

Creating Comprehensive Children's Mental Health Indicators for British Columbia

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ABSTRACT

Canada urgently requires a population health approach to children's mental health—promoting health and preventing disorders, in addition to providing treatment. Underpinning this approach, indicators could enable population monitoring, thereby informing ongoing public investments. To investigate potential indicators for British Columbia, we developed a comprehensive population health framework, established selection guidelines, reviewed data sources, and identified sample indicators. While 15 survey and administrative sources yielded 90 indicators, there were significant imbalances in coverage of the framework. To create truly comprehensive children's mental health indicators, we therefore recommend collecting new data, enhancing existing data sources, and evaluating existing programs.

Keywords: children's mental health, population health, public policy, public data, indicators, monitoring

RÉSUMÉ

En matière de santé mentale des enfants, il est urgent que le Canada se dote d'une approche axée sur la santé de la population si nous voulons favoriser la santé et prévenir les problèmes en plus d'offrir des traitements. Cette approche devrait s'appuyer sur des indicateurs qui permettraient de faire un suivi de la santé de la population, et donc de guider les investissements publics en cours. Dans cette étude, dans le but de suggérer de tels indicateurs pour la Colombie-Britannique, nous avons conçu un cadre visant à donner une vue d'ensemble de la santé de la population, élaboré des lignes directrices pour le choix des indicateurs, évalué des sources de données et déterminé des indicateurs possibles. Nous avons ainsi retenu 15 enquêtes

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et autre sources gouvernementales de données à partir desquelles il est possible de recueillir 90 indicateurs. Toutefois, à cause des disparités entre ces sources, il est impossible de répondre intégralement aux critères de notre cadre. C'est pourquoi nous recommandons la cueillette de nouvelles données, l'amélioration des sources de données qui existent déjà et l'évaluation des programmes en place.

Mots clés : santé mentale des enfants, santé de la population, politiques publiques, données publiques, indicateurs, suivi

Mental health—or social and emotional well-being—is fundamental to human development and essential for all children to flourish. Yet at any given time, an estimated 14% of children (or 800,000 in Canada) experience mental disorders causing significant symptoms and impairment (Waddell, Offord, Shepherd, Hua, & McEwan, 2002). Exacerbating matters, clinical treatment services still reach fewer than 25% of these children despite substantial public investments in health care (Canadian Institute for Health Information, 2010; Waddell et al., 2002). Meanwhile, there are almost no investments in programs that could address determinants and prevent problems (Waddell, McEwan, Peters, Hua, & Garland, 2007). Consequently, mental disorders unnecessarily persist throughout the lifespan, with adverse outcomes ranging from reduced educational and occupational chances to increased mortality (Boyle & Georgiades, 2010; Fergusson, Horwood, & Ridder, 2005; Jokela, Ferrie, & Kivimaki, 2009). The associated economic burden is now estimated to exceed \$51 billion in Canada annually, urgently underscoring the need to better address mental health starting in childhood (Lim, Jacobs, Ohinmaa, Schopflocher, & Dewa, 2008).

To address children's mental health adequately, a new comprehensive population health approach is needed—promoting healthy development for all children and preventing disorders in children at risk, in addition to providing effective treatment for children with established problems and disorders (Waddell, McEwan, Shepherd, Offord, & Hua, 2005). Attending solely to any one of these promotion, prevention, or treatment components will not be sufficient to meet mental health needs, as evidenced by the current Canadian experience of investing mainly in treatment (Boyle & Georgiades, 2010; Waddell, Shepherd, & McLaughlin, 2008). Ongoing monitoring, underpinning a population health approach, is crucial for tracking our collective progress towards improving all children's lives (Ben-Arieh, 2008a; Junek, 2012; Moore & Theokas, 2008; Mrazek, Biglan, & Hawkins, 2004). Essential population health monitoring functions include identifying health needs in the population, evaluating existing public investments, and informing new investments to improve outcomes. Strategically, monitoring could also raise public awareness about the importance of children's mental health—understanding that “what gets counted, counts”—as is being done with early child development (ECD) (Hertzman & Williams, 2009, p. 68).

Ideally for population monitoring, rigorous and repeated cross-sectional epidemiologic surveys would capture essential information on children's mental health status and determinants including trends, disparities, and access to interventions over time. Other wealthy countries conduct such surveys (Jenkins et al., 2009). However, Canada's two high-quality child mental health surveys—the 1983 Ontario Child Health Survey (OCHS) and the 1992 Quebec Child Mental Health Survey—have not been repeated, largely because of financial constraints (Boyle et al., 1987; Breton et al., 1999; Offord et al., 1987). As a result, Canada cur-

rently lacks a coherent approach to population monitoring as a crucial platform for improving children's mental health.

In the absence of new surveys, indicators derived from existing public data sources could potentially enable population monitoring for children's mental health. An indicator is simply "a measure that summarizes information relevant to a particular phenomenon, or a reasonable proxy for such a measure" (Jenkins, 1990, p. 501). Indicators have been widely hailed as a means of spurring policy change on behalf of children (Ben-Arieh, 2008a, 2008b; Junek, 2012; Moore & Theokas, 2008; Moore, Vandivere, Atienza, & Thiot, 2008). There are also ample public data in Canada, collected for other purposes but potentially available for secondary analysis and indicator development (Black, McGrail, Fooks, Baranek, & Maslove, 2005). Furthermore, Canadian policy-makers have repeatedly suggested that they would welcome children's mental health indicators (Junek, 2012).

While they are neither specific nor comprehensive regarding children's mental health, there are nevertheless several encouraging models for indicator development in Canada. The Manitoba Centre for Health Policy routinely gathers administrative data and tracks measures of children's health and development, including the prevalence of autism spectrum disorders (ASD) and attention-deficit/hyperactivity disorder (ADHD) (Brownell et al., 2008). The Human Early Learning Partnership in British Columbia and the Offord Centre for Child Studies in Ontario and other provinces use the Early Development Instrument (EDI) to regularly survey the school readiness of young children (Janus et al., 2007; Janus & Offord, 2007; Kershaw, Anderson, Warburton, & Hertzman, 2009). There have also been previous agreements between all levels of government to monitor ECD outcomes (Government of Canada, 2007). Meanwhile, the Canadian Institute for Health Information routinely monitors children's health care indicators, primarily drawing on provincial/territorial administrative data regarding physician and hospital services (Canadian Institute for Health Information, 2010). The robustness of these efforts strongly suggests that creating children's mental health indicators should be feasible.

Given our overarching goal of advancing a population health approach to children's mental health, we aimed to explore whether comprehensive indicators could be derived from existing public data sources. Indicators are particularly germane for provinces/territories, where most health and social programs are administered. Therefore we specifically aimed to determine whether children's mental health indicators could be created to fulfill essential population monitoring functions for the province of British Columbia.

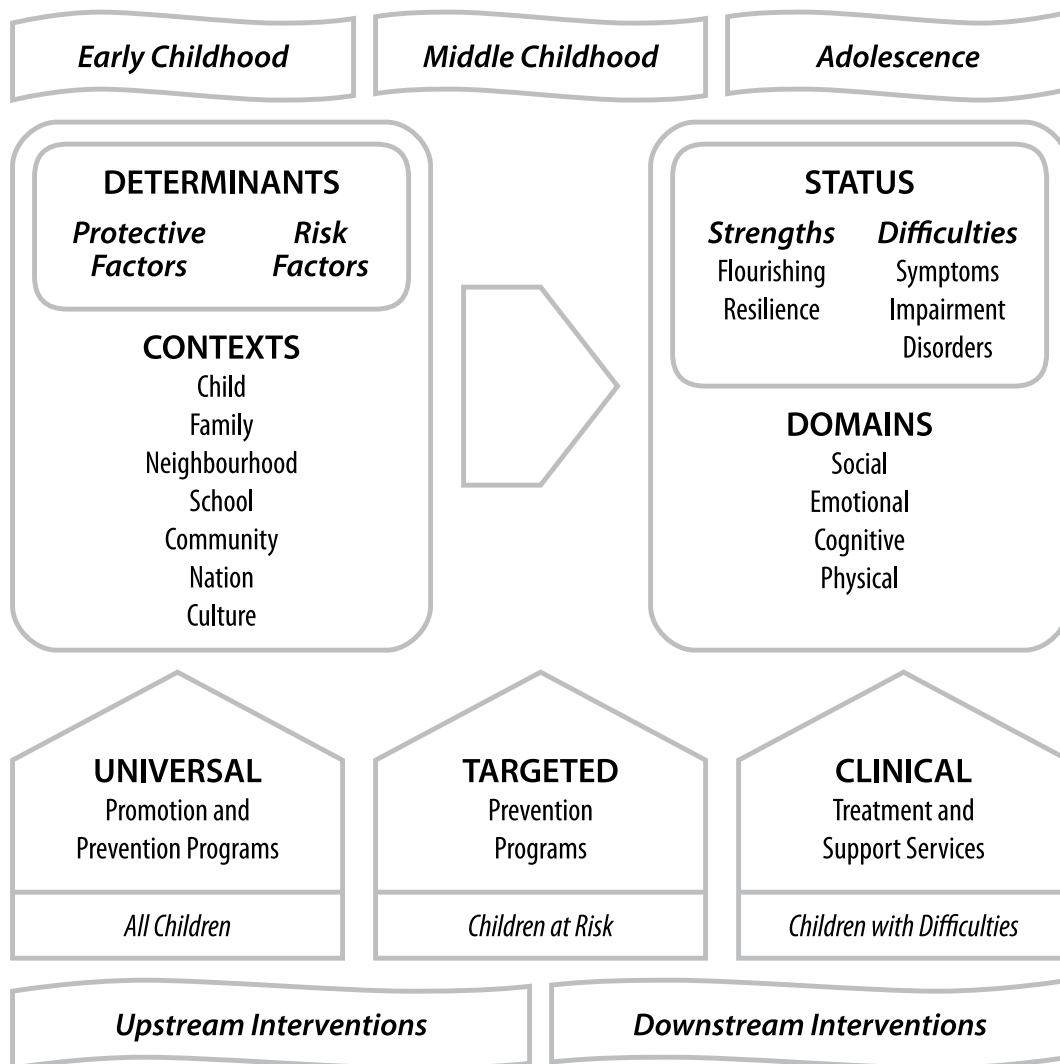
APPROACH

We began by consulting with B.C. policy-makers on the potential applications of indicators through a longstanding research-policy partnership in children's mental health (Waddell, Shepherd, & Barker, 2007). We then developed a comprehensive conceptual framework: to capture information on all the relevant aspects of children's mental health, and to ensure that indicator development was not driven by data availability. We also established guidelines to ensure a parsimonious selection of indicators, based on policy-makers' advice that this would enhance usefulness. Following this, we reviewed available data sources to identify sample indicators that could be mapped onto the population health framework.

Population Health Framework

A population health approach for children’s mental health—promoting health and preventing disorders, in addition to providing treatment—requires a correspondingly broad framework encompassing concepts central to the social and emotional well-being of the entire population of children. Therefore we propose a comprehensive framework that covers: major developmental stages; determinants and contexts; mental health status and related developmental domains; and a wide range of intervention approaches. This framework is depicted in Figure 1.

Figure 1
Population Health Framework for Children’s Mental Health Indicators



The framework first incorporates the full continuum of *developmental stages*—from early childhood (starting prenatally) through middle childhood and adolescence—because each constitutes a distinct period with lasting consequences. For example, certain mental disorders tend to emerge at particular stages: ASD and ADHD during early childhood; anxiety disorders during middle childhood; and depression, substance abuse, and psychotic disorders during adolescence. Limiting the framework to just one or two stages would omit important developmental implications specific to each of these disorders.

The framework next incorporates *determinants* of mental health and disorder. Child development constitutes a highly dynamic process, entailing multiple interactions among individual and environmental factors occurring over time (Rutter, 2009). Within this process, mental health and disorder are thought to arise from the interplay of causal protective and risk factors (Essex et al., 2006; Rutter, 2009; Shanahan, Copeland, Costello, & Angold, 2008). While scientific evidence is still emerging on protective factors, several risk factors are now well established, including exposure to child maltreatment and to parental mental disorder (Essex et al., 2006; Shanahan et al., 2008). Protective and risk factors in turn occur within a series of contexts, from the proximal (child, family, neighbourhood, school) to the distal (community, culture, nation) (Boyle & Lipman, 2002; Earls & Carlson, 2001). These contexts are also captured in the framework.

Mental health status follows determinants in the framework. We propose starting with *strengths*—defined as *flourishing*, or thriving commensurate with potential, and *resilience*, or thriving despite adversity. Resilience has been well characterized in the developmental psychopathology literature, but there is still no consensus on defining and measuring positive concepts of children's social and emotional well-being (Moore & Theokas, 2008; Pollard & Lee, 2003; Rutter, 2006). Therefore we propose flourishing in supportive conditions as a counterpart to resilience in adverse circumstances. We also propose including *difficulties*, namely symptoms, impairment, and disorders. These constructs have been well characterized in the child psychiatric epidemiology literature, albeit with some persistent measurement challenges (Boyle & Georgiades, 2010; Winters, Collett, & Myers, 2005). In the framework, strengths and difficulties are then situated within developmental *domains*. For children's mental health, the social and emotional domains predominate, while the cognitive and physical are also recognized as integral to development.

Finally, for policy salience, the framework is grounded in the continuum of *interventions*—from *upstream* (promoting health and preventing disorders) through *downstream* (treating problems and minimizing their impact). Within this continuum, universal promotion and prevention programs aim to modify determinants for all children, targeted prevention programs aim to modify determinants for children at risk, and clinical treatment and support services aim to modify status for children with established difficulties (Mrazek & Haggerty, 1994; Offord, Kraemer, Kazdin, Jensen, & Harrington, 1998).

Indicator Selection Guidelines

A broad framework has the potential to encourage a proliferation of indicators. Therefore we developed the guidelines to ensure a relatively parsimonious selection of indicators. In particular, we suggest that indicators need to be meaningful and actionable from both policy and research perspectives. From a policy perspective, meaningful indicators are arguably those that are conceptually coherent and relevant to public policy goals (Ben-Arieh, 2008b). To be actionable, they should also reflect variables that can actually be modified through public interventions. At the same time, from a research perspective, meaningful indicators

should ideally reflect the best available research evidence to provide some assurance that measures are reliable and valid (Jenkins, 1990). Then to be actionable from a research perspective, data should be accessible on an ongoing basis, permitting measurement and reporting at repeated intervals, thereby facilitating population monitoring over time. Figure 2 depicts proposed guidelines for indicator selection based on these principles. When in doubt, guidelines were interpreted liberally to maximize the potential indicators available for this exploratory exercise.

Figure 2
Selection Guidelines for Children’s Mental Health Indicators

	<i>Policy Perspective</i>	<i>Research Perspective</i>
<i>Meaningful</i>	Indicator is conceptually coherent to policy-makers and relevant to public policy goals	Indicator reflects research evidence on reliable and valid measures of determinants and status
<i>Actionable</i>	Indicator reflects a variable that can be modified through public policy interventions	Indicator is derived from accessible public data that permit ongoing measurement and reporting

Data Sources and Sample Indicators

We identified all Canada-wide and B.C.-specific survey and administrative public data sources relevant to children’s mental health—by scanning websites, then approaching data stewards to confirm scope, methods, measures, and access procedures. Next, applying the selection guidelines, we selected preliminary indicators from each data source, accessed the data, and verified that each indicator could be measured (from either Canada-wide or B.C.-specific sources) over multiple time points and for all regions of the province. From this we derived a shortlist of suitable data sources and sample indicators. Finally, we mapped the sample indicators onto the various components of the population health framework to assess comprehensiveness of coverage.

FINDINGS

Data Sources

Following the approach outlined above, we identified 15 Canada-wide or B.C.-specific data sources suitable for deriving children’s mental health indicators. These include 6 sources of survey and administrative data managed by Statistics Canada: Canada Census; National Longitudinal Survey of Children and Youth (NLSCY); Canadian Community Health Survey (CCHS); Uniform Crime Reporting Survey (UCRS); Youth

Court Survey; and Corrections Key Indicator Report (CKIR). The other 9 sources of survey and administrative data are managed by a variety of B.C. stewards: Medical Services Plan (MSP); Discharge Abstract Database (DAD); Brief Child and Family Phone Interview (BCFPI); Vital Statistics; PharmaNet; Education Data; Early Development Instrument (EDI); Adolescent Health Survey (AHS); and Socio-Economic Profiles. Tables 1 and 2 describe these 15 sources.

As Tables 1 and 2 illustrate, there was considerable variation in scope and accessibility across the data sources. This is not surprising given that different sources generated data for different purposes. Regarding scope, coverage ranged from information on the entire child population to information on children receiving specialized services (e.g., youth justice, mental health, special education, child protection). All ages were represented, but middle childhood somewhat less so than early childhood and adolescence. Regarding accessibility, data were obtainable over two or more time points from each of the 15 sources. However, some had stringent access procedures resulting in significant delays (e.g., 2 or more years for MSP data), confirming previous observations that many data sources are available but few are easily accessible (Black et al., 2005). As well, some sources only made aggregate data available, while individual data are preferable for comparing data across sources and for generating specific indicators.

Data quality also varied enormously across the 15 sources. For surveys, it is crucial that the sample be representative. At one end of the spectrum, Statistics Canada used probability sampling to ensure representation of the entire population in the Census, and to represent the majority of the population in the NLSCY and CCHS (albeit excluding residents of Aboriginal reserves, military bases, and institutions). Then within B.C., Vital Statistics covered the entire population, while the EDI covered all children attending kindergarten in public, independent, or Aboriginal schools (home-schooled children were excluded). Conversely, at the other end of the spectrum, the AHS was still striving to be representative.

Then, regarding administrative data, most sources covered the entire population within their defined catchments. The one exception was the newly adopted BCFPI, with variable implementation across B.C. However, administrative catchments for most sources were narrowly defined as children receiving specialized services, with little information on the appropriateness or effectiveness of those services. Meanwhile, some surveys adopted new measures as these became available over time (e.g., NLSCY, CCHS), whereas some administrative sources retained outdated measures (e.g., diagnostic criteria used by MSP). Almost all sources relied on single informants, even though the assessment of children's symptoms and impairment is greatly improved by reports from multiple informants (Boyle et al., 1987). As well, there was little overlap across sources, and as a result it was difficult to corroborate indicators. Nevertheless the NLSCY, EDI, and BCFPI were all notable for deriving their measures from rigorous epidemiologic scales originally developed for OCHS (Cunningham, Boyle, Hong, Pettingill, & Bohaychuk, 2009; Janus & Offord, 2007; Willms, 2002).

Sample Indicators

Applying the selection guidelines, 90 sample indicators were derived from the 15 data sources and mapped onto the population health framework for children's mental health. Sample indicators are depicted in Tables 3 and 4, with applicable framework components noted for each. Table 5 then summarizes the indicators available for populating the major framework components (*determinants, status, and interventions*) across the major *developmental stages*.

Table 1
Canada-Wide Data Sources for Children's Mental Health Indicators

#	Source	Description
1	<i>Canada Census</i> Statistics Canada	<ul style="list-style-type: none"> • Census of the population with detailed data collected from random 20% sample (indicators derived from detailed data only) • Data collected from parents or caregivers every 5 years since 1956, participation made voluntary as of 2011 • Representative of all children 0–18 years (and adults) in private households (excluding institutions) • Individual data available as well as aggregate data at various contextual levels (e.g., neighbourhoods, health regions, provinces/territories)
2	<i>National Longitudinal Survey of Children and Youth</i> Statistics Canada	<ul style="list-style-type: none"> • Survey of early child development based on Ontario Child Health Survey scales (indicators derived from cross-sectional component only) • Data collected from parents or caregivers every 2 years since 1994, replaced by the Survey of Young Canadians as of 2010 • Representative of all children 0–5 years in private households (excluding institutions, Aboriginal reserves, military bases, and territories) • Individual data available as well as aggregate data at various contextual levels (e.g., neighbourhoods, health regions, provinces/territories)
3	<i>Canadian Community Health Survey</i> Statistics Canada	<ul style="list-style-type: none"> • Survey of adolescent (and adult) health • Data collected from children (and adults) every 2 years from 2000 to 2007 and annually since 2007 • Representative of all children 12–18 years (and adults) in private households (excluding institutions, Aboriginal reserves, and military bases) • Individual data available as well as aggregate data at various contextual levels (e.g., neighbourhoods, health regions, provinces/territories)
4	<i>Uniform Crime Reporting Survey</i> Statistics Canada	<ul style="list-style-type: none"> • Administrative data on all criminal incidents reported to police • Data collected from police monthly from since 1962; more detailed incident-based data gathered since 1988 • Includes all children 0–18 years (and adults) involved in incidents reported to police • Aggregate data available for police jurisdictions
5	<i>Youth Court Survey</i> Statistics Canada	<ul style="list-style-type: none"> • Administrative data on all criminal charges and convictions, under the Young Offenders' Act until 2003, Youth Criminal Justice Act since 2003 • Data collected from court staff annually since 2000 • Includes all children 12–17 years appearing in court • Aggregate data available for provinces/territories
6	<i>Corrections Key Indicator Report</i> Statistics Canada	<ul style="list-style-type: none"> • Administrative data on all children (and adults) on probation or incarcerated • Data collected from corrections staff monthly since 1985 • Includes all children 12–18 years (and adults) on probation or incarcerated • Aggregate data available for provinces/territories

Table 2
B.C.-Specific Data Sources for Children's Mental Health Indicators

#	Source	Description
1	<i>Medical Services Plan</i> Ministry of Health	<ul style="list-style-type: none"> • Administrative data on fee-for-service physician contacts and diagnoses (using International Classification of Diseases [ICD] 9th Edition) • Data collected from physicians continuously since 1985 (excluding ~10% of physicians remunerated through alternative payment programs) • Includes all children 0–18 years (and adults) receiving fee-for-service physician services in the community or in hospitals • Individual data available as well as aggregate data at various contextual levels (e.g., neighbourhoods, health regions, province)
2	<i>Discharge Abstract Database</i> Ministry of Health	<ul style="list-style-type: none"> • Administrative data on hospital discharges and diagnoses (using ICD 10th Edition) • Data collected from physicians continuously since 1985 • Includes all children 0–18 years (and adults) receiving hospital services (including day procedures but excluding emergency room visits) • Individual data available as well as aggregate data at various contextual levels (e.g., health regions, province)
3	<i>Brief Child and Family Phone Interview</i> Ministry of Children and Family Development (MCFD)	<ul style="list-style-type: none"> • Administrative data on MCFD community mental health intake assessments based on Ontario Child Health Survey (OCHS) scales • Data collected from children, parents, or teachers continuously since 2005 • Includes most children 6–18 years referred to MCFD community mental health services (implementation varies region to region) • Individual data available as well as aggregate data at various contextual levels (e.g., MCFD regions, province)
4	<i>Vital Statistics</i> Ministry of Health	<ul style="list-style-type: none"> • Census of all deaths (including causes) registered in British Columbia (B.C.) • Data collected from physicians and coroners continuously since 1985 • Includes all children 0–18 years (and adults) who have died • Individual data available as well as aggregate data at various contextual levels (e.g., health regions, province)
5	<i>PharmaNet</i> Ministry of Health	<ul style="list-style-type: none"> • Administrative data on prescriptions dispensed in the community • Data collected from pharmacists continuously since 1996 • Includes all children 0–18 years (and adults) receiving prescriptions • Individual data available as well as aggregate data at various contextual levels (e.g., health regions, province)
6	<i>Education Data</i> Ministry of Education	<ul style="list-style-type: none"> • Administrative data on student assessments (Grades 4, 7, 10–12), high school completion, and special education enrollment • Data collected from school staff annually since 1995 (including public, independent, and Aboriginal schools) • Includes all children 5–18 years in kindergarten through Grade 12 (excluding ~10% of students who do not complete assessments) • Individual data available as well as aggregate data at various contextual levels (e.g., schools, school districts, province)

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Table 2
(continued)

#	Source	Description
7	Early Development Instrument Human Early Learning Partnership	<ul style="list-style-type: none"> • Survey of early child development based on OCHS scales • Data collected from teachers every 3 years in most schools since 2001, annually in all schools since 2009 • Includes all children 5–6 years enrolled in kindergarten (including public, independent, and Aboriginal schools) • Individual data available as well as aggregate data at various contextual levels (e.g., neighbourhoods, health regions, province)
8	Adolescent Health Survey McCreary Centre Society	<ul style="list-style-type: none"> • Survey of adolescent development • Data collected from children every 5 years in most high schools since 1992 (2008 survey reached ~90% of students) • Includes most children 12–18 years in Grades 7–12 (excluding independent and Aboriginal schools) • Individual data available as well as aggregate data at various contextual levels (e.g., health regions, province)
9	Socio-Economic Profiles BC Stats	<ul style="list-style-type: none"> • Community profiles compiled from Canada Census and various B.C. government data sources (indicators derived from B.C. sources only) • Data compiled annually • Includes all children 0–18 years (and adults) living in B.C. • Aggregate data available for school districts and local health areas

As Tables 3 and 4 demonstrate, existing public data could be used to generate an array of indicators relevant to children's mental health. Regarding Canada-wide sources, the large Statistics Canada surveys (the Census, NLSCY, and CCHS) yielded 36 indicators of *determinants* (mainly risk factors such as low family socio-economic status or unsafe neighbourhoods) and *status* (mainly difficulties such as symptoms of mental disorders). Meanwhile youth justice administrative data yielded 8 indicators of determinants, status, and downstream *interventions*. Many indicators of determinants depicted the family *context*, reflecting the focus of data collection. Notably, however, data from the Census, NLSCY, and CCHS may be aggregated to multiple levels of measurement, thereby permitting comparisons across other contexts of interest for population health monitoring, such as neighbourhoods.

Turning to the B.C.-specific sources, administrative data yielded 35 indicators almost exclusively depicting *status* (mainly difficulties such as symptoms or diagnoses of mental disorders) or downstream *interventions*. Meanwhile, the EDI, AHS, and Vital Statistics surveys yielded 11 indicators of status (namely development in kindergarten and high school, as well as child deaths). The EDI and Education Data were most notable for capturing strengths—healthy development in kindergarten, subsequent academic achievement, and high-school completion. Indicators of *determinants* from B.C.-specific sources typically depicted the family and school *contexts*, but many of these data could also be aggregated to multiple contextual levels.

Table 3
Sample Children's Mental Health Indicators: Canada-Wide Data Sources

Source	#	Sample indicator	Applicable framework component				Context or domain
			Stage	Major component	Minor component		
<i>Canada Census</i>	1	% 0-18y whose parent has a university degree	All ages	Determinants	Protective	Family	
	2	% 0-18y where neither parent employed in past year	All ages	Determinants	Risk	Family	
	3	% 0-18y living in low-income households	All ages	Determinants	Risk	Family	
	4	% 0-18y living in lone-parent families	All ages	Determinants	Risk	Family	
	5	% 0-18y where neither parent completed high school	All ages	Determinants	Risk	Family	
	6	% 0-18y whose parents are teens	All ages	Determinants	Risk	Family	
	7	% 0-18y not living with parents	All ages	Determinants	Risk	Family	
	8	% 0-18y who are parents	All ages	Determinants	Risk	Family	
	9	% 0-18y living in rental housing	All ages	Determinants	Risk	Neighbourhood	
<i>National Longitudinal Survey of Children and Youth</i>	10	% 0-5y with positive & consistent parenting	Early childhood	Determinants	Protective	Family	
	11	% 0-5y living in cohesive neighbourhoods	Early childhood	Determinants	Protective	Neighbourhood	
	12	% 0-5y with ineffective parenting	Early childhood	Determinants	Risk	Family	
	13	% 0-5y whose parent is depressed	Early childhood	Determinants	Risk	Family	
	14	% 0-5y whose parent binge drinks	Early childhood	Determinants	Risk	Family	
	15	% 0-5y whose parent has an impairing condition	Early childhood	Determinants	Risk	Family	
	16	% 0-5y whose parent was a teen at time of birth	Early childhood	Determinants	Risk	Family	
	17	% 0-5y whose parent worries about money	Early childhood	Determinants	Risk	Family	
	18	% 4-5y experiencing events causing worry/sadness	Early childhood	Determinants	Risk	Family	
	19	% 0-5y living in unsafe neighbourhoods	Early childhood	Determinants	Risk	Neighbourhood	
	20	% 3-5y who frequently exhibit positive behaviours	Early childhood	Status	Strengths	Social	
	21	% 0-5y in good or excellent physical health	Early childhood	Status	Strengths	Physical	
	22	% 2-5y with behaviour problems	Early childhood	Status	Difficulties	Social	
	23	% 2-5y with emotional problems	Early childhood	Status	Difficulties	Emotional	
	24	% 2-5y with attention/hyperactivity problems	Early childhood	Status	Difficulties	Cognitive	
	25	% 3-5y with developmental delays	Early childhood	Status	Difficulties	Cognitive	

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Table 3
(continued)

Source	#	Sample indicator	Applicable framework component			
			Stage	Major component	Minor component	Context or domain
<i>Canadian Community Health Survey</i>	26	% 12–18y with good social & emotional supports	Adolescence	Determinants	Protective	Family
	27	% 12–18y reporting positive social interactions	Adolescence	Status	Strengths	Social
	28	% 12–18y in good or excellent mental health	Adolescence	Status	Strengths	Social
	29	% 12–18y satisfied with life	Adolescence	Status	Strengths	Emotional
	30	% 12–18y in good or excellent physical health	Adolescence	Status	Strengths	Physical
	31	% 12–18y with alcohol abuse/dependence symptoms	Adolescence	Status	Difficulties	Social
	32	% 12–18y using cannabis weekly or more	Adolescence	Status	Difficulties	Social
	33	% 12–18y with drug abuse/dependence symptoms	Adolescence	Status	Difficulties	Social
	34	% 12–18y with depressive symptoms	Adolescence	Status	Difficulties	Emotional
	35	% 12–18y diagnosed with a mood disorder	Adolescence	Status	Difficulties	Emotional
<i>Uniform Crime Reporting Survey</i>	36	% 12–18y diagnosed with an anxiety disorder	Adolescence	Status	Difficulties	Emotional
	37	Community crime rates	All ages	Determinants	Risk	Community
<i>Youth Court Survey</i>	38	% 0–18y who are victims of violent crimes	All ages	Determinants	Risk	Community
	39	% 12–18y charged with non-violent crimes	Adolescence	Status	Difficulties	Social
<i>Corrections Key Indicator Report</i>	40	% 12–18y charged with violent crimes	Adolescence	Status	Difficulties	Social
	41	% 12–17y convicted of non-violent crimes	Adolescence	Status	Difficulties	Social
<i>Corrections Key Indicator Report</i>	42	% 12–17y convicted of violent crimes	Adolescence	Status	Difficulties	Social
	43	% 12–18y on probation	Adolescence	Intervention	Clinical	–
	44	% 12–18y incarcerated	Adolescence	Intervention	Clinical	–

Table 4
Sample Children's Mental Health Indicators: B.C.-Specific Data Sources

Source	#	Sample indicator	Applicable framework component				Context or domain
			Stage	Major component	Minor component		
Medical Services Plan	1	% 0–18y diagnosed with behaviour disorders	All ages	Status	Difficulties	Social	
	2	% 0–18y diagnosed with substance use disorders	All ages	Status	Difficulties	Social	
	3	% 0–18y diagnosed with anxiety disorders	All ages	Status	Difficulties	Emotional	
	4	% 0–18y diagnosed with depressive disorders	All ages	Status	Difficulties	Emotional	
	5	% 0–18y diagnosed with attention disorders	All ages	Status	Difficulties	Cognitive	
	6	% 0–18y diagnosed with developmental delays	All ages	Status	Difficulties	Cognitive	
	7	% 0–18y diagnosed with psychotic disorders	All ages	Status	Difficulties	Cognitive	
	8	% 0–18y visiting family doctors for mental disorders	All ages	Intervention	Clinical	–	
	9	% 0–18y visiting pediatricians for mental disorders	All ages	Intervention	Clinical	–	
	10	% 0–18y visiting psychiatrists	All ages	Intervention	Clinical	–	
	11	# family doctor visits for mental disorders 0–18y	All ages	Intervention	Clinical	–	
	12	# pediatrician visits for mental disorders 0–18y	All ages	Intervention	Clinical	–	
	13	# psychiatrist visits 0–18y	All ages	Intervention	Clinical	–	
Discharge Abstract Database	14	% 0–18y hospitalized for psychiatric care	All ages	Intervention	Clinical	–	
	15	# psychiatric hospitalizations 0–18y	All ages	Intervention	Clinical	–	
Brief Child and Family Phone Interview	16	% 6–18y demonstrating positive behaviours & affect	Middle/Adolescence*	Status	Strengths	Social	
	17	% 6–18y with repetitive behaviours/impulses	Middle/Adolescence*	Status	Difficulties	Emotional	
	18	% 6–18y with preoccupations with weight	Middle/Adolescence*	Status	Difficulties	Social	
	19	% 6–18y exhibiting suicide risk	Middle/Adolescence*	Status	Difficulties	Emotional	
	20	% 6–18y with delusions or hallucinations	Middle/Adolescence*	Status	Difficulties	Cognitive	
	21	% 6–18y with social & academic impairment	Middle/Adolescence*	Status	Difficulties	Social	
	22	% 6–18y with developmental delays	Middle/Adolescence*	Status	Difficulties	Cognitive	
	23	% 6–18y referred to community mental health	Middle/Adolescence*	Intervention	Clinical	–	
Vital Statistics	24	% 0–18y dying of suicide	All ages	Status	Difficulties	Emotional	
	25	% 0–18y dying of any cause	All ages	Status	Difficulties	Physical	

... continued

Table 4
(continued)

Source	#	Sample indicator	Applicable framework component				Context or domain
			Stage	Major component	Minor component		
<i>PharmaNet</i>	26	% 0–18y receiving prescriptions for stimulants	All ages	Intervention	Clinical	–	
	27	% 0–18y receiving prescriptions for antidepressants	All ages	Intervention	Clinical	–	
	28	% 0–18y receiving prescriptions for anxiolytics	All ages	Intervention	Clinical	–	
	29	% 0–18y receiving prescriptions for antimanics	All ages	Intervention	Clinical	–	
	30	% 0–18y receiving prescriptions for antipsychotics	All ages	Intervention	Clinical	–	
<i>Education Data</i>	31	% schools where >10% excelled in grades 4 & 7	Middle childhood	Determinants	Protective	School	
	32	% passing standard tests in grades 4 & 7	Middle childhood	Status	Strengths	Cognitive	
	33	% passing provincial exams in grade 10–12	Adolescence	Status	Strengths	Cognitive	
	34	% completing high school	Adolescence	Status	Strengths	Cognitive	
	35	% enrolled in special education programs	Middle/Adolescence*	Intervention	Clinical	–	
<i>Early Development Instrument</i>	36	% 5–6y with social competence	Early childhood	Status	Strengths	Social	
	37	% 5–6y with good communication skills	Early childhood	Status	Strengths	Social	
	38	% 5–6y with emotional maturity	Early childhood	Status	Strengths	Emotional	
	39	% 5–6y with good language & cognitive development	Early childhood	Status	Strengths	Cognitive	
	40	% 5–6y with good physical health	Early childhood	Status	Strengths	Physical	
<i>Adolescent Health Survey</i>	41	% 12–18y reporting physical or sexual abuse	Adolescence	Determinants	Risk	Family	
	42	% 12–18y who considered or attempted suicide	Adolescence	Status	Difficulties	Emotional	
	43	% 12–18y who engaged in self-injuring behaviours	Adolescence	Status	Difficulties	Emotional	
	44	% 12–18y accessing health care when needed	Adolescence	Intervention	Clinical	–	
<i>Socio-Economic Profiles</i>	45	% 0–18y in need of protection	All ages	Status	Risk	Family	
	46	% 0–18y taken into protective care	All ages	Intervention	Clinical	–	

* Counted as middle childhood in Table 5

Table 5
Sample Children's Mental Health Indicators: Summary of All Sources

Stage	Population health framework component							Total
	Determinants		Status		Interventions			
	Protective	Risk	Strengths	Difficulties	Universal	Targeted	Clinical	
All ages	1	11	–	9	–	–	14	35
Early childhood only	2	8	7	4	–	–	–	21
Middle childhood only	1	–	2	6	–	–	2	11
Adolescence only	1	1	6	12	–	–	3	23
Total	5	20	15	31	–	–	19	90

While 90 sample indicators may seem far from parsimonious, Table 5 illustrates that there were still significant imbalances in coverage of the comprehensive population health framework for children's mental health. (Each indicator is counted only once in Table 5, to produce a tally of unique indicators for each framework component.) For *developmental stages*, early childhood and adolescence were better represented than middle childhood, largely because of surveys specifically focusing on early childhood (NLSCY, EDI) or adolescence (CCHS, AHS). For *determinants*, *risk factors* greatly outweighed *protective factors*. Even so, there were few indicators for established risk factors such as child maltreatment. Similarly for *status*, *difficulties* greatly outweighed *strengths*, yet still it was not possible to derive robust indicators of the population prevalence and impact of disorders. The BCFPI did capture robust information on symptoms and impairment, but only for those children referred to selected community mental health agencies. Then regarding *interventions*, multiple indicators could be derived for clinical treatment and other downstream interventions, but indicators reflecting upstream interventions—promotion and prevention programs—were not available from any source. This is concerning because a system of indicators that captures only those children receiving services for established problems cannot provide policy-makers with reliable information on all children in the population, or information on those children not receiving services.

From a population health perspective, it was also striking that indicators of social determinants such as family socio-economic status and neighbourhood cohesion relied almost solely on data from two large Statistics Canada surveys, the Census and NLSCY. However, the detailed form of the Census was recently made voluntary and the Survey of Young Canadians recently replaced the NLSCY (although data from this new survey are not yet available). Both changes may exacerbate the imbalances in framework coverage, rendering it even more difficult to develop a truly comprehensive system of children's mental health indicators.

DISCUSSION

Canada urgently requires a population health approach to children's mental health—promoting health and preventing disorders, in addition to providing treatment. Underpinning this approach, indicators could enable population monitoring, thereby informing ongoing public investments. To investigate potential indicators for British Columbia, we developed a comprehensive population health framework, established selection guidelines, reviewed data sources, and identified sample indicators. While 15 survey and administrative sources yielded 90 indicators, we nevertheless found a patchwork, with significant imbalances in coverage of the comprehensive population health framework.

Survey sources supplied considerable good-quality data, but the most comprehensive of these were undergoing significant changes, while the rest focused on selected segments of the child population. Meanwhile, administrative sources typically covered service populations only, with concurrent concerns about data quality or access (or both) in many cases. No one source permitted the derivation of the full array of indicators needed for population monitoring in children's mental health. Corroboration across sources was also seldom possible. Therefore, losing access to even a few sources could leave the patchwork looking threadbare. Finally, sample indicators were heavily weighted towards risks, difficulties, and “downstream” clinical interventions—likely reflecting the preponderance of current public investments, which have yet to appreciably improve children's mental health outcomes in the population.

We found that while it was feasible to derive children's mental health indicators from existing public data, it was not possible to develop a *comprehensive* system of indicators for B.C. To remedy this situation, three complementary options need to be considered: collecting new data, enhancing existing data sources, and evaluating existing programs.

The first option involves collecting new epidemiologic data on children's mental health. A rigorous and repeated cross-sectional survey in a representative sample in the population would be the ideal way to track children's social and emotional well-being over time. A well-designed survey could cover all components of the comprehensive population health framework, including uptake of effective promotion and prevention programs as well as access to effective treatment services. Launching and maintaining such a survey would be costly. However, the data could be made available through agencies such as Statistics Canada, enabling widespread use by researchers and policy-makers across the country. The costs of a new survey also need to be weighed against the opportunity costs of continuing with the status quo, in which children's mental disorders exact a high toll.

Another promising option involves enhancing existing high-quality data sources. The EDI and the BCFPI provide two notable examples, with researchers actively working to enhance both measures and expand their reach (Boyle et al., 2009; Janus & Offord, 2007). In particular, the EDI is rapidly approaching Canada-wide coverage, with full implementation in most provinces/territories and partial implementation in the rest (Offord Centre for Child Studies, 2010). The latest version of the EDI includes new questions on diagnosed mental disorders in early childhood, which could be used in future waves of B.C. data collection (Human Early Learning Partnership, 2011). The newly created Middle Years Development Instrument will also soon be used to gather B.C. data on social and emotional well-being in middle childhood, following the EDI model (Guhn et al., in press). Meanwhile, the BCFPI has been implemented only in complex

service settings in B.C. and Ontario to date, but it has considerable untapped population-wide potential for tracking symptoms and impairment associated with childhood mental disorders (Boyle et al., 2009). Taken together, the EDI and the BCFPI could also capture data across two important continua: early childhood through adolescence, and well-being through disorder. Building on the momentum of these two measures could arguably be the first step in creating a comprehensive system of children's mental health indicators.

Finally, evaluating existing promotion and prevention programs could be a means of patching the one major gap in available indicators. Numerous ECD programs across Canada currently employ both universal and targeted strategies to promote healthy child development. However, few of these programs have a clear focus on children's mental health, and even fewer have been rigorously evaluated (Waddell, McEwan et al., 2007). Ideally, ECD program outcomes would be evaluated from the outset, following the positive example of Ontario's Better Beginnings, Better Futures (Peters et al., 2010). Evaluations of the rare prevention programs that exist, such as B.C.'s Friends program, would be invaluable as well (Waddell, McEwan et al., 2007). Researchers would need to make evaluation data widely available to enable indicator development. However, clearly tracking the benefits for children, or clearly demonstrating insufficient programming, could help increase public support for new investments in promotion and prevention.

Ongoing population monitoring is a crucial means of tracking our collective progress towards improving the lives of all children. At present, it does not appear feasible to develop a truly comprehensive system of indicators for monitoring children's mental health in B.C. using existing public data. However, it appears possible to remedy this situation by collecting new epidemiologic data, enhancing existing high-quality data sources, and evaluating existing promotion and prevention programs. The potential benefits of undertaking these three options are immense, given that children's mental health is one of the most important investments that any society can make.

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