.[31–32] Yet several public sources could potentially be combined to yield a minimum essential dataset, covering all age groups. The best current sources for this purpose include: 1) for determinants and status, Canada Census, BC Education Data, EDI, MDI, CCHS, HBSC and McCreary; and 2) for interventions and services, BCFPI and MSP. The BCFPI and MSP data have limitations, as noted above. But these data cover both younger and older children, the BCFPI is robust, and MSP also captures primary care, an important venue for mental healthcare.[33] At the same time, policymakers (and researchers) need to have ongoing access to all these data sources. Linkages across sources would also be ideal. Initiatives that can house and steward multiple data sources and create linkages would therefore greatly assist in monitoring children's mental health. The BC Data Innovation Program is an example of beginning to address this need.[34]

But for this shortlist of suggested public data sources, given their limitations, estimates should be always normed against findings from high-quality epidemiological studies on child mental disorder prevalence and service gaps in large population-based/probabilistic samples — because most children with mental disorders

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are not reached by existing services.[4] Direct "crosswalks" between public data and epidemiological studies are likely not feasible, given differing methods and population foci. Yet epidemiological studies can provide benchmarks. For example, population estimates of the number of children with mental disorders — and who therefore need treatment — at any given time in BC can be compared to numbers of children actually accessing mental healthcare (using BCFPI and MSP data) — enabling calculation of service gaps and planning for the needed increases in treatment capacity.

4.2 Conclusions

Improving children's mental health requires comprehensive population monitoring of determinants, status and service use across all age groups, from infancy through late adolescence, to assess public investments aimed at better meeting the needs. To inform policy efforts, we conducted an audit of public data sources with potential application for children's mental health monitoring in BC, in conjunction with epidemiological studies.

We found 25 data sources — 11 covering mental health determinants or status, and 14 providing mental health service-based administrative data, including on prevention programs. Several sources show promise:

1) For determinants and status, Canada Census and BC Education data (covering all ages), the EDI and MDI (covering early and middle childhood), and the CCHS, HBSC and McCreary Adolescent Health surveys (covering adolescents); and
2) For interventions and services, BCFPI combined with BC MSP diagnoses from fee-for-service practitioners, each of which provide data on mental healthcare services encounters for children of all ages.

None of these sources is adequate alone, however. They therefore should be used in aggregate — and benchmarked against rigorous epidemiological data on both prevalence and service use in the population. For example, combining BCFPI and MSP data can give a picture of children receiving mental healthcare, which can then be compared to population estimates — informing planning to address the service gaps.

Children's mental health monitoring is also just one component of a comprehensive population health strategy for children's mental health. Such a strategy includes:

1) Addressing social determinants and reducing avoidable childhood adversities that contribute to the development of mental health problems;
2) Providing effective prevention programs for children before disorders arise;
3) Providing effective treatments for all children with disorders; and
4) Monitoring needs and outcomes across the population.

Vigorous central leadership is required to ensure that such a plan is sustained over time, coordinated across all relevant sectors within government, and accompanied by adequate and dedicated children's mental health budgets. BC's children will benefit, as will everyone, if their mental health is made a high public policy priority. A monitoring system can contribute to this aim by enabling ongoing assessment and reporting on public investments designed to help all children flourish.

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if their mental health is made a high public policy priority.

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