



Child and Youth Health and Well-Being Indicators Project:
Appendix I—Economic and Material Well-Being
Evidence Review



Office of the
Provincial Health Officer



Canadian Institute
for Health Information

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Evidence Review

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Prepared For
CIHI and the Office of the Provincial Health Officer

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Assessing Concepts and Potential Indicators of Child Health and Well-Being In British Columbia: *Economic & Material Well-being Dimension*

Introduction

Background of the Project

The Office of the Provincial Health Officer (PHO) of British Columbia is working towards generating a suite of core indicators that will inform future “report cards” on the health and well-being of children in British Columbia. The ultimate goal of the initiative will be to identify a limited number of indicators that are both significant to the health and well-being of children and youth and amenable to policy, program, or service interventions.

A total of 264 indicators associated with child health and well-being were identified by an initial working group, partly based on sources identified during background research for this project. This list has been informed by the extensive Canadian work over the last decade on:

- Population-level health indicators (e.g., the *Health Indicators Project* sponsored by Statistics Canada and the Canadian Institute for Health Information)
- Certain indicator inventories with a specific connection to child health (e.g., the *Perinatal Health Indicators for Canada* managed by the Public Health Agency of Canada)
- The well-established research area related to the social determinants of health, especially as they pertain to child health and well-being

The first important analytic step in the project was to create a smaller working list of concepts through an initial relevance filter (the report summarizing this process is reproduced in Annex E-1 of the separate document entitled *Evidence Review Protocol for Assessing Concepts and Indicators*). A major part of the additional analytic work conducted for this project consisted of a refinement of the initial relevance filter by examining in more detail the following four aspects of each concept and/or the indicator(s) related to that concept.

- ***Magnitude***
Proportion of B.C. child/youth population to which concept/indicator applies (considered in terms of an absolute number)
- ***Significance/Impact***
Association between the concept and health and well-being, with an emphasis on the particular dimension or sub-dimension of health and well-being in focus (in the present case, this represents economic and material well-being)

- **Modifiability**
Is the concept/indicator(s) amenable to change through public policy or other intervention?
- **Data Availability/Validity**
Routine availability and quality of information for the component indicator(s) for each concept

The specific project target represented by this report involves understanding the association between 13 selected economic and material well-being concepts and the health and well-being of children. In other words, the series of literature reviews conducted were aimed at finding how **important** and **feasible** a particular concept (e.g., family income, housing conditions, or adequate child care) might be in tracking pediatric health and well-being at a population level. Generally, evaluation of **importance** involved the magnitude and significance/impact categories, whereas **feasibility** involved the modifiability and data availability/quality categories.

Overview of the Report

As already indicated, all the concepts in this report bear some relationship to economic matters; this is consistent with, for example, the report on physical health—all of the concepts/indicators in that instance had a clear connection to physical health. As for the present report, even when it is not explicitly referenced, the income theme may still be detected, for example, the intrinsic connection between housing availability and housing affordability.

The present organizational principle comes across in the sub-dimensions suggested in the table of contents for the report. Again, the categories are slightly different than those proposed by the initial working group for this project. The most notable feature of the indicated sub-dimensions is that they are all related to one or another of the economic/material factors, usually defined as household income coordinated with some concept of poverty; sometimes there is a movement beyond the household per se to some geographical analysis (e.g., community assets such as child care spaces or the availability of outlets selling healthy foods). The final organization for the report is follows:

- Concept of Socioeconomic Status
- Concepts Related Directly to Income
- Concepts Related Indirectly to Income
- Housing-Related Concepts
- Concepts Combining Household and Community Resources

In the present report, emotional, mental, social, and other aspects of well-being will be considered. Thus, while material well-being was the dominant lens when selecting the drivers of overall pediatric well-being, neither physical health nor economic wealth will be the end of the discussion about the outcomes influenced by these drivers. This broader consideration represents the fact that well-being is not only about physical health and income. An important example of this fact is offered by two concepts in this report, receiving social assistance and being employed/unemployed; certainly, both concepts have a direct or indirect connection with income, but the costs of being on assistance or being unemployed are much more than economic for the children involved—they often can include stigma, shame, bullying, depression, etc.

As seen with the physical health dimension, there are many overlaps between concepts, especially between income indicators (in their different formulations) and other concepts/indicators that sometimes double as health outcomes. A good example is provided by food security, a potential indicator in its own right, but also highly correlated with household income. Sometimes the intrinsic link between concepts made it appropriate to treat them as a unit in one chapter, e.g., the three housing-related concepts.

Finally, given the broad scope afforded to the consideration of pediatric outcomes, there will inevitably be some overlap with the other dimensions that make up this project, including mental/emotional health and well-being, social relationships, and cognitive development.

The information required by each evaluation category (magnitude, significance/impact, etc.) called for a specific strategy, as follows.

Often, identifying the latest information on the magnitude (or population prevalence) of a measurement of interest led naturally to understanding the range of data sources available, as well as to how routinely the related statistics were gathered and reported. It is clear that, in order to be useful as an indicator of baseline health and well-being and future progress, population-level information specific to B.C. must be regularly updated through surveys or by mining administrative databases. As the analysis was drawn towards a conclusion, the aim for the key recommendations was to identify the best “off the shelf” indicators that are available for use without delay; secondarily, other indicators may be identified as potentially high priority, but still needing substantial development in terms of data tracking in the context of British Columbia.

The largest volume of work for each concept and its associated indicator(s) involved the significance/impact category of assessment. While the issue of modifiability could have required an equally extensive investigation, the scoping for this already substantial project called for only a high-level evaluation of the degree to which each concept or indicator could be changed by policy or other interventions. Of course, evaluating the evidence for effectiveness of pertinent interventions, and thereby ranking the overall modifiability of a concept/indicator, would be a large exercise unto itself. For the present purposes, the evaluation of how much or how easily a concept could be improved for the sake of child health and well-being in B.C. was established by drawing on the expertise of the review team.

Following the mandate and method laid out in the separate document *Systematic Review Protocol for Assessing Indicators of Child Health and Well-Being*, the central feature of the chapters to follow will be an evidence review of the associations between economic factors and effects on pediatric health and well-being. As described in the aforementioned *Protocol*, the information on the significance/impact of each concept was explored via one of two approaches, according to the availability of literature:

- **Level A search:** Review of systematic reviews (generally dating from 2005-present)
- **Level B search:** Review of primary studies (generally dating from 2000-present)

For certain topics, a systematic approach to finding evidence did not prove at all fruitful; in such cases, more informal search processes were ultimately followed and reported accordingly. Occasionally, the available systematic reviews (or their included studies) were somewhat dated; or, certain subtopics under the concept were found to be not well covered in the identified reviews. In such cases, the plan was to pursue an additional search for updates

in the form of more recent studies. Finally, when deemed to be useful, narrative reviews were consulted, especially in the absence of any systematic reviews.

Each concept chapter begins with a brief section on background and context, followed by (as appropriate) the literature search methodology and summary and discussion of results. Potential data sources for each indicator, the quality and regularity of the data stream, and the most up-to-date population magnitude related to the indicator are all noted. Finally, a conclusion is offered as to the utility of the concept or its component indicators in terms of a measure of child and youth health and well-being and a marker of progress following secular trends or any future public health interventions. Whether or not a concept and at least one associated indicator is recommended for the initial list of core or representative indicators is clearly stated in each case.

For ease of synthesis and comparison, the latter information is summed for each of the four evaluation categories noted above in a tabular form at the end of the report.

Concept/Indicator Assessment Methodology

Each category is assessed using the rubric of “high”, “medium” or “low” utility, as defined in the following grid:

| Key to Summary Assessments by Evaluation Category | | | | |
|--|---|---|--|---|
| | Magnitude <i>Estimated prevalence of affected B.C. children</i> | Significance / Impact <i>Physical and other health effects</i> | Modifiability <i>Expert assessment of prevention potential</i> | Data Availability/Validity <i>B.C.-specific information sources</i> |
| Low | < 19,000 (<2% of total pediatric cohort) | Minimal effects and/or little indication of direct causation | Underlying risk factor not well-identified or not amenable to further prevention | Data not routinely collected and reported |
| Medium | 19,000 - 97,000 (2-10% of total pediatric cohort) | Substantial acute effects or moderate chronic effects; causation still not well-established | Medium Underlying risk factor theoretically amenable to further prevention, but potential interventions not yet proposed in the literature | Medium Data routinely collected but not easily accessible and/or of potentially questionable validity (e.g., mostly self-reported topics with stigma attached) |
| | | | Medium-High Underlying risk factor amenable to prevention, but identified interventions have not been well-tested and/or have shown mixed evidence of effectiveness | Medium-High Data routinely collected via sources based on self-reported information of high validity (e.g., the Census) |
| High | >97,000 (>10% of total pediatric cohort) | Substantial chronic effects and/or elevated mortality; strong evidence, with causation well-established | Underlying risk factor amenable to prevention, and identified interventions have been shown to be effective | Annual data routinely collected and reported via administrative sources or (objective) physical measurement methods |

With respect to the significance/impact assessment category, there are a number of considerations when deciding on a high, medium, or low rating. Generally, a higher rating is dictated by: (i) larger effect sizes for outcomes of greater import (e.g., risk of chronic, disabling conditions, mortality); (ii) confidence about causation (because, for instance, potentially confounding factors have been well controlled); and (iii) strength of evidence at a pediatric population level. On the latter point, evidence of impact becomes progressively weaker when it focuses on a group other than the general pediatric population (such as an at-risk subgroup, or when the affected children reach adulthood and the risk of poor health persists); this caveat does not mean that intervention studies targeting at-risk groups or reports tracking health effects into adulthood are of no importance, just that they are less valuable as population-level evidence than effects that are measured within a general pediatric population.

A second implication is that actual health effects (i.e., incidence, morbidity) are deemed to be more vital in assessing an indicator than any indirect impact involving a risk factor. If a risk factor is considered to be important enough to track, then it is most appropriate for it to be considered in its own right as a concept/indicator in the pediatric population rather than as simply a downstream effect of some other factor. Finally, there is a hierarchy within the range of true health impacts; thus, reduced morbidity (i.e., secondary prevention) is generally less compelling as evidence than reduced incidence (i.e., primary prevention). These sorts of nuances become important when evaluating the power of a candidate indicator as a measure of population health improvements among children.

Further, it is clear from the table above that extra granularity was required in the rating scheme for both modifiability and data availability/validity. As noted above, modifiability of a concept/indicator is being assessed mainly by reviewer expertise rather than by a full examination of the literature. The four levels in this category of assessment allow for distinguishing a high expectation for modifying a concept (given adequate resources) from the situation where there is low potential for further prevention progress *because most or all of the clear and effective approaches have already been applied to a substantial degree*. The two remaining intermediate assessment rankings cover situations where further prevention gains are notionally possible, but information about effective interventions is lacking in some way.

Next, the refined level of assessment for data is due to the inherent unreliability of self-reported information—which, importantly, is the class into which all survey data fall. However, self-reported information is not all created equal; in short, there is a difference between the issue of poor recall and outright dissembling. When the factor in question may be considered a high-stigma topic, there is a certain rate of “reticence” across a population to report accurately; the inaccuracy may be compounded when parents or other “second-party” respondents are asked to report on behalf of their children (however, there may be some instances where parental information may be *more* accurate, as when identifying whether a child has a chronic disease or disability). Data streams based on self-report are generally assessed as having intermediate utility when informing an indicator. The more favourable intermediate category, Medium-High, is reserved for self-reported data related to topics of low or no stigma.

As well as the three main rating levels, sometimes the available information did not allow any clear conclusion; for the purposes of notionally combining the four evaluation categories into an aggregate rating, the weight given to an “Unclear” assessment was equated to that found for “Low.”

While magnitude is also summarized in terms of the same basic rating scale used for the other three categories, it is the one assessment category where a *quantitative* approach was pursued. The following steps were followed (see Annex I-1 for a summary of the details across all the concepts):

1. The best incidence or prevalence information (preferably B.C.-specific, which mostly was achievable) was identified for the most pertinent indicator(s) under each concept.
2. In the case of prevalence data, the absolute number of cases was simply calculated by applying that rate to the pertinent 2010 age cohort (see the table below).

| BC Population by Gender and Age, July 2010 | | | |
|---|----------------|----------------|----------------|
| Age | Male | Female | Total |
| <1 | 22,994 | 21,522 | 44,516 |
| 1 | 23,403 | 21,845 | 45,248 |
| 2 | 23,476 | 22,010 | 45,486 |
| 3 | 22,920 | 21,548 | 44,468 |
| 4 | 22,788 | 21,153 | 43,941 |
| 5 | 22,578 | 21,093 | 43,671 |
| 6 | 22,819 | 21,265 | 44,084 |
| 7 | 22,931 | 21,246 | 44,177 |
| 8 | 22,921 | 21,184 | 44,105 |
| 9 | 23,239 | 21,673 | 44,912 |
| 10 | 23,687 | 22,298 | 45,985 |
| 11 | 24,204 | 22,915 | 47,119 |
| 12 | 24,498 | 23,123 | 47,621 |
| 13 | 25,677 | 23,887 | 49,564 |
| 14 | 26,510 | 25,022 | 51,532 |
| 15 | 27,484 | 25,613 | 53,097 |
| 16 | 27,888 | 26,447 | 54,335 |
| 17 | 28,878 | 27,472 | 56,350 |
| 18 | 30,094 | 28,160 | 58,254 |
| 19 | 32,214 | 29,749 | 61,963 |
| Total | 501,203 | 469,225 | 970,428 |
| Source: Statistics Canada | | | |

3. Incidence data sometimes required an adjustment.
4. As for the balance of the concepts with an incidence measure attached, when there was some reason to believe that the generally more acute health effects were reversible, then incidence was assumed to be the same as the prevalence.

The resulting magnitude figures (and pertinent age ranges) are provided in the summary table in Annex I-1 as well as at the end of each section for the various concepts related to the economic and material well-being dimension.

Five general observations about the assessment process would be useful at this juncture:

- The assessments provided always relate to a *particular* indicator pertinent to a concept. Often, an indicator was selected because magnitude data were in fact available, the totals involved were substantial, and/or it was a high-leverage focus for prevention that was amenable to routine data tracking; in other words, the indicator was poised to be rated reasonably high in terms of utility.
- It was not realistic to make age-standardization adjustments when the underlying prevalence rates were based on a specific age cohort, or to qualify the analysis when the absolute number of cases identified was for a cohort other than the entire 0-19 year age group; these limitations are likely not very critical, since the goal was to make broad quantitative assessments.
- The prevalence estimates are, by definition, not meant to be precise figures but rather a representation of “order of magnitude” information in order to allow comparisons at a high level only.

- The concepts are ordered in an Annex I-1 table based on the prevalence estimate, in order to highlight the effect of that assessment category; again, this has been done for ease of comparison across this one category, not because it is the most important category. By contrast, the summary table provided in the Summary and Conclusion section at the end of the entire report is ordered according to the aggregate rating across all four assessment categories.
- A final assessment category that could provide useful information would be the recent trend related to each indicator of interest, but assembling this information was beyond the scope of the project.

Key Evidence and Data Sources

Similar to the report prepared on the physical health dimension, it is useful to point out the key data sources that would be relied on to populate the majority of indicators for the dimension at hand. Before turning to that topic, additional sources for identifying evidence papers and reports will be briefly introduced here.

Not surprisingly, evidence related to the dimension of physical health largely depended on PubMed, the premiere database of biomedical literature. In order to accommodate the complexity of economic concepts and their effects outside of the realm of physical health, it was determined that additional databases should be searched for applicable reviews and/or studies. A preliminary examination of available databases found that, while PubMed would still be a very important source for this report, the search could be easily and effectively broadened by also including the databases of EBSCO¹ Host (for a variety of peer-reviewed sources) and the National Bureau of Economic Research (for targeted grey literature to augment standard searches in Google). These supplementary databases are outlined below.

EBSCO Host Databases

The EBSCO Host collection includes 50 databases, ranging from general academic literature to more topic-specific sources. It clearly represents a powerful and efficient tool to move beyond typical biomedical sources. Through the integrated utility of EBSCO Host, the databases may be searched individually or in any combination. Because EBSCO includes the Medline database, there would be substantial overlap between EBSCO and PubMed if no selection was applied. However, it was possible to exclude PubMed/Medline and to select specific databases to search out of the entire EBSCO inventory. The following five databases illustrate what is available through EBSCO, all of which proved useful in the context of the present report.

Academic Search Complete

Academic Search Complete is the largest scholarly, multi-disciplinary full-text database in the world. It includes a total of more than 12,600 publications, of which over 11,900 are peer-reviewed journals. Articles from more than 6,800 journals are available in full-text, an important feature given the detailed analysis of any paper identified for the child health and well-being indicator project.

¹ A subscription agency founded in 1944 by Elton Bryson Stephens (hence the EBSCO acronym **E**lton **B** Stephens **C**ompany).

CINAHL

The Cumulative Index to Nursing and Allied Health Literature, or CINAHL, provides full text services for over 600 journals in the fields of nursing and allied health, making it the most comprehensive collection of nursing literature.

EconLit

EconLit is the electronic database of the American Economic Association, covering a wide range of topics related to economics, including health-related economics. It contains over a million records.

Family & Society Studies Worldwide

Family & Society Studies Worldwide is an anthology of four databases providing access to over 1.3 million records between 1970 and the present. It covers research, policy and practice in the fields of Family Science, Human Ecology, Human Development, and Social Welfare, all of which have a bearing on certain concepts in the present report.

PsycINFO

Managed by the American Psychological Association, PsycINFO is the largest resource for peer-reviewed literature in behavioural science and mental health. The database includes articles from 2,400 periodicals from around the world.

National Bureau of Economic Research

An additional source of information used in certain of the following chapters involves the work of the National Bureau of Economic Research (NBER), a private, nonprofit, organization in the U.S. dedicated to performing, promoting, and disseminating economic research across disciplines. NBER was founded in 1920, and since that time the focus of the organization has broadened from pure economic research to ultimately overlap with many other areas of concern; today the research agenda includes a wide range of societal issues, including health and well-being. NBER articles and books can be searched on the organization's website according to keywords such as "socioeconomic."

Key Data Sources

In order to avoid repetition, it is useful to introduce the main sources of data for potential core indicators examined in this report. Two sources, the Canadian Census and the National Longitudinal Study of Children and Youth, both administered by Statistics Canada, were of particular use in the following chapters. An outline of each source is provided below.

The Census

The Canadian Census is conducted every five years; it is designed to collect data from every household in the country, making it one of the largest sources of information on Canadian citizens and society. The first Census was administered in 1871, and the most recent took place on May 16, 2006. The Census collects information on a wide variety of topics. For the purposes of the present report, specific data were used in the chapters on income, parental employment, lone-parent families, and idle youth. Census data also provides the basis for any population totals and calculations involving family structure. It should be noted that the relative infrequency of Census data does limit the usefulness of this source, causing it to be rated as Medium-High rather than High in the assessment that appears in the conclusion to the report. Some proposed changes to the future gathering of Census data may further hamper its utility for any indicator project.

Census information is available from the Statistics Canada website, in the form of official tables, searchable databases, or downloadable files. While many reports are available free of charge, some information must be purchased—though, presumably, different rules would apply for intergovernmental requests. Specific topics are analyzed in more details in occasional Statistics Canada reports; many other investigators and organizations also make use of Census data, and such secondary interpretations have sometimes been consulted for the present project. A great deal of the information provided by BC Stats, for example, is drawn from the Census.

National Longitudinal Study of Children and Youth

Another source of information, managed by Statistics Canada in partnership with Human Resources and Skills Development Canada, is the National Longitudinal Study of Children and Youth (NLSCY). The survey began in 1994, and entails following a cohort of children in terms of their development from birth into early adulthood. The most recent cycle, active between 2008 and 2009, included a total of 35,795 individuals from 0 to 7 and 14 to 25 years old in various longitudinal and cross-sectional samples. Notably, the sample is not drawn from children living on Indian reserves or Crown lands, residents of institutions, full-time members of the Canadian Armed Forces, or residents of some remote regions.

Although the survey is currently labelled as inactive, the structure and content of the NLSCY make it highly pertinent to this report. A significant portion of the NLSCY-based background data used in the following chapters was summarized in a report by the Canadian Council on Social Development, which linked various aspects of child well-being with income.²

² Ross DP and Roberts P. *Income and Child Well-being: A New Perspective on the Poverty Debate*. 1999. Canadian Council on Social Development. Available at <http://www.ccsd.ca/pubs/inckids/index.htm>. Accessed November 2010.

Socioeconomic Status Concept

Children Socioeconomic Status Circumstances

Background and Context

Socioeconomic status (SES), a concept that first appeared in the biomedical literature in the 1940s,³ is now well-established in the analysis of health and well-being around the world. Discussions about SES represent an attempt to think in an integrated way about the main social and economic factors influencing health; sometimes the agenda has included pursuing a combined metric that captures SES in a single number.

Classically, three main component factors have informed SES: income, employment category or type of occupation, and attained educational level. The reason that occupation and education are entrenched in SES goes back to the British roots of the concept. “Social class” has been a dominant analytic category for centuries in that country; furthermore, the idea of social position or status has always been linked to the type of work one pursued. More recently, the definition of “social” has been expanded to reflect the web of relationships that also create an advantage in life; recognition of the benefits of social networks has even spawned a term—social capital—that consciously echoes economic terminology.

Before proceeding to the main task of tracking evidence for a connection between SES circumstances of a child and that child’s health and well-being, it is important to understand the challenges involved with measuring the concept when it is positioned as an indicator.

Measurement of SES

A key measurement issue is whether SES will be assessed at the individual or neighbourhood level. The latter approach is dominant among researchers because SES is difficult to track in individuals, especially in the context of personal health outcomes; in contrast, the classic components of SES are generally available at the neighbourhood level through national census data (which is why a combined SES metric is often referred to as a census-based index).

There are three approaches to SES measurement found in the literature, as summarized below.

1. Choosing one component, usually household income but sometimes employment category or educational attainment, as the operational definition of SES; the choice is made based on which component seems to have the most substantial impact on health and well-being.
2. Alternating between different components of SES, depending on the one that seems to have the most impact on the outcome of interest at that time.
3. Constructing some index that integrates SES components into a single metric that then allows comparisons between geographical areas; often the classic components are incorporated, that is, income, occupation, and education, but other concepts are sometimes woven into the index.

³ Lawrence PS. Chronic illness and socioeconomic status. *Public Health Reports*. 1948; 63(47): 1507-21.

All of these approaches have been applied in the Canadian context. For example, the project known as Health Disparity in Saskatoon examined neighbourhood income, education, and employment categories separately, and then highlighted one or other SES component that most influenced a health outcome of interest.⁴

There are issues involved with the construction of a combined SES metric: How will the decision be made as to what should be included in the index, how will the components themselves be measured and weighted in the index formula, and so on. However, the alternative of simply equating SES with income or to occupational category is also problematic. Such components still need to be measured (see the discussion on income in the next section to better understand the complexities involved). Most tellingly, if the analysis is reduced to one component such as income, then it may as well just be considered an indicator in its own right rather than as a proxy for SES.

To avoid such reductionism, it seems that investigators from the majority of industrialized nations have pursued an integrated SES statistic.^{5,6,7,8,9} The resulting metric is typically referred to as a deprivation index (DI); depending on the country of origin, the socioeconomic components (i.e., education, employment, income, etc.) included in the DI vary, along with the health outcomes that have been explicitly correlated with them (e.g., mortality rate, self-reported health, pediatric injuries).

A Canadian example of integrated SES measurement is the INSPQ Deprivation Index, originating with the work of Pampalon and colleagues in Quebec.¹⁰ It has been very influential at a national level, serving, for instance, as the foundation of a major ongoing project managed by Canadian Institute for Health Information that compares area-based SES to health outcomes in different urban centres.¹¹ As with most of the indices, it is derived from data available through the national census. The INSPQ index demonstrates a contemporary trend in the construction of such DI metrics, namely, moving beyond the classic material deprivation categories of income, employment, and education to better represent the so-called *social* deprivation arena; in the case of the INSPQ DI, the latter emphasis is captured by three other components: the proportion of the population living alone; the proportion that is separated, divorced or widowed; and the proportion of families that are lone-parent.

⁴ Lemstra M, Neudorf C. *Health disparity in Saskatoon: Analysis to intervention*. 2008. Saskatoon Health Region.

⁵ Haggarty P, Campbell DM, Duthie S et al. Diet and deprivation in pregnancy. *British Journal of Nutrition*. 2009; 102(10): 1487-97.

⁶ Dominguez-Berjon MF, Borrell C, Lopez R et al. Mortality and socioeconomic deprivation in census tracts of an urban setting in southern Europe. *Journal of Urban Health*. 2005; 82(2): 225-36.

⁷ Sundquist K, Malmstrom M, Johansson SE et al. Care Need Index, a useful tool for the distribution of primary health care resources. *Journal of Epidemiology & Community Health*. 2003; 57(5): 347-52.

⁸ Brown CE, Chishti P, Stone DH. Measuring socio-economic inequalities in the presentation of injuries to a paediatric A&E department: the importance of an epidemiological approach. *Public Health*. 2005; 119(8): 721-5.

⁹ Fukuda Y, Nakamura K, Takano T. Higher mortality in areas of lower socioeconomic position measured by a single index of deprivation in Japan. *Public Health*. 2007; 121(3): 163-73.

¹⁰ Gamache P, Pampalon R, Hamel D. *The material and social deprivation index: a summary*. 2010. Institut national de sante publique. Available at <http://www.inspq.qc.ca/santescope/liens.asp?Lg=en&comp=9&nav=N>. Accessed December 2010.

¹¹ Canadian Institute for Health Information. *Reducing gaps in health: A focus on socio-economic status in urban Canada*. 2008. Canadian Institute for Health Information. Available at <http://www.ihe.ca/publications/health-db/geo/617/>. Accessed December 2010.

Whatever their potential value, there are a number of practical challenges with DI projects:

- DIs are statistical constructs, the devising of which theoretically has no end.
- Each DI, with the various components and integration algorithms involved, requires its own process of validation as a predictor of health and well-being, particularly for the pediatric context.
- Because there are so many different DIs being investigated across the world, it makes international comparisons of SES measurements very challenging. This concern also applies to regional models within a single country; for example, apart from the DI metric devised in Quebec, there are at least three “competing” Canadian approaches: a DI developed in London, Ontario; the Vancouver Area Neighbourhood Deprivation Index; and the Ontario Deprivation Index that has recently been adopted as the basis of an official survey in that province.^{12,13,14}

Where does the preceding discussion leave the task of evaluating the evidence for an association between SES and health? The short answer is contained in another question: *Which version of SES?* In a sense, the validation task is either stalled or made redundant before it is begun. This is true either because the whole concept of SES must be seen as still under development, or because the ultimate “circularity” of SES projects must be acknowledged. Circularity here refers to the fact that the aim of SES projects is by definition to create an indicator that *explains area-based disparities in health as much as possible*. In other words, once a DI is devised and adopted in a pediatric context, it *automatically* becomes a powerful predictor of health and well-being, and therefore a strong candidate for any core indicator list. Again, given the multiplicity of DI options being tested by investigators, it would seem that the day is still a long way off when such a proxy metric for health will be established and widely accepted.

Notwithstanding the position just stated, an overview of evidence for SES (variously understood) will be provided below. The reason is simply that it is this sort of evidence that continues to inform and motivate the drive for the most effective understanding of SES in reference to health. It also affords an opportunity to focus on the evidence related to this concept that is pertinent to the *pediatric* context.

Methodology and Provisional Results

As suggested in the Introduction to this report, an economic “lens” provided the main perspective through which the concepts were identified for this part of the project. Considered broadly, the economic category refers not only to income per se, but to other factors bearing on income, such as employment and education. In other words, socioeconomic factors would be an appropriate alternate heading for the dimension of health and well-being influences being covered herein. As described more fully in the section below on Direct Income Concepts, it was appropriate and efficient to start by pursuing a literature scan of review papers in PubMed for all socioeconomic areas covered in this report. To

¹² Tompkins JW, Luginaah IN, Booth GL et al. The geography of diabetes in London, Canada: the need for local level policy for prevention and management. *International Journal of Environmental Research and Public Health*. 2010; 7(5): 2407-22.

¹³ Bell N, Schuurman N, Oliver L et al. Towards the construction of place-specific measures of deprivation: a case study from the Vancouver metropolitan area. *The Canadian Geographer*. 2007; 51(4): 444-61.

¹⁴ Matern R, Mendelson M, Oliphant M. *Testing the validity of the Ontario Deprivation Index*. 2009. Daily Bread Food Bank and the Caledon Institute of Social Policy. Available at <http://www.dailybread.ca/learningcentre/publications.cfm?id=3-2>. Accessed December 2010.

accomplish this, the MeSH term “Socioeconomic Factors” was used, coordinated with an extensive list of health and well-being outcomes (equivalent to the terms in item #3 below). For the purposes of this chapter, reviews pertinent to SES were identified from the total list of 468 gleaned in that process.

Following this initial step, searching for evidence of a connection between SES per se and health and well-being effects was continued in PubMed. It is an anomaly of the Medical Subject Heading list in **PubMed** that “Socioeconomic Status” is not included in the indexing. Not being able to exploit a direct MeSH approach, the term “socioeconomic status” was simply coordinated in turn with the following items:

1. No coordinating terms, but limits set for reviews and meta-analyses (139 total results, 19 potentially pertinent reviews chosen by title)
2. British Columbia OR Canada (187 total results, 9 reviews)—for purposes of gathering background information
3. "Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR “Outcome Assessment (Health Care)”[Mesh] OR “Medicine/statistics and numerical data”[Mesh] OR “Hospital Departments/statistics and numerical data”[Mesh] OR “Quality of Life”[Mesh] OR “Personal Satisfaction”[Mesh] (200 total studies from 2010 alone, again scanned for pertinent reviews)
4. (child OR adolescent OR infant OR teen OR youth OR pediatric) AND “health” (84 reviews)

Unless otherwise noted, the following limits were applied to the preceding searches:

Date: 2005-present *Language:* English *Subjects:* Human *Age:* 0-18 years*

*While the protocol defines a child as 0-20 years of age, the search limit available in PubMed for All Child is 0-18 years, so this approximation was used.

EBSCO Host was also searched as an alternate source of papers, specifically within the following databases: Academic Search Complete, CINAHL, Education Research Complete, Family & Society Studies Worldwide, Humanities International Index, and PsycINFO.

The search in EBSCO was conducted on the following terms: “socioeconomic status” AND child AND health, for all studies dated 2005-present; to further focus the results, the following major subject headings related to pediatric health and well-being were selected: childhood development, behaviour problems, and mental disorders. The search returned 158 papers, which were scanned for the most pertinent sources of review evidence and/or background information.

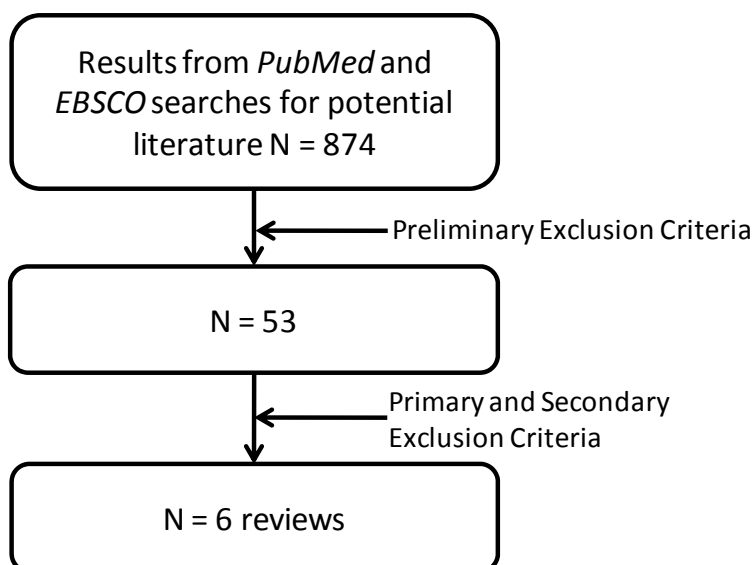
The **National Bureau of Economic Research** was also searched, returning 9 potential working papers on the SES theme; finally Google was searched using the terms

"socioeconomic status" AND ("health effect" OR "health outcome" OR "health status" OR well-being OR "well being") AND (child OR adolescent OR infant OR teen OR youth OR pediatric).

There were sufficient systematic reviews discovered by these various methods to confirm that a level A search was the appropriate platform on which to depend for this concept. Ultimately, 6 systematic review papers remained after the various exclusion steps (see the Volume report and bibliography table below).

Literature Volume Report:

Dimension: Economic and Material Well-being **Concept:** Children SES Circumstances



| Summary of Relevant Reviews | | | | | | |
|---|-------------|------|--|------------------------------|-----------------------|----------------|
| Dimension: <i>Economic Health and Well-being</i> | | | | | | |
| Concept: <i>Children SES Circumstances</i> | | | | | | |
| Title of Study | Lead Author | Year | Journal | Journal Impact Factor (2005) | Year Range of Studies | No. of Studies |
| 1 Effects of socioeconomic status on the physical activity in adolescents: a systematic review of the evidence | Stalsberg | 2010 | Scandinavian Journal of Medicine & Science in Sports | 2.15 | 1998-2009 | 62 |
| 2 Socioeconomic status and adiposity in childhood: A systematic review of cross-sectional studies 1990-2005 | Shrewsbury | 2008 | Obesity | 3.97 | 1992-2005 | 45 |
| 3 Socioeconomic status and health behaviors in adolescence: A review of the literature | Hanson | 2007 | Journal of Behavioral Medicine | 3.08 (2009) | 1975-2007 | 162 |
| 4 Systematic review of the influence of childhood socioeconomic circumstances on risk for cardiovascular disease in adulthood | Galobardes | 2006 | Annals of Epidemiology | 2.29 | 1964-2005 | 40 |
| 5 Socioeconomic status and childhood leukaemia: a review | Poole | 2006 | International Journal of Epidemiology | 4.05 | 1980-2002 | 14 |
| 6 Evaluating the evidence for models of life course socioeconomic factors and cardiovascular outcomes: a systematic review | Pollitt | 2005 | BMC Public Health | 1.66 | 1980-2003 | 49 |

Dimension: *Economic and Material Well-being Concept: Socioeconomic Status*

Summary Table of Reviews

| Lead Author | Review Title | Number of Studies Reviewed | Conclusions/Comments |
|--------------------------|---|----------------------------|--|
| Stalsberg (2010) | Effects of socioeconomic status on the physical activity in adolescents: a systematic review of the evidence | 62 | Main results indicate that adolescents with higher SES are more physically active than those with lower SES. The findings are inconsistent (i.e., 42% of the included studies report no or an opposite relation). Overall, the basic understanding was reinforced that there is no single explanation for any observed difference in physical activity between different socioeconomic groups. |
| Shrewsbury (2008) | Socioeconomic status and adiposity in childhood: A systematic review of cross-sectional studies 1990-2005 | 45 | SES was inversely associated with adiposity in school-age children in 19 studies; there was no association in 12 studies; in a further 14 studies there was a mixture of no associations and inverse associations across subgroups. Children whose parents have a low level of education appear to be at higher than average risk. |
| Hanson (2007) | Socioeconomic status and health behaviours in adolescence: A review of the literature | 162 | In the majority of studies, behaviours related to diet and physical activity were significantly associated with adolescent SES; low SES adolescents reported poorer nutritional habits and less exercise than high SES teens. Low SES adolescents were at greater risk for cigarette smoking. There was no significant association between SES and adolescents' alcohol consumption and marijuana use. |
| Galobardes (2006) | Systematic review of the influence of childhood socioeconomic circumstances on risk for cardiovascular disease in adulthood | 40 | 31 studies found a robust inverse association between childhood SES circumstances and cardiovascular disease (CVD) risk. The association was stronger for stroke and, in particular, hemorrhagic stroke, than for coronary heart disease. |
| Poole (2006) | Socioeconomic status and childhood leukaemia: a review | 14 | The connections between SES and leukemia were found to vary with place and time. The authors encourage the development of more specific studies, separating out various risk factors (such as income and education) and differentiating between individual- and ecological-level factors. |
| Pollitt (2005) | Evaluating the evidence for models of life course socioeconomic factors and cardiovascular outcomes: a systematic review | 49 | Study results suggest that low SES throughout the life course modestly impacts CVD risk factors and overall CVD risk; studies provided moderate support for the role of low early-life SES and elevated levels of CVD risk factors and CVD morbidity and mortality. |

Bibliography for Table of Reviews

Stalsberg R, Pedersen AV. Effects of socioeconomic status on the physical activity in adolescents: a systematic review of the evidence. *Scandinavian Journal of Medicine & Science in Sports*. 2010; 20: 368-83.

Shrewsbury V, Wardle J. Socioeconomic status and adiposity in childhood: a systematic review of cross-sectional studies 1990-2005. *Obesity*. 2008; 16: 275-84.

Hanson MD, Chen E. Socioeconomic status and health behaviors in adolescence: a review of the literature. *Journal of Behavioral Medicine*. 2007; 30: 263-85.

Galobardes B, Smith GD, Lynch JW. Systematic review of the influence of childhood socioeconomic circumstances on risk for cardiovascular disease in adulthood. *Annals of Epidemiology*. 2006; 16: 91-104.

Poole C, Greenland S, Luetters C et al. Socioeconomic status and childhood leukaemia: a review. *International Journal of Epidemiology*. 2006; 35: 370-84.

Pollitt RA, Rose KM, Kaufman JS. Evaluating the evidence for models of life course socioeconomic factors and cardiovascular outcomes: a systematic review. *BMC Public Health*. 2005; 5: 7.

Summary of Results and Conclusion

Similar to the extended discussion earlier in this section on the complexities of SES metrics, the evidence of health effects driven by SES (variously defined) also proves to be a cautionary tale. While the strongest evidence is for early exposure to low SES circumstances and its influence on cardiovascular disease and stroke risks in adults, evidence for other outcome areas was equivocal. In fact, most of the studies in the reviews related to indirect measures of health, that is, the effect on risk factor prevalence (e.g., levels of adolescent smoking, nutrition, and physical activity) as opposed to actual health outcomes.

A more direct health effect with suspected ties to SES is leukemia, but one that (along with allergies) may be a rare example where the normal gradient is reversed; in short, many older studies have found *higher* rates for pediatric leukemia among wealthier groups of people. However, questions have been raised about the quality and heterogeneity of these past investigations.¹⁵ A review by Poole et al., as well as an analysis by Adam and colleagues,¹⁶ has also challenged the older results, showing that in some studies leukemia appears to be tied to low SES, rather than high SES.^{17,18} Given the inconsistent results, the suggestion has been made to abandon a combined index of SES as a metric in future studies of a leukemia connection in favour of more specific component factors, such as household income or parental education. This serves as an example of the complexity involved with constructing and populating metrics of SES that then must be validated in terms of an association with one or more health and well-being outcomes. Similarly, parental education rather than some other measure of SES appeared to be a better predictor of adiposity in children according to the review by Shrewsbury and Wardle.

The conclusion has to be that a single SES-related indicator has not yet been identified that can be confidently attached to pediatric health and well-being, but the quest for such a tool will undoubtedly continue in universities and government statistic departments around the world.

| Summary Assessment | | | | | |
|-----------------------------------|---|-----------|---------------------|---------------|-------------------------------|
| Children in Low SES Circumstances | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| | | Unclear | Unclear | Unclear | Unclear |

As summarized above, assessments have been applied to the Children Socioeconomic Status concept.

The pediatric population **Magnitude** of the potential indicator is assessed as **Unclear**. No single SES-related indicator has been identified that can be confidently associated with child health and well-being and therefore be used to generate a magnitude of exposure to low SES.

¹⁵ Kuehni CE, Zwahlen M. Commentary: numerous, heterogeneous, and often poor--the studies on childhood leukaemia and socioeconomic status. *International Journal of Epidemiology*. 2006; 35(2): 384-5.

¹⁶ Adam M, Rebholz CE, Egger M et al. Childhood leukaemia and socioeconomic status: what is the evidence? *Radiation Protection Dosimetry*. 2008; 132(2): 246-54.

¹⁷ Poole C, Greenland S, Luetters C et al. Socioeconomic status and childhood leukaemia: a review. *International Journal of Epidemiology*. 2006; 35(2): 370-84.

¹⁸ Adam M, Rebholz CE, Egger M et al. Childhood leukaemia and socioeconomic status: what is the evidence? *Radiation Protection Dosimetry*. 2008; 132(2): 246-54.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **Unclear**. The evidence of health effects of SES, variously defined, is weak; additionally, as a candidate indicator that has been identified, the significance cannot be determined.

The **Modifiability** of the potential indicator is assessed as **Unclear**. Since an SES-related indicator associated with child health and well-being has not been identified, the modifiability cannot be rated.

Data Availability/Validity for the potential indicator is assessed as **Unclear**. As no single SES-related indicator has been identified, the data availability cannot be assessed.

Based on the indicated assessment, the potential indicator is **Not Recommended** for consideration as a core indicator of child health and well-being, largely due to the current challenges involved with measuring the concept when it is positioned as an indicator. *It is important to note, however, that a number of the concepts commonly included in measuring SES (e.g., family income, parental employment, lone parent families, and food security) are covered in detail in the remainder of this review.*

Direct Income Concepts

Background and Context

The income of caregivers, while only one measure of economic and material well-being, has important implications for the broader sense of well-being of children in British Columbia and other provinces in Canada. It is well-recognized that the related impacts range well beyond physical health.¹⁹ Living in low-income circumstances can have a significant impact on a child's life, since it limits where families can choose to live, what they eat, how the family members interact, and the positive activities that are available to children. Low income (also known as poverty) is thus best conceived of as a measure of social disadvantage, with the effects on child health and well-being generally operating indirectly; in other words, low income is a risk factor for various other factors that more directly influence the risk of reduced well-being. These factors have the potential to influence health and well-being not only in the periods of childhood and adolescence, but on into adult life as well.

Measurement of Income

One difficulty in assessing the impact of income on well-being is the variety of ways in which income is described, discussed, and measured. In many studies, income is incorporated into a combined metric for socioeconomic status (SES), often alongside the caregiver's level of education or some other measure of social class. SES is dealt with more fully in the preceding section of this report, where a potential overlap with the present section was already noted (especially in the cases where SES is simply equated with income). Another measurement challenge relates to the varying approaches adopted by investigators, sometimes considering income on the level of the individual family and sometimes assessing it on the "ecological" level of the neighbourhood; this is exactly parallel to SES being calculated either by household or by geographic area.

As discussed more fully below, although organizations like Statistics Canada track a wide range of income data, it is not immediately clear which of these measurements represents the strongest association with pediatric health and well-being. Guided by the terms of reference for the present project, this report will ultimately discuss three different markers of families being at-risk due to income-related factors:

- Family income
- Poverty status relative to the low income cut off (LICO)
- Receipt of social assistance

This is not an exhaustive list. For instance, great research interest has been expressed in the health impact of *relative* income (or income inequality) in a society or specific geographic area. This complex and sometimes controversial concept was not assigned in the present project, and therefore lies outside the scope of the present discussion.

Methodology and Provisional Results

The challenges just described led to the construction of the generalized search strategy outlined below, designed to find studies that used a number of measures of economic and material well-being, SES, etc. as predictors of overall pediatric well-being. The main coordinating term, "socioeconomic factors," covers a long list of pertinent topics under the

¹⁹ Children's Hospital of Eastern Ontario. *Reducing poor health outcomes for children and youth: Recommendations for the Ontario Poverty Reduction Strategy*. 2008. Available at http://www.cheo.on.ca/uploads/AboutUs/Files/poverty_submission_e.pdf. Accessed December 2010.

Medical Subject Headings (MeSH) in PubMed. It is clear that review papers and/or studies using income as an indicator, even as part of an analysis of socioeconomic status, will likely be captured under the general category of socioeconomic factors. Since several other indicators also of direct relevance to this part of project would also be captured as a part of the search, it was efficient to collect and sift through all the pertinent strands of literature at the same time. Thus, the fruit of the PubMed component of the search will be represented in a number of subsequent sections of the report, even as it already influenced the opening section related to SES. Another result of this approach will be the occasional overlap between reference lists, for example, as was seen with this section and the next one on parental employment.

Initial Search Process

For one of the main electronic searches, the database used was PubMed, with the following limits:

Date: 2005-present *Language:* English *Subjects:* Human *Age:* 0-18 years*

Type of Article: Review, Meta-analysis

*While the protocol defines a child as 0-19 years of age, the search limit available in PubMed for All Child is 0-18 years, so this approximation was used.

Electronic Search Keywords

“Socioeconomic Factors” [Mesh] **AND**

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR “Outcome Assessment (Health Care)”[Mesh] OR “Medicine/statistics and numerical data”[Mesh] OR “Hospital Departments/statistics and numerical data”[Mesh] OR “Quality of Life”[Mesh] OR “Personal Satisfaction”[Mesh])

The search processes returned 468 reviews for consideration on the theme of income and (as noted above) other topics relevant to this part of the project.

Preliminary Exclusion

The review articles were scanned *by title*, with articles not pertinent to the research topic being excluded; specifically, if the article did not appear to be investigating the association between income and pediatric health and well-being, then it was excluded for the purposes of the present section. The one exception was any review aimed at tracing effect begun in childhood but extending in the adult years.

After completing this first exclusion process, the list of articles was reduced to 147.

Primary Exclusion

The abstracts and/or full versions of the 147 review articles were then examined in more detail. Articles not directly pertinent to the research topic were excluded. There were 31 reviews remaining in the list following the primary exclusion.

Secondary Exclusion

Systematic reviews that were deemed to be of lesser quality or usefulness were excluded, yielding a final total of 8 reviews, as indicated in the following Volume Report. The list of review papers is then detailed in the table that follows.

Supplementary Search Process

In order to include articles from outside of the health field, selected sources from the EBSCO Host collection of databases was also searched, using a modified list of basic search terms, as follows:

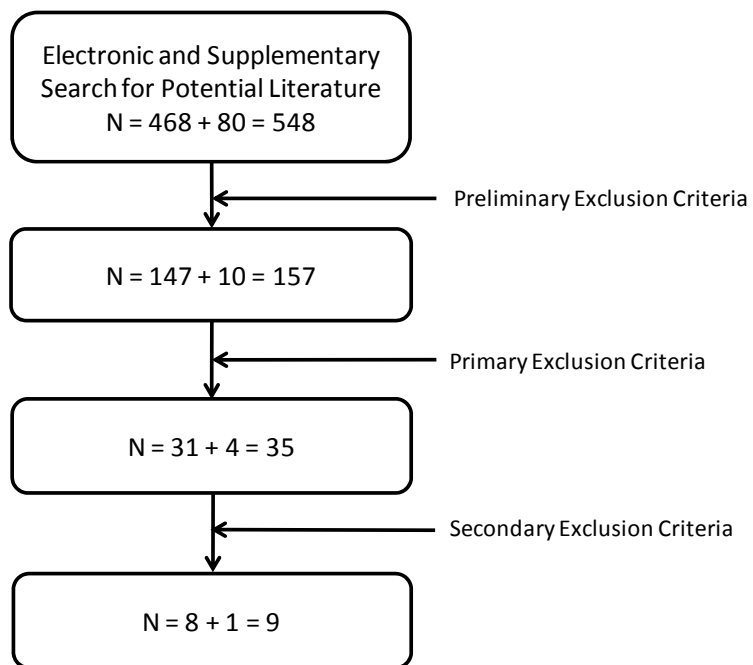
("Income" OR "Poverty" OR "Social Assistance" OR "Welfare" OR "Socioeconomic Factor") **AND** ("Health" OR "Health Status Indicators" OR "Risk Factors" OR "Physical Fitness" OR "Disease" OR "Medicine" OR "Hospital" OR "Quality of Life" OR "Personal Satisfaction") **AND** (Child OR Childhood OR Children OR Adolescent OR Adolescence OR Infant OR Infancy OR Teenage) **AND** "Systematic Review"

This search was limited to articles published since 2005. Other limits, such as language, subject species, and subject age were set for individual databases, when this feature was made available by the source construction. Limits for article type were generally not available; this was instead achieved by including "Systematic Review" as a search term.

This supplementary search found 80 additional reviews, of which 10 remained after preliminary exclusion, 4 after primary exclusion, and only 1 after secondary exclusion (see the following Volume Report). The information available through reviews was deemed to be sufficient and current, so that no additional searching was required at the level of individual studies.

Literature Review Volume Report: Reviews

Dimension: Economic and Material Well-Being **Concept:** Income



Summary of Relevant Reviews
Dimension: Economic and Material Well-Being
Concept: Income

| | Title of Review | Lead Author | Year | Journal | Journal Impact Factor (2005) | Year Range of Studies | No. of Studies |
|---|--|--------------------|-------------|---------------------------------------|-------------------------------------|------------------------------|-----------------------|
| <i>Mental Health and Family Relationship</i> | | | | | | | |
| 1 | Attachment security and disorganization in maltreating and high-risk families: a series of meta-analyses | Cyr | 2010 | Development and Psychopathology | 2.49 | 1984-2005 | 62* |
| 2 | A systematic review of depressed mood and anxiety by SES in youth aged 10-15 years | Lemstra | 2008 | Canadian Journal of Public Health | 0.98 | 1996-2006 | 7* |
| 3 | Protecting children from the dangers of urban poverty | Kiser | 2007 | Clinical Psychology Review | 3.79 | 1994-2005 | 9* |
| 4 | Understanding the ecology of child maltreatment: a review of the literature and directions for future research | Freisthler | 2006 | Child Maltreatment | 2.61 (2009) | 1978-2004 | 11* |
| <i>Physical Activity and Obesity</i> | | | | | | | |
| 5 | Socioeconomic status and adiposity in childhood: a systematic review of cross-sectional studies 1990-2005 | Shrewsbury | 2008 | Obesity | 3.97 | 1998-2007 | 11* |
| 6 | Environmental correlates of physical activity in youth - a review and update | Ferreira | 2007 | Obesity Reviews | 5.09 (2009) | 1996-2004 | 8* |
| <i>Drug and Alcohol Use</i> | | | | | | | |
| 7 | Is socioeconomic status in early life associated with drug use: A systematic review of the evidence | Daniel | 2009 | Drug and Alcohol Review | 1.62 | 1992-2002 | 10* |
| <i>Injuries</i> | | | | | | | |
| 8 | Correlation between socioeconomic indicators and traumatic dental injuries: a qualitative critical literature review | Bendo | 2009 | Dental Traumatology | 0.72 | 2000-2006 | 4* |
| 9 | The significance of neighbourhood context to child and adolescent health and well-being: a systematic review of multilevel studies | Sellström | 2006 | Scandinavian Journal of Public Health | 0.73 | 1999-2002 | 8* |
| * Studies most pertinent to the income concept selected from a broader complement | | | | | | | |

Detailed Results

For the 9 reviews identified by the literature search and exclusion process, a summary table of results was developed, as follows.

| Dimension: <i>Economic and Material Well-being</i> Concept: <i>Family Income</i> Summary Table of Reviews | | | |
|--|--|----------------------------|---|
| Lead Author | Review Title | Number of Studies Reviewed | Conclusions/Comments |
| <i>Mental Health and Family Relationship</i> | | | |
| Cyr (2010) | Attachment security and disorganization in maltreating and high-risk families: a series of meta-analyses | 62* | Children from “high-risk” (low income) families were found to have insecure attachment and be disorganized in higher proportions than children from low-risk backgrounds, putting them at greater risk for psychopathology, behaviour problems, stress dysregulation, and poor cognitive performance; the associations held even for families with no evidence of maltreatment. |
| Lemstra (2008) | A systematic review of depressed mood and anxiety by SES in youth aged 10-15 years | 7* | The prevalence of depressed mood or anxiety was found to be 2.5 times higher in youth with low SES. Income was used as the indicator for SES in 7 of 9 total studies. |
| Kiser (2007) | Protecting children from the dangers of urban poverty | 9* | The included studies drew various conclusions. Economic hardship and poverty status were shown to be correlated with parental depression and distress, lowering the quality of parent/child relationships and generating family conflict, leading to poorer behaviour, academic performance, and social adjustment in adolescents. Perceived threat of neighbourhood crime and violence also influenced parental distress and increased confrontational behaviour and child conduct problems. |
| Freisthler (2006) | Understanding the ecology of child maltreatment: a review of the literature and directions for future research | 11* | Child maltreatment, especially physical abuse and neglect, was found to be more common in neighbourhoods with more inhabitants below the poverty level. Related factors, such as housing stress, child care burden, and unemployment were also found to have an impact. |
| <i>Physical Activity and Obesity</i> | | | |
| Shrewsbury (2008) | Socioeconomic status and adiposity in childhood: a systematic review of cross-sectional studies 1990-2005 | 11* | Of the 11 studies, 4 found a clear inverse relationship between family income and adiposity, while 4 additional studies found a similar relationship for some subpopulations; 3 of the studies found no statistically significant relationship at all. |
| Ferreira (2007) | Environmental correlates of physical activity in youth – a review and update | 8* | In adolescents, family income was found to be one of a number of factors that strongly influenced physical activity. The authors suggested that, for this subtopic, measures of SES normally ought to be broken down into more specific categories, including income. |
| <i>Drug and Alcohol Use</i> | | | |
| Daniel (2009) | Is economic status in early life associated with drug use: A systematic review of the evidence | 10* | Although data for many types of drug use are severely limited, it appears that cannabis use is likely to be an additional sequela of childhood disadvantage. |
| <i>Injuries</i> | | | |

Dimension: Economic and Material Well-being Concept: Family Income
Summary Table of Reviews

| Lead Author | Review Title | Number of Studies Reviewed | Conclusions/Comments |
|-------------------------|--|----------------------------|--|
| Bendo (2009) | Correlation between socio-economic indicators & traumatic dental injuries: a qualitative critical literature review | 4* | One study out of four found a significant relationship between income and traumatic dental injuries in children. Studies dealing with other measures of SES also found correlations. |
| Sellström (2006) | The significance of neighbourhood context to child and adolescent health and well-being: a systematic review of multilevel studies | 8* | Included studies examined area-based, rather than family-level, data. Disadvantaged neighbourhoods (as defined by income) were found to have higher rates of behavioural problems and (possibly) more maltreatment of children; on the physical health front, there was a higher incidence of low birth weight and pediatric injuries. On average, 10% of variation in health outcomes could be explained in terms of neighbourhood determinants—notably those driven by income. |

*Studies most pertinent to the income concept selected from a broader complement

Bibliography for Table of Reviews

- Cyr C, Euser EM, Bakermans-Kranenburg MJ et al. Attachment security and disorganization in maltreating and high-risk families: a series of meta-analyses. *Development and Psychopathology*. 2010; 22(1): 87-108.
- Lemstra M, Neudorf C, D'Arcy C et al. A systematic review of depressed mood and anxiety by SES in youth aged 10-15 years. *Canadian Journal of Public Health*. 2008; 99(2): 125-9.
- Kiser LJ. Protecting children from the dangers of urban poverty. *Clinical Psychology Review*. 2007; 27(2): 211-25.
- Freisthler B, Merritt DH and LaScala EA. Understanding the ecology of child maltreatment: a review of the literature and directions for future research. *Child Maltreatment*. 2006; 11(3): 263-80.
- Shrewsbury V and Wardle J. Socioeconomic status and adiposity in childhood: a systematic review of cross-sectional studies 1990-2005. *Obesity*. 2008; 16(2): 275-84.
- Ferreira I, van der Horst K, Wendel-Vos W et al. Environmental correlates of physical activity in youth - a review and update. *Obesity Reviews*. 2007; 8(2): 129-54.
- Daniel JZ, Hickman M, Macleod J et al. Is socioeconomic status in early life associated with drug use? A systematic review of the evidence. *Drug and Alcohol Review*. 2009; 28: 142-53.
- Bendo CB, Scarpelli AC, Vale MP et al. Correlation between socioeconomic indicators and traumatic dental injuries: a qualitative critical literature review. *Dental Traumatology*. 2009; 25(4): 420-5.
- Sellström E and Bremberg S. The significance of neighbourhood context to child and adolescent health and well-being: a systematic review of multilevel studies. *Scandinavian Journal of Public Health*. 2006; 34(5): 544-54.

Summary of Results

Emotional and Social Health

The most common outcome theme seen in the identified literature was the strain placed on families dealing with inadequate income. As Kiser et al. explain, additional stress on parents in low income situations can lead to changing patterns of family interaction and discipline, in turn affecting the quality of parent-child relationships. This corresponds with the findings of Freisthler et al., who describe an increase in child maltreatment, particularly physical abuse and neglect, in low income families. These effects appear to be compounded by other factors that typically coexist with low income, such as living in areas with a higher threat of violence and crime.

Even when maltreatment is not present, however, children from poor families were found by many of the studies to be at greater risk for poor social adjustment. For example, Cyr et al. describe the apparent difficulty experienced by children growing up in economically challenged families in terms of developing strong attachments to parents and other people. The authors maintain that this phenomenon can lead directly to psychopathologies, behavioural problems, stress dysregulation, and poor cognitive performance later in life. The higher levels of depressed mood and anxiety in adolescents from low-SES families, as reported by Lemstra et al., support this conclusion.

Physical Health

While the emotional and social health impacts of poverty are generally understood and well-accepted, the physical health outcomes are less clear. Obesity is one physical health effect that appears to have a plausible connection to low income; proposed causal mechanisms include improper diet stemming from inability to purchase (often higher priced) nutritional foods and the fact that neighbourhoods with low income levels often lack appropriate grocery stores and safe areas to exercise. However logical may be the relationship between low income and risk factors for obesity, reviews of the literature by Shrewsbury and Ferreira confirm that this area of investigation remains complex. While low income does appear to be a risk factor for obesity and overweight, some studies have found little evidence for such a correlation. At the other end of the lifecycle, the opposite pattern was demonstrated in the review by Sellstrom and Bremberg: there is an increased incidence of low birth weight in families from poorer neighbourhoods. On a final note, injury rates among children appear to be higher in neighbourhoods that are materially deprived; Sellstrom and Bremberg again offer evidence to this effect, reinforced by the specific situation of dental injuries as investigated by Bendo and colleagues.

Despite some variety in the evidence, there does appear to be a correlation between income and physical health. This has been borne out in terms of certain global health measures in the Canadian context. For example, according to the work by Ross and Roberts for the Canadian Council on Social Development (based on the National Longitudinal Survey of Children and Youth), children from low income families are less likely to be rated “in excellent health” by their parents.²⁰ They are also about 2.5 times more likely than children from the highest income families to have health problems that impair their ability to fully function.

²⁰ Ross DP, Roberts P. *Income and Child Well-being: A New Perspective on the Poverty Debate*. 1999. Canadian Council on Social Development. Available at <http://www.ccsd.ca/pubs/inckids/index.htm>. Accessed November 2010.

Data Sources on Income-Related Concepts

Canadian Census

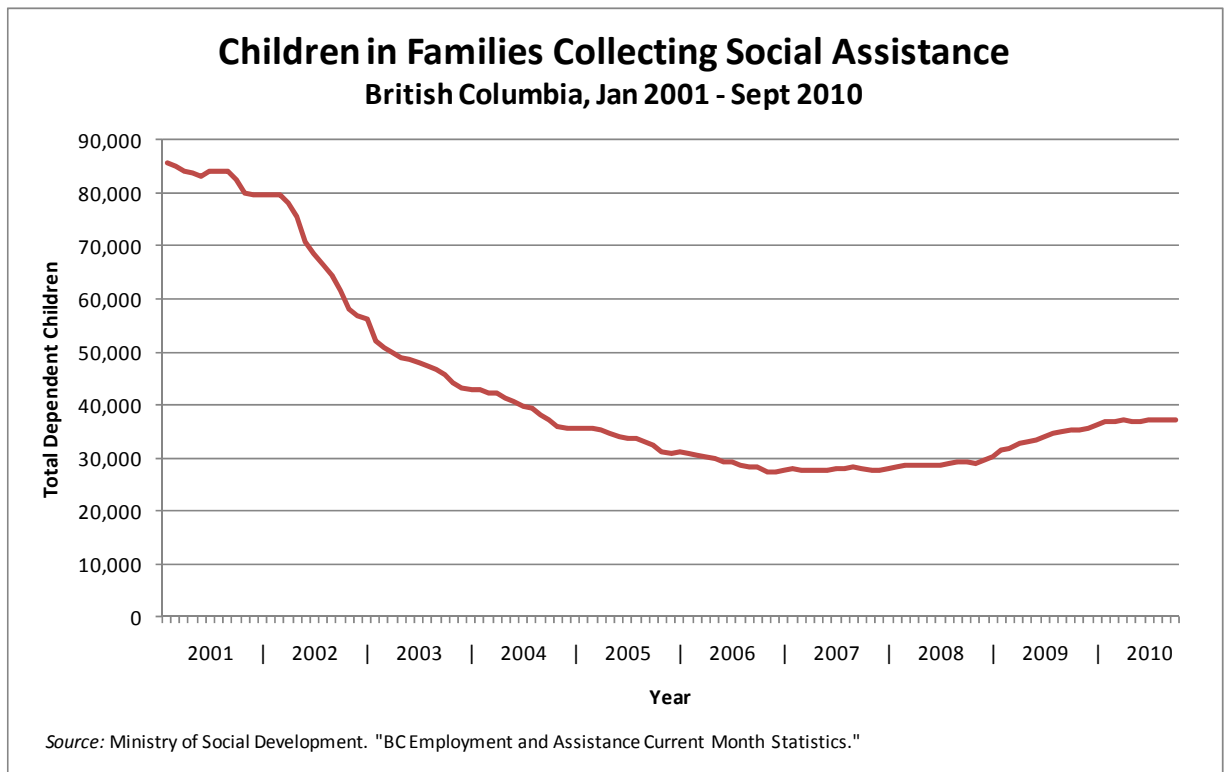
Every five years, the Census collects substantial data on income. It allows for analysis of income and poverty at the individual, family, and neighbourhood levels, tracking all three of the income indicators discussed in this section of the report.

National Longitudinal Study of Children and Youth (NLSCY)

The NLSCY is a long-term study of the development of Canadian children, and a unique tool for understanding the risk factor trends affecting the well-being of children. Collected biennially, the survey targets children aged 0 to 11 years, following them until adulthood.²¹ The NLSCY includes a series of quantitative and qualitative questions related to family income.

BC Ministry of Social Development

The BC Ministry of Housing and Social Development is responsible for distribution of social assistance within the province. The statistics collected during this process are available online, and include the number of social assistance client families by month and by category of assistance. The ministry also tracks the total number of dependent children in the families receiving social assistance each month, as illustrated in the following chart.²²



In 2010, the average number of dependent children in families receiving social assistance was 37,032.

²¹ *National Longitudinal Survey of Children and Youth (NLSCY)*. 2010. Statistics Canada. Available at <http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=4450&lang=en&db=imdb&adm=8&dis=2>. Accessed November 2010.

²² Statistics are available at <http://www.eia.gov.bc.ca/research/index.htm>. Accessed November 2010.

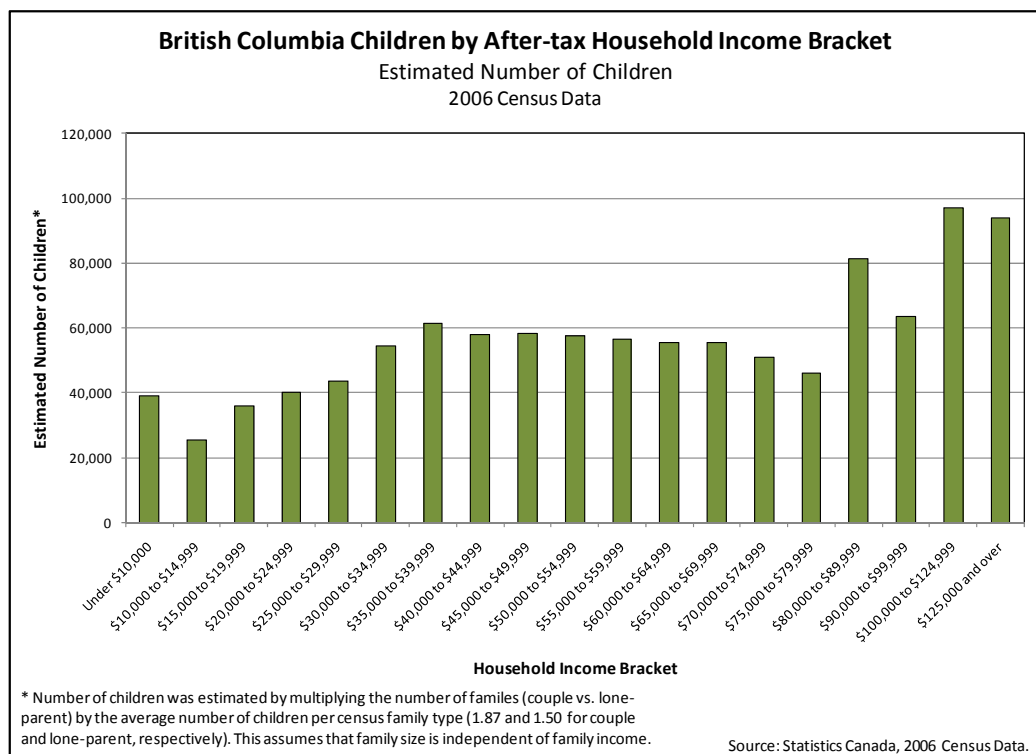
Discussion of Potential Indicator Data

Although there is evidence, as outlined above, that income can be a useful indicator of child health and well-being, there is no consensus in the literature as to how income should be evaluated, or which measurement might serve as the best indicator of pediatric health effects (especially when seeking to track *causal* relationships). The first measure to be considered in this section, family income, represents a relative measure; the idea is to see whether there is any evidence of health and well-being variations between low- and high-income groups. The other two assigned measures, being below LICO or receiving social assistance, are more absolute in character; they establish the population that lies below some kind of income cut-off. Each of the assigned concepts will be discussed further in the following sections.

Family Income

Family (or household) income commonly appears in discussions of the social determinants of health. As suggested in the literature review, low family income has been correlated with a variety of negative health and social effects. The challenge of using family income as an indicator, however, is that it does not always correspond accurately with disadvantage, since the cost of living can vary so much between countries, provinces, and even cities. Depending on location, family structure, and other household arrangements, it is possible for families with relatively low incomes to live quite comfortably in comparison to families with higher incomes in other jurisdictions.

However, when examining a specific population within a given neighbourhood, city, or region with relatively consistent cost-of-living, family income can generally be considered an accurate proxy for socioeconomic disadvantage leading to potential health effects. Whatever the ultimate conclusion about its utility, information on the prevalence of children in households of different income levels is available from Statistics Canada, generated either by Census data every 5 years or by an analysis of annual tax returns (the latter source is discussed further in the section on lone-parent families). The basic profile offered by 2006 Census data is provided in the following chart.



A major challenge with constructing an indicator for this concept is that Family Income examined without cut-offs applied does not allow for identification of an at-risk group of children. In other words, income may provide information about a health gradient, but ultimately a threshold below which the income and related health effects are deemed to be serious enough for policy intervention would need to be identified. This sort of analysis is akin to using a sophisticated tool such as the Low-Income Cut-Off, which is the next concept to be examined. An alternate approach is to simply observe the health and well-being effects of living on, for instance, the bottom 20% of incomes—once again, the key thing is to assign some sort of cut-off as an intrinsic part of the concept. In sum, Family Income *by itself* does not generate the sort of indicator of interest in the present project, and therefore will not be considered further.

Children in Families Living Below the LICO

As discussed above, while family income may be useful in assessing *gradients* of health effects, knowing more clearly when an individual or family is in a “low income” situation is potentially more valuable as a concept/indicator. The Low Income Cut-Off (LICO) is one attempt to quantify the social disadvantage related to poverty by testing financial resources against a definition of what constitutes “low income” in specific circumstances. Other measures have been developed over the years, which has served to complicate the discussion of poverty both within Canada and in comparison with other countries.^{23,24} Two alternate income-assessment methods employed by Statistics Canada are the Low Income Measure (LIM) and the Market Basket Measure (MBM).²⁵ LIM, which is based on the median adjusted family income in a society rather than purchasing power/living standard, is closest to the methodology used in other countries; it has recently been revised in the Canadian context to bring it even more into line with international standards.²⁶

Broadly speaking, LICO and LIM represent a *relative* approach to measuring low-income, while MBM represents an *absolute* approach based on the ability to purchase a defined “basket” of goods. Each measure produces a cut-off point—where individuals falling below the line are deemed to be in a low income situation. Statistics Canada has consistently maintained that these lines do not represent a poverty line. This is likely a result of confusion regarding the definition of poverty itself; some choose to characterize poverty as an inability to purchase the bare necessities, while others maintain that it is the inability to participate fully in the life of one’s community.

LICO is defined as the “income level at which the family spends 20 percentage points higher than the ratio of average spending on food, shelter and clothing and average family income.”²⁷ The measure was first developed in 1967, with the most recent LICO thresholds published in 1992. The annual LICO thresholds are updated yearly using the Consumer Price Index (CPI). The LICO is a moving scale that is dependent on a number of key variables, including household size, city population, and geographical region (i.e., Atlantic Provinces,

²³ deGroot-Maggetti G. *A measure of poverty in Canada*. 2002. Available at http://action.web.ca/home/cpj/attach/A_measure_of_poverty.pdf. Accessed December 2010.

²⁴ Phipps S, Curtis L. *Poverty and child well-being in Canada and the United States: Does it matter how we measure poverty?* 2000. Available at <http://www.ciln.mcmaster.ca/papers/2000/curtisphipps.pdf>. Accessed December 2010.

²⁵ Giles P. *Low Income Measurement in Canada*. 2004. Available at <http://www.statcan.gc.ca/pub/75f0002m/75f0002m2004011-eng.pdf>. Accessed December 2010.

²⁶ Murphy B, Zhang X, Dionne C. *Revising Statistics Canada's Low Income Measure (LIM)*. 2010. Available at <http://www.statcan.gc.ca/pub/75f0002m/75f0002m2010004-eng.pdf>. Accessed December 2010.

²⁷ Zhang X. *Low income measurement in Canada: What do difference lines and indexes tell us?* 2010. Available at <http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=75F0002M2010003&lang=eng>. Accessed January 2011.

Quebec, Ontario, Prairies, and B.C.). An example of the 2008 LICO cut-offs is presented in the table below.

| Low Income Cut Offs, After Tax | | | | | |
|--|-------------|--|----------|----------|----------|
| By Household Size and Community Population, 2008 | | | | | |
| Household Size | Rural areas | Urban areas (by population, thousands) | | | |
| | | < 30 | 30-100 | 100-500 | > 500 |
| 1 person | \$12,019 | \$13,754 | \$15,344 | \$15,538 | \$18,373 |
| 2 persons | 14,628 | 16,741 | 18,676 | 18,911 | 22,361 |
| 3 persons | 18,215 | 20,845 | 23,255 | 23,548 | 27,844 |
| 4 persons | 22,724 | 26,007 | 29,013 | 29,378 | 34,738 |
| 5 persons | 25,876 | 29,614 | 33,037 | 33,453 | 39,556 |
| 6 persons | 28,698 | 32,843 | 36,640 | 37,100 | 43,869 |
| 7 or more persons | 31,519 | 36,072 | 40,241 | 40,747 | 48,181 |

Source: StatsCan, "Low income cut-offs (1992 base) after tax"

LICO has a number of advantages and disadvantages compared with the other two low-income measures. As noted above, LICO does take into account regional variability; however, LICO does not adjust for differences in cost of living between communities of the same size within the same region. For instance, two cities in B.C. with the same population would have identical thresholds; this is a limitation in that cost of living can vary greatly between sub-regions. Also, the LICO is not updated annually, a limitation noted by Giles: “[t]he percentage of spending on food, shelter and clothing is decreasing over time, so the choice of base year has an impact on the low income rate.”²⁸

On the other hand, LICO takes into account both relative income and increases in cost of living; neither the MBM nor the LIM embrace both of these perspectives (see following table). The MBM, while accounting for regional variation with greater accuracy than LICO, does not consider relative income or, by extension, income inequalities. The LIM, while reflecting such inequalities, does not take into account the changes in cost of living.

| Characteristics of Low Income Measures | | | |
|--|-------------------|------------------|------------------|
| | LICO [†] | LIM [‡] | MBM ^Ω |
| Conceptual Transparency | Low | High | High |
| International Comparability | No | Yes | No |
| Implicit Choices | Many | Few | Few |
| Resources to Produce Data | Low | Low | High |
| Regional Variability | Some | No | High |
| Relative Income | Yes | Yes | No |
| Cost of Living | Yes | No | Yes |

[†] Low Income Cut-off; [‡] Low Income Measure; ^Ω Market Basket Measure
Modified From: Zhang, *Income Research Paper Series*, 2010.

LICO is the longest-standing low-income measure used by Statistics Canada and is the focus of this section of the report.

²⁸ Giles P. *Low income measurement in Canada*. Available at <http://www.statcan.gc.ca/pub/75f0002m/75f0002m2004011-eng.pdf>. Accessed January 2011.

The LICO is established in terms of both before- and after-tax income. In British Columbia, the proportion of families living beneath either cut-off has dropped steadily over the past decade. The population living below the After-Tax LICO fell 5% in absolute terms between 1999 and 2008, from 16.4% to 11.4%. Despite this encouraging picture of local progress, the provincial below-LICO prevalence has been consistently above the Canadian average every year during this same period.²⁹

Certain types of households are more likely than others to be below the LICO (see the following table). For example, families that include both preschoolers (under 6 years old) and school-aged children (6-17 years old) are consistently more likely to be below the LICO than families with children in only one of these categories. As well, families headed by single parents of either gender have the highest likelihood of being below the LICO. In fact, well over half of all single mothers with preschool children exist on an income below the LICO; the proportion drops when only school-aged children are being cared for, presumably because the mother is more available to work at paid employment (at least during school hours).

| Households Below LICO, Before and After Tax | | | | | |
|--|------------------|-----------------------|------------|----------------------|------------|
| By Family Structure, British Columbia, 2006 | | | | | |
| Households | Total Households | Low Income Before Tax | | Low Income After Tax | |
| | | Households | Prevalence | Households | Prevalence |
| Economic families | 1,112,805 | 148,255 | 13.3% | 109,800 | 9.9% |
| Couple families | 937,010 | 96,480 | 10.3% | 70,435 | 7.5% |
| With children under 6 years only | 77,455 | 9,825 | 12.7% | 7,415 | 9.6% |
| With children 6 to 17 years only | 143,185 | 19,225 | 13.4% | 14,905 | 10.4% |
| With at least one child in each age group, and no children over 17 | 51,155 | 8,830 | 17.3% | 6,515 | 12.7% |
| Married couple families | 804,025 | 81,405 | 10.1% | 59,615 | 7.4% |
| With children under 6 years only | 64,910 | 7,775 | 12.0% | 6,015 | 9.3% |
| With children 6 to 17 years only | 127,130 | 17,315 | 13.6% | 13,545 | 10.7% |
| With at least one child in each age group, and no children over 17 | 45,000 | 7,510 | 16.7% | 5,620 | 12.5% |
| Common-law couple families | 132,985 | 15,080 | 11.3% | 10,815 | 8.1% |
| With children under 6 years only | 12,550 | 2,050 | 16.3% | 1,400 | 11.2% |
| With children 6 to 17 years only | 16,055 | 1,910 | 11.9% | 1,360 | 8.5% |
| With at least one child in each age group, and no children over 17 | 6,155 | 1,320 | 21.4% | 890 | 14.5% |
| Female lone-parent families | 123,940 | 41,495 | 33.5% | 31,745 | 25.6% |
| With children under 6 years only | 9,610 | 6,100 | 63.4% | 5,030 | 52.4% |
| With children 6 to 17 years only | 42,265 | 17,230 | 40.8% | 12,865 | 30.4% |
| With at least one child in each age group, and no children over 17 | 6,765 | 4,575 | 67.6% | 3,760 | 55.6% |
| Male lone-parent families | 29,600 | 5,570 | 18.8% | 4,110 | 13.9% |
| With children under 18 years only | 13,120 | 3,215 | 24.5% | 2,410 | 18.4% |
| Persons in private households | 3,978,210 | 686,590 | 17.3% | 521,425 | 13.1% |
| Under 15 years | 660,925 | 131,045 | 19.8% | 99,335 | 15.0% |
| Under 6 years | 236,780 | 46,385 | 19.6% | 35,670 | 15.1% |
| 6 to 9 years | 174,475 | 35,755 | 20.5% | 26,830 | 15.4% |
| 10 to 14 years | 249,665 | 48,895 | 19.6% | 36,840 | 14.8% |
| 15 to 17 years | 163,755 | 30,415 | 18.6% | 23,255 | 14.2% |

Source: Statistics Canada, 2006 Census of Population, Statistics Canada catalogue no. 97-563-XCB2006028.

As a measurement of low income and the associated social disadvantage and health effects, the LICO represents a potentially useful approach. On the other hand, its utility is mitigated by the fact that no review articles were identified that examined the family-level pediatric

²⁹ *Low income cut-offs (1992 base) after tax*. 2009. Statistics Canada. Available at <http://www.statcan.gc.ca/pub/75f0002m/2009002/tbl/tbl-2-eng.htm>. Accessed November 2010.

health impacts of being below LICO, or the effect of living in a neighbourhood with a relatively high prevalence of below-LICO households. Partly because LICO is a metric peculiar to Statistics Canada, there is resistance to adopting it as an official definition of the often controversial concept of poverty. This may account for the reality that only two individual studies could be located in the literature that employed the idea of LICO, one examining the level of food insecurity in low-income, female lone-parent households and the other based on neighbourhoods categorized by LICO.^{30,31}

If LICO became more generally accepted as a tool, additional research on associated health effects would be valuable. It is quite possible, however, that LIM will supplant LICO to create more international comparability; this appears to have happened in the context of the child and youth health indicators scheme recently adopted in Ontario.³² For comparison purposes, the proportion of low income or impoverished children in B.C. over the last decade according to LIM calculations is provided in the following table. Interestingly, the most recent LIM-based information is similar to the estimate of children in households below the LICO that were provided earlier (at approximately 15%).

| Children Under 18 Years of Age in Low Income Circumstances British Columbia, Based on the Low Income Measure Percentage and Absolute Number Impacted, 2000-2008 | | |
|---|--|--|
| Year | Absolute Number of Impacted Individuals | Proportion of Pediatric Cohort Impacted |
| 2000 | 138,000 | 15.8% |
| 2001 | 142,000 | 16.5% |
| 2002 | 189,000 | 22.1% |
| 2003 | 181,000 | 21.4% |
| 2004 | 173,000 | 20.6% |
| 2005 | 165,000 | 19.7% |
| 2006 | 161,000 | 19.4% |
| 2007 | 148,000 | 17.9% |
| 2008 | 128,000 | 15.3% |
| Source: Statistics Canada. Cansim table 202-0802. | | |

Children in Families Receiving Social Assistance

Another indicator of economic disadvantage is receipt of social assistance. While there are many routes of social assistance, many only affect income indirectly by covering expenses that the household would otherwise be required to pay. This section will focus on routine forms of *direct* income assistance from the government, once commonly known as welfare; information on the distribution of such monies is typically well-tracked by the provincial ministry responsible, as suggested by the chart provided earlier in this section.

Receiving social assistance has the potential to be a useful indicator of certain aspects of child health and well-being, particularly with psychological and social impacts related to the stigma

³⁰ McIntyre L, Glanville NT, Officer S et al. Food insecurity of low-income lone mothers and their children in Atlantic Canada. *Canadian Journal of Public Health*. 2002; 93(6): 411-5.

³¹ Lemstra M, Neudorf C and Opondo J. Health disparity by neighbourhood income. *Canadian Journal of Public Health*. 2006; 97(6): 435-9.

³² See <http://www.children.gov.on.ca/htdocs/English/breakingthecycle/strategy/targets.aspx>

of requiring such support—a sure public sign of being manifestly poor.³³ Such effects do not pertain to LICO, for instance; to be below a theoretical cut-off line does not generate the same emotional or mental burden. In contrast, there is little way to escape the consciousness or reputation of being “on assistance.” However, little evidence was uncovered for negative pediatric health and well-being outcomes caused by being on social assistance per se. A recent Cochrane review of interventions involving financial assistance to low-income families in the developed world was consistent with this result:³⁴

...on the basis of current evidence we cannot state unequivocally whether financial benefits delivered as an intervention are effective at improving child health or wellbeing in the short term. Our conclusions are limited by the fact that most of the studies had small effects on total household income and that while no conditions were attached to how money was spent, all studies included strict conditions for receipt of payments.

Receipt of social assistance demonstrates other important limitations as a stable and valid indicator of income status and associated health effects. First, existing social assistance programs are designed to smooth over some of the worst socioeconomic disadvantages and health impacts experienced by heads of households and the children in their care; in short, government transfers tend to *decrease* the prevalence of child poverty in B.C. and other jurisdictions.³⁵ Second, the usefulness of tracking social assistance over time is limited. This is illustrated by the chart provided earlier in the section. The number of children on assistance dropped dramatically over the first part of the last decade, only to stabilize or rise slightly since 2007. The difficulty with evaluating such numbers, however, is that the volume of social assistance clients is not necessarily equivalent to the “true” need for such support. Social assistance distribution is controlled by government policy, with its availability shifting according to the overall economy and the priorities of the political party in power.

Another challenge of using social assistance as an indicator is that it is not a purely statistical measurement with universal and neutral application. Collecting government funds requires the family to subject themselves to the application process, means test, and so on; some families may opt out of the system altogether. The application process itself can have a negative effect on the entire family, causing additional stress or even depression in parents, engendering negative self-image in children, etc. For this reason, it is important to view the receipt of social assistance not merely as an indicator of child well-being, but rather as a potential causal risk factor in its own right.³⁶ As noted by one study, it must be acknowledged that “the dynamics of the relationship between social assistance, poverty and health are not well understood.”³⁷

³³ Robinson LM, McIntyre L, Officer S. Welfare babies: poor children's experiences informing healthy peer relationships in Canada. *Health Promotion International*. 2005; 20(4): 342-50.

³⁴ Lucas PJ, McIntosh K, Petticrew M et al. Financial benefits for child health and well-being in low income or socially disadvantaged families in developed world countries. *Cochrane Database Systematic Reviews*. 2006.

³⁵ BC Campaign 2000. *2009 Child Poverty Report Card*. 2009. Available at <http://www.campaign2000.ca/reportCards/provincial/BritishColumbia/2009ReportCard.pdf>. Accessed December 2010.

³⁶ Lucas PJ, McIntosh K, Petticrew M et al. Financial benefits for child health and well-being in low income or socially disadvantaged families in developed world countries. *Cochrane Database Systematic Reviews*. 2006.

³⁷ Phipps S, Curtis L. *Poverty and child well-being in Canada and the United States: Does it matter how we measure poverty?* 2000. Available at <http://www.ciln.mcmaster.ca/papers/2000/curtisphipps.pdf>. Accessed December 2010.

Conclusion

There is good evidence in the academic literature that economic disadvantage is a risk factor for a wide variety of physical, emotional, and social health problems in children. What is not clear, however, is how this can best be quantified in terms of an indicator. Discussion of income in the academic literature is often tied to socioeconomic status more generally. When analyzed on its own, income is routinely considered at a neighbourhood level rather than on a family basis; these two approaches actually represent different indicators, each potentially generating a different set of health associations.

Concepts such as the LICO and receipt of social assistance are two different ways of attempting to capture the concept of social disadvantage generated in some way by lack of material resources; as for the third concept originally assigned in this area, the lack of utility of Family Income per se was already identified earlier in this section. Each of the remaining approaches has good access to a data stream, but also demonstrates certain weaknesses in application. For example, an indicator based on LICO shows promise, but suffers from a lack of evidence of association with pediatric health and well-being. Given the intense policy issues around definitions of, and responses to, poverty, any theoretical construct generated by economists and statisticians (such as the LICO approach) will always require validation, and likely will engender ongoing debate.

| Summary Assessment | | | | | |
|--|--|-----------|---------------------|---------------|----------------------------|
| Children in Families Living Below the After-Tax LICO | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 0-17 | 144,000 | High | Medium | Medium | Medium-High |

As summarized above, assessments have been applied to cover the concepts directly related to income, specifically in terms of the indicator with at least some support in the literature, namely: *number of children in families living below the after-tax LICO*. Below, an assessment is also offered on an income-related but somewhat less direct measure, namely, the prevalence of children living in families on social assistance.

The pediatric population **Magnitude** of the potential indicator is assessed as **High**. Based on 2006 Census data for B.C., it is estimated that 15.1% of children aged 0-5 years, 15.4% of children aged 6-9 years, 14.8% of children aged 10-14 years, 14.2% of children age 15-17 years, and 14.0% of children aged 18-19 years live in families that fall below the after-tax LICO. When these proportions are applied to the 2010 B.C. pediatric cohort, the estimated prevalence of the indicator is 144,000. This is greater than 10% of the total pediatric population (97,000), resulting in a magnitude classification of High.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **Medium**. There is good evidence in the academic literature that economic disadvantage is a risk factor for a wide variety of physical, emotional, and social health problems in children. This evidence would normally result in a High rating. However, there is limited evidence for the specific association of pediatric health outcomes with living below the after-tax LICO.

The **Modifiability** of the potential indicator is assessed as **Medium**. In theory, modifying income levels of the population could be influenced by taxation policy, minimum wage rates, and so on. In practice, however, any changes are substantially influenced by, among other factors, politics and the health of the general economy.

Data Availability/Validity for the potential indicator is assessed as **Medium-High**. The LICO variable is based on data routinely collected via the Census, based on self-reported information of high validity.

Based on the indicated assessment, the potential indicator is **Recommended** for consideration as a core indicator of child health and well-being. Economic disadvantage affects approximately 15% of B.C.'s children and youth, and is a significant risk to their health and wellbeing. High quality data are routinely available to track trends in economic disadvantage as measured by the after-tax LICO. Finally, economic disadvantage at the population level can be modified, albeit the barriers to implementing interventions may be considerable.

| Summary Assessment | | | | | |
|--|--|-----------|---------------------|---------------|----------------------------|
| Children in Families Receiving Social Assistance | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 0-19 | 37,000 | Medium | Low | High | Medium |

As summarized above, assessments have also been applied to the Children in Families Receiving Social Assistance concept.

The pediatric population **Magnitude** of the potential indicator is assessed as **Medium**. Based on 2010 B.C. Ministry of Housing and Social Development data, the number of children in families receiving social assistance is 37,000. This is between 2 and 10% of the total pediatric cohort, resulting in a magnitude classification of Medium.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **Low**. Very little evidence was found for any association (positive or negative) between receipt of social assistance and child health and well-being.

The **Modifiability** of the potential indicator is assessed as **High**. The number of children in families receiving social assistance is substantially influenced by government policy.

Data Availability/Validity for the potential indicator is assessed as **Medium**. High quality data for this area are routinely available from the B.C. Ministry of Housing and Social Assistance. However, as noted earlier, trends in the number of children in families receiving social assistance is largely controlled by government policy (which also makes this indicator highly modifiable). This compromises the reliability of the data/indicator as a measure (over time) of economic disadvantage.

Based on the indicated assessments, the potential indicator is **Not Recommended** for consideration as a core indicator of child health and well-being. The main reasons are the weak evidence of pediatric health effects and the lack of reliability of the indicator as a consistent measure over time of economic disadvantage; as an additional consideration, there is the fact that the majority of children in families receiving social assistance would also be included in the recommended "below after-tax LICO" indicator.

Indirect Income Concepts

Parental Employment

Background and Context

The unemployment rate is commonly used as a key indicator of the health of the overall economy in a jurisdiction. The focus of this section will be on the basic notion of being employed (rather than unemployed). In other words, the *type of work* is not on the agenda. It is difficult to construct independent indicators of occupational status given the fluid job titles, the changing economic status of different work categories, and the confounding effect of variable pay levels. Moreover, occupational category or status is often included in discussions of socioeconomic status (see the relevant section earlier in the report). The substantial overlaps with topic covered in other sections should also be noted, including the employment challenges of lone parents (especially mothers), the potential solution to such problems afforded by adequate child care, and the family income effects and related health impacts when unemployment is experienced.

One difficulty in using parental employment as an indicator of child health and well-being is the constant shifts in the work profile of households. Considered over a longer timeframe, the structure of parental employment has changed as women have become more involved in the labour force; recently, it has been noted that this complement includes a growing percentage of women with young children, a phenomenon that raises its own personal and policy challenges.³⁸ Of course, these patterns are not only about personal choice and changing social norms; economic fluctuations of the past and present have also been a major driver of employment patterns—including the impact of housing prices and other aspects of the cost of living.

Beyond broader economic forces, parents may make employment decisions based on the ages of their children, the availability and quality of child care, and other factors related to their individual context. Whatever the various motivators and obstacles involved, the ultimate question remains: How does the basic reality of being employed or unemployed affect the health and well-being of children?

Methodology and Provisional Results

As described more fully in the section on Direct Income Concepts, it was appropriate and efficient to start by pursuing a literature scan of review papers in PubMed for all socioeconomic areas covered in this report. To accomplish this, the MeSH term “Socioeconomic Factors” was used, coordinated with an extensive list of health and well-being outcomes. For the purposes of this section, reviews pertinent to parental employment and childhood health were identified from the total list of 468 gleaned in that process.

For this **main electronic search**, the database used was PubMed, with the following limits:

Date: 2005-present *Language:* English *Subjects:* Human *Age:* 0-18 years*

Type of Article: Review, Meta-analysis

*While the protocol defines a child as 0-19 years of age, the search limit available in PubMed for All Child is 0-18 years, so this approximation was used.

³⁸ “Dreaming of a full and balanced life.” *Vancouver Sun*. March 8, 2011.

Electronic Search Keywords

“Socioeconomic Factors” [Mesh] **AND**

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR “Outcome Assessment (Health Care)”[Mesh] OR “Medicine/statistics and numerical data”[Mesh] OR “Hospital Departments/statistics and numerical data”[Mesh] OR “Quality of Life”[Mesh] OR “Personal Satisfaction”[Mesh])

The search processes returned 468 reviews for consideration.

Preliminary Exclusion

The articles were scanned *by title*, with articles not pertinent to the research topic being excluded; specifically, if the article did not appear to be investigating the association between child weight and physical health, then it was excluded. After completing this first exclusion process, the list of articles was reduced to 147.

Primary Exclusion

The abstracts and/or full versions of the 147 articles were then reviewed. Articles not pertinent to the research topic were excluded. There were 21 reviews remaining in the list following the primary exclusion.

Secondary Exclusion

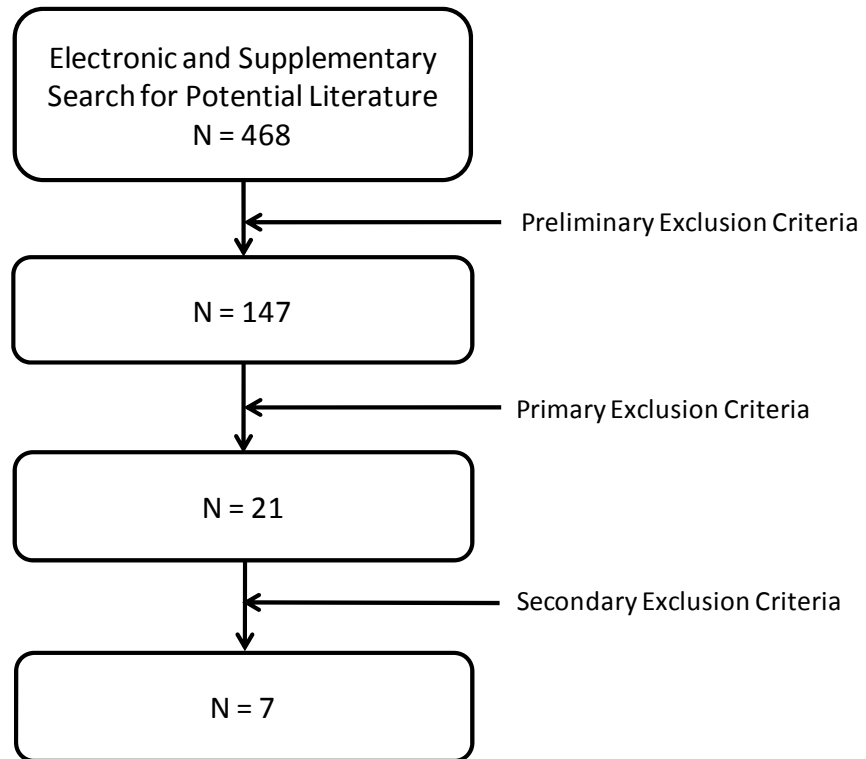
Systematic reviews that were deemed to be of lesser quality or usefulness were excluded, yielding a final total of 7 reviews, as indicated in the following Volume Report. The list of review papers is detailed in the table that follows. It will be clear that, given the limited literature available, liberal parameters were applied. Thus, some papers were included that examined the topic from the perspective of pediatric outcome rather than starting with the concept of parental employment/unemployment; likewise, information about employment effects were sometimes abstracted from reviews of broader SES themes. This meant that 3 papers overlapped with those that were used in the analysis of direct income concepts, and that the relevant studies considered here were drawn from a longer total list of studies covered by those review articles.

Supplementary Search Process

In addition to PubMed, a series of searches of the EBSCO Host set of databases was also carried out. However, no efficient search protocol could be found, since most of the academic literature deals with (parental) health as a determinant of employment, rather than the reverse.

Literature Review Volume Report: Reviews

Dimension: Economic and Material Well-Being ***Concept:*** Parental Employment



Summary of Relevant Reviews
Dimension: *Economic and Material Well-Being*
Concept: *Parental Employment*

| | Title of Review | Lead Author | Year | Journal | Journal Impact Factor (2005) | Year Range of Studies | No. of Studies |
|--|---|--------------------|-------------|--|-------------------------------------|------------------------------|-----------------------|
| <i>Mental, Social and Family Health</i> | | | | | | | |
| 1 | Maternal employment and children's achievement in context: a meta-analysis of four decades of research | Goldberg | 2008 | Psychological Bulletin | 9.75 | 1961-2005 | 68 |
| 2 | Understanding the ecology of child maltreatment: a review of the literature and directions for future research | Freisthler | 2006 | Child Maltreatment | 2.61 (2009) | 1978-2004 | 11* |
| <i>Physical Activity and Obesity</i> | | | | | | | |
| 3 | Maternal employment and indicators of child health: a systematic review in pre-school children in OECD countries | Mindlin | 2009 | Journal of Epidemiology and Community Health | 3.00 | 1981-2007 | 21 |
| 4 | Environmental correlates of physical activity in youth - a review and update | Ferreira | 2007 | Obesity Reviews | 5.09 (2009) | 1996-2004 | 13* |
| 5 | A review of risk factors for overweight in preschool children: A policy perspective | Hawkins | 2006 | International Journal of Pediatric Obesity | 2.00 (2009) | 1999 | 2* |
| <i>Injuries</i> | | | | | | | |
| 6 | Correlation between socioeconomic indicators and traumatic dental injuries: a qualitative critical literature review | Bendo | 2009 | Dental Traumatology | 0.72 | 2000-2006 | 3* |
| <i>Cardiovascular Disease</i> | | | | | | | |
| 7 | Systematic review of the influence of childhood socioeconomic circumstances on risk for cardiovascular disease in adulthood | Galobardes | 2006 | Annals of Epidemiology | 2.29 | 1961-2005 | 22* |
| * Relevant studies selected from a larger total number | | | | | | | |

Detailed Results

For the 7 reviews identified by the literature search and exclusion process, a summary table of results was developed, as follows.

| Dimension: <i>Economic and Material Well-being Concept: Parental Employment</i> | | | |
|---|---|----------------------------|--|
| Summary Table of Review Papers | | | |
| Lead Author | Review Title | Number of Studies Reviewed | Conclusions/Comments |
| <i>Mental, Social, and Family Health</i> | | | |
| Goldberg (2008) | Maternal employment and children's achievement in context: a meta-analysis of four decades of research | 68 | There was no significant difference in the academic performance of children whose mother worked compared with those whose mother did not. Part time maternal employment was found to actually be beneficial in this regard. |
| Freisthler (2006) | Understanding the ecology of child maltreatment: a review of the literature and directions for future research | 11* | Unemployment in a neighbourhood, especially among males, was found to correlate with increased levels of child maltreatment. Suggested mechanisms include working families being more connected to social support systems, as well as experiencing less socioeconomic stress. Ability to hold a job could also be considered an indicator of general competence, which may include competent parenting that would thus represent a confounding factor. |
| <i>Physical Activity and Obesity</i> | | | |
| Mindlin (2009) | Maternal employment and indicators of child health: a systematic review in pre-school children in OECD countries | 21 | <i>Overweight:</i> Maternal employment was found to be correlated with child overweight, with higher rates of overweight when mothers worked more hours per week. Higher family income actually exaggerated this effect. <i>Vaccination:</i> Vaccination programme compliance was at least as high, or higher, in employed mothers, compared with unemployed mothers. |
| Ferreira (2007) | Environmental correlates of physical activity in youth – a review and update | 13* | One study found parental unemployment to be correlated with lower physical activity in girls. Employed status of household head, father, or mother all appear to be moderately related to increased physical activity, although some studies found no connection. |
| Hawkins (2008) | A review of risk factors for overweight in preschool children: A policy perspective | 2* | The two pertinent studies examined found an increased likelihood of obesity among children whose mothers worked full time. |
| <i>Injuries</i> | | | |
| Bendo (2009) | Correlation between socioeconomic indicators and traumatic dental injuries: a qualitative critical literature review | 3* | One study out of three dealing with parental employment found a significant relationship between unemployment and traumatic dental injuries in children. Studies dealing with other measures of SES found similar correlations. |
| <i>Cardiovascular Disease</i> | | | |
| Galobardes (2006) | Systematic review of the influence of childhood socioeconomic circumstances on risk for cardiovascular disease in adulthood | 22* | Individual studies found a correlation between paternal unemployment during childhood and greater risk of coronary heart disease in men, and between non-working mothers and myocardial infarction in both men and women. The studies, however, did not always control for income and socioeconomic status more generally. |
| *Studies most pertinent to the parental income concept selected from a broader complement | | | |

Bibliography for Table of Reviews

Goldberg WA, Prause J, Lucas-Thompson Ret al. Maternal employment and children's achievement in context: a meta-analysis of four decades of research. *Psychological Bulletin*. 2008; 134(1): 77-108.

Freisthler B, Merritt DH and LaScala EA. Understanding the ecology of child maltreatment: a review of the literature and directions for future research. *Child Maltreatment*. 2006; 11(3): 263-80.

Mindlin M, Jenkins R, Law C. Maternal employment and indicators of child health: a systematic review in pre-school children in OECD countries. *Journal of Epidemiology and Community Health*. 2009; 63(5): 340-50.

Ferreira I, van der Horst K, Wendel-Vos Wet al. Environmental correlates of physical activity in youth - a review and update. *Obesity Reviews*. 2007; 8(2): 129-54.

Hawkins SS, Law C. A review of risk factors for overweight in preschool children: a policy perspective. *International Journal of Pediatric Obesity*. 2006; 1(4): 195-209.

Bendo CB, Scarpelli AC, Vale MP et al. Correlation between socioeconomic indicators and traumatic dental injuries: a qualitative critical literature review. *Dental Traumatology*. 2009; 25(4): 420-5.

Galobardes B, Smith GD, Lynch JW. Systematic review of the influence of childhood socioeconomic circumstances on risk for cardiovascular disease in adulthood. *Annals of Epidemiology*. 2006; 16(2): 91-104.

Summary of Results

Physical Health Outcomes

Parental unemployment appears to have distinct but limited physical health effects for children. Ferreira et al. found some evidence of lowered physical activity in girls with unemployed parents, but no effect in boys.³⁹ Bendo et al. described the connection between parental unemployment and traumatic dental injuries seen in a small number of studies. This very specific type of trauma is mirrored in individual studies offering a broader examination of all injuries; for example, Edward et al. report a drop in the number of deaths from injury and poisoning in UK children since 1981, *except* in families with no employed parents.^{40,41} In addition to these acute effects, Galobardes et al. found an increased risk of the chronic condition of cardiovascular disease developing in the progeny of unemployed parents, particularly sons.⁴²

While most of these outcomes were echoed in studies that used other measures of socioeconomic status, the direct effects of parental unemployment should not be ruled out. As one confirmation of such an association, Reinhardt Pedersen et al. found parental labour market participation to be a strong indicator of pediatric health and well-being in a cross-sectional study of Nordic children aged 2-17 years. Children with no parents employed in the past six months were found to have significantly poorer general health, a result that held despite the varying levels of unemployment and social benefits among Nordic countries. The authors note that this effect may be attributed to mental distress arising from adverse psychosocial factors, such as “decreased social status, disruption of family roles, loss of self esteem and increased financial strain.”⁴³ If the latter interpretation of “poor health” is true, then this study may have more bearing on the matter of non-physical health outcomes (see below).

Finally, some reviews examined the physical health of children in relation to maternal employment. A particular area of focus seems to be childhood obesity. Although results were not always statistically significant, reviews by Mindlin et al. and Hawkins and Law came to a general consensus that children with mothers working full time were more likely to be obese, compared to those whose mothers worked only part time or not at all.^{44,45} Providing an interesting counterpoint to this finding, however, the review by Mindlin et al. observed that vaccination rates were higher among children of working mothers. This adds weight to the suggestion that some disadvantages of decreased maternal attention may be offset by the

³⁹ Ferreira I, van der Horst K, Wendel-Vos W et al. Environmental correlates of physical activity in youth - a review and update. *Obesity Reviews*. 2007; 8(2): 129-54.

⁴⁰ Bendo CB, Scarpelli AC, Vale MP et al. Correlation between socioeconomic indicators and traumatic dental injuries: a qualitative critical literature review. *Dental Traumatology*. 2009; 25(4): 420-5.

⁴¹ Edwards P, Roberts I, Green J et al. Deaths from injury in children and employment status in family: analysis of trends in class specific death rates. *British Medical Journal*. 2006; 333(7559): 119.

⁴² Galobardes B, Smith GD, Lynch JW. Systematic review of the influence of childhood socioeconomic circumstances on risk for cardiovascular disease in adulthood. *Annals of Epidemiology*. 2006; 16(2): 91-104.

⁴³ Reinhardt Pedersen C, Madsen M. Parents' labour market participation as a predictor of children's health and wellbeing: a comparative study in five Nordic countries. *Journal of Epidemiology and Community Health*. 2002; 56(11): 861-7.

⁴⁴ Mindlin M, Jenkins R, Law C. Maternal employment and indicators of child health: a systematic review in pre-school children in OECD countries. *Journal of Epidemiology and Community Health*. 2009; 63(5): 340-50.

⁴⁵ Hawkins SS, Law C. A review of risk factors for overweight in preschool children: a policy perspective. *International Journal of Pediatric Obesity*. 2006; 1(4): 195-209.

increased availability of social support systems and/or household resources to better attend to pediatric health care. This would help to explain the mix of positive and negative effects on child health and well-being that maternal employment appears to generate.

Emotional and Social Health Outcomes

One important area of emphasis beyond the physical health effects of parental employment is child academic performance. While there are a large number of factors that contribute to academic success, it has been suggested that maternal employment may play a unique role. For example, in a 2002 study Brooks-Gunn et al. found that, when mothers worked 30 or more hours per week within the first 9 months after a birth, the child was likely to have lower school readiness scores at 36 months. This result held even when controlling for other factors, such as child-care quality, home environment, and maternal sensitivity.⁴⁶ In contrast with this one particular study, however, the review by Goldberg et al. found no significant difference in the academic performance of children whose mothers worked. In fact, part-time maternal employment provided a slight benefit in this regard. In situations where there is a partner also providing income, part-time maternal work could reflect a positive work-life balance, providing for relatively high income as well as preservation of mother-child interactions.⁴⁷

The review by Freisthler et al. also considered maternal employment, albeit indirectly. They report on measurements of non-parental child care exposure in terms of the percentage of women in the workforce. Although higher rates of employed women generally might be expected to correlate with higher rates of adverse experiences among children, the authors actually found that rates of child maltreatment, including physical and sexual abuse, were *reduced* when more women in a neighbourhood worked outside of the home. One possible explanation for this is that working gives women access to social support and other neighbourhood resources (including adequate child care) that would otherwise be inaccessible. It is also possible that labour force participation can be considered a marker of general personal competence that translates into more effective parenting.⁴⁸

Another finding in the review by Freisthler and colleagues was that unemployment, particularly male unemployment, may exert a strong negative influence on family relationships, one that extends beyond any economic ramifications. Child maltreatment in neighbourhoods was consistently found to rise in step with male unemployment. This is possibly the result of negative social and psychological effects, in turn creating negative fathering experiences for children; it is also possible that mothers in such instances were forced to work longer hours, further affecting the family dynamic and the quality of parenting.

⁴⁶ Brooks-Gunn J, Han WJ, Waldfogel J. Maternal employment and child cognitive outcomes in the first three years of life: the NICHD Study of Early Child Care. National Institute of Child Health and Human Development. *Child Development*. 2002; 73(4): 1052-72.

⁴⁷ Goldberg WA, Prause J, Lucas-Thompson R et al. Maternal employment and children's achievement in context: a meta-analysis of four decades of research. *Psychological Bulletin*. 2008; 134(1): 77-108.

⁴⁸ Freisthler B, Merritt DH and LaScala EA. Understanding the ecology of child maltreatment: a review of the literature and directions for future research. *Child Maltreatment*. 2006; 11(3): 263-80.

Data Sources on Parental Employment

Census

A standard source for information concerning employment in Canada is the Census. The Census is distributed every five years, and is intended to collect data from every household in the country. The resulting information generates the most complete statistical picture of Canada; for the present purpose, this includes a detailed examination of family structure and employment, as well as related themes such as income. The 2006 Census data indicated that there were an estimated 41,023 children living in homes with at least one unemployed parent, or 3.83% of children.⁴⁹ The proportion of children living in a home with an unemployed parent is substantially higher if the home is headed by a single parent (9.77%), compared to situations in which the parent(s) have been ever-married or living common-law (3.48%).

| Employment Status of Parents with Children By Marital Status, British Columbia, 2006 | | | | | | | | |
|---|-----------------|----------------|---------------|---------------------|------------------|------------------|-----------------------------------|--------------|
| | In Labour Force | Employed | Unemployed | Not in Labour Force | Total | Total Children | Children in Unemployed Situations | |
| | | | | | | | Total | Proportion |
| Ever-Married or Common-law | 899,270 | 858,740 | 40,535 | 247,805 | 1,147,080 | 1,011,400 | 35,213 | 3.48% |
| Never Married (Single) | | | | | | | | |
| Female | 25,305 | 22,290 | 3,015 | 8,715 | 34,020 | 48,995 | 4,680 | 9.55% |
| Male | 6,275 | 5,450 | 825 | 1,505 | 7,780 | 10,500 | 1,130 | 10.76% |
| Sub-Total | 31,580 | 27,740 | 3,840 | 10,220 | 41,800 | 59,495 | 5,810 | 9.77% |
| Total with Children at Home | 930,850 | 886,480 | 44,375 | 258,025 | 1,188,880 | 1,070,895 | 41,023 | 3.83% |

The Census and other Statistics Canada data are also the primary source for the official unemployment rate, the most commonly referenced measurement of unemployment. However, in many ways the official unemployment rate is an imperfect measurement. As commentators have pointed out, certain categories of people are omitted from these calculations, causing the size of the labour force, and therefore also the actual unemployment rate, to be underestimated. Would-be workers who are not actively seeking a job, because of discouragement or a lack of appropriate openings, are one such category. “Underemployed” workers—those who are qualified for higher pay or more hours of work, but are not currently receiving it—are also counted as employed, further lowering the unemployment rate, even though the individuals involved are likely unsatisfied with their position in the labour force.

It is unclear how much of an effect these factors have on the use of parental employment as an indicator of child health, but they at least suggest further caution in using the unemployment rate for this purpose.

⁴⁹ Statistics Canada. 2006 Census. Available at <http://www12.statcan.ca/census-recensement/2006/dp-pd/tbt/Rp-eng.cfm?TABID=1&LANG=E&APATH=3&DETAIL=0&DIM=0&FL=A&FREE=0&GC=0&GID=838062&GK=0&GRP=1&PID=92109&PRID=0&PTYPE=88971.97154&S=1&SHOWALL=0&SUB=0&Temporal=2006&THEME=67&VID=0&VNAMEE=&VNAMEF=&D1=0&D2=0&D3=0&D4=0&D5=0&D6=0>. Accessed February 2011.

Note that the definition of children as defined by Statistics Canada for this purpose does include an upper age limit. Therefore, included in the analysis, for example, could be children over the age of 19 who are still living at home.

National Longitudinal Study of Children and Youth

The National Longitudinal Study of Children and Youth (NLSCY) is a long-term study of the development of Canadian children, and thus a unique tool for understanding the factors affecting the well-being of children. Data are collected biennially, with the survey targeting younger children and tracking them until adulthood.⁵⁰ Among many other topics, the NLSCY collects information about parent labour force participation, including hours worked per week, whether parents work weekends, and number of jobs held. Unemployed status is determined by asking how many weeks out of the past year the parent has worked, as well as the prime reason for not working in the remaining weeks. While potentially useful with respect to the present topic, and particularly the sub-concept of too many work hours, the pertinent data from this survey do not seem to be readily available.

Discussion

The evidence for a connection between parental employment and child health and well-being falls into two categories: firstly, where unemployment is the issue being studied; and, secondly, the situation where parents may in fact be working too much. Unemployment tends to lead to lower household income and increased likelihood of receiving social assistance (especially when employment insurance benefits are depleted); however, this does not automatically mean that the effects of unemployment are fully explained by the sort of income mediators discussed above. As outlined in the Summary of Results, there are negative effects of unemployment on the physical and mental health of children that may have causes not related to income per se. Unemployment, especially male unemployment, introduces psychological stresses into a home (and into parenting) that may result in: short-term maltreatment or neglect of children; the development of pediatric obesity (though some of the data are weaker here); and longer-term conditions (such as heart disease) once the offspring grow into adulthood.

The second suggested pathway through which employment may affect children involves the idea that employed parents, and especially employed mothers, can potentially do more harm than good by working too many hours. A large subset of the recent academic literature concerning parental employment has this theme as a focus. The general conclusion of these studies, as noted in the reviews led by Mindlin and Hawkins, is that there is a limit to how much parents can work before the benefits of additional income are offset by the disadvantages of inadequate parental attention, especially in important health-related matters such as nutrition and pediatric exercise.

Some studies considered by reviewers Ferreira et al. and Galobardes et al. also examined occupational status as an indicator of child health. This sub-concept corresponds with traditional definitions of social class first devised in the UK. The health impact of different types of work is likely mediated by varying income levels, though it could also be tied to the job satisfaction and/or social prestige experienced by the employed parent. As noted in the Background and Context section, given the fluidity of job categories in the contemporary world and the confounding effect of household income, these lines of investigation were not a focus of the present project. Furthermore, the issue of occupational status arguably should be considered under the concept of SES, given that it is one of the classic components that enter

⁵⁰ *National Longitudinal Survey of Children and Youth (NLSCY)*. 2010. Statistics Canada. Available at <http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=4450&lang=en&db=imdb&adm=8&dis=2>. Accessed November 2010.

into considerations of SES and into the construction of an index of deprivation that seeks to integrate such components.

Conclusion

Parental employment and unemployment impact pediatric health in ways that to some extent act independently of income. The literature suggests that the effects of parental employment on the well-being of children are related to problems at two ends of a spectrum, that is, either too little employment or too many work hours. Ultimately, evidence for the health effects of parental unemployment are more substantial, and population data for this sub-concept are more routinely available, making it the stronger candidate for consideration as a core indicator.

| Summary Assessment | | | | | |
|----------------------------------|--|-----------|---------------------|---------------|----------------------------|
| Children with Unemployed Parents | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 0-19 | 37,167 | Medium | Medium | Medium | Medium-High |

As summarized above, assessments have been applied to the Parental Employment concept, specifically in terms of the indicator with the most compelling support in the literature, namely: *proportion of children with parents in unemployed circumstances*.

The pediatric population **Magnitude** of the potential indicator is assessed as **Medium**. This is based on an estimate of 37,167 with at least one parent unemployed (calculated as 3.83% of the total 2010 BC pediatric population of 970,420); falling into the range of 2 to 10% of the pediatric cohort, the appropriate rating is Medium.

The **Significance** of the potential indicator as indicated by the evidence of impact on an child's health and well-being is assessed as **Medium**. There are both physical health effects and psychological stresses associated with parental unemployment; a *causal* linkage to such effects is less well established.

The **Modifiability** of the potential indicator is assessed as **Medium**. In theory, adjusting unemployment levels in the population could be influenced by job creation and/or increasing the capacity of parents (especially lone parents) to work. In practice, however, any changes are substantially influenced by, among other factors, politics and the health of the general economy. Another issue involves matching the skills of the unemployed with available jobs. As suggested here, parental unemployment appears to be significantly correlated with the challenges faced by lone parent families, the next concept to be covered in this report.

Data Availability/Validity for the potential indicator is assessed as **Medium-High**. While Census data are available related to the number of unemployed individuals with children at home, data on the actual number of children with unemployed parents is not easily accessible and therefore will need to be estimated.

Based on the indicated assessment, the potential indicator is **Recommended** for consideration as a core indicator of child health and well-being. The rationale for this is the reasonably high rating across all assessment categories. While overlapping with income concerns, the

evidence supports mechanisms influencing well-being that extend beyond receiving a paycheque.

Lone Parent Families

Background and Context

The purpose of this review was to find research evidence of an association between lone parent families and child health and well-being. The reasons for lone parenthood—also referred to as sole parenthood or single parenthood—include never having partnered, having separated and/or divorced, and being widowed. The effects of single parenthood on children have been widely studied in the literature; child outcomes that have been suggested for a lone parent family structure include poor academic achievement, behavioural problems/delinquency, depression, difficult social relations, and poor physical health.

While there is a range of reasons why child well-being might be affected by living in lone parent families, poverty is considered the key driver for many of the adverse outcomes. The single-parent household is likely to have less income than a two-parent household, resulting in fewer material goods and higher levels of parental stress, both of which can adversely affect the children involved. Between 35% and 65% of lone parent families live below the “poverty line” (depending in part on how it is defined); lone parent families also tend to have lower salaries, higher unemployment rates, and higher rates of social assistance utilization, as well as being less likely to own their own homes—which can result in a larger proportion of their monthly income being spent on housing rather than on other necessities.⁵¹

Other issues faced by lone parent families that may result in adverse outcomes for the child include the following:^{52,53}

- Less contact with the non-custodial parent and loss of extended family networks
- Parental separation resulting in a wide variety of changes to a child’s living situation, including less regular contact with social networks (for example, if living part-time in two different neighbourhoods)
- Exposure to open parental conflict in the post-separation period
- Exposure to various forms of social stigmatization at school, in other peer groups, and in family settings

The adverse effects of being part of a single-parent family may continue into adulthood; there is evidence of a greater likelihood that adults who have spent time as a child in a lone parent family will be unemployed, have a child outside of marriage, have marital problems and eventually divorce, gain a criminal record, and achieve lower educational levels.⁵⁴

⁵¹ Ambert A. *One parent families: Characteristics, causes, consequences, and issues*. 2006. Vanier Institute of the Family. Available at <http://www.vifamily.ca/node/396>. Accessed December 2010.

⁵² Chapple S. *Child well-being and sole-parent family structure in the OECD: An analysis*. 2009. OECD. Available at <http://www.policypointers.org/Page/View/9079>. Accessed December 2010.

⁵³ Ambert A. *One parent families: Characteristics, causes, consequences, and issues*. 2006. Vanier Institute of the Family. Available at <http://www.vifamily.ca/node/396>. Accessed December 2010.

⁵⁴ Ambert A. *One parent families: Characteristics, causes, consequences, and issues*. 2006. Vanier Institute of the Family. Available at <http://www.vifamily.ca/node/396>. Accessed December 2010.

In the last few decades, rates of sole parenthood have generally been rising in OECD countries, to a point where they now represent a large portion of the population. In Canada, 25.8% of all families with children were lone parent families in 2006, compared to 16.6% in 1981.⁵⁵ The 2006 Census data for British Columbia indicate that the provincial rate, at 25.7%, was nearly identical to the Canadian average. There were 175,170 lone parent families in the province that year, with a total of 262,570 children living at home with these families (see following table).⁵⁶ This represents 21.8% of all children in the province. The 21.8% is lower than the proportion of lone parent families (25.7%) as lone parent families tend to have fewer children on average (1.50) compared to couple families (1.85). An important caveat to note about these numbers is that “children” living at home is not restricted to 0-19 year-olds.

| Children in Lone Parent Families | | | | | |
|--|-----------------|----------------------|--------|---------|-----------|
| Number and Proportion of Children | | | | | |
| British Columbia, 2006 | | | | | |
| | Couple Families | Lone Parent Families | | Total | Total |
| | | Female | Male | | |
| Number of children at home | | | | | |
| 1 | 194,830 | 84,820 | 23,675 | 108,495 | 303,325 |
| 2 | 218,865 | 41,330 | 8,965 | 50,295 | 269,160 |
| 3+ | 93,160 | 13,620 | 2,760 | 16,380 | 109,540 |
| Total families with children at home | 506,855 | 139,770 | 35,400 | 175,170 | 682,025 |
| Total children at home | 939,565 | 212,025 | 50,545 | 262,570 | 1,202,135 |
| Avg # of children at home | 1.85 | 1.52 | 1.43 | 1.50 | 1.76 |
| Proportion of all children in lone parent families | | | | 21.8% | |

Methodology and Provisional Results

Review Search Process

For the electronic search for reviews in this area, the initial database used was PubMed, using MeSH terms and based on the following limits:

Date: 2005-present *Language:* English *Subjects:* Human *Age:* 0-18 years*

Type of Article: Review, Meta-analysis

*While the protocol defines a child as 0-20 years of age, the search limit available in PubMed for All Child is 0-18 years, so this approximation was used.

Search Keywords

(“Single Parent” OR “Single-Parent Family”) AND

⁵⁵ Canadians in Context – Households and Families. Human Resources and Skills Development Canada. Available at http://www4.hrsdc.gc.ca/.3ndic.1t.4r@-eng.jsp?iid=37#M_4 . Accessed December 2010.

⁵⁶ See ‘Families and Households’ topic-based tabulations at <http://www12.statcan.gc.ca/census-recensement/2006/rt-td/fam-eng.cfm>

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR "Outcome Assessment (Health Care)"[Mesh] OR "Medicine/statistics and numerical data"[Mesh] OR "Hospital Departments/statistics and numerical data"[Mesh] OR "Quality of Life"[Mesh] OR "Personal Satisfaction"[Mesh])

This search only returned 2 reviews in total for further consideration, so a supplementary search for recent individual studies was deemed to be necessary.

Supplementary Search Process

An additional search by means of the EBSCO Host service was performed to identify relevant papers. All databases were included in the search. In EBSCO, studies and reviews cannot be separated accurately (as "review" in EBSCO parameters actually refers to reviews of books); thus this single integrated search was used to identify additional reviews as well as recent studies (2009 or later). Of additional note, Medline was included in this search process, so a secondary search for applicable studies in that source (via PubMed) was not required.

The following limits were selected for the EBSCO search:

Date: 2005-present *Major Heading:* Health Status, Single Parent, Family Structure

Search Keywords

("lone-parent" OR "single-parent" OR "family structure") AND ("child" OR "youth" OR "adolescent") AND ("health" OR "well-being" OR "perceived health")

This search returned 277 papers, yielding 279 in total potential sources when the two reviews found earlier were included.

An additional informal search for literature was also part of the process, involving:

- The PubMed "Related citations" utility
- A scan in Google for grey literature and for any obvious articles missed, using terms such as: (**lone parent** OR **family structure**) AND (**child** OR **adolescent** OR **youth**) AND (**health** OR **well-being**)
- Hand-searching bibliographies of key papers
- Checking for study updates (by author)

Preliminary Exclusion

The 279 identified articles were scanned *by title* by two reviewers working individually, with articles not pertinent to the research topic being excluded; specifically, if the article did not appear to be investigating the association between lone-parents and a health outcome(s) or measure of well-being (psychological or other) in children, then it was excluded.

After completing this first exclusion process, the list of articles was reduced to 35.

Primary Exclusion

The abstracts were then reviewed, with articles not pertinent to the research topic being excluded; specifically, if the article did not link 'lone-parents' or 'family structure' with health or well-being outcome(s) in children, it was excluded. If there was uncertainty as to whether an article should be excluded, the reviewers discussed the matter further to reach a consensus.

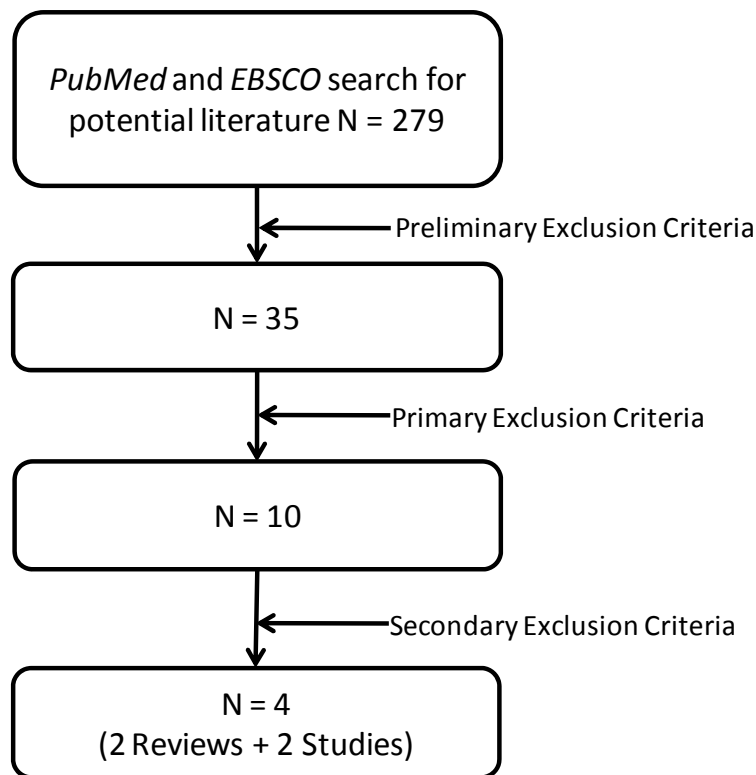
There were 10 articles remaining following primary exclusion, including both of the review articles and more recent studies (published since the reviews).

Secondary Exclusion

Full-text versions of each of the remaining articles were examined. Ultimately, a total of 2 studies and 2 reviews were deemed to be of relevance and therefore retained for the present analysis; helpfully, the complement included an extensive grey literature report.

Literature Volume Report: Studies and Reviews

Dimension: Economic and Material Well-being **Concept:** Lone Parent Families



Summary of Relevant Studies and Reviews

Dimension: *Economic Health and Well-being*

Concept: *Lone Parent Families*

| Journal Impact | | | | | | | | | | Conflict of Interest |
|---|----------------|------|---|-----------------------|-----------------------------|--|---|-------------|------------|----------------------|
| Title of Study | Primary Author | Year | Journal | Factor | Type of Study | Sample Size | Sample Population | Location | | |
| Studies | | | | | | | | | | |
| 1 The health of children in sole-parent families in New Zealand: results of a population-based cross-sectional survey | Tobias | 2010 | Australian and New Zealand Journal of Public Health | 1.35 | Cross-sectional survey | 1,783 | Children aged 0-14 years and adults aged 15+ | New Zealand | Not Stated | |
| 2 Changes in family structure and the well-being of British children: evidence from a fifteen-year panel study | Robson | 2010 | Child Indicators Research | 1.36 | Retrospective data analysis | Data varies year on year (between 750 and 1,500) | British Youth Panel (ages 11-15) data from 1994 to 2008 | England | Not Stated | |
| Reviews | | | | | | | | | | |
| Title of Review | Primary Author | Year | Journal | Year Range of Studies | Number of Studies | | | | | |
| Reviews | | | | | | | | | | |
| 1 Child well-being and sole-parent family structure in the OECD: An analysis | Chapple | 2009 | N/A | | 122 | | | | | |
| 2 Father absence and adolescent development: a review of the literature | East | 2006 | Journal of Child Health Care | 1997-2004 | 13 | | | | | |

Detailed Results

For the 2 studies identified through the literature search and exclusion process, a summary table was developed, as provided below.

| Dimension: <i>Economic and Material Well-being Concept: Lone Parent Families</i> | | | | | | | |
|--|--|--|--|--|--|---|--|
| Summary Table of Studies | | | | | | | |
| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
| Tobias (2010) | To investigate if children in sole-parent families bear excess risks related to poor mental or physical health compared to children in two-parent families | Through a questionnaire applied to children of single-mothers and partnered-mothers, determine physical health summary scores and psychosocial health summary scores | New Zealand 502 children (5-14 years) of sole-mothers and 1,281 children of partnered mothers | New Zealand Health Survey -child questionnaire, answered by primary caregiver -adult questionnaire | -Physical health summary score (PhS) -Psychosocial health summary score (PsS) | -Children of sole mothers were 1.26 times more likely to return a low PhS score than children of partnered mothers -Children of sole mother were more than twice as likely as children of partnered mother to return a low PsS score | There is a weak negative association between sole-parenting and child physical health; a much stronger connection is seen with child mental health. This mental health correlation is likely to be at least partly mediated by poorer mental health of sole parents. |
| Robson (2010) | To examine how changes in family structure influence the well-being of young people | Use 15 years of data to model well-being outcomes in British children | England -children aged 11-15 years -ranging from 750 to about 1,500 individuals per year | British Household Panel Survey (1994-2008) -longitudinal annual household survey | - Happiness, self-esteem, household income, family structure changes | - There is evidence that family structure impacts on the happiness, self-esteem and household incomes of young people. -Leaving a two-parent form of family for any other form is correlated with a negative effect on happiness and self-esteem | Movement away from two-parent families (towards either lone-parent or step-parent) has a negative impact on youth well-being. |

Bibliography for Table of Studies

Tobias M, Kokaua J, Gerritsen S et al. The health of children in sole-parent families in New Zealand: results of a population-based cross-sectional survey. *Australian and New Zealand Journal of Public Health*. 2010; 34(3): 274-80.

Robson K. Changes in family structure and the well-being of British children: evidence from a fifteen-year panel study. *Child Indicators Research*. 2010; 3(1): 65-83.

For the 2 reviews identified through the literature search and exclusion process, a summary table was developed, as provided below.

| Dimension: <i>Economic and Material Well-being Concept: Lone Parent Families</i> | | | |
|--|--|----------------------------------|--|
| Summary Table of Reviews | | | |
| Lead Author | Review Title | Number of Studies Reviewed | Conclusions/Comments |
| East (2010) | Father absence and adolescent development: a review of the literature | 13 | The research suggests that father absence is an independent predictor of detrimental psychological well-being and life adversity of developing children and adolescents. |
| Chapple (2009) | Child well-being and sole-parent family structure in the OECD: An analysis | 122 international investigations | The average negative effect of sole parenthood on child well-being is small; the better quality of the study, the smaller the effect size found. Effect sizes varied by country, but it was not possible to link this systematically to differences in policies. There is no justification yet for radical changes in policy; while the literature on sole parenthood and child well-being is extensive and growing in sophistication, there lacks a clear consensus on causal effect. |

Bibliography for Table of Reviews

OECD. *Child well-being and sole-parent family structure in the OECD: An analysis*. 2009. Available at <http://www.policypointers.org/Page/View/9079>. Accessed December 2010.

East L. Father absence and adolescent development: a review of the literature. *Journal of Child Health Care*. 2006; 10(4): 283-95.

Summary of Results

The Organisation for Economic Co-operation and Development (OECD) report by Chapple is a substantial meta-analysis and literature review that addresses two questions: (i) Is there a causal effect on well-being linked to being brought up in a lone parent family; and (ii) How large is the effect? The report offers a substantial comparison across OECD countries. The meta-analysis concludes that the average negative effect of sole-parenthood on child well-being is small, consistent with earlier reviews of (mainly) U.S.-based studies. The author also points out that being raised in a single-parent family could have positive effects compared to any prior situation where the (now absent) parent used to be abusive, created an environment with a high amount of conflict, had alcohol or drug abuse problems, was prone to criminal behaviour, etc. The majority of the literature on single-parent families, however, focuses on *adverse* effects of this family structure. With regard to general question of etiology, Chapple states that the literature “lacks a clear consensus on the existence of a causal effect.”⁵⁷

The review by East et al. examined the literature on father absence, particularly with respect to adolescent well-being and development. Father absence is defined by the reviewers as “existing where the father is not resident in the family home because of parental turmoil, parental relationship instability or breakdown of the parental relationship.” The authors determined that there are many gaps in the literature, including an explanation for why the absence of fathers can cause adverse behavioural disturbances in the children left behind. Overall, they conclude that father absence contributes significantly to life adversity factors such as poor academic achievement, maladaptive behaviour, low self-identity, and risk behaviour.

The two studies reviewed for this section both concluded that sole-parenting results in a negative impact on child well-being. Tobias et al. found that children living in sole-parent families have about twice the risk of poor mental health compared to their counterparts in two-parent families; the authors determined this is almost entirely explicable by the “multiple and persistent social and economic disadvantages often experienced by these children”.⁵⁸ There was only a weak negative association with child physical health.

Data Sources for Lone Parent Families

The Canadian Census is completed every 5 years, with the most recent round dating to 2006, which means the next one is imminent. The Census is the most fundamental source of information about the country and its society; according to the Statistics Act of 1918, every Canadian household is required to complete a questionnaire.

Based on 2006 Census data, 21.8% of B.C. children live in lone parent families. Estimates of the number of children ages 0-19 living in lone parent families in 2010 is 211,553 (or 21.8% of 970,428).

⁵⁷ Chapple S. *Child well-being and sole-parent family structure in the OECD: An analysis*. 2009. OECD. Available at <http://www.policypointers.org/Page/View/9079>. Accessed December 2010.

⁵⁸ Tobias M, Kokaua J, Gerritsen S et al. The health of children in sole-parent families in New Zealand: results of a population-based cross-sectional survey. *Australian and New Zealand Journal of Public Health*. 2010; 34(3): 274-80.

Discussion

The reviews and studies discussed for the present concept consistently concluded that there is a negative association between living in a single-parent household and child health and well-being. There also seems to be a consensus in the literature that the independent effects of single parenting on the child are typically small, and that the social and economic disadvantages often experienced in single-parent households have a greater impact on child health and well-being than the number of parents in the household.^{59,60,61}

Determining causality in the association between lone parenting and child outcomes is problematic for a number of reasons. First, the ideal method for establishing causality would be randomized controlled trials, which are impossible to conduct in this area for obvious practical and ethical reasons. Longitudinal data sets are often used, but in such instances it is not possible to control for all potentially confounding factors. A particular concern is the possibility of reverse causality, in which a child's poor health may lead to parental separation or other changes in family structure, rather than being a consequence of the family situation.

Despite the small effect size and the difficulties in determining causality, the literature tends to confirm that the impact of growing up in a lone parent family is an important policy issue. For example, Chapple states that "there is enough in the literature to suggest policy makers should be concerned about the implications of family structure for child well-being."⁶² The evidence provided by Tobias et al. supports policies directed toward the social and economic disadvantages of sole parenthood, thus focusing on the socioeconomic context within which single parenthood occurs rather than single parenthood itself.

Conclusion

Considered in independent terms, apart from important mediators such as income, sole parenting likely has a small but important adverse effect on child health and well-being. This may particularly be the case during adolescence. The inter-relationship of lower socioeconomic status and lone parent families makes determining causality challenging. The literature assessing the effect of lone parent families on a child's health and well-being is still at an immature point, although it is rapidly expanding. Monitoring social trends such as changes in family structure could be an important tool, especially as further research reveals more about the impact on child health.

⁵⁹ Fergusson DM, Boden JM, Horwood LJ. Exposure to single parenthood in childhood and later mental health, educational, economic, and criminal behavior outcomes. *Archives of General Psychiatry*. 2007; 64(9): 1089-95.

⁶⁰ Chapple S. *Child well-being and sole-parent family structure in the OECD: An analysis*. 2009. OECD. Available at <http://www.policypointers.org/Page/View/9079>. Accessed December 2010.

⁶¹ Tobias M, Kokaua J, Gerritsen S et al. The health of children in sole-parent families in New Zealand: results of a population-based cross-sectional survey. *Australian and New Zealand Journal of Public Health*. 2010; 34(3): 274-80.

⁶² Chapple S. *Child well-being and sole-parent family structure in the OECD: An analysis*. 2009. OECD. Available at <http://www.policypointers.org/Page/View/9079>. Accessed December 2010.

| Summary Assessment | | | | | |
|----------------------------------|--|-----------|---------------------|---------------|----------------------------|
| Children in Lone Parent Families | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 0-19 | 212,000 | High | Medium | Low | Medium-High |

As summarized above, assessments have been applied to the Lone Parent Families concept, specifically in terms of the indicator with the most compelling support in the literature, namely: *proportion of children living in lone parent families*.

The pediatric population **Magnitude** of the potential indicator is assessed as **High**. Based on 2006 Census data, 21.8% of children live with single parents. When this percentage is applied to the entire 2010 pediatric cohort it results in an estimated prevalence of 212,000; this is greater than 10% (97,000) of the total pediatric cohort, resulting in a magnitude classification of High.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **Medium**. While negative effects are associated with children living in lone parent families, information on causality is currently limited; as well, much of the observed negative impact may be due to income effects or broader factors such as socioeconomic status.

The **Modifiability** of the potential indicator is assessed as **Low**, since modifying marital status of the population is largely outside of the policy reach of governments and their agencies. The most that can be mandated is "secondary prevention" approaches that would ameliorate the proximate mechanisms of well-being driven by lone parenthood, such as poverty.

Data Availability/Validity for the potential indicator is assessed as **Medium-High**. Data on the number of children in lone parent families is available from the Canadian Census and Statistics Canada. The updates, however, are only available every five years.

Based on the indicated assessment, the potential indicator is **Not Recommended** for consideration as a core indicator of child health and well-being. The utility of the indicator mainly "fails" based on the absence of direct policy responses until such time as the upstream causes of lone parenthood are clarified, and effective preventive interventions are identified for the most frequent causes of this family structure.

Housing-Related Concepts

The current section integrates three related concepts that focus on housing:

- Homelessness
- Housing availability
- Housing conditions

The first step to understanding the connections between these three concepts and their influence on overall child health and well-being is to establish a definition for each term.

Homelessness

The government of Canada recognizes three different categories of homelessness: chronically homeless, cyclically homeless, and temporarily homeless, as defined below.⁶³

The chronically homeless group includes people who live on the periphery of society and who often face problems of drug or alcohol abuse or mental illness.

The cyclically homeless category includes individuals who have lost their dwelling as a result of some acute change in their situation, such as loss of a job, a move, a prison term, or a hospital stay; the particular subset that must use safe houses or soup kitchens from time to time include women who are victims of family violence, runaway youths, and persons who are unemployed or recently released from a detention centre or psychiatric institution.

The temporarily homeless group includes those who are without accommodation for a relatively short period of time. Likely to be included in this category are persons who lose their home as a result of a disaster (fire, flood, war) and those whose economic and personal situation is briefly altered by, for example, a marital separation or loss of job. Some researchers do not consider this group as being truly homeless and therefore typically exclude them from their studies.

Though a child can be homeless at any age, the majority of the literature focuses on homeless youth, or those who can more or less operate independently in life. The definition varies, but generally this group includes those aged 12 to 24 years, though in some research the upper limit extends as high as 29 years of age.⁶⁴ All studies that at least included those less than 19 years of age were consulted as part of the review to ensure that the fullest information was ultimately captured. On a related note, research in this area often focuses on so-called “street-youth” or “street-involved youth.” Such studies were excluded due to the fact that, by strict definition, only about half of the street-involved youth population is actually homeless.⁶⁵

⁶³ Information available at <http://dsp-psd.pwgsc.gc.ca/Collection-R/LoPBdP/modules/prb99-1-homelessness/definition-e.htm>. Accessed November 2010.

⁶⁴ Raising the Roof. *Youth Homelessness in Canada: The Road to Solutions*. 2009. Available at <http://www.raisingtheroof.org/>. Accessed November 2010.

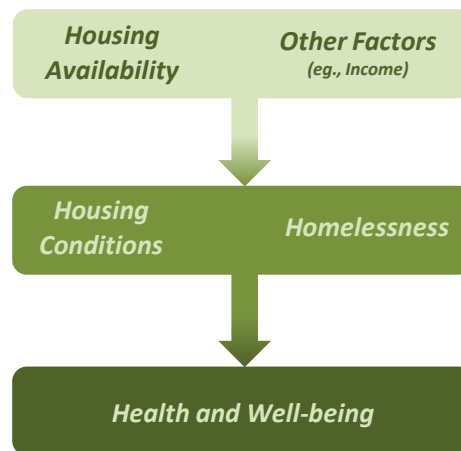
⁶⁵ Rachlis BS, Wood E, Zhang R et al. High rates of homelessness among a cohort of street-involved youth. *Health & Place*. 2009; 15(1): 10-7.

Housing Availability and Housing Conditions

For present purposes, the concept of housing availability will refer to the total pool of potential housing options available within a geographical area of interest. This is meant to include all temporary and permanent housing options, including shelters, social housing, rental housing, and ownership of market property.

Housing conditions will be taken to refer to the housing structure (such as building materials, insulation, ventilation, etc.) and the quantitative and qualitative conditions pertaining within the dwelling (including air/water quality, crowding, heating, etc.). The definition does not include literature that focuses on a neighborhood characteristic, such as the built environment, that is external to the house. It should be noted that the specific subtopic of environmental tobacco smoke in the home was covered already in the report on the Physical Health dimension, specifically under the concept of Pregnancy Outreach Services and Targets.

A model is proposed below that shows how the three concepts interact to ultimately shape overall child health and well-being.



One notable feature of this model is that housing availability exerts only an indirect influence on the health and well-being of adults and children by dictating the housing conditions (including the extreme condition of “no home”) to which they are exposed. For this reason, it is difficult to evaluate the impact of housing availability without considering the more direct factors of homelessness or housing conditions. Other important mediators of housing conditions exist, most notably income. A metric combining measures of income and housing supply is often referred to as housing affordability. The Canadian government refers to a housing affordability problem

*if more than 30% of household income is spent on housing costs. At that level of spending, it is likely that inadequate funds will be available for other necessities such as food, clothing, and transportation. Housing affordability problems affect renters more than owners.*⁶⁶

⁶⁶ Information available at <http://www.statcan.gc.ca/pub/82-221-x/4060874-eng.htm>. Accessed November 2010.

As diagramed above, both *housing conditions* and *homelessness* may be considered as existing on a singular axis; the unified scale of risk exposures is illustrated below.



Every individual or family can be placed somewhere along the axis, which identifies good housing conditions as the most favourable exposure, contrasted with chronically homeless as the most unfavourable situation to be experiencing. As discussed above, individuals may shift on this scale at different points during their lives in accordance with personal and societal forces. For example, if low-cost housing availability decreases, an individual may transition from being cyclically homeless to chronically homeless.

Methodology and Provisional Results

Initial Review Search Process

As described more fully in the section on Direct Income Concepts, it was appropriate and efficient to start by pursuing a literature scan of review papers in PubMed for all socioeconomic areas covered in this report. To accomplish this, the MeSH term “Socioeconomic Factors” was used, coordinated with an extensive list of health and well-being outcomes. For the purposes of this section, reviews pertinent to housing and health were identified from the total list of 468 gleaned in that process. Although housing was noted as an occasional variable in studies examining overall socioeconomic status, this search process generally did not identify any review papers focusing on housing as the dominant theme; one exception was a paper that examined psychological stress as a potential mechanism for the elevated asthma rates sometimes observed in substandard housing.⁶⁷ A small number of other papers also began with the health and well-being outcome as the focus (e.g., allergies) and offered a narrative review of risk factors that ultimately included housing conditions or supply as possible risk factors; in one review examining the topic of child maltreatment, the housing-related variables that were considered (i.e., residential mobility and tenure category) fell outside of the scope of the assigned concepts to be covered in the present section of the report.⁶⁸ The limited fruit from this initial scan of the literature made it clear that additional searches were warranted for the various housing-related concepts.

Targeted Search Process for Reviews

A search for review articles on housing conditions was pursued in PubMed using the MeSH term “Residential Characteristics” (which incidentally includes “Housing” in its tree of terms). As well, the MeSH term “Homeless Youth” was used to target the concept of homelessness. Finally, it was found that housing availability was not well represented in either the review (or study) search processes that were conducted, and thus it is not

⁶⁷ Sandel M, Wright RJ. When home is where the stress is: expanding the dimensions of housing that influence asthma morbidity. *Archives of Disease in Childhood*. 2006; 91(11): 942-8.

⁶⁸ Freisthler B, Merritt DH, LaScala EA. Understanding the ecology of child maltreatment: a review of the literature and directions for future research. *Child Maltreatment*. 2006; 11(3): 263-80.

represented in the summary of results regarding an association with pediatric health and well-being. In fact, it should be noted that “Housing Availability” (or close synonyms such as housing supply or housing stock) is not a term currently tracked through MeSH in PubMed.

As usual, the limits applied to the search for reviews in PubMed included the following:

Date: 2005-present *Language:* English *Subjects:* Human *Age:* 0-18 years*

Type of Article: Review, Meta-analysis

*While the protocol defines a child as 0-20 years of age, the search limit available in PubMed for All Child is 0-18 years, so this approximation was used.

Search Keywords

“Residence Characteristics”[Mesh] **AND**

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR “Outcome Assessment (Health Care)”[Mesh] OR “Medicine/statistics and numerical data”[Mesh] OR “Hospital Departments/statistics and numerical data”[Mesh] OR “Quality of Life”[Mesh] OR “Personal Satisfaction”[Mesh])

This search returned 52 reviews in total.

"Homeless Youth"[MeSH] **AND**

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR “Outcome Assessment (Health Care)”[Mesh] OR “Medicine/statistics and numerical data”[Mesh] OR “Hospital Departments/statistics and numerical data”[Mesh] OR “Quality of Life”[Mesh] OR “Personal Satisfaction”[Mesh])

The search returned 8 reviews, plus one obtained by using the “Related citations” utility in PubMed. After closer examination, only 2 of these proved to be pertinent systematic reviews; with a further 3 falling into the narrative category. Given the low volume of papers located (with only 1 systematic review related to younger children, and 1 to adolescents), combined with the fact that the results related to homelessness was not altered by the secondary search process described immediately below, it was ultimately decided to conduct a Level B search for individual studies for the concept of Homelessness (see pertinent subsection).

Secondary Search Process for Reviews

An additional search of the EBSCO Host integrated database was performed to identify review papers of relevance to the housing-related concepts.

The following databases were selected for inclusion:

Academic Search Complete, Bibliography of Native North Americans, Biomedical Reference Collection: Comprehensive, CINAHL with Full Text, EconLit, Family & Society Studies Worldwide, Humanities International Index, PsycARTICLES, PsycBOOKS, PsycCRITIQUES, PsycEXTRA, PsycINFO, Social Work Abstracts.

The following limits were applied when possible:

Date: 2005-present *Major Heading:* Housing

Search Keywords

("housing" OR "homelessness") AND ("child" OR "adolescent" OR "teenager" OR "teen" OR "infant" OR "pediatric" OR "youth" OR "inuit" OR "aboriginal") AND ("health" OR "well-being" OR "quality of life" OR "rural health" OR "air pollution" OR "respiratory tract infections" OR "crowding" OR "mould" OR "ventilation")

This search returned 112 papers in total.

Preliminary Exclusion

The articles from the various searches for review articles were scanned *by title* by two reviewers working individually, with articles not pertinent to the research topic being excluded; specifically, if the article did not appear to be investigating the association between housing conditions (specifically the housing structure and/or the environment within the house itself) or homelessness and a health outcome or measure of well-being (psychological or otherwise), then it was excluded. Additionally, all non-reviews from the EBSCO search were eliminated.

After completing this first exclusion process, the list of articles was reduced to 28, with 27 of these pertinent to housing conditions and only 1 dealing with homelessness (already identified in the PubMed search described earlier).

Based on the combined results from the review search process, it was determined that researching evidence related to housing conditions would remain at the review level (incorporating both systematic/meta-analytic and substantial narrative reviews).

Primary Exclusion of Review Papers: Housing Conditions

The full articles remaining after the primary exclusion were then examined in more detail, with articles not pertinent to the research topic being excluded; specifically, if the article did not link housing conditions with health or well-being outcome(s) in children, it was excluded. If there was uncertainty as to whether an article should be excluded, the reviewers discussed the matter further to reach a consensus.

There were 6 articles remaining in the list following the primary exclusion step, with 3 being systematic/meta-analytic in nature, and 3 narrative. A further exclusion step was not required; the final Volume Report is summarized in a diagram below.

Study Search Process: Homelessness

As noted earlier, second electronic search was conducted for individual studies in the area of homelessness. The main database used was PubMed, with the following search terms and limits:

Date: 2000-present *Language:* English *Subjects:* Human *Age:* 0-18 years*

Type of Article: Clinical Trial, Randomized Controlled Trial, Controlled Clinical trial.

*While the protocol defines a child as 0-20 years of age, the search limit available in PubMed for All Child is 0-18 years, so this approximation was used.

Search Keywords

"Homeless Youth"[MeSH] **AND**

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR "Outcome Assessment (Health Care)"[Mesh] OR "Medicine/statistics and numerical data"[Mesh] OR "Hospital Departments/statistics and numerical data"[Mesh] OR "Quality of Life"[Mesh] OR "Personal Satisfaction"[Mesh])

"Residence Characteristics"[Mesh] **AND**

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR "Outcome Assessment (Health Care)"[Mesh] OR "Medicine/statistics and numerical data"[Mesh] OR "Hospital Departments/statistics and numerical data"[Mesh] OR "Quality of Life"[Mesh] OR "Personal Satisfaction"[Mesh])

Combined, the two searches above returned 175 studies.

An additional search of PubMed and Google using keywords such as 'homelessness' AND 'child' AND ('health' OR 'well-being' OR 'quality of life') was performed, which identified an additional 15 studies for consideration.

Also considered were the 112 papers returned on the previous EBSCO search using terms such as housing and homelessness, leading a total of 302 studies for consideration.

Preliminary Exclusion

The 302 articles were scanned *by title* by two reviewers working individually, with studies not pertinent to the research topic being excluded; specifically, if the article did not appear to be investigating the association between homelessness and a health outcome(s) or measure of well-being (psychological or otherwise), then it was excluded. Also, only studies from the EBSCO search were retained.

After completing this first exclusion process, the list of articles was reduced to 36.

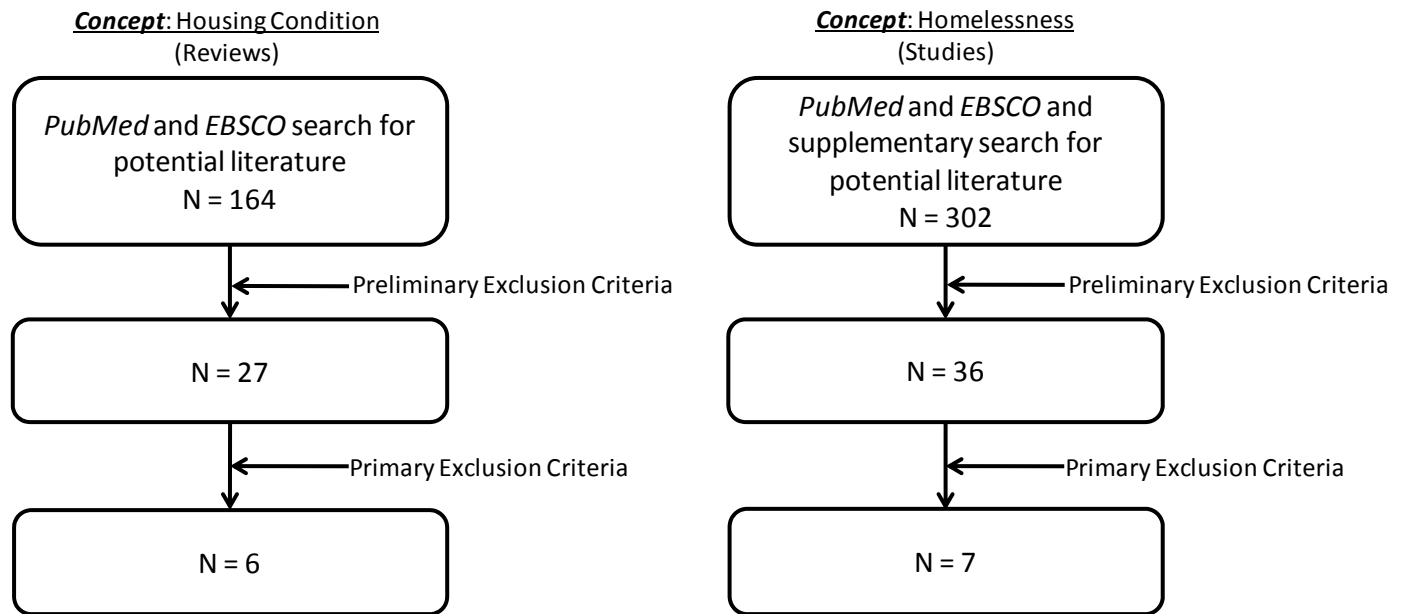
Primary Exclusion

The full articles were then reviewed, with articles not pertinent to the research topic being excluded; specifically, if the article did not link 'homelessness' with health or well-being outcome(s) in children, it was excluded. If there was uncertainty as to whether an article should be excluded, the reviewers discussed the matter further to reach a consensus.

There were 7 articles remaining in the list following the primary exclusion step, as summarized in the combined Volume Report below.

Literature Volume Report: Reviews and Studies

Dimension: Economic and Material Well-being



Summary of Relevant Reviews
Domain: *Economic Health and Well-being*
Concept: *Housing Conditions*

| | Title of Review | Lead Author | Year | Journal | Journal Impact Factor | Year Range of Studies | No. of Studies |
|--|---|--------------------|-------------|--|----------------------------------|------------------------------|---------------------------|
| <i>Narrative Reviews</i> | | | | | | | |
| 1 | Housing and child development | Leventhal | 2010 | Children and Youth Services Review | 1.75 | | ~40 |
| 2 | Health effects of mold in children | Seltzer | 2007 | Pediatric Clinics of North America | 1.36 | | ~90 |
| 3 | Child development and the physical environment | Evans | 2006 | Annual Reviews in Psychology | 22.75 | | >100 |
| <i>Systematic Reviews / Meta-Analyses</i> | | | | | | | |
| 4 | Exposure to indoor mould and children's respiratory health in the PATY study | Antova | 2008 | Journal of Epidemiology and Community Health | 3 | 1988-1998 (Questionnaire) | 12 |
| 5 | Childhood asthma and environmental interventions | Wu | 2007 | Environmental Health Perspectives | 5.34 | 1992-2005 | 15 |
| 6 | Indoor residential chemical emissions as risk factors for respiratory and allergic effects in children: a review | Mendell | 2007 | Indoor Air | 0.98 | 1989-2005 | 21 |

Summary of Relevant Studies
Dimension: Economic Health and Well-being
Concept: Homelessness

| | Social problems related to homelessness | | | | | | | | | Conflict of Interest |
|------------------|---|-----------------|------|-----------------------------------|-----------------------|--------------------|-------------|--|------------------------|----------------------|
| | Title of Study | Author(s) | Year | Journal | Journal Impact Factor | Type of Study | Sample Size | Sample Population | Location | |
| Asthma | | | | | | | | | | |
| 1 | Asthma and Behavior in Homeless 4- to 7-year-olds | Cutuli et al. | 2010 | Pediatrics | 4.27 | Cross-sectional | 104 | Homeless children | Minnesota | None |
| HIV | | | | | | | | | | |
| 2 | Homlessness and unstable housing associated with an increased risk of HIV and STI transmissions among street-involved youth | Marshall et al. | 2009 | Health & Place | 1.83 | Cross-sectional | 529 | Street-involved youth | B.C., Canada | Not stated |
| 3 | Injection drug use among street-involved youth in a Canadian setting | Kerr et al. | 2009 | BMC Public Health | 1.66 | Prospective Cohort | 560 | Street-involved youth | B.C., Canada | None |
| 4 | Housing status and associated differences in HIV risk behaviors among young injection drug users | Coady et al. | 2007 | AIDS Behaviour | 1.27 | Cross-sectional | 3,266 | Injection drug users | Various cities, U.S.A. | Not stated |
| Nutrition | | | | | | | | | | |
| 5 | Food intake patterns of homeless youth in Toronto | Li et al. | 2009 | Canadian Journal of Public Health | 1.35 | Cross-sectional | 261 | Homeless youth | Toronto, Canada | Not stated |
| 6 | Homeless youth in Toronto are nutritionally vulnerable | Tarasuk et al. | 2005 | The Journal of Nutrition | 3.69 | Cross-sectional | 261 | Homeless youth | Toronto, Canada | Not stated |
| Violence | | | | | | | | | | |
| 7 | Violence and aggression in the lives of homeless children | Annoshain | 2005 | Journal of Family Violence | 0.94 | Cross-sectional | 93 | Homeless families (children aged 6-12) | Midwestern US | Not stated |

Dimension: *Economic and Material Well-being Concept: Housing Conditions*

Summary Table of Reviews

| Lead Author | Review Title | Number of Studies Reviewed | Conclusions/Comments |
|--------------------------|--|----------------------------|---|
| <i>Narrative Reviews</i> | | | |
| Leventhal (2010) | Housing and child development | ~40 | The review focused on six features of housing in relation to children's development: (i) physical housing quality; (ii) crowding; (iii) residential mobility; (iv) homeownership; (v) subsidized housing; (vi) unaffordability. The strongest evidence for deleterious associations with children's health was found between physical housing quality (specifically, environmental toxins/hazards) and crowding. |
| Seltzer (2007) | Health effects of mould in children | ~30 | This review focused on four adverse health outcomes (AHOs) of mould, including: (i) immunologic reactions; (ii) toxicity; (iii) irritation; (iv) indeterminate. There often is insufficient data to draw a causal connection between mould and AHOs. However, a causal relationship was found between the mould <i>Alterinaria</i> and asthma; likewise, <i>Candida</i> has been shown to cause multi-organ system diseases. Hypersensitivity to mould can cause a rapid-onset cascade of neurocognitive symptoms. Additionally, there is evidence for an association among dampness, mould, and AHOs. |
| Evans (2006) | Child development and the physical environment | ~100 | <p>Characteristics of the physical environment (and health) were investigated, including: (i) lead, mercury, PCBs, etc. (behavioural); (ii) noise (reading, cognitive processes, psychophysiology, mental health, motivation); and (ii) crowding (interpersonal behaviours, mental health, motivation, cognitive processes).</p> <p><i>Toxins</i> Accumulated lead burden was associated with IQ deficits; lead levels above currently understood "safe" thresholds appear to produce: IQ deficits in three- to five-year olds and elementary aged children; deficits in reaction time, visual-motor integration, and attention; an inverse relationship with reading and math levels. Pediatric lead poisoning can manifest as: increased hyperactivity, impulsivity, and aggression (all of which can persist into adulthood); elevated behaviour problems; increased juvenile delinquency. Mercury: Effects of in utero exposure result in numerous negative cognitive and behavioural outcomes later in life. PCBs: exposure has been implicated in cognitive deficits with 3- and 4-year-olds.</p> <p><i>Noise</i> Reading: Effects occur at noise levels far below those that produce hearing damage (e.g., exposure to transportation noise is linked to significant delays in reading); a dose-response relationship has been determined between noise exposure and reading deficits; children in higher grades are more adversely impacted by ambient noise; 12- to 14-year old males in noisier homes had deficits in intellectual functioning. Cognitive processes: long-term memory is adversely affected by chronic and acute noise exposure; a relationship between chronic noise exposure and poorer attention has been identified. Psychophysiology: chronic exposure to loud noise (e.g., near airports) elevates blood pressure levels in children and neuroendocrine stress hormones. Mental health: chronic airport noise can adversely impact self-reported psychological well-being (the longer the exposure the greater the adverse impacts). Motivation: children are less persistent with challenging tasks upon exposure to acute or chronic noise.</p> |

Dimension: *Economic and Material Well-being Concept: Housing Conditions*

Summary Table of Reviews

| Lead Author | Review Title | Number of Studies Reviewed | Conclusions/Comments |
|---|--|----------------------------|--|
| | | | <p><i>Crowding</i></p> <p>Interpersonal Behaviours: crowding was positively associated with social withdrawal among children at nursery school; elevated aggression and conflict and diminished cooperation occurs among more crowded preschoolers, elementary school children, and adolescents. Mental health: crowded elementary school children are more neurotic, psychologically distressed, display poorer behavioural adjustment at school, and lower social and cognitive competency. Motivation: crowding leads to less task persistence among high school students and lower motivation. Cognitive processes: school performance suffers, including standardized reading tests and educational attainment in high school and later in life; impaired memory in toddlers has been observed.</p> |
| Systematic Reviews / Meta-Analyses | | | |
| Antova (2008) | Exposure to indoor mould and children's respiratory health in the PATY study | 12 | Indoor mould exposure was consistently associated with adverse respiratory health outcomes in children living in diverse jurisdictions (including Austria, Bulgaria, Czech Republic, Germany, Hungary, Italy, The Netherlands, North America, Poland, Russia, Slovakia, Switzerland). |
| Wu (2007) | Childhood asthma and environmental interventions | 15 | Interventions such as dust mite-impermeable bedding covers, improved cleaning practices, high-efficiency particulate air vacuum cleaners, mechanical ventilation, and parental education are associated with both asthma trigger reduction and improved health outcomes for asthmatic children. |
| Mendell (2007) | Indoor residential chemical emissions as risk factors for respiratory and allergic effects in children: a review | 21 | Composite wood materials that emit formaldehyde, flexible plastics that emit plasticizers, and new paint have all been associated with increased risks of respiratory and allergic health effects in children. |

Bibliography for Table of Reviews

Leventhal T, Newman S. Housing and child development. *Children and Youth Services Review*. 2010; 32: 1165-74.

Seltzer JM, Fedoruk MJ. Health effects of mold in children. *Pediatric Clinics of North America*. 2007; 54(2): 309-33, viii-ix.

Evans GW. Child development and the physical environment. *Annual Reviews of Psychology*. 2006; 57: 423-51.

Antova T, Pattenden S, Brunekreef B et al. Exposure to indoor mould and children's respiratory health in the PATY study. *Journal of Epidemiology & Community Health*. 2008; 62(8): 708-14.

Wu F, Takaro TK. Childhood asthma and environmental interventions. *Environmental Health Perspectives*. 2007; 115(6): 971-5.

Mendell MJ. Indoor residential chemical emissions as risk factors for respiratory and allergic effects in children: a review. *Indoor Air*. 2007; 17(4): 259-77.

Dimension: *Economic and Material Well-being Concept: Homelessness*

Summary Table of Studies

| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
|--|--|--|---|----------------------------|--|---|---|
| <i>Asthma</i> | | | | | | | |
| Cutuli (2009) | Determine the prevalence of asthma in homeless children and correlate this to behavioural and academic problems. | Families were recruited from homeless shelters; parents identified if their children had asthma; if so, children completed cognitive/IQ and other tests. | Minnesota, U.S.A. 104 children aged 4-7 years | Cross-sectional | -Asthma prevalence -Hospitalization history -Cognitive and IQ scores -Executive functioning tasks | -27.9% of adults indicated that their children has asthma -Children with asthma were more likely to be hospitalized overnight -Differences were observed in emergency department use between asthmatic and non-asthmatic children -Asthma status was not correlated to cognitive function; children with asthma had higher levels of ADHD symptoms -Children with asthma had lower levels of academic functioning | Homeless children have higher levels of asthma than the general population (greater than 3 times the rate in this sample). Asthma in turn is linked to behaviour problems and worse academic functioning. |
| <i>HIV, other STIs, and Related Risks</i> | | | | | | | |
| Marshall (2009) | To examine the impact of youth homelessness on risk behaviours for HIV and other STI infections. | Interview-based survey of street-involved youth with a focus on three housing situations: (1) stably housed; (2) unstably housed (shelter or hostel); (3) homeless. Survey completed between Sept. 2005 and Oct. 2006. | Vancouver, B.C., Canada 529 participants with an average age of 21.9 years | Cross-sectional survey | -Sexual behaviours as a function of housing status, including consistency of condom use and number of sexual partners. | -Living on the street was significantly and inversely associated with consistent condom use. -Living on the street was marginally significantly associated with a greater number of sexual partners. | Living on the street is correlated to higher rates of known risk factors for HIV and other STIs. |
| Kerr (2009) | To examine the prevalence of injection drug use and associated risks among street-involved youth. | Survey youth with a focus on possible predictors of injection drug use. | Vancouver, B.C., Canada 560 participants with a median age of 21.9 years | Prospective cohort study | -Age, gender, ethnicity, incarceration, sex work, drug dealing, warrants, overdose as predictors of drug use. -Prevalence of drug use among street-involved youth | - Older age, history of incarceration, sex work involvement, drug dealing, having a warrant, non-fatal overdose, and HCV infection were all associated with current injection drug use. - 41.1% of participants reported injection drug use. | Injection drug use is high among street-involved youth; a variety of factors are associated with elevated rates of this behaviour. |

| | | | | | | | |
|-------------------------|---|--|--|---------------------------|--|---|--|
| Coady (2007) | To examine the correlation between youth housing status and HIV risk behaviours, as well as biologically-measured HIV and HCV prevalence. | Survey injection drug users with a focus on three housing scenarios: (1) homeless; (2) equivocally housed; (3) housed. Survey was completed between May 2002 and Jan 2004. | Baltimore, Chicago, Los Angeles, New York City, and Seattle, U.S.A. 3266 participants between the age of 15 and 30, with a mean age of 23.9 years | Cross-sectional | -Proportion of injection drug users (IDUs) who are homeless -Risk factor prevalence (alcohol use, crack/cocaine use, methamphetamine use, injection drug use, HIV risk related to injections, sharing practices) by housing status. -Biologically-measured prevalence of HIC and HCV | - 37% of IDUs were classified as being homeless -Being homeless increased the risk of: drinking alcohol, using crack/cocaine and methamphetamine at least daily; risky injecting practices (sharing syringes, back loading); recently engaging in sex work and having three or more sex partners -Biologically measured HIV and HCV prevalence was not correlated to housing status | Homelessness is correlated to a number of HIV risk behaviours, although it was not linked to biologically increased infection rates of either HIV or HCV. The authors acknowledge that this may be a result of temporal factors associated with the study. |
| Nutrition | | | | | | | |
| Li (2009) | To evaluate the pattern of food intake among homeless youth. | Youth were recruited from outdoor locations and downtown drop-in centers and asked to recall their dietary consumption over the last 24 hours. | Toronto, Ontario, Canada 261 youth aged 16-24 years | Cross-sectional survey | -Mean usual food intake by food group (servings per day) | - Usual food intake was well below current recommendations for all four food groups and below intake of the general population - Youth consumed less than half the number of servings of fruit and vegetables than the general population | Homeless youth typically consume less than the general population, and eat food of a lower nutrition quality. This is consistent with previous studies that identified nutrient inadequacies in this population. |
| Tarasuk (2005) | To characterize the nutritional vulnerability of homeless youth. | Youth were recruited from drop-in centers and outdoor locations and asked to recall their dietary consumption over the last 24 hours. | Toronto, Ontario, Canada 261 youth aged 16-24 | Cross-sectional survey | -Usual energy intake and associated nutrient intake by nutrient type | -Usual energy intake approximated mean requirements for very sedentary lifestyles but fell well short of the requirements to maintain energy balance with normal activities -Inadequacies in nutrition intakes were in excess of 50% for folate, vitamin A, vitamin C, magnesium, and zinc | Homeless youth have lower energy intake and lower intake of specific nutrients than the general population. |
| Violence | | | | | | | |
| Anooshian (2005) | To examine the role of violence and aggression in the lives of children in | Families were recruited and interviewed. Economic distress, child behaviour, | Midwestern U.S. 93 families with children | Cross-sectional interview | -Economic distress, child behaviour check list, ratings of aggressions, friendship and victimization measures, social avoidance, attitudes | -88% of parents reported being victims of violence -Violence experienced by homeless mothers plays a significant role in the development | Exposure to violence in homeless families is common, and can lead to negative social outcomes and behavioural problems |

| | | | | | | | |
|--|--|---|-----------|--|-------------------------------------|--|-----------------------|
| | homeless families, focusing on family violence, children's aggression, and social isolation and rejection. | and various aggression/violence measures were recorded. | aged 6-12 | | towards peers, pediatric depression | of behaviour problems (such as aggression), as well as social isolation and avoidance, in their homeless children. -Children whose mother report excessive current violence and economic distress are most likely to experience social isolation/rejection by peers | in homeless children. |
|--|--|---|-----------|--|-------------------------------------|--|-----------------------|

Bibliography for Table of Studies

Cutuli JJ, Herbers JE, Rinaldi M et al. Asthma and behavior in homeless 4- to 7-year-olds. *Pediatrics*. 2010; 125(1): 145-51.

Marshall BD, Kerr T, Shoveller JA et al. Homelessness and unstable housing associated with an increased risk of HIV and STI transmission among street-involved youth. *Health & Place*. 2009; 15(3): 753-60.

Kerr T, Marshall BD, Miller C et al. Injection drug use among street-involved youth in a Canadian setting. *BMC Public Health*. 2009; 9: 171.

Coady MH, Latka MH, Thiede H et al. Housing status and associated differences in HIV risk behaviors among young injection drug users (IDUs). *AIDS Behaviour*. 2007; 11(6): 854-63.

Li A, Dachner N, Tarasuk V. Food intake patterns of homeless youth in Toronto. *Canadian Journal of Public Health*. 2009; 100(1): 36-40.

Tarasuk V, Dachner N, Li J. Homeless youth in Toronto are nutritionally vulnerable. *Journal of Nutrition*. 2005; 135(8): 1926-33.

Anooshian L. Violence and aggression in the lives of homeless children. *Journal of Family Violence*. 2005; 20(6): 373-87.

Summary of Results

Housing Conditions

Leventhal and Newman showed that the strongest evidence between child health and housing-related factors was in the realm of environmental toxins/hazards (related to physical health and sometimes development effects with a poor cognitive outcome) and crowding (physical and psychosocial effects). These two forces generated impacts that exceeded the effects of other factors—such as residential mobility, homeownership (compared with renting), living in subsidized housing, and an unaffordable housing pool.

The review by Evans found that household toxins such as lead and polychlorinated biphenyls (PCBs) have substantial and varied effects on child development. The impacts range from IQ and other cognitive deficits to behavioural problems. While arguably a concern driven more by the *external* environment, higher household noise levels (e.g., caused by proximity to an airport) have been correlated with reading deficits and impairments in intellectual functioning, poorer long-term memory, increased blood pressure, and low self-reported psychological well-being. Crowding in homes was positively associated with social withdrawal, elevated aggression and conflict, and decreased cooperation. Children experiencing crowding were also found to be more neurotic, psychologically distressed, and more likely to display lower social and cognitive competency, which correlated with decreased academic performance in high school and later in life.

Antova et al. found that indoor mould exposure was consistently associated with adverse respiratory health outcomes. Seltzer and Fedoruk found that, although it is difficult to prove direct causality between mould and adverse health effects in children, there is evidence for a relationship between dampness, mould and such outcomes, as well as for specific connections between moulds such as *Alternaria* and *Candida* and systemic conditions, especially asthma.

Wu and Takaro were able to show that micro-environmental interventions such as mite-resistant bedding covers and improved cleaning practices are capable of improving health outcomes in asthmatic children. Finally, Mendall found that exposure to chemicals commonly emitted from wood, plastics, and paint is positively associated with an increased risk of respiratory and allergic effects in children. It should be noted that these influences may point to the potential for secondary prevention rather than the absolute reduction in the presence of asthma and similar diseases in the pediatric population. In other words, it may be possible to reduce disease severity even if disease incidence stays the same.

Homelessness

Turning to the studies located on the topic of homelessness, Cutuli et al. focused on asthma prevalence and its connection with cognitive functioning, behavioural outcomes, and academic performance in homeless children aged 4-7 years. They found that asthma is more than 3 times as common in homeless compared to housed children, and that this phenomenon is linked to more behavioural problems and lower academic functioning at school.

Three papers included in the literature review focused on risk behaviours related to human immunodeficiency virus (HIV) and other infections. The investigators generally found that homelessness is correlated to higher rates of known risk factors for HIV and other STIs compared to other housing situations (i.e., sleeping at a shelter/hostel or being stably housed). Coady et al. also measured actual infection rates for HIV and hepatitis C virus (HCV), but found no significant increase in these within the young homeless population. Kerr et al. found

an “alarmingly high prevalence of injection drug use among street-involved youth,” a behaviour which is a known risk factor for HIV and other infections. The authors cite a number of correlates, including HCV infection, sex work involvement, and non-fatal overdose, as predictors for current injection drug use. The overall conclusion is that an elevated prevalence of risky behaviours is confirmed among homeless youth, but the proof of elevated negative physical health effects is still being pursued.

There were two papers located that focused on nutritional intake among homeless youth aged 16-24 years. It was found that homeless youth typically consume fewer calories than the general population, and that the food typically contributing to existing caloric intake is of lower nutritional value. Additionally, many inadequacies were observed with respect to specific vitamins, including folate, vitamin A, vitamin C, magnesium, and zinc.

The final paper was one of only two that highlighted the effect of homelessness on young children (less than 15 years of age). Anooshian focused on the cofactor of violence/aggression in a survey of 93 families; 88% of the parents reported being the victims of violence, which can translate into behaviour problems (such as aggression) and social avoidance in their children. Also, children of homeless mothers who reported excessive current violence and economic distress were more likely to experience negative psychosocial outcomes such as social isolation/ rejection by peers.

Data Sources on Housing-Related Concepts

Housing Availability/Housing Conditions

As introduced in the Background and Context section, the model for the relationship between the three housing-related concepts and child health and well-being proposes that housing availability acts as a mediator (along with other factors such as income) on both housing conditions and homelessness, with the latter situation of “no home” essentially representing an extreme form of poor housing. As discussed below, data are limited with respect to absolute number of homeless children/youth; however, there is information available on housing availability for this area of need, specifically the number of beds in emergency shelters. Broader consideration of housing availability in a society calls for a complex effort of data tracking and analysis.

The strong linkage between the availability of adequate housing and the prevalence of adults and children living in substandard housing suggests the potential for a global indicator integrating the two ideas. This very project has in fact been pursued by Canada Mortgage and Housing Corporation (CMHC), the country’s national housing agency. Acting on behalf of the federal government, the CMHC provides mortgage loan insurance, mortgage-backed securities, housing policy and programs, and housing research.⁶⁹ Under the latter mandate, the CMHC provides estimates of the extent of housing problems in Canada by means of a metric known as “core housing need.” Through Census data (the most recent being for 2006), the CMHC has estimated that just under 1.5 million Canadian households were in core housing need, equivalent to approximately 12.7% of all households.⁷⁰

⁶⁹ Information available at <http://www.cmhc-schl.gc.ca/en/corp/about/index.cfm>. Accessed November 2010.

⁷⁰ The Co-operative Housing Federation of Canada. *The Dunning Report: Dimensions of Core Housing Need in Canada (2nd Edition)*. 2009. Available at <http://www.chfcanada.coop/eng/pdf/DunningReport2009EnWeb.pdf>. Accessed November 2010.

Core housing need is made up of three key components: adequacy, suitability, and affordability. Each component is defined in the following table:

| Indicator: Core Housing Need |
|---|
| Adequate dwellings are those reported by their residents as not requiring any major repairs |
| Suitable dwellings have enough bedrooms for the size and make-up of resident households, according to National Occupancy Standard (NOS) requirements |
| Affordable dwellings cost less than 30% of before-tax household income |
| Source: The Co-operative Housing Federation, The Dunning Report, 2009. |

A household is deemed to be in core housing need “if its housing falls below at least one of the adequacy, suitability, or affordability standards **and** it would have to spend 30% or more of its before-tax income to pay the median rent of alternative local housing that is acceptable (meets all three standards).”⁷¹

The data are provided in such a way that families with children (and single parent families in particular) may also be abstracted to better grasp the magnitude of the pediatric impact of this metric. The information specific to B.C. is provided in the table below; the average number of children per family (also from the 2006 census) was used to calculate the estimated absolute number of children living in households experiencing core housing needs in B.C. It should be noted that this analysis may also be applied to selected sub-regions of the province, including Abbotsford, Kelowna, Vancouver, and Victoria.⁷²

⁷¹ The Co-operative Housing Federation of Canada. *The Dunning Report: Dimensions of Core Housing Need in Canada (2nd Edition)*. 2009. Available at <http://www.chfcanada.coop/eng/pdf/DunningReport2009EnWeb.pdf>. Accessed November 2010.

⁷² Information available at http://www.cmhc-schl.gc.ca/en/corp/about/cahoob/data/data_013.cfm. Accessed November 2010.

| Households Experiencing Core Housing Needs in B.C. 2006, by Household Type | | | |
|---|---|--|--|
| Household | Number of Households Experiencing Core Housing Needs* | Average Number of Children per Household † | Estimated Absolute Number of Children Affected |
| Couples with Children | 42,410 | 1.87 | 79,307 |
| Lone Parent Families | | | |
| Female | 34,720 | 1.52 | 52,774 |
| Male | 4,960 | 1.43 | 7,093 |
| Total | 82,090 | 1.70 | 139,174 |
| Source: | | | |
| * Canadian Mortgage and Housing Corporation, 2009. | | | |
| † Statistics Canada, 2006 Census Data; Average from http://www.bcstats.gov.bc.ca/data/cen06/facts/cff0603.pdf | | | |

The information provided by the CMHC has been used by a number of advocacy groups, including the Research Alliance for Canadian Homelessness, Housing, and Health (or REACH³) and the Co-operative Housing Federation of Canada. The latter group's 2009 report features B.C.-specific data at the provincial level, including information on the relative prevalence of each of the three components that inform the core housing need metric. As summarized in the table below, it is clear that *affordability* is by far the dominant driver of core housing need in B.C.

| Distribution of Components Producing Core Housing Need in B.C., 2006 | |
|---|---|
| Component of Need | Proportion of Total "Core Housing Need" Cases |
| Failing on one standard | 81% |
| <i>Affordability</i> | 71% |
| <i>Suitability</i> | 6% |
| <i>Adequacy</i> | 5% |
| Failing on multiple standards | 19% |
| <i>Affordability and suitability</i> | 9% |
| <i>Affordability and adequacy</i> | 8% |
| <i>Suitability and adequacy</i> | 1% |
| <i>Affordability, suitability, and adequacy</i> | 1% |
| Source: The Co-operative Housing Federation, The Dunning Report, 2009. | |

Homelessness

*Runaway, "throwaway," or otherwise homeless youth are, by definition, a hidden population difficult to enumerate....*⁷³

Homeless youth tend to be under-represented in national surveys, including any efforts to track the prevalence of risk factors (such as substance use) among youth. The unreliability of attempts to count this subpopulation in B.C. and other jurisdictions can be traced to both methodological issues involved with conducting surveys and characteristics of the homeless population. Counts can miss large proportions of the homeless populations that are simply difficult to find; as well, figure tend not to include the temporarily homeless, a group which is also underrepresented in the literature.⁷⁴ As well, the homeless cohort is highly variable, with individuals moving between "the street" and different stages of housing, or between geographical regions. Adding a pediatric lens to this concept only increases the complexity. As mentioned in the background section, "youth homelessness" (rather than the experience of younger children) tends to dominate the literature, with the age group of interest defined as 12 to 24 years.

National estimates of homelessness in youth range widely, extending from 65,000 to 150,000 individuals, which is consistent with the above-mentioned unreliability of data-gathering.^{75,76} More recently, the Vancouver Foundation has published more conservative estimates, suggesting that there are about 700 homeless youth in the city of Vancouver, with considerably more in Metro Vancouver as a whole.⁷⁷ This figure may be extrapolated to the entire province (see Annex I-1), although it is difficult to know how disproportionately homeless youth may be represented in the urban areas of the Lower Mainland. An even more conservative estimate may be derived from the 2008 Metro Vancouver Homeless Count, which determined that there were 270 *unaccompanied* youth on the street.⁷⁸

Proxy measures may be a stop-gap alternate approach to tracking if pediatric homelessness were in fact to be adopted as a core indicator. Thus, available beds in youth shelters at least allows for quantification of the "supply" of resources at the low end of the housing scale that are presently available to homeless teens. Shelter spaces available to homeless families may provide a similar tracking method for younger children. Of course, these sorts of statistics represent a very poor proxy measure, because the supply may be greatly mismatched with the true need.

⁷³ Molina BS. High risk adolescent and young adult populations: consumption and consequences. *Recent Developments in Alcoholism*. 2005; 17: 49-65.

⁷⁴ Information available at <http://www.straight.com/article-140217/homeless-count-hides-many>. Accessed November 2010.

⁷⁵ DeMatteo D, Major C, Block B et al. Toronto street youth and HIV/AIDS: prevalence, demographics, and risks. *Journal of Adolescent Health*. 1999; 25(5): 358-66.

⁷⁶ Raising the Roof. *Youth Homelessness in Canada: The Road to Solutions*. 2009. Available at <http://www.raisingtheroof.org/>. Accessed November 2010.

⁷⁷ Information available at <http://www.vancouverfoundation.ca/specialprojects/youthhomelessness.htm>. Accessed November 2010.

⁷⁸ Available at http://www.metrovancouver.org/planning/homelessness/ResourcesPage/web_2008_Count_FAQ%20_Final_Release_Sept_15.pdf. Accessed December 2010.

Discussion

In addition to the just-noted data challenges, the **concept of homelessness** suffers from a number of gaps in the literature with respect to the health outcome perspective. Perhaps the most telling limitation is the fact that only two studies were identified that focused on the younger ages, that is, the experience of homelessness among those less than 13 years old. There is a likely distinction in the health effects experienced by younger homeless children, where they still have one or more adult caregivers to help “fend for them,” as opposed to the risks and impacts faced by homeless adolescents operating autonomously “on the street.” The relative limited investigation of outcomes among younger children may be due to low absolute numbers in developed countries or certain methodological challenges. Commentaries insist that, whether unique to their age or not, the challenges faced by homeless preadolescents remain a great concern.^{79,80} The two studies examined for this project do suggest that the poor health and well-being outcomes among the younger homeless may embrace both the physical (specifically, asthma prevalence) and the behavioural/social.

Most of the information on health outcomes for homeless adolescents is limited in usefulness because the upper age limit and median age of the studies sample tend to be in the 20s; however, older teens are certainly included in the study groups, so it is still valid to cite the results in a qualified way for the purpose of this project. Another limitation is the fact that investigations sometimes focus on “street youth” or “street-involved youth,” a category that overlaps with the homeless but probably should be seen as broader in scope. However, with that caveat again in place, information from “street youth” certainly does complement research insights concerning the homeless per se. One example involves the higher prevalence of STI-related risk behaviours observed in studies of homeless youth. Surprisingly, Coady et al. found no biologically measured increase in HIV or HCV infection in their study population; the conclusion that this might reflect an issue with the study design is borne out by the fact that HIV and HCV is generally known to be high among street youth in Canada.^{81,82,83}

While the literature search did not find any individual studies that focused on cognition in homeless children, it did locate one pertinent review by Parks et al. that summarized a variety of studies. Each of the studies in that review paper fell outside of the search parameters and therefore was not captured in the literature search that focused on studies. For completeness, however, it is useful to summarize the results of Parks et al, as follows:⁸⁴

- Older homeless children obtained lower scores on most measures of developmental status compared to normally housed children
- Receptive vocabulary was significantly lower in homeless preschool children

⁷⁹ Grant R, Shapiro A, Joseph S et al. The health of homeless children revisited. *Advances in Pediatrics*. 2007; 54: 173-87.

⁸⁰ Family Housing Fund. *Homelessness and its Effects on Children*. 1999. Available at http://www.fhfund.org/_dnld/reports/SupportiveChildren.pdf. Accessed December 2010.

⁸¹ Public Health Agency of Canada. *Street Youth in Canada*. 2006. Available at http://www.phac-aspc.gc.ca/std-mts/reports_06/pdf/street_youth_e.pdf. Accessed November 2010.

⁸² DeMatteo D, Major C, Block B et al. Toronto street youth and HIV/AIDS: prevalence, demographics, and risks. *Journal of Adolescent Health*. 1999; 25(5): 358-66.

⁸³ See <http://www.phac-aspc.gc.ca/sti-its-surv-epi/epi/hepc-eng.php>

⁸⁴ Parks RW, Stevens RJ, Spence SA. A systematic review of cognition in homeless children and adolescents. *Journal of the Royal Society of Medicine*. 2007; 100(1): 46-50.

- School-aged children (aged 6-12 years) achieved significantly lower vocabulary scores and trended toward reduced reading ability
- Homeless children had three times the cognitive and developmental problems that would be expected among children in general.

Conversely, one study cited by Parks et al. found that general cognitive function measures among homeless and domiciled children were similar; however, differences were still evident in academic achievement, with homeless children faring more poorly. Among adolescents, Parks et al. noted that the homeless scored below “normal” on visuomotor and problem solving strategies and displayed poor judgment, weak logical thinking, and slow performance on timed tasks. One potential driver of psychosocial impairment was the high rate of abuse histories among this subpopulation.

For the **housing conditions concept**, there is persuasive evidence that components of the core housing need metric can and do influence the health and well-being of children. In particular, the adequacy and suitability of housing, defined in terms of toxins/moulds and overcrowding, appear to be strongly related to pediatric health—including physical and psychosocial effects. Specific recent studies augment the evidence based on reviews. For instance, it has been shown that poor housing conditions can increase the likelihood of injury. According to research in one U.S. jurisdiction, it is estimated that accidental burns and falls represent about 10% of the total direct and indirect costs attributable to children living in substandard housing.⁸⁵ Another important area of investigation specific to Canadian housing conditions involves those living in remote locations, including Aboriginal groups. For example, there is evidence that reduced ventilation in housing in Inuit villages has lead to an increased rate of lower respiratory tract infections among young children.⁸⁶ This sort of information is likely of relevance to northern and other remote First Nations communities in B.C.

There are variations on the housing theme that were not explored under the three concepts covered in this section. One example is residential mobility, which is characterized by variables such as distance moved, reason for moving, frequency of moving, attributes of neighborhoods moved to or from, and the time since the last residential change. Pertinent to this topic, a 2008 systematic review by Jelleyman and Spencer found that a high frequency of residential change was a potential marker for clinical risk of behavioural and emotional problems.⁸⁷ As well, examining specific types of housing circumstances (such as supportive, foster care, rental tenure vs. ownership, etc.) may generate correlations to health and well-being outcomes. Variations on the homeless theme, such as foster care, serve to underline the psychosocial reality that a “home is more than a house.” There is evidence that children in supportive housing face significant behavioural, emotional, and school challenges.⁸⁸ These disparities may carry through to young adulthood and beyond; for example, housing

⁸⁵ Chenoweth D, Estes C, Lee C. The economic cost of environmental factors among North Carolina children living in substandard housing. *American Journal of Public Health*. 2009; 99 Suppl 3: S666-74.

⁸⁶ Kovesi T, Gilbert NL, Stocco C et al. Indoor air quality and the risk of lower respiratory tract infections in young Canadian Inuit children. *Canadian Medical Association Journal*. 2007; 177(2): 155-60.

⁸⁷ Jelleyman T, Spencer N. Residential mobility in childhood and health outcomes: a systematic review. *Journal of Epidemiology & Community Health*. 2008; 62(7): 584-92.

⁸⁸ Gewirtz A, Hart-Shegos E, Medhanie A. Psychosocial status of homeless children and youth in supportive housing. *American Behavioral Scientist*. 2008; 51(6): 810-23.

circumstances have been shown to have direct and indirect impacts on access to care among adolescents transitioning from the foster system.^{89,90}

Notwithstanding the potential role for other concepts, one of the cited reviews (by Leventhal and Newman) did investigate residential mobility and housing tenure (rental vs. ownership, subsidized housing, etc.) and found that the evidence related to child health and well-being was generally mediated by housing conditions (including crowding).⁹¹ In short, housing conditions may be the most pertinent concept to land upon in order to capture some of the other housing-related drivers.

Conclusion

Despite the gaps identified in the Discussion section, it is clear that homelessness can be correlated to elevated incidence of HIV/STI risk behaviours and poor nutrition, as well as increased exposure to violence that may result in adverse psychosocial and behavioural outcomes. That being said, the single biggest impediment for homelessness as a concept is data availability; there is no solid indicator of the magnitude of homelessness in B.C. or any other jurisdictions in Canada.

There is also no pertinent literature available on the pediatric health effects related to the housing availability concept; this limitation may be partly a reflection of the fact that housing availability mostly influences the other two concepts under consideration in this section, that is, homelessness and housing conditions. Lack of affordable housing stock contributes to people being forced into substandard shelter options that may compromise health in variety of ways; while the “upstream” reality of inadequate housing stock may be a major driver, it is the *proximate* mechanisms of exposure to unhealthy housing that have garnered most of the research attention.

There is convincing evidence for a relationship between poor housing conditions and adverse health and well-being outcomes among children. Helpfully, the CMHC “core housing need” indicator effectively and routinely captures various aspects of housing conditions, including the integrity of the structure and exposure to crowding. In conjunction with other Census data, the number of children deemed to be experiencing core housing need is estimated at 139,000. These considerations suggest that housing conditions, integrated with availability through the metric of core housing need, could be a useful core concept defining child health and well-being in British Columbia.

⁸⁹ Yen I, Hammond W, Kushel M. From homeless to hopeless and healthless?: The health impacts of housing challenges among former foster care youth transitioning to adulthood in California. *Issues in Comprehensive Pediatric Nursing*. 2009; 32: 77-93.

⁹⁰ Lopez P, Allen PJ. Addressing the health needs of adolescents transitioning out of foster care. *Pediatric Nursing*. 2007; 33(4): 345-55.

⁹¹ Leventhal T, Newman S. Housing and child development. *Children and Youth Services Review*. 2010; 32: 1165-74.

| Summary Assessment | | | | | |
|---|--|-----------|---------------------|---------------|----------------------------|
| Children in Families with Core Housing Need | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 0-19 | 139,000 | High | High | Medium | Medium-High |

As summarized above, assessments have been applied to the Housing Condition/Housing Availability concepts, specifically in terms of the combined indicator with the most compelling support in the literature, namely: *children living in core housing need*.

The pediatric population **Magnitude** of the potential indicator is assessed as **High**. Based on 2006 Canadian Mortgage and Housing Corporation estimates of households in core housing need, and the average number of children in each household type, an estimated 139,000 children live in households in core housing need in B.C. in 2006. This is greater than 10% (19,000) of the total 2010 pediatric cohort resulting in a magnitude classification of high.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **High**. There is convincing evidence for a relationship between poor housing conditions and adverse health and well-being outcomes among children, including physical/developmental (especially related to toxins/mould) and psychosocial components (especially associated with crowding).

The **Modifiability** of the potential indicator is assessed as **Medium**. While core housing needs can theoretically be addressed through policies focusing on social/subsidized housing, both politics and the health of the general economy, among other factors, ultimately influence the practical level of modifiability.

Data Availability/Validity for the potential indicator is assessed as **Medium-High**. Based on data from the Canada Mortgage and Housing Corporation and the Canadian Census, it is possible to estimate the number of children living in households that are experiencing core housing needs in B.C.

Based on the indicated assessment, the potential indicator is **Recommended** for consideration as a core indicator of child health and well-being. A substantial proportion of B.C. children and youth are affected, there is convincing evidence for a relationship between poor housing conditions and adverse health and well-being outcomes among children, the situation is theoretically modifiable, and data for tracking purposes are available and reasonably valid.

| Summary Assessment Homeless Children | | | | | |
|---|---|-----------|---------------------|---------------|-------------------------------|
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| | 575 - 2,730 | Low | Medium | Medium | Low |

As summarized above, assessments have been applied to the Homelessness concept.

The pediatric population **Magnitude** of the potential indicator is assessed as **Low**. As outlined in this section, the limited data sources allow an estimate of 575 to 2,730 homeless children in B.C., which is considerably less than 2% of the total pediatric cohort, that is, well below the threshold that would attract a Medium rating.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **Medium**. While the assessment might be assumed to be high, only minimal research exists to back up this intuition.

The **Modifiability** of the potential indicator is assessed as **Medium**. The reasons are that considerable resources are already being expended to reduce the incidence or at least the impacts of homelessness, especially in various urban areas of B.C. While there is little policy research that suggests that homelessness can be completely averted, a program of new responses targeted to homelessness among young people would be well received among the public in British Columbia.⁹²

Data Availability/Validity for the potential indicator is assessed as **Low**. The reasons are the well-known difficulty in conducting surveys to accurately count homeless individuals, a challenge that is only intensified when the focus is on children and adolescents.

Based on the indicated assessment, the potential indicator is **Not Recommended** for consideration as a core indicator of child health and well-being. The reasons are the low-to-medium ratings across all assessment categories.

⁹² "British Columbians primed to act on poverty, poll finds." *Vancouver Sun*. March 7, 2011.

Concepts Combining Household and Community Resources

Adequate Child Care

Background and Context

The purpose of this review was to find research evidence of an association between adequate child care and the health and well-being of children. Child care is “a broad term used to describe any number of arrangements or settings where the primary responsibility is caring for young children.”⁹³ The qualifying term “adequate” can generate nuances of meaning; basically it may be defined as “sufficient in quality or quantity to meet a need.” Thus, both quality and availability of child care and their effects on the child will need to be explored in this section.

Whatever the “arrangements or settings” adopted, access to good quality, reliable child care is considered important in allowing parents of young children to participate in the work force and/or pursue educational studies in a serious way. There has been a significant increase in the use of child care services in Canada since the 1990s, with over half of children aged six months to five years in some form of child care in 2002.⁹⁴ Child care may occur in-home, where the provider is often a relative; in such situations, a child care license is not required. Another type of in-home care involves nannies, au pairs, or other non-related babysitters. Alternatively, child care can be offered outside of the family home, either as a centre-based service or through another person’s home (with the specific focus here on care provided by a non-relative). In the latter types of settings, a child care license is usually required; this sort of regulated child care will be the focus of this report, as it is the most common type of child care arrangement used in Canada and the only one where tracking quality and quantity data seems feasible.

Child care is a multi-dimensional phenomenon and, as a result, defining high-quality child care is challenging. There is a general consensus, however, on the categories to be assessed when evaluating quality child care; they include the following:^{95,96}

- Licensing and accreditation
- Staff-to-child ratio and group size
- Director and staff experience and training
- Health and safety issues
- Physical environment
- Daily activities and routines

⁹³ Harris-Solomon A. Child Care – Availability and Quality, Cost and Financing. Available at <http://education.stateuniversity.com/pages/1825/Child-Care.html>. Accessed November 2010.

⁹⁴ Community Resources. Canadian Council on Social Development. Available at <http://www.ccsd.ca/pccy/2006/community.htm>. Accessed November 2010.

⁹⁵ Committee on Early Childhood, Adoption, and Dependent Care. Jyoti DF, Frongillo EA, Jones SJ. Food insecurity affects school children's academic performance, weight gain, and social skills. *Journal of Nutrition*. 2005; 135(12): 2831-9, Family Housing Fund. *Homelessness and its Effects on Children*. 1999. Available at http://www.fhfund.org/_dnld/reports/SupportiveChildren.pdf. Accessed December 2010.

⁹⁶ Harris-Solomon A. Child Care – Availability and Quality, Cost and Financing. Available at <http://education.stateuniversity.com/pages/1825/Child-Care.html>. Accessed November 2010.

The notion that quality child care is important to a child's development is an established view among child care researchers. Higher-quality care has been associated with improved cognitive skills and academic performance, as well as fewer behavioural problems and better socio-emotional and peer outcomes.^{97,98} An issue of contention in the literature, however, is the size of such effects, and whether they persist in the long term.^{99,100} There are also other aspects of child care that can affect developmental outcomes in the child, including both duration (amount of time spent in care) and service delivery type (in-home, centre-based, etc.).¹⁰¹ For example, some reports in the literature indicate that children in care more than 30 hours per week, or those with longer duration in centre-based care, are more likely to manifest behavioural problems.^{102,103} The effects of duration and type of child care are generally studied separately from quality issues; both factors may be considered to act independently of child care quality.

As noted already, the theme that high quality child care is important for developmental outcomes in the child, and that development suffers when children experience poor quality care, is consistent throughout the literature. However, it is apparent from the complexity of this topic and the multitude of factors to be considered when evaluating child care that it would be difficult to isolate one indicator of child care quality. Accordingly, there is a dearth of data regarding quality of child care in Canada. As was made known in a recent series in the Vancouver Sun, information is obtainable on the mandated inspection frequency of daycares in the province, a "risk rating" that can serve as a proxy for licensed child care quality.¹⁰⁴ More commonly, information such as rates of usage, types and characteristics of care, and hours children spend in care is available nationally and/or provincially. Data sources on child care availability are discussed in a later subsection.

Methodology and Provisional Results

Review Search Keywords

Rather than beginning with the general search based on the MeSH term "Socioeconomic Factors," it was deemed more appropriate to depend from the start on the more targeted MeSH term for this topic, as follows:

"Child Day Care Centers"[Majr] AND

("Health"[Mesh] OR "Health Status Indicators"[Mesh] OR "Risk Factors"[Mesh] OR "Health Status/statistics and numerical data"[Mesh] OR "Physical Fitness"[Majr] OR "Diseases

⁹⁷ Bradley RH, Vandell DL. Child care and the well-being of children. *Archives of Pediatric & Adolescent Medicine*. 2007; 161(7): 669-76.

⁹⁸ Child-care effect sizes for the NICHD Study of Early Child Care and Youth Development. *American Psychologist*. 2006; 61(2): 99-116.

⁹⁹ Vandell DL, Wolfe B. *Child care quality: Does it matter and does it need to be improved?* 2000. Institute for Research on Poverty. Available at <http://www.irp.wisc.edu/publications/specreports.htm>. Accessed November 2010.

¹⁰⁰ Belsky. Quality, Quantity and type of child care: effects on child development in the USA.

¹⁰¹ Early child care and children's development in the primary grades: Follow-up results from the NICHD study of early child care. *American Educational Research Journal*. 2005; 42(3): 537-70.

¹⁰² Bradley RH, Vandell DL. Child care and the well-being of children. *Archives of Pediatric & Adolescent Medicine*. 2007; 161(7): 669-76.

¹⁰³ Child-care effect sizes for the NICHD Study of Early Child Care and Youth Development. *American Psychologist*. 2006; 61(2): 99-116.

¹⁰⁴ Available at <http://www.vancouversun.com/news/daycare-ratings/index.html>. Accessed March 2011.

Category/prevention and control"[Majr] OR "Phenomena and Processes Category/prevention and control"[Majr] OR "Diseases Category/statistics and numerical data"[Majr] OR "Phenomena and Processes Category/statistics and numerical data"[Majr] OR "Outcome Assessment (Health Care)"[Mesh] OR "Medicine/statistics and numerical data"[Mesh] OR "Hospital Departments/statistics and numerical data"[Mesh] OR "Quality of Life"[Mesh] OR "Personal Satisfaction"[Mesh])

While the above search processes returned some relevant and useful narrative reviews, no systematic reviews were identified that met the criteria for this project. Thus, a further search was conducted for individual studies, as described below.

Study Search Process

A second electronic search was conducted for individual studies in this area. The database used was EBSCO Host, using search keywords such as **(child care quality)** AND **(child health)**.

In addition to the above method, the following searches were conducted:

- In PubMed, using similar basic terms to those applied to EBSCO, as well as the "Related citations" utility
- A scan in Google for grey literature and for any obvious articles missed, using terms such as: **(child care quality)** AND **(child health)**
- Hand-searching bibliographies of key papers
- Checking for study updates (by author)

Despite this extensive search, there were no experimental-type studies or trials identified for this topic area. Because no relevant reviews or studies were identified for this concept, a Volume Report was not produced.

Results and Discussion

As noted above, there were no systematic reviews or individual studies identified in the literature search that met the inclusion criteria laid out for this project. Various narrative reviews were identified, as well as a number of papers analyzing and commenting on results from the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development. The project was launched in the U.S. in the early 1990s; it was designed to examine three features of the child-care experience: quality of care, quantity of care, and type of care. A cohort of over 1,000 children have been tracked from birth into mid-adolescence to determine whether experiences in child care relate to academic performance and behaviour problems in high school. In an analysis of 4½ year-olds from this study, it was determined that child care quality did not uniformly cause better child outcomes; if there is any effect, it tends to be small and restricted to cognitive effects.¹⁰⁵ In a further analysis of older children from the NICHD study, Belsky et al. concluded that "children who experienced higher quality early child care (of any kind) displayed somewhat better vocabulary scores in fifth grade than did children who experienced poorer quality care."¹⁰⁶ The authors caution that effect sizes were modest and, due to the particular study design

¹⁰⁵ Does quality of child care affect child outcomes at age 4 1/2? *Developmental Psychology*. 2003; 39(3): 451-69.

¹⁰⁶ Belsky J, Vandell DL, Burchinal M et al. Are there long-term effects of early child care? *Child Development*. 2007; 78(2): 681-701.

employed (aimed at finding correlations but not causation per se), it ranged from difficult to impossible to draw etiologic inferences.

In a narrative-type review, Love et al. discuss three studies separate from the NICHD work, each examining associations between early child care and child outcomes. The reviewers concluded that these studies do “suggest that quality of child care is an important factor influencing children’s development and that quality may be an important moderator of the amount of time in care, particularly when the child care contexts differ from those of the NICHD research.” They also determined that further study is required to examine “how both quality and quantity of child care may influence a range of young children’s developmental outcomes.”¹⁰⁷

Overall, despite an apparent consensus in the literature that quality child care is important to developmental outcomes in the child, there is only fair evidence for this conclusion. The effects presented are generally small in magnitude, and often wane over the long term.

As discussed in the Background and Context section, child care quality is a complex measure; global or component data related to quality are not available for British Columbia or other regions in Canada. However, adequate child care as determined by available spaces is a metric that *is* routinely monitored. For the sub-concept of child care availability, there have been studies conducted on the relationship to fertility decisions such as first-birth timing.^{108,109} While an important theme in the context of declining fertility rates, no studies of actual child health and well-being outcomes were identified. Although there is unlikely to be a *direct* link between availability and child health and well-being, access to child care services is important for many parents who participate in the workforce; employment generally equates to earning an income with which to better support their children—which naturally could include investing family resources to promote the health and well-being of the child. With respect to improving accessibility, the creation of new child care spaces in British Columbia was listed as a priority action for the province in a 2009 Ministry of Children and Family Development report.¹¹⁰ Pursuing this agenda more vigorously would fulfill the calls for progress regularly made by advocacy organizations in this jurisdiction and in many other developed parts of the world.

Data Sources on Child Care Availability

Childcare Resource and Research Unit (CRRU)

The CRRU is a policy- and research-oriented facility that focuses on early childhood education and child care (ECEC) and family policy in Canada and internationally. The CRRU periodically assembles pan-Canadian data on ECEC, with the most recent report published in 2009. This comprehensive publication provides key data on child care and kindergarten across Canada. It tracks available spaces, finances, certain quality issues, and public policy developments at the provincial/ territorial and federal levels, demographic information such

¹⁰⁷ Love JM, Harrison L, Sagi-Schwartz A et al. Child care quality matters: how conclusions may vary with context. *Child Development*. 2003; 74(4): 1021-33.

¹⁰⁸ Baizan P. Regional child care availability and fertility decisions in Spain. *Demographic Research*. 2009; 21: 803-42.

¹⁰⁹ Rindfuss RR, Guilkey D, Morgan SP et al. Child care availability and first-birth timing in Norway. *Demography*. 2007; 44(2): 345-72.

¹¹⁰ Child Care in British Columbia. Ministry of Children and Family Development. 2009. Available at <http://www.mcf.gov.bc.ca/childcare/publications.htm>. Accessed November 2010.

as maternal labour force participation, and identified trends over time.¹¹¹ In 1992, there were 42,927 regulated child care spaces in British Columbia, compared to 87,538 spaces in 2008. This means there was a regulated child care space for 15.4% of children 0-12 years in 2008 in the province. More detailed statistics on the regulated spaces in B.C. are also available, including information on the centre-based/home-based, full-day/part-day, and for-profit/non-profit categories.

Canadian Council on Social Development

The Canadian Council on Social Development (CCSD) is a not-for-profit organization that was founded in 1920. Its mission is to develop and promote progressive social policies inspired by social justice, equality and the empowerment of individuals and communities. The CCSD published the number of regulated child care spaces in Canada and in the provinces/territories for 2003/04; the information was contained in supplementary tables for its report entitled *Progress of Canada's Children and Youth 2006*.¹¹² In British Columbia, there were 80,230 regulated child care spaces; this represents enough spaces for 13.7% of children aged 0-12. While this is the seventh edition of the report since 1996, it is not clear whether these reports will continue to be produced.

As a comparison, the 2009 *Child Care in British Columbia* report produced by the provincial government indicated that, since 2003/04, the number of licensed child care spaces has been increased by 20%, to approximately 90,000.¹¹³

Conclusion

There is fair evidence for an effect of child care quality on child health and well-being outcomes; however, when an effect is in fact detected, it is generally small in magnitude. Perhaps a more significant issue in determining the utility of child care *quality* as an indicator relates to the fact that this sub-concept is not currently monitored in British Columbia, nor is there a straightforward way to implement such a system. On the other hand, the *availability* of regulated child care spaces is currently monitored, although only in absolute terms rather than as measure of the gap between need and supply. Although the latter information might be of key importance from a socioeconomic and/or political perspective, there is as yet no correlation drawn in the literature between child care quantity gaps and pediatric health and well-being outcomes at a population level. In sum, the ironic situation with the concept Adequate Child Care is that there is either moderate evidence but no indicator data (on the quality issue), or partial indicator data but no evidence of health effects (on the quantity issue), which ultimately suggests that it does not represent a fruitful source for a core indicator of pediatric health and well-being.

¹¹¹ Beach J, Friendly M, Ferns C et al. *Early childhood education and care in Canada 2008*. 2009. Childcare Resource and Research Unit. Available at <http://www.childcarecanada.org/ECEC2008/index.html#toc>. Accessed December 2010.

¹¹² The Progress of Canada's Children and Youth. 2006. Web-only Supplementary Data, Community Resources. Available at <http://www.ccsd.ca/pccy/2006/webonly.htm>. Accessed November 2010.

¹¹³ Child Care in British Columbia. Ministry of Children and Family Development. 2009. Available at <http://www.mcf.gov.bc.ca/childcare/publications.htm>. Accessed November 2010.

| Summary Assessment | | | | | |
|---|--|-----------|---------------------|---------------|----------------------------|
| Children with Unmet Need for Access to Child Care | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| | | Unclear | Low | Medium | Low |

As summarized above, assessments have been applied to the Adequate Child Care concept. It has already been acknowledged that there are severe limitations on constructing an indicator around either the quality or quantity meaning of “adequate.” Therefore, the choice of indicator to assess here was somewhat arbitrary, based on generating the most potential for a useful data stream in the future, namely: *proportion of children with unmet need for access to care*.

The pediatric population **Magnitude** of the potential indicator is assessed as **Unclear**. While there are sources of information on the number of child care spaces, it is not clear what proportion of children in need is currently not being serviced.

The **Significance** of the potential indicator as indicated by the evidence of effect on a child’s health and well-being is assessed as **Low**. Little evidence has been developed of the population impact of inadequate supply of child care.

The **Modifiability** of the potential indicator is assessed as **Medium**. The reasons are the complex political and financial obstacles to developing one or more types of child care to a greater extent.

Data Availability/Validity for the potential indicator is assessed as **Low**. There are a number of published figures about child care spaces in the province, which show remarkable consistency; however, the main data gap persists around knowing exactly what the unmet need might be—to simply equate it with the total number of preschool children would be arguably a large overestimate.

Based on the indicated assessment, the potential indicator is **Not Recommended** for consideration as a core indicator of child health and well-being. The reasons are simply the low (or unclear) rating across most of the assessment categories. However, this does represent an indicator that could be explored in terms of future development.

Food Security

Background and Context

The purpose of this review is to find research evidence of an association between food security and child health and well-being. As defined by the Food and Agriculture Organization of the United Nations, “food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy lifestyle.”¹¹⁴ Conversely, food insecurity is deemed to exist when people do not have adequate physical, social, or economic access to food as defined above. Individuals may be food-insecure if they live in geographically isolated areas, limiting their access to nutritionally adequate foods; food insecurity is also closely associated with low-income households that cannot afford to purchase foods that constitute a healthy diet.^{115,116} One of the “tragic ironies” of this field is the fact that healthy foods tend to be more expensive than high-energy-density foods of little nutritional value (commonly known as junk food).¹¹⁷ In Canada and many other developed nations, food insecurity is a growing concern for the poor; certain subsets of Canadian households, such as those involving single parents, the disabled, the unemployed, and First Nations people living off-reserve, are particularly at-risk for experiencing food insecurity.¹¹⁸ Recently, alarm has been raised that the rise in world food prices are even putting the “working poor” at risk in Canada.¹¹⁹

Other terms that overlap with *food insecurity* include *food insufficiency* and simply *hunger*. Food insufficiency was a term used by the U.S. Third National Health and Nutrition Examination Survey (NHANES III); it was defined as living in a family that “sometimes or often did not get enough food to eat.” A child was classified as “food insufficient” if the respondent to the family questionnaire answered in the affirmative when asked about that specific experience. Based on cognitive testing of the meaning/perception of food insecurity, hunger, and food insufficiency questions, the concept of food insufficiency appears more severe than food insecurity but not as severe as hunger.¹²⁰ While food insecurity is the main topic of this review, food insufficiency was also considered a relevant subset of the topic, and therefore the studies utilizing NHANES III data were included. In contrast, true hunger is considered a relatively rare phenomenon in Canada, and therefore was not added to the agenda for consideration.¹²¹

¹¹⁴ The State of Food Insecurity in the World 2010. Food and Agriculture Organization of the United Nations. Available at <http://www.fao.org/docrep/013/i1683e/i1683e00.htm>. Accessed November 2010.

¹¹⁵ Food, Health and Well-Being in British Columbia. Provincial Health Officer’s Annual Report 2005. Available at <http://www.health.gov.bc.ca/pho/pdf/phoannual2005.pdf>. Accessed November 2010.

¹¹⁶ Food for thought: The issues and challenges of food security. August 2010. Provincial Health Services Authority. Available at <http://www.phsa.ca/HealthProfessionals/Population-Public-Health/Food-Security/default.htm>. Accessed November 2010.

¹¹⁷ Monsivais P, Drewnowski A. The rising cost of low-energy-density foods. *Journal of the American Dietetic Association*. 2007; 107(12): 2071-6.

¹¹⁸ Food, Health and Well-Being in British Columbia. Provincial Health Officer’s Annual Report 2005. Available at <http://www.health.gov.bc.ca/pho/pdf/phoannual2005.pdf>. Accessed November 2010.

¹¹⁹ “Politicians need to combat Canada’s food insecurity.” *Vancouver Sun*. March 8, 2011.

¹²⁰ Alaimo K, Olson CM, Frongillo EA, Jr. Low family income and food insufficiency in relation to overweight in US children: is there a paradox? *Archives of Pediatric & Adolescent Medicine*. 2001b; 155(10): 1161-7.

¹²¹ Cook B. *Food Security Issues in a Public Health Context*. A report prepared for the National Collaborating Centre for Determinants of Health. Antigonish, Nova Scotia: 2008.

The term *food security* became widely recognized in the 1990s when the United States Department of Agriculture developed a standardized household food security scale based on 18 questions. Since then, the scale has undergone extensive testing (leading to minor modifications) that further established its validity and reliability. In 2004, the Canadian Community Health Survey (CCHS) included a multiple-indicator measure of household food security that was based upon the U.S. approach. In order to determine overall status based on the Household Food Security Survey Model (HFSSM), the food security status of the adult and child members in the household are first determined individually; the specific questions related to the adult and child scales are given in the following table. A household-level metric is then derivable, as explained below.

| CCHS Household Food Security Survey Module (HFSSM) | |
|--|--|
| Adult and Child Scales* | |
| Adult Scale | |
| | You and other household members worried food would run out before you got money to buy more Food |
| | You and other household members bought didn't last and there wasn't any money to get more |
| | You and other household members couldn't afford to eat balanced meals |
| | You or other adults in your household ever cut size of meals or skipped meals |
| | You or other adults in your household ever cut size of meals or skipped meals in 3 or more months |
| | You (personally) ever ate less than you felt you should |
| | You (personally) were ever hungry but did not eat |
| | You (personally) lost weight |
| | You or other adults in your household ever did not eat for whole day |
| | You or other adults in your household ever did not eat for whole day in 3 or more months |
| Child Scale | |
| | You or other adults in your household relied on only a few kinds of low-cost food to feed child(ren) |
| | You or other adults in your household couldn't feed child(ren) a balanced meal |
| | Any of the child(ren) were ever hungry |
| | Any of the child(ren) ever skipped meals |
| | Any of the child(ren) ever skipped meals in 3 or more months |
| | Any of the child(ren) ever did not eat for whole day |
| *The full wording of each question, asked of an adult household member, includes explicit reference to resource limitation (e.g. "...because there wasn't enough money for food"). | |
| Source: Health Canada | |

The number of questions in each of the HFSSM scales to which the respondent answered affirmatively on behalf of the household determines the food security status at the adult and child level. To be considered food secure at the adult or child level, at most one of the questions in the Adult or Child Scale, respectively, can be answered affirmatively. A child is categorized as *moderately* food insecure if responses for 2 to 4 of the statements are in the affirmative on the Child Food Security Scale. Moderate food insecurity suggests some compromise in the quality and/or quantity of food consumed. *Severe* food insecurity is indicated if 5 or more affirmative responses are provided, equating to an experience of reduced food intake *and* disrupted eating patterns. Adult food security status is determined in a similar fashion, based on the Adult Food Security Scale (see the summary table below).

Once adult and child food security is known, the food security status of the household can be established.

| Food Security Status Classification Criteria | | | |
|--|--|--|---|
| Food Security Status | Adult Status (based on the Adult Scale) | Child Status (based on the Child Scale) | Household Status (derived from Adult and Child Status) |
| Food Secure | No, or one, indication of difficulty with income-related food access; <i>0 or 1 affirmative responses</i> | No, or one, indication of difficulty with income-related food access; <i>0 or 1 affirmative responses</i> | Both adult status and child status are food secure |
| Food Insecure, Moderate | Indication of compromise in quality and/or quantity of food consumed; <i>2 to 5 affirmative responses</i> | Indication of compromise in quality and/or quantity of food consumed; <i>2 to 4 affirmative responses</i> | Either adults or children, or both adults and children, in the household are moderately food insecure, and neither is severely food insecure |
| Food Insecure, Severe | Indication of reduced food intake and disrupted eating patterns; <i>≥ 6 affirmative responses</i> | Indication of reduced food intake and disrupted eating patterns; <i>≥ 5 affirmative responses</i> | Either adults or children in the household are severely food insecure |

Source: Health Canada

According to the 2004 CCHS, 9.2% of Canadian households were moderately or severely food insecure, compared to 10.4% in British Columbia. The prevalence rate rose to 45% in the lowest household income bracket in B.C.; not surprisingly, the prevalence of household food insecurity generally decreased with increasing household income. Matching a pattern that has been seen elsewhere in this project, food insecurity is both a potential indicator in its own right *and* an outcome related to another indicator, namely, household income.

At the individual level, a higher proportion of B.C. adults were considered food insecure (10.2%) compared to B.C. children (6.4%).¹²² The difference in these two statistics highlights the fact that household or adult food security status will not necessarily be the same as child food security status. It may well be, for example, that parents express their care-giving role in the face of constrained circumstances by disproportionately sharing available food with their offspring.¹²³ In addition, children, especially those who are school-age or older, may supplement their food intake by participating in school breakfast or lunch programs, eating at the homes of friends and neighbours, participating in extracurricular activities that include a snack, or (at older ages) by working and thereby using their own income to purchase food.

Finally, the fact that either adult or child members of the household can “trigger” food insecure status at the household level explains why it is possible to have a much lower percentage of food insecure children compared with the percentage of food insecure households in a particular region; the “excess” households in such cases would be generated by having food insecure adult members.

¹²² Health Canada Food and Nutrition. Available at http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/income_food_sec-sec_alim_table_e2-eng.php. Accessed November 2010.

¹²³ McIntyre L, Glanville NT, Raine KD et al. Do low-income lone mothers compromise their nutrition to feed their children? *Canadian Medical Association Journal*. 2003; 168(6): 686-91.

Methodology and Provisional Results

Initial Review Search Process

As described more fully in the section on Direct Income Concepts, it was appropriate and efficient to start by pursuing a literature scan of review papers in PubMed for all socioeconomic areas covered in this report. To accomplish this, the MeSH term “Socioeconomic Factors” was used, coordinated with an extensive list of health and well-being outcomes. For the purposes of this section, reviews pertinent to food security and health were identified from the total list of 468 gleaned in that process. Only seven potential papers were so identified, and these were subsequently deemed to not be pertinent. Thus, it was necessary to move to a Level B search approach, targeting individual studies.

Study Search Process

A second electronic search was conducted for individual studies in this area. The database used was EBSCO Host, using search keywords such as **(food security) AND (child health)**

In addition to the above search method, the following searches were conducted:

- Exploiting the “Related citations” link in PubMed
- A scan in Google for grey literature and for any obvious articles missed, using terms such as: **(food insecurity) AND (child health)**
- Hand-searching bibliographies of key papers
- Checking for study updates (by author)

A total of only 8 articles were identified via this process, as detailed below. No further exclusion steps were deemed to be necessary, thus a Volume Report was not produced.

Summary of Relevant Studies
Dimension: *Economic and Material Well-being*
Concept: *Food Security*

| | Title of Study | Lead Author | Year | Journal | Journal Impact Factor (2005) | Type of Study | Sample Size | Sample Population | Location | Conflict of Interest |
|---|---|--------------------|-------------|--|---|------------------------|---|---|-----------------|-----------------------------|
| 1 | Food security during infancy: Implications for attachment and metal proficiency in toddlerhood | Zaslow | 2009 | Maternal and Child Health Journal | 1.77 (2009) | Longitudinal survey | 8,944 | 9-month-old infants (final survey at 24 months) | USA | Not Available |
| 2 | Food insecurity works through depression, parenting, and infant feeding to influence overweight and health in toddlers | Bronte-Tinkew | 2007 | Journal of Nutrition | 3.69 | Longitudinal survey | 8,693 | 9-month-old infants (final survey at 24 months) | USA | Not Available |
| 3 | Food insecurity affects school children's academic performance, weight gain, and social skills | Jyoti | 2005 | Journal of Nutrition | 3.69 | Longitudinal survey | 21,000 | children entering kindergarten | USA | Not Available |
| 4 | Poverty, food insecurity, and nutritional outcomes in children and adults | Bhattacharya | 2004 | Journal of Health Economics | 2.71 | Cross-sectional survey | 34,000 | children aged 2 years and older | USA | Not Available |
| 5 | Family food insufficiency, but not low family income, is positively associated with dysthymia and suicide symptoms in adolescents | Alaimo | 2002 | Journal of Nutrition | 3.69 | Cross-sectional survey | 754 | adolescents aged 15-16 years | USA | Not Available |
| 6 | Food insufficiency, family income, and health in US preschool and school-aged children | Alaimo | 2001a | American Journal of Public Health | 3.57 | Cross-sectional survey | 6,154 (1-5-year-olds); 5,667 (6-16-year-olds) | 1-5-year-olds and 6-16-year-olds | USA | Not Available |
| 7 | Low family income and food insufficiency in relation to overweight in US children | Alaimo | 2001b | Archives of Pediatrics & Adolescent Medicine | 3.57 | Cross-sectional survey | 5,200 (2-7-year-olds); 3,996 (8-16-year-olds) | 2-7-year-olds and 8-16-year-olds | USA | Not Available |
| 8 | Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development | Alaimo | 2001c | Pediatrics | 4.27 | Cross-sectional survey | 3,286 (6-11-year-olds); 2,063 (12-16-year-olds) | 6-11-year-olds and 12-16-year-olds | USA | Not Available |

For the 8 studies identified through the literature search and exclusion process, a summary table was developed, as provided below.

| Dimension: <i>Economic and Material Well-being Concept: Food Security</i> <i>Summary Table of Studies</i> | | | | | | | |
|--|--|--|---|--|--|--|---|
| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
| Zaslow (2009) | Examine the associations between household food security during infancy and attachment & mental proficiency in toddlerhood | Data from a longitudinal nationally representative sample of infants and toddlers from the Early Childhood Longitudinal Study; 9-month (2001-2002) and 24-month (2003-2004) surveys were used. | USA N=8,944 nine-month-old infants. Certain populations were over-sampled: Asians and American Indians, low- to moderately low-birthweight infants, and twins. | Longitudinal survey -parent interviews and child assessments | -Social and emotional well-being at 24 months -Cognitive/mental proficiency at 24 months | <i>Social and emotional development</i> -Food insecurity is positively associated with depression, which is in turn negatively associated with positive parenting; more positive parenting practices reduce the likelihood of insecure attachment. -Food insecurity has no significant direct association with being insecurely attached. <i>Cognitive development</i> -There is no direct effect of food insecurity on cognitive development -High levels of food insecurity are positively associated with depression, depression is negatively associated with more positive parenting practices, and positive parenting practices are positively associated with mental proficiency | Greater food insecurity predicted insecure child attachment and less advanced mental proficiency at 24 months, operating indirectly through food insecurity's influence on maternal depression and parenting practices. |
| Bronte-Tinkew (2007) | To explore whether there are associations between food insecurity and child nutritional status & physical health outcomes | Data were from the Early Childhood Longitudinal Survey-Birth Cohort 9- and 24-month surveys | USA N=8,693 nine-month-old infants. Certain populations were over-sampled: Asians and American Indians, low- to moderately low-birthweight infants, and twins. | Longitudinal survey -parent interviews and child assessments | -Physical health at 24 months -Overweight at 24 months -Length for age at 24 months | <i>Physical health</i> -There was a significant indirect association between food insecurity and fair or poor health, mediated by parental depression <i>Overweight</i> -Food insecurity did not directly affect overweight. -Food insecurity worked indirectly through parenting practices and infant feeding to influence overweight. <i>Length for age</i> -Food insecurity not associated. | By age 2 years, food insecurity interferes with parent-child interactions and affects key markers of development such as overall health and overweight. The association of food insecurity with overweight and overall physical health is indirect through parental depression and parenting practices. |
| Jyoti (2005) | To investigate how food insecurity over time related to changes in reading and mathematics | Data were from the Early Childhood Longitudinal Study-Kindergarten Cohort | USA N=~21,000 nationally representative children entering kindergarten in 1998 and followed | Longitudinal survey -parent interviews, teacher questionnaires, and child | -food insecurity (parent interview) -Academic performance (direct assessment) -Weight, height, and BMI (direct assessment) -Social skills (teacher questionnaire) | Food insecurity at kindergarten predicted impaired academic performance in reading and mathematics for girls and boys, a greater decline in social skills for boys, and greater weight and BMI gains for girls. | Food insecurity in the early elementary years has developmental consequences, measured in terms of both nutritional and non-nutritional aspects |

Dimension: Economic and Material Well-being Concept: Food Security

Summary Table of Studies

| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
|----------------------------|--|---|--|---|---|---|--|
| | test performance, weight/BMI, and social skills in children | | through 3 rd grade | assessments | | | |
| Bhattacharya (2004) | To examine the relationship between nutritional status, poverty, and food insecurity for household members of various ages | Data were from the 3 rd National Health and Nutrition Examination Survey (NHANES III), conducted between Oct 1988 and Oct 1994 | USA N=34,000 respondents aged 2 months and older (analysis restricted to individuals two years and older) | Cross-sectional survey -survey, physical exam, dietary intake module | -USDA Healthy Eating Index (HEI) (summary measure of 24 h dietary recall data) -BMI -Composite measure based on micronutrients in the blood | Food insecurity measures have little predictive power in models of children's nutritional outcomes, once poverty is controlled. Among school-age children, there are few systematic differences in diet between the food secure and the food insecure. | Among school-age children, neither poverty nor food insecurity is associated with nutritional outcomes. Food insecurity does not provide any predictive power for poor nutrition among preschool children once poverty is controlled. |
| Alaimo (2002) | To determine if there is an association between food insufficiency and depressive disorders in U.S. adolescents | Data were drawn from NHANES III, conducted from 1988 to 1994, | USA N=754 adolescents aged 15-16 years | Cross-sectional survey -interviews and medical examinations | -Food insufficiency -Depression, dysthymia (mild chronic depression), and symptoms of suicide | Food insufficiency was strongly associated with depressive disorders and symptoms of suicide. | A large percentage of dysthymic and suicidal adolescents are living in families that do not have enough food to eat; more research is required to determine if food insufficiency is a causal factor in dysthymia and suicidal behaviours. |
| Alaimo (2001a) | To examine the relationships between family income, family food insufficiency, and health measures in US children | Data were drawn from NHANES III | USA Children aged 1-5 years (N=6154) and 6-16 years (N=5667) | Cross-sectional survey -interviews with survey participants and their proxies -medical examinations | -Food insufficiency -Proxy-reported health status -Frequency of headaches and stomach aches -Number of lifetime ear infections -Number of colds in the past 12 months -Presence of an impairment that kept the child from usual activities | After adjustment for potential confounding factors (e.g., family income, race/ethnicity, and other sociodemographic characteristics) food-insufficient children, in comparison with food-sufficient children, were significantly more likely to be in poor health and to have more frequent stomach aches and headaches, but not to have more frequent ear infections, iron deficiency, or activity-limiting impairments. Food-insufficient preschool children had experienced more | Not having enough food to eat increases low- and middle-income children's risk of poor health. |

Dimension: Economic and Material Well-being Concept: Food Security
Summary Table of Studies

| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
|-----------------------|--|---------------------------------|---|---|--|--|---|
| | | | | | or from attending school -Iron deficiency | colds in the previous year. | |
| Alaimo (2001b) | To investigate associations between family income, food insufficiency, and being overweight in U.S. children aged 2 to 7 and 8 to 16 years | Data were drawn from NHANES III | USA Children aged 2-7 years (N=5200) and 8-16 years (N=3996) | Cross-sectional survey -interviews with survey participants and their proxies -medical examinations | -Food insufficiency -Overweight | After adjusting for confounding variables, food insufficiency was not positively associated with overweight except in older, non-Hispanic white girls. | Some difficulty in interpretation of results attributable to the fact that food insufficiency, as tracked by NHANES III, is a family measure (assigns the same value to adults and children in the family). Further research, including longitudinal studies, is required to elucidate the relationship between food insecurity and overweight. |
| Alaimo (2001c) | To examine the relationships between family food insufficiency and cognitive, academic, and psychosocial outcomes in a nationally representative sample of American school-aged children | Data were drawn from NHANES III | USA Children aged 6-11 years (N=3286) and 12-16 years (N=2063) | Cross-sectional survey -medical and cognitive examinations and interviews conducted with survey participants and proxies | -Cognitive functioning -Academic achievement -Psychosocial outcomes: number of days absent from school in the previous year; whether the child had ever seen a professional for any emotional, mental, or behaviour problems; whether the child had ever been suspended from school or had difficulty getting along with other children -Proxy-reported health status | After adjusting for confounding variables, 6-11-year-old food-insufficient children had significantly lower arithmetic scores and were more likely to have repeated a grade, have seen a psychologist, and have had trouble getting along with other children. Food-insufficient teenagers were more likely to have seen a psychologist, have been suspended from school, and have had trouble getting along with other children. | Negative academic and psychosocial outcomes are associated with family-level food insufficiency. |

Bibliography for Table of Studies

Zaslow M, Bronte-Tinkew J, Capps R et al. Food security during infancy: implications for attachment and mental proficiency in toddlerhood. *Maternal and Child Health Journal*. 2009; 13: 66-80.

Bronte-Tinkew J, Zaslow M, Capps R et al. Food insecurity works through depression, parenting, and infant feeding to influence overweight and health in toddlers. *Journal of Nutrition*. 2007; 137: 2160-5.

Jyoti DF, Frongillo EA, Jones SJ. Food insecurity affects school children's academic performance, weight gain, and social skills. *Journal of Nutrition*. 2005; 135: 2831-9.

Bhattacharya J, Currie J, Haider S. Poverty, food insecurity, and nutritional outcomes in children and adults. *Journal of Health Economics*. 2004; 23: 839-62.

Alaimo K, Olson CM, Frongillo EA. Family food insufficiency, but not low family income, is positively associated with dysthymia and suicide symptoms in adolescents. *Journal of Nutrition*. 2002; 132: 719-25.

Alaimo K, Olson CM, Frongillo EA, Jr. et al. Food insufficiency, family income, and health in US preschool and school-aged children. *American Journal of Public Health*. 2001a; 91: 781-6.

Alaimo K, Olson CM, Frongillo EA, Jr. Low family income and food insufficiency in relation to overweight in US children: is there a paradox? *Archives of Pediatric & Adolescent Medicine*. 2001b; 155: 1161-7.

Alaimo K, Olson CM, Frongillo EA, Jr. Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics*. 2001c; 108: 44-53.

Summary of Results

All of the studies reviewed used household (or family) food security status as a proxy measure of food security experienced by children, as opposed to directly tracking pediatric food security status. The two studies that used data from the Early Childhood Longitudinal Survey–Birth Cohort determined that food insecurity operated indirectly through parental depression and parental parenting practices to negatively affect aspects of child development. Jyoti et al. used the same survey but instead analyzed data from the kindergarten cohort, concluding that food insecurity predicted impaired academic performance, a decline in social skills for boys, and weight and body mass index (BMI) gains for girls.

The remaining five studies were all based on data from the 3rd National Health and Nutrition Examination Survey (NHANES III), administered in the U.S. between 1988 and 1994. Four of these studies, based on different age categories, were conducted by the same study group (Alaimo and colleagues). Food security was not used as an outcome measure, but rather food insufficiency, a concept considered more severe than food security per se.

After adjusting for potential confounding variables, such as family income and race/ethnicity, the conclusions of Alaimo et al. included the following:

- Food-insufficient children were significantly more likely to be in poorer health than food-sufficient children
- Family-level food insufficiency is associated with negative academic and psychosocial outcomes
- Food insufficiency was not positively associated with overweight except in older, non-Hispanic white girls

Another study by Alaimo et al., focusing on adolescents, found that food insufficiency was strongly associated with depressive disorders and symptoms of suicide.

Finally, Bhattacharya et al. analyzed NHANES III data related to individuals 2 years and older, concluding that food insecurity is not associated with nutritional outcomes in school-age children; as well, once poverty was controlled for, food insecurity did not provide any predictive power for poor nutrition among preschool children.

Taken together, the identified studies suggest that the narrower category of food insufficiency may generate a more substantial effect on pediatric health and well-being than the broader concept of food insecurity; moreover, the impact of both concepts may not in all instances be mediated through mechanisms directly related to nutrition.

Data Sources for Food Security

The primary source for food security status information for British Columbia and the rest of Canada is the Canadian Community Health Survey (CCHS). The Household Food Security Survey Module, included in the 2004 CCHS cycle, was described in detail in the Background and Context section. Food security has been included as optional content in each CCHS cycle since 2004; in 2009, all provinces and territories with the exception of New Brunswick and P.E.I. elected to participate in the food security module.¹²⁴ Data available from survey results

¹²⁴ Statistics Canada. Availability of optional content by province or territory, CCHS 2009. Available at http://www.statcan.gc.ca/imdb-bmdi/document/3226_D46_T9_V2-eng.pdf. Accessed January 2011.

include household, adult, and child food security status for all households, for households with children, and for households without children. Among all B.C. households in 2004, 10.4% were reported to be food insecure at the household level; among households with children, the proportion was higher at 13.7%.¹²⁵ These statistics indicate that households with children are more likely to be food insecure than those without children—a fact of some concern to a project focused on pediatric health and well-being. As noted earlier, the way household-level food insecurity is calculated allows for the situation of this relatively high rate of 13.7% of households, compared with 6.4% of individual B.C. children being food insecure.

The total number of British Columbia children (18 years of age and younger) in food insecure households can be estimated based on the CCHS-derived data. According to the 2004 CCHS, there were 71,300 food insecure households with children in B.C. These households were multiplied by the average number of children per household reported through the 2006 Census (1.76 in 2006), to reach the final estimate of 125,000 children in food insecure households.

Discussion

Except for some highly-publicized situations involving poor inner-city neighbourhoods and remote (usually Northern) communities, the concept of food security, and especially outright hunger, is not on the radar of many people in Canada. However, the fact that a reported 753,000 Canadians depended on charitable food handouts at food banks in 2006 suggests that understanding the related health impacts, especially among children, may have broader importance than first realized.¹²⁶ Most of the literature identified for this review demonstrated associations between food insecurity and negative health outcomes for children; these outcomes included academic, psychosocial, physical and overall health. A 2010 editorial in the *Archives of Pediatrics and Adolescent Medicine* summed up the evidence, pointing out that food insecurity generates “negative effects on all aspects of child well-being.”¹²⁷

In the four studies conducted by Alaimo et al., it should be noted that *food insecurity* was not the measure, but rather *food insufficiency* – a condition considered more severe than food insecurity. In the realm of nutritional outcomes such as BMI, the evidence is conflicting. For example, Jyoti et al. reported that food insecurity predicted greater weight and BMI gains for girls (in a kindergarten cohort), whereas Bhattacharya et al. concluded that food insecurity is not associated with nutritional outcomes (including BMI). Common throughout the literature on this topic, however, is the recognition that causality is very difficult to determine for the complex, multi-factorial condition of food insecurity. Many studies controlled for poverty, a significant confounding variable closely tied to food insecurity,¹²⁸ but there are many other characteristics related to children’s health that typically have not been controlled for, such as historical family income and quality of health care received.

There are several mechanisms proposed for the relationship between food insufficiency/food insecurity and child health. First, it is possible that health is influenced through biological

¹²⁵ Health Canada. Available at http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/bc_table-tableau_bc-eng.php. Accessed November 2010.

¹²⁶ Kennedy G. Food for all. *Canadian Medical Association Journal*. 2007; 177(12): 1473.

¹²⁷ Casey PH, Ettinger de Cuba SA, Cook JT et al. Child hunger, food insecurity, and social policy. *Archives of Pediatric & Adolescent Medicine*. 2010; 164(8): 774-5.

¹²⁸ Tarasuk V, Vogt J. Household food insecurity in Ontario. *Canadian Journal of Public Health*. 2009; 100(3): 184-8.

means, that is, as a result of reduced food intake, lower food quality, or micronutrient deficiencies.¹²⁹ As pointed out by Jyoti and colleagues, “studies have shown that adults in food-insecure households had lower consumption of fruits and vegetables, had less food on hand, obtained a higher percentage of energy from carbohydrate, and had lower intakes of dietary fiber and other vital nutrients compared with food-secure households.”¹³⁰ Food insecurity has also been linked with obesity; individuals in food-insecure households may only be able to afford cheap, energy-dense foods that contribute to weight gain.¹³¹ Bronte-Tinkew et al. suggest an indirect association of food insecurity with child obesity, in which compromised parenting practices and decisions in food-insecure households result in poorer infant feeding practices, influencing pediatric overweight.¹³² Another potential explanation for the effects of food insecurity on child health is parental anxiety or depression, which works in part by affecting the quality of parenting behaviours. Lack of food in the household can lead to high levels of parental stress, due to constant worry about not having enough food or general fatigue/irritability caused by not eating enough. These sort of factors may generate a strain on household dynamics and result in psychological or behavioural problems in the child.^{133,134,135}

Conclusion

While there are mixed results for certain health and well-being domains, there appears to be reasonably strong evidence for an association between food insecurity (or, more specifically, food insufficiency) and negative outcomes for children and adolescents. There are both direct and indirect mechanisms suggested for the various health and well-being effects of food insecurity, although it is challenging to prove causation due to multiple confounding factors. Food security in British Columbia is monitored by the CCHS, with information available regarding food security status in relation to socio-demographic variables such as household income, education, and type of household (couple-led, with children, lone-parent, etc.). Food security, therefore, would be a relevant and useful indicator for child health and well-being in British Columbia.

¹²⁹ Alaimo K, Olson CM, Frongillo EA, Jr. et al. Food insufficiency, family income, and health in US preschool and school-aged children. *American Journal of Public Health*. 2001a; 91(5): 781-6.

¹³⁰ Jyoti DF, Frongillo EA, Jones SJ. Food insecurity affects school children's academic performance, weight gain, and social skills. *Journal of Nutrition*. 2005; 135(12): 2831-9.

¹³¹ Alaimo K, Olson CM, Frongillo EA, Jr. Low family income and food insufficiency in relation to overweight in US children: is there a paradox? *Archives of Pediatric & Adolescent Medicine*. 2001b; 155(10): 1161-7.

¹³² Bronte-Tinkew J, Zaslow M, Capps R et al. Food insecurity works through depression, parenting, and infant feeding to influence overweight and health in toddlers. *Journal of Nutrition*. 2007; 137(9): 2160-5.

¹³³ Zaslow M, Bronte-Tinkew J, Capps R et al. Food security during infancy: implications for attachment and mental proficiency in toddlerhood. *Maternal and Child Health Journal*. 2009; 13(1): 66-80.

¹³⁴ Bronte-Tinkew J, Zaslow M, Capps R et al. Food insecurity works through depression, parenting, and infant feeding to influence overweight and health in toddlers. *Journal of Nutrition*. 2007; 137(9): 2160-5.

¹³⁵ Alaimo K, Olson CM, Frongillo EA, Jr. Food insufficiency and American school-aged children's cognitive, academic, and psychosocial development. *Pediatrics*. 2001c; 108(1): 44-53.

| Summary Assessment | | | | | |
|---|--|-----------|---------------------|---------------|----------------------------|
| Children Living in Food Insecure Households | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 0-19 | 125,000 | High | Medium-High | Medium-High | Medium |

As summarized above, the project-mandated assessments have been applied to the Food Security concept, specifically in terms of the indicator with data available in B.C. and with the most compelling evidence, namely: *children living in food insecure households*. Two alternative concepts/indicators were considered but not adopted: (i) food insecure children; and (ii) food insufficiency. An indicator related to food insecure children would generate half the prevalence of affected children (62,000 vs. 125,000), which still represents a substantial absolute number; however focusing instead on *all* food insecure households with children is ultimately justifiable because the literature suggests that there are impacts on children that are not strictly related to quantity/quality of food but instead are driven by mechanisms such as parental stress. Secondly, while the U.S.-developed metric *food insufficiency* is not specifically measured and reported in Canada, the category of food insecure (severe) could offer an equivalent metric, in that it represents the most serious subset of food insecurity and is defined in terms of actual reduced food intake. However, given that the negative effects of *all* levels of food insecurity have in fact been well-established,¹³⁶ it represents the most appropriate option for focusing this concept in the context of child health and well-being.

The pediatric population **Magnitude** of the potential indicator is assessed as **High**. Based on 2004 CCHS data, there were 71,300 food insecure households with children in B.C. This figure was multiplied by the average number of children per household (2006 Census data), producing a prevalence estimate of 125,000 children living in food insecure households in B.C. This is greater than 10% (19,000) of the total 2010 pediatric cohort, resulting in a magnitude classification of High.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **Medium-High**. While the evidence for the effects of food insufficiency appears to be stronger, there is still good support for food insecurity (moderate or severe) having a negative effect on pediatric health and well-being; on the other hand, demonstrating a direct causal connection remains a challenge in the face of the complex set of mechanisms that may be involved with creating an experience of food insecurity.

The **Modifiability** of the potential indicator is assessed as **Medium-High**. Potential underlying risk factors of inadequate nutrition and inadequate resources to purchase healthy food are technically amenable to prevention, but the most pertinent policy efforts have not been well-identified or well-tested. For instance, the recently announced plan for the mammoth retailer Wal-Mart to move towards pricing that would encourage purchasing of healthy foods in the U.S. represents a heartening development, but is still unclear how it will affect consumer behaviour at a population level, or ultimately impact food insecurity rates.¹³⁷

¹³⁶ Children's Healthwatch. *Even very low levels of food insecurity found to harm children's health*. 2009. Available at http://www.childrenshealthwatch.org/upload/resource/chwbrieif_FI.pdf. Accessed March 2011.

¹³⁷ White House press release. Available at <http://www.whitehouse.gov/the-press-office/2011/01/20/first-lady-michelle-obama-announces-collaboration-walmart-support-let-s->. Accessed January 2011.

Data Availability/Validity for the potential indicator is assessed as **Medium**. Data may be routinely available through the CCHS; however, the underlying information is typically self-reported and therefore potentially of more questionable validity, especially given that there may be some stigma attached to characterizing one's household as a setting where children are not always well-fed.

Based on the assessment summarized here, the indicator tracking children living in food insecure households is **Recommended** for consideration as a core indicator of child health and well-being in British Columbia, to be populated with data routinely available through the CCHS. There were no Low ratings among the assessment categories; Magnitude was in fact assessed as High, while significance and modifiability were assessed as Medium-High and data availability/validity as Medium, thus positioning the indicator as one of the stronger candidates found among the Economic and Material Well-being concepts.

Recreational Program Participation and Idle Youth

Background and Context

This review combines two different topics, both of which are associated with how youth spend their time. The term “recreational program” suggests an activity outside of normal school hours, i.e., community-based or leisure-time activities; this in fact will be the focus of the present section, rather than school-based activities. The term “idle” may be interpreted several ways, with definitions ranging from “unemployed” to “doing nothing” and “meaningless existence.” To be considered idle, youth would not be participating in recreational programs – the other topic in this section—nor would they be employed or attending school. The topic of educational attainment is covered in a separate report under the dimension related to cognitive development. For the purposes of this section, therefore, idle youth will focus on older adolescents who do not do paid work, i.e., the unemployed.

This review is aimed at finding research evidence within the pediatric population of an association between: (i) recreational program participation and health and well-being; and (ii) unemployment and health and well-being. Participation in recreational programs (or extracurricular activities) has been associated with a range of positive outcomes in the context of adolescent development. These include academic achievement, fewer risky behaviours, physical well-being (since a high proportion of extracurricular activities involve physical activity/sports), and more positive attitudes. The negative health impacts of unemployment in adults have been studied extensively, especially pertaining to psychological health effects and unhealthy behaviours such as substance abuse; in this review, the focus will be on unemployment in youth, and specifically the evidence for short- and long-term health impacts. Before turning to the main results related to the benefits of not being idle, it should be noted that there are qualitative and quantitative aspects of youth employment, such as participating in risky jobs and/or too many work hours, which could end up being detrimental to health and well-being; this sort of concern is intensified in developing countries.¹³⁸

Methodology and Provisional Results

Initial Review Search Process

As described more fully in the section on Direct Income Concepts, it was appropriate and efficient to start by pursuing a literature scan of review papers in PubMed for all socioeconomic areas covered in this report. To accomplish this, the MeSH term “Socioeconomic Factors” was used, coordinated with an extensive list of health and well-being outcomes. For the purposes of this section, reviews pertinent to youth activities and health were identified from the total list of 468 gleaned in that process. Only two potential papers were so identified, but these were subsequently deemed not to be pertinent. Thus, it was necessary to move to a Level B search approach, targeting individual studies.

Study Search Process

A second electronic search was conducted for individual studies in this area. The database used was EBSCO Host, using search keywords such as **youth unemployment AND health; (extracurricular activities) AND adolescent AND health;** and similar phrases.

In addition to the above approach, the following searches were conducted:

¹³⁸ Roggero P, Mangiaterra V, Bustreo F et al. The health impact of child labor in developing countries: evidence from cross-country data. *American Journal of Public Health*. 2007; 97(2): 271-5.

- Exploiting the “Related citations” link in PubMed
- A scan in Google for grey literature and for any obvious articles missed, using terms such as: **(extracurricular activities) AND adolescent AND health**
- Hand-searching bibliographies of key papers
- Checking for study updates (by author)

There were only 5 articles located that linked youth extracurricular activities or employment with physical health outcome(s), as detailed below; no further exclusion steps were deemed to be necessary. As the search procedure followed did not match the systematic process possible in a PubMed search, a Volume Report was not produced.

For the 5 studies identified through the literature search and exclusion process, a summary table was developed, as provided below.

| Dimension: <i>Child Health and Well-being Concept: Recreation Programs and Idle Youth</i> | | | | | | | |
|---|--|--|---|--|--|--|---|
| Summary Table of Studies | | | | | | | |
| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
| Recreational Programs | | | | | | | |
| Darling (2005) | To examine the association between participation in school-based extracurricular activities (ECA) and adolescent adjustment among students from six high schools | Students were invited to complete a self-report questionnaire that focused on school-related behaviours but also included measures of family relationships, peer relationships, and psychological adjustment. Data were collected in Year 1 (1987-1988) and Year 2 (1989-1990). Cross-sectional analyses were performed on Year 2 data, and longitudinal analyses on Year 1 and Year 2 data. | California, USA N=4,264 high school students (cross-sectional component) and 2,462 high school students (longitudinal component) | Longitudinal and cross-sectional analyses of survey data -self-report questionnaire | -extracurricular activity participation, type of activity -alcohol and marijuana use -academic adjustment -adjustment and extracurricular activity participation of friends | Adolescents who participated in school-based extracurricular activities reported lower levels of marijuana use, higher grades and aspirations, and more positive academic attitudes. There was no association between participation and drinking. Benefits of participation do not vary as a function of demographic characteristics. Peer adjustment was positively associated with adolescent adjustment. ECA participation by peers was associated with better grades and a more positive attitude toward school, controlling for adolescents' own participation, peer adjustment, and demographic characteristics. | Results suggest that the relationship between extracurricular activity participation and adolescent adjustment is consistent, albeit small. |

Dimension: Child Health and Well-being Concept: Recreation Programs and Idle Youth

Summary Table of Studies

| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
|---------------------------|--|--|---|------------------------------------|--|---|---|
| Blomfield (2010) | Investigate the association between participation in extracurricular activities and indicators of positive and negative development for Australian adolescents; and to determine if these associations were mediated by the characteristics of the adolescents' friends. | Self-report questionnaires were administered to high school students | Australia N= 98 high school students, aged 15-18 years | Cross-sectional survey | - activity participation - academic track, future intentions, school belonging - risk behaviour (alcohol use, skipping school) - friend characteristics | Adolescents who participated in extracurricular activities were more likely to be on a university track than adolescents who did not participate in any extracurricular activity. Students who participated in extracurricular activities reported higher levels of school belonging and lower frequency of skipping school. Adolescents who participated in school involvement activities reported having more friends who encouraged them to do their best in school. | The association between activity participation and developmental indicators may, in part, reflect the characteristics of the students who choose to participate in organized activities, though activity participation may also actually play a role in the emergence of positive results for the developmental indicators studied. |
| Idle Youth | | | | | | | |
| Scanlan (2009) | To compare the health of unemployed 18-25-year-olds during a period of low unemployment (April 2007) against population norms for unemployed people during a period of higher unemployment (Feb 1995 – Jan 1996). | Cross-sectional health survey | Australia N=251 unemployed 18-25-year-olds | Cross-sectional survey | -physical function, body pain, general health, vitality, social functioning, mental health | The low unemployment group reported poorer health than Australian, age-matched norms. | Conclusions about causality cannot be drawn, but results are consistent with previous findings; the suggestion is either that unemployment causes deterioration in psychological health or that gaining employment enhances psychological health. |
| Hammarstrom (2002) | To investigate the long term | A 14-year follow-up of a cohort of | Sweden | Prospective cohort study | -unemployment patterns, smoking, | There was an association between early unemployment | Youth unemployment constitutes a significant public health problem, |

Dimension: Child Health and Well-being Concept: Recreation Programs and Idle Youth

Summary Table of Studies

| Lead Author | Study Objective | Study Description | Setting/ Participants | Design/ Data Collection | Outcomes | Results | Conclusions/Comments |
|----------------------|---|--|--------------------------------------|------------------------------------|--|---|--|
| | effects of early unemployment (more than half a year of unemployment between the ages of 16 and 21 years) on health behaviour & psychological and somatic symptoms. | school leavers conducted from 1981 to 1995. The cohort members were 16 years at the beginning of the study; they were followed up independently of their activity after compulsory school until the age of 30. | N=1,083 | -group questionnaires | alcohol consumption, somatic symptoms, psychological symptoms | and smoking as well as psychological and somatic symptoms in males, even after controlling for health behaviour and working class background at the beginning of the study and unemployment at the end of the study. No correlation was found between early unemployment and excess alcohol consumption. | which creates effects that can remain to adult age. |
| Davila (2010) | Assess the relationship between employment status and mortality over a 2-year period among a nationally representative sample of young adults. | Data were from the 1986-2000 National Health Interview Survey and its public use mortality follow-up through 2002, and regressed on employment status at baseline, controlling for gender, race, education, season, and survey design. | USA N=121,478 18-24-year-olds | Cross-sectional survey | Logistic regression for employment on all-cause and cause-specific mortality | Being employed was associated with reduced mortality risk from all-causes, homicide, and all other causes of death, after controlling for gender, race, and education. | Employment is associated with reduced mortality risk in young adults; further research is needed to fully understand the mechanisms behind this protective effect. |

Bibliography for Table of Studies

Darling N, Caldwell L, Smith R. Participation in school-based extracurricular activities and adolescent adjustment. *Journal of Leisure Research*. 2005; 37: 51-76.

Blomfield C, Barber B. Australian adolescents' extracurricular activity participation and positive development: Is the relationship mediated by peer attributes? *Australian Journal of Educational & Developmental Psychology*. 2010; 10: 114-28.

Scanlan JN, Bundy AC. Is the health of young unemployed Australians worse in times of low unemployment? *Australian and New Zealand Journal of Public Health*. 2009; 33: 79-82.

Hammarstrom A, Janlert U. Early unemployment can contribute to adult health problems: results from a longitudinal study of school leavers. *Journal of Epidemiology and Community Health*. 2002; 56: 624-30.

Davila EP, Christ SL, Caban-Martinez AJ et al. Young adults, mortality, and employment. *Journal of Occupational and Environmental Medicine*. 2010; 52: 501-4.

Summary of Results

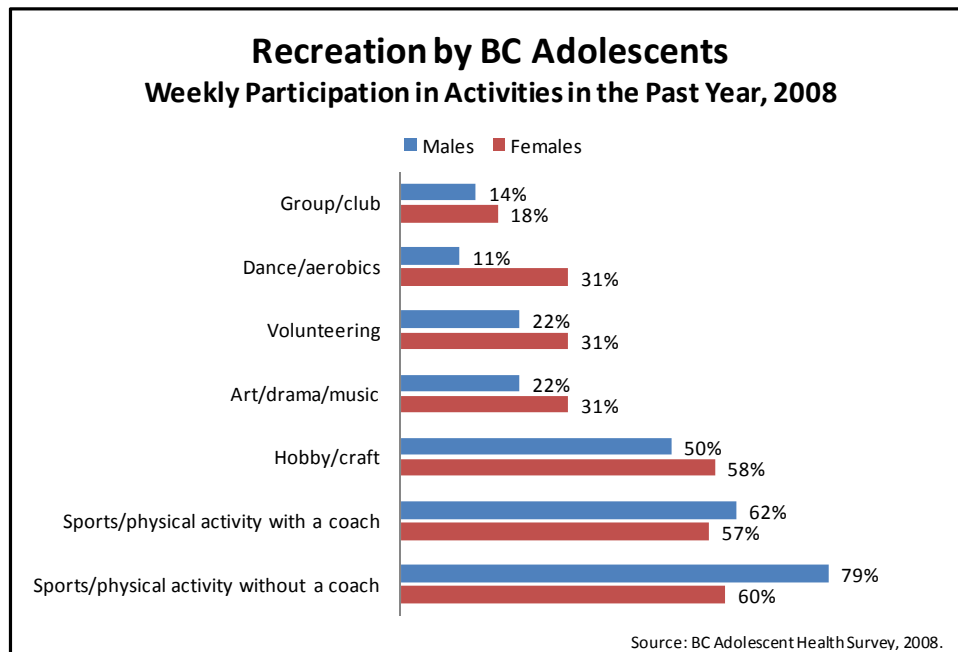
For the concept of recreational programs, the literature searches mainly identified studies on adolescents and extracurricular activities, both in and out of school settings. The two studies included in this review determined that there is a relationship between adolescent participation in extracurricular activities and positive indicators of development, with the caveat that effects were modest and may in fact be mediated by a range of other factors.

Each of the three studies on unemployment and youth health approached the topic from a different perspective. Research by Scanlan highlighted the poor psychological health experienced by youth during times of unemployment; the Hammerstrom study was more long-term, concluding that “early unemployment was significantly associated with unfavourable health behaviour and symptoms at age 30.”¹³⁹ The third study, by Davila et al., found that employment is associated with reduced mortality risk in young adults, conversely suggesting that unemployment among youth may result in increased mortality risks. It must be admitted that these data are of reduced value for the purposes of this report, in that the studies tended to include a limited component of the adolescent age spectrum.

Data Sources for Recreational Programs and Idle Youth

BC Adolescent Health Survey

The periodic BC Adolescent Health Survey (AHS)¹⁴⁰ asks youth in grades 7 to 12 about their weekly participation in activities in the past year. Results from the 2008 survey are shown below. Sports/physical activity without a coach was the activity most commonly reported among males and females, followed by sports/physical activity with a coach and time spent with a hobby/craft.



¹³⁹ Hammarstrom A, Janlert U. Early unemployment can contribute to adult health problems: results from a longitudinal study of school leavers. *Journal of Epidemiology and Community Health*. 2002; 56(8): 624-30.

¹⁴⁰ See the background description in the Introduction to the combined report for the physical health dimension.

Youth employment information is also available from the AHS. According to 2008 results, 41% of students worked at a paid job during the school year. Students who were employed also reported the hours spent working at a paid job, with the greatest proportion employed from 5 to 19 hours per week.

BC Stats

Youth employment statistics for BC youth are available from a report on labour market outcomes produced by BC Stats, based on 2006 Canadian Census data. According to this report, 36% of British Columbia youth aged 15-19 years attended school and participated in the labour force; 7% of this age group are both not attending school and not in the labour force.¹⁴¹ The latter situation may be deemed to represent *idle* youth.

Health Assessment of School-Aged Children (HASAC)

BC's HASAC survey represented a project to help BC schools gather information on the nutrition, physical activity, smoking behaviour, and self-perception of grade six students. It was conducted during the 2008-09 school year in 19 schools around the province. When asked about participation in extracurricular physical activity, 71% of students reported participation both inside and outside of school, 11% participated in physical activity in school only, and 6% did not participate in extracurricular physical activity either inside or outside of school.¹⁴²

Canadian Council on Social Development

Although it is not clear if future publications are planned, a 2006 report prepared by the Canadian Council on Social Development offered data on participation in recreation by Canadian children (based on the National Longitudinal Survey of Children and Youth, 2000). Participation in unorganized sports (i.e., sports without a coach) was the activity most frequently identified.¹⁴³ The pertinent data on sports involvement are provided below; they indicate a reasonable level of consistency with the B.C.-specific figures reported earlier (based on the AHS).

¹⁴¹ Labour Market Outcomes of Young British Columbians. June 2009. Available at <http://www.bcstats.gov.bc.ca/data/lss/lmi/lmoyoung.pdf>. Accessed November 2010.

¹⁴² Health Assessment of School-Aged Children 2008-09. Feedback Report for All Schools. Available at <http://www.phsa.ca/HealthProfessionals/Population-Public-Health/Surveillance-Health-Indicator-Reports/default.htm>. Accessed November 2010.

¹⁴³ Progress of Canada's Children and Youth 2006. Canadian Council on Social Development. Available at <http://www.ccsd.ca/pccy/2006/community.htm>. Accessed November 2010.

| Proportion of Children Participating in Sports With Or Without a Coach Ages 4-13 Years, Canada, 2000 | | | |
|--|-------------|-------|-------|
| Activity and Frequency | Age (Years) | | |
| | 4-5 | 6-9 | 10-13 |
| Sports with a coach | | | |
| Less than once a week | 62% | 44.7% | 45.6% |
| 1 or more times/week | 37.9% | 55.2% | 64.4% |
| Sports without a coach | | | |
| Less than once a week | 43.1% | 37.7% | 27.7% |
| 1 or more times/week | 56.9% | 62.3% | 72.3% |
| Source: <i>Progress of Canada's Children and Youth 2006</i> , Canadian Council on Social Development. | | | |

According to this same report, the employment rate for 15-19-year-olds in B.C. in 2004 was 41%. As might be expected, most working teens in Canada have part-time rather than full-time jobs; 70% of all employed youth aged 15 to 19 years worked part-time in 2004.

Discussion

The evidence presented herein for an association between youth participation in recreational programs/extracurricular activities and health and well-being is modest. The Australian study by Blomfield and Barber was based on only 98 participants, limiting generalizability. Both this research and the much larger study by Darling and colleagues came to similar conclusions, however. There does appear to be an association between participation and health effects but, due to the complex nature of the topic of adolescent development and the number of factors that may be involved, it is difficult to draw conclusions about causality. Darling et al. point out that extracurricular activity is only one aspect of the broader context of leisure; furthermore, the impact of recreational participation may vary with personal characteristics, the setting, and the activity itself. Even so, longitudinal research controlling for individual characteristics does exist; it has concluded that “developmental outcomes are at least partially a result of participation in extracurricular activities.”¹⁴⁴

The topic of youth unemployment as it relates to health and well-being is no less complicated. The studies reviewed herein associate psychological symptoms, smoking, adult health problems, and increased mortality risk with youth unemployment. However, a number of potential mediators and confounding factors are discussed, again highlighting the challenge in drawing conclusions about causality. Social background, education, childhood environment, and parental poverty are some of the factors closely correlated with youth unemployment. Davila et al. note that one potentially confounding mediator of the relationship between employment and mortality risk may be that “young adults who have safer and healthier habits and a more positive frame of mind and personality choose to work.”¹⁴⁵ This is but one example of a possible mechanism behind the protective effect of youth employment on mortality risk, a topic that generally requires further study and analysis.

¹⁴⁴ Blomfield C, Barber B. Australian adolescents' extracurricular activity participation and positive development: Is the relationship mediated by peer attributes? *Australian Journal of Educational & Developmental Psychology*. 2010; 10: 114-28.

¹⁴⁵ Davila EP, Christ SL, Caban-Martinez AJ et al. Young adults, mortality, and employment. *Journal of Occupational and Environmental Medicine*. 2010; 52(5): 501-4.

Conclusion

There is some evidence for an association between adolescent recreation/extracurricular activities and health, and between youth unemployment and health. Both of these topics clearly bear on the concept of idle youth, but both are also complex, incorporating a wide range of potential mediators and confounding factors; however, it is generally confirmed in the literature that youth employment and participation in recreation programs/extracurricular activities can play a role in promoting health and well-being. Data specific to B.C. are available for youth employment from Census data and from the AHS; the AHS is also a good source of information on recreational participation by youth. For a concept such as recreational program registrations, which could involve a wide variety of activities, it may be useful to choose one indicator that would have some level of impact, such as whether or not there is any involvement in community-based sports/physical activity. As has been noted, this type of recreational pursuit can be divided into organized (with a coach) and unorganized (without a coach) varieties; while there may be more benefits attached to a coached sport,¹⁴⁶ for the purposes of this project the unorganized version has been selected—given the advantages of low barriers for participation. Another pertinent assumption at this point is that there will be a large overlap between the two groups of young people participating in each variety of community sports activities. A large proportion of youth already participate in such programs, but there is room for growth in the level of involvement. The potential health benefits of the physical activity aspects are well known, as discussed in the separate report on the Physical Health dimension.

| Summary Assessment | | | | | |
|--|--|-----------|---------------------|---------------|----------------------------|
| Children Not Participating in Un-coached Sport/Physical Activity | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 12-17 | 94,000 | Medium | Low | Medium | Medium |

As summarized above, assessments have been applied to the Recreation Program Registrations concept, specifically in terms of the indicator with the most compelling support in the literature, namely: *children involved in community-based sports or physical activity without a coach*.

The pediatric population **Magnitude** of the potential indicator is assessed as Medium. Based on 2008 Adolescent Youth Health Survey data, 21% of males and 40% of females aged 12-17 do not participate in sports or physical activity without a coach. When these percentages are applied to the 2010 pediatric cohort of the same age and gender, it is estimated that 94,000 children age 12-17 do not participate in sports/physical activity without a coach. This is between 2 and 10% (19,000-97,000) of the total pediatric cohort (97,000) resulting in a magnitude classification of Medium.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual's health and well-being is assessed as **Low**. While the literature does indicate that recreational program participation plays a role in promoting child health and well-being, evidence for causation is limited by the fact that there are multiple potential confounders.

¹⁴⁶ Bergeron MF. Improving health through youth sports: is participation enough? *New Directions for Youth Development*. 2007; (115): 27-41, 6.

The **Modifiability** of the potential indicator is assessed as **Medium**. Although increasing recreation program registrations or participation in sports/physical activity is theoretically possible (e.g., tax credits for sports equipment, free enrolment in leisure centre programs for low-income families), the effectiveness of interventions has not been well-tested.

Data Availability/Validity for the potential indicator is assessed as **Medium**. While there are several potential data sources, they are all based on self-report and are not collected on an annual basis. Both the HASAC and the Canadian Council for Social Development analyses are likely not going to be repeated; the AHS has been conducted approximately every 4-6 years, and will likely continue.

Based on the indicated assessment, the potential indicator related to no sports involvement is **Not Recommended** for consideration as a core indicator of child health and well-being. The ratings are mostly medium-to-high, which would support placing this indicator on a list of “secondary interest.” While the Significance in terms of health outcomes is rated as Low based on the formal literature, there is a good intuitive basis to be confident that involvement in sports and other forms of physical activity in the community will be of benefit to the short-term well-being of youth, whatever may be the ultimate long-term health impacts.

| Summary Assessment | | | | | |
|---------------------------------------|--|-----------|---------------------|---------------|----------------------------|
| Youth Not Attending School or Working | | | | | |
| Age group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude | Significance/Impact | Modifiability | Data Availability/Validity |
| 15-19 | 19,900 | Medium | Low | Medium-High | Medium-High |

As summarized above, assessments have been applied to the Idle Youth concept, specifically in terms of the indicator with the most compelling support in the literature, namely: *proportion of youth not attending school or working*.

The pediatric population **Magnitude** of the potential indicator is assessed as **Medium**. Based on B.C. Stats Labour Market data (based on Census data), 7% of youth aged 15-19 are not working or attending school. When this percentage is applied to the 2010 pediatric cohort it results in a magnitude estimate of 19,900 individuals. This is just above 2% of the total pediatric cohort (19,400) resulting in a Magnitude classification of Medium.

The **Significance** of the potential indicator as indicated by the evidence of impact on an individual’s health and well-being is assessed as **Low**. While the literature does indicate that youth unemployment may have various health effects, causation has not been established given the multiple potential confounding factors.

The **Modifiability** of the potential indicator is assessed as **Medium-High**. There are numerous potential approaches / policy interventions for increasing employment rates and/or school attendance (and eventual completion) though many of them are not being implemented or have been thoroughly assessed as to their effectiveness.

Data Availability/Validity for the potential indicator is assessed as **Medium-High**. Data is available from BC Stats based on 2006 Census data, however, it is not collected on an annual basis.

Based on the indicated assessment, the potential indicator is **Not Recommended** for consideration as a core indicator of child health and well-being. The reasons are the Low rating for significance/impact, and, although the magnitude receives a rating of Medium, the overall affected paediatric cohort of 19,900 is just marginally above the Low rating (<19,000).

Summary and Conclusion

This final section of the report is intended to efficiently pull together the large volume of information gleaned for the dimension of Economic and Material Well-being. The ultimate purpose of this report and the others in this series is to support the overall project in recommending a set of core, high-leverage indicators of child health and well-being. “High-leverage” reflects a combination of: (i) the population magnitude or prevalence of the risk-generating condition(s) of most interest for each candidate concept; and (ii) the level of health effects caused in individuals by such conditions. *Feasibility* of application in the real world is another important consideration; it comprises both prevention potential and the ability to populate the indicator with valid data and thereby track prevention progress.

It is useful to re-emphasize several provisos concerning the feasibility of application at this point:

- Prevention potential here refers to the proportion of an indicator’s underlying factor that can conceivably be prevented (e.g., where it is not genetically driven or related to an unknown cause) and/or the existence of interventions of proven effectiveness; while it was not possible in the scope of the present report to conduct a literature review on the latter (major) side topic, reviewer expertise was applied to achieve at least a high-level assessment of the availability of interventions with real-world application.
- Effective interventions need to be considered in the real world context; in particular, the assessment of effectiveness needs to take into consideration the nature of the *remaining* unreached subpopulation, which may in fact be resistant to standard maneuvers because the “low hanging fruit” of realistically preventable cases has already been “picked.”
- On the other hand, it is important to note that prevention *potential* as qualified above is *not* the same thing as prevention *capacity*—in other words, assessing whether there is any theoretical “room for improvement” related to a particular concept or indicator, or whether it is already being covered in the public health system at or close to a “saturation” level (e.g., a situation that may apply to efforts addressing youth homelessness); the fact is that prevention capacity is already fully captured under the Magnitude (or prevalence) category of assessment.
- Rating a concept as infeasible in terms of prevention potential and/or indicator data availability/validity is not necessarily a final assessment; where the area is deemed to be high-leverage in terms of population burden, the conclusion may be that research into effective interventions and/or establishing pertinent data ought to be made high priorities—in other words, the indicator is a candidate for potential development.

As noted in the Introduction to the report, the four assessment categories applied to each potential indicator are summed up under the following headings: magnitude; significance/impact; modifiability; and data availability/validity. The category of magnitude could be ascertained objectively, according to calculations detailed in Annex I-1; if an estimate of prevalence was not possible, it was labelled Unclear. The other three categories were assessed qualitatively in terms of a rating of Low, Medium, or High; for convenience, the meaning of these ratings is provided in the following table (first seen in the Introduction).

| Key to Summary Assessments by Evaluation Category | | | | |
|--|--|---|--|---|
| | Magnitude <i>Estimated prevalence of affected B.C. children</i> | Significance / Impact <i>Physical and other health effects</i> | Modifiability <i>Expert assessment of prevention potential</i> | Data Availability/Validity <i>B.C.-specific information sources</i> |
| Low | < 19,000 (<2% of total pediatric cohort) | Minimal effects and/or little indication of direct causation | Underlying risk factor not well-identified or not amenable to further prevention | Data not routinely collected and reported |
| Medium | 19,000 - 97,000 (2-10% of total pediatric cohort) | Substantial acute effects or moderate chronic effects; causation still not well-established | Medium Underlying risk factor theoretically amenable to further prevention, but potential interventions not yet proposed in the literature | Medium Data routinely collected but not easily accessible and/or of potentially questionable validity (e.g., mostly self-reported topics with stigma attached) |
| | | | Medium-High Underlying risk factor amenable to prevention, but identified interventions have not been well-tested and/or have shown mixed evidence of effectiveness | Medium-High Data routinely collected via sources based on self-reported information of high validity (e.g., the Census) |
| High | >97,000 (>10% of total pediatric cohort) | Substantial chronic effects and/or elevated mortality; strong evidence, with causation well-established | Underlying risk factor amenable to prevention, and identified interventions have been shown to be effective | Annual data routinely collected and reported via administrative sources or (objective) physical measurement methods |

Careful consideration of the information in the assessment categories in an aggregate manner would allow certain concepts/indicators to rise to the top of the priority list for a set of core metrics that could be integrated into a progress report related to child health and well-being. Thus, it would be surprising if a concept/indicator rated High in all four assessment categories was *not* considered a very strong candidate for a suite of core indicators; likewise, a Low rating in all four categories should automatically propel the indicator to the bottom of the list.

Some “exceptions to the rule” have already been suggested above.

- A Low rating for data availability/validity but higher ratings for the other categories; in such instances, the indicator could be seen as part of a list for future exploration and development.
- If the modifiability category is rated Low because effective interventions are not yet identified, then the indicator again could be placed on the development list, subject to the pursuit of more scientific evidence. On the other hand, if the Low rating for modifiability is due to the fact that the easily preventable subsets of the relevant target population have already been successfully covered by existing interventions, then the concept typically should be excluded even from the “potentially develop” list.

Based on the considerations described above, a total of four indicators (covering five concepts) rose to the surface for priority consideration in a suite of core indicators of child health and well-being. One indicator was ultimately selected for each of the sub-dimensions constructed for this report (apart from Socioeconomic Status Circumstances).

In addition to the unqualified Not Recommended classification, two intermediate stratifications were created as part of the summary assessment process, as follows:

- *Indicator of Secondary Interest*—these are indicators of potential usefulness, but with overall less compelling assessment ratings than the seven indicators ultimately recommended for the core list

- *Indicator to Potentially Develop*—these are indicators that could be considered for a core indicator inventory if data sources and/or evidence of effective interventions were enhanced in the future

Gathering together the information provided at the end of each section of the report, the following table summarizes the assessments made across all of the concepts/indicators.

| Child Health and Well-being Summary Assessment of Concepts/Indicators for Economic and Material Well-being Dimension | | | | | | | |
|---|--|-------------------|--|--|---|---|---|
| Concept | Indicator | Age Group (Years) | Est. Prevalence Among B.C. Children (2010) | Magnitude <small>Proportion of B.C. child/youth population to which concept/indicator applies</small> | Significance / Impact <small>Association between concept and health/well-being dimension</small> | Modifiability <small>Degree the concept/indicator(s) be reasonably changed through public policy or other intervention</small> | Data Availability/Quality <small>Existence and validity of information for the component indicator(s) for each concept</small> |
| | Recommended as Core Indicator | | | | | | |
| Children in Families Living Below the LICO | Children in Families Living Below the After-Tax LICO | 0-17 | 144,000 | High | Medium | Medium | Medium-High |
| Housing Condition / Housing Availability | Children in Families with Core Housing Need | 0-19 | 139,000 | High | High | Medium | Medium-High |
| Food Security | Children Living in Food Insecure Households | 0-19 | 125,000 | High | Medium-High | Medium-High | Medium |
| Parental Employment | Children with Unemployed Parents | 0-19 | 37,000 | Medium | Medium | Medium | Medium-High |
| | Indicator of Secondary Interest | | | | | | |
| Recreation Program Registrations | Children Not Participating in Un-coached Sport/Physical Activity | 12-17 | 94,000 | Medium | Low | Medium | Medium |
| | Indicator to Potentially Develop | | | | | | |
| Adequate Child Care | Children with Unmet Need for Access to Child Care | | | Unclear | Low | Medium | Low |
| | Not Recommended as Core Indicator | | | | | | |
| Lone Parent Families | Children in Lone Parent Families | 0-19 | 212,000 | High | Medium | Low | Medium-High |
| Children in Families Receiving Social Assistance | Children in Families Receiving Social Assistance | 0-19 | 37,000 | Medium | Low | High | Medium |
| Idle Youth | Youth Not Attending School or Working | 15-19 | 19,900 | Medium | Low | Medium-High | Medium-High |
| Homelessness | Homeless Children | | 575-2,730 | Low | Medium | Medium | Low |
| Children SES Circumstances | Children in Low SES Circumstances | | | Unclear | Unclear | Unclear | Unclear |
| Family Income | N/A | | | | | | |

Inevitably there will be discussion and even debate about the final selections on the Recommended list; some of the ratings have a subjective element, and others are based in part on reviewer expertise. Some planners may find it difficult to leave certain indicators (e.g., adequate child care) off of the initial core list. As an ultimate reassurance in the face of the recommendations made herein, *it is important to recall that the final list of core indicators is supposed to be a highly selective monitoring tool, that is, a representative list rather than a complete inventory of the prevention targets and maneuvers that ought to be pursued among children in the province of British Columbia.*

Annex I-1: Details of Magnitude Estimates

Magnitude Summary for Selected Child/Youth Indicators

| Concepts / Indicator | Age Group | Prevalence | Source Year | Source | 2010 B.C. Population* | Absolute Number |
|--|--------------|--------------|-------------|---|-----------------------------|-----------------|
| Socioeconomic Status Concept | | | | | | |
| Children SES Circumstances | | | | | | N/A |
| Direct Income Concepts | | | | | | |
| Family Income | | | | | | N/A |
| Children in Families Living Below the LICO (After Tax) | | | | | | |
| | 0-5 | 15.1% | 2006 | Statistics Canada, Census of Population | 267,330 | 40,367 |
| | 6-9 | 15.4% | 2006 | | 177,278 | 27,301 |
| | 10-14 | 14.8% | 2006 | | 241,821 | 35,790 |
| | 15-17 | 14.2% | 2006 | | 163,782 | 23,257 |
| | 18-19 | 14.0% | | | 120,217 | 16,830 |
| | Total | 14.8% | | | 970,428 ^Ω | 143,545 |
| Children in Families Receiving Social Assistance | | | 2010 | B.C. Ministry of Housing and Social Development | ^μ | 37,032 |
| Indirect Income Concepts | | | | | | |
| Parental Employment | | | | | | N/A |
| Lone Parent Families | | | | | | |
| Children Living with Lone Parent Families | 0-19 | 21.8% | 2006 | Statistics Canada, Census of Population | 970,428 [†] | 211,553 |
| Housing-Related Concepts | | | | | | |
| Homelessness | 16-19 | | 2009 | Vancouver Foundation website | 230,902 [‡] | 2,730 |
| | 16-19 | | 2008 | Metro Vancouver Homeless Count | 230,902 ^α | 575 |
| Housing Condition/Housing Availability | | | | | | |
| Core Housing Need | | | 2006 | Canadian Mortgage and Housing Corporation | [#] | 139,174 |
| Concepts Combining Housing and Community Assets | | | | | | |
| Adequate Child Care | | | | | | N/A |
| Food Security | | | | | | |
| Children in Food-insecure Households | 0-18 | | 2004 | Canadian Community Health Survey | [^] | 125,488 |
| Recreation Program Registrations | | | | | | |
| No Sports/Physical Activity Without a Coach | | | | | | |
| Males | 12-17 | 21% | 2008 | Adolescent Youth Health Survey | 160,935 | 33,796 |
| Females | 12-17 | 40% | 2008 | | 151,564 | 60,626 |
| | | | | | Total | 94,422 |
| Idle Youth | | | | | | |
| Not Attending School or Working | 15-19 | 7% | 2009 | BC Stats: Labour Market Outcomes - Based on Census Data | 283,999 | 19,880 |

*Generally, population estimates are taken from BC Stats (available at: <http://www.bcstats.gov.bc.ca>).

Ω Proportion of households below after-tax applied to pediatric population. LICO Data are also available for pre-tax income, a metric that would generally propel higher proportion of children below the LICO. Data for the 18-19 year cohort were not available from Statistics Canada, thus a conservative estimate of 14% was applied to the missing years to ensure that the absolute prevalence estimate reflected all children aged 0-19.

§ Data on prevalence for 18-19 year olds were not available so it was assumed that the overall percentage was equivalent to children aged 0-17. This was done to ensure that the absolute number reflected the entire cohort aged 0-19 years.

μ Absolute number was calculated from the number of households receiving social assistance (lone-parent, couple etc.) and the average number of children in each of these households.

† 2006 Census data was used to determine the percentage of children living with single parents. This was accomplished by determining what percentage of children live with single parents (for 2006 this was 226,575/1,202,145 = 21.8%) and applying this percentage to the total 2010 cohort of children under 20 years of age.

‡ Absolute number was calculated from Vancouver Foundation Estimate of 700 homeless youth in Vancouver in 2009. This number corresponds to those aged 16-24; generally there are more in the 20-24 age range than in the 16-19. The 700 estimated homeless youth in Vancouver was scaled up to the B.C. population level (multiplied by 7.8 = 5460) and divided in half to represent only those aged 16-19 (final n=2730). Both estimation steps are generous, that is, they likely overestimate the number of homeless youth. On the other hand, the number does not account for younger children who are homeless, for which there is no reliable estimate.

α Number was estimated from the 2008 Metro Vancouver Homeless Count which found 270 'unaccompanied youth.' This number was multiplied by a factor of 2.13 so as to represent the entire province of B.C.

This calculation was based on 2006 CMHC data that tracks households in core housing need combined with the average number of children per household. As this approach is not easily adapted to the 2010 population, this estimate of absolute numbers of affected children represents the year 2006.

^ CCHS data reports that there are 71,300 food insecure households with children in B.C. These households were multiplied by the average number of children per household from 2006 Census data (1.76 in 2006) to reach the estimate of 125,488 children in food insecure households.

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