Environmental influences on population mental health promotion for children and youth

This document is part of a collection produced by the six National Collaborating Centres for Public Health to encourage mental health promotion for children and youth within a strong, integrated public health practice. The collection provides numerous entry points for the public health sector to collaborate with other stakeholders to support evidence-informed action that addresses the determinants of mental well-being for all children and youth in Canada.

This paper explores how the structural and intermediary determinants\(^1\) of mental wellbeing intersect with physical and social environments to both influence risk for poor mental health and protect positive mental health in children and youth. Details on search methods and terms used for this paper can be found in the introduction document: Population mental health promotion for children and youth - a collection for public health in Canada.

**WHAT ENVIRONMENT MEANS**

The term “environment” encompasses three major areas (Barnett & Casper, 2001; Schulz & Northridge, 2004):

1. **The built environment** refers to buildings, spaces and products created or modified by people. This includes houses, roads, traffic noise, transport systems, buildings, public spaces and urban green-space.

2. **The natural environment** includes the air, water, landscapes, natural green space such as forests and fields, and chemical contaminants and pollutants in these spaces.

3. **The social environment** refers to the physical surroundings, social relationships and cultural settings within which people function. It includes social and economic processes, beliefs about place and community, and influences such as income, race, social supports, cultural practices (including religion), community connectedness, stress, social inequities, networks, family influences and power relations (Barnett & Casper, 2001).

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\(^1\) Structural (mechanisms generating social stratification) and intermediary determinants (influence differences in exposure and vulnerability as a consequence of social stratification) as defined in Solar & Irwin, 2010.
The physical environment is a term often used to describe the natural environment, as well as the built environment (Goldsteen, Goldsteen, & Dwelle, 2015).

The environment is more than just a place in which positive outcomes can be obtained - it impacts every aspect of the human experience, including circumstances directly influenced by genetic factors, psychological predispositions and personal practices (Corral-Verdugo & Frias-Armenta, 2016). It is a web of interrelated human, physical and social elements that evolve over time. Political and economic processes are fundamental factors that influence how the physical environment and social structures intersect to impact health and well-being. Attention to both social conditions and physical environmental hazards are necessary to address disparities in environmental health (Gee & Payne-Sturges, 2004).

OVERVIEW OF EVIDENCE CONNECTING ENVIRONMENT WITH THE MENTAL HEALTH OF CHILDREN AND YOUTH

All aspects of the environment have distinct and interrelated influences on child and youth mental health. Children are more vulnerable than adults to exposures in their environment. The developing brain is most sensitive in utero and throughout early childhood, to toxic physical, chemical and biological exposures, as well as to the effects of social factors and psychological stress (Raub & Margolis, 2016). Societal factors, including poverty, education, employment, income, security, social support and housing are independent structural determinants of mental health that also modify or exaggerate the effects of exposures to physical factors in the environment (Tost, Champagne, & Meyer-Lindenberg, 2015). The cumulative effects of toxic environmental exposures in children and youth over the life course can cause physiological disruptions that persist into adulthood, and lead to lifelong impairments of physical or mental health (Shonkoff et al., 2012). Further research is needed to understand the impact of interactions between environmental exposures on the developing human brain.

RISK AND PROTECTIVE FACTORS IN THE PHYSICAL ENVIRONMENT

Risk factors

Children and youth can be exposed to toxins prenatally, and when they breathe contaminated air, drink contaminated water, breastfeed, ingest food and touch contaminated soil and objects. Known toxic exposures in the natural and built environments that affect neurodevelopment and the mental health of children and youth include lead, manganese, cadmium, polyaromatic hydrocarbons and organochlorine and organophosphate pesticides. Pesticide exposures in particular are more common for children living in rural agricultural areas (Raub & Margolis, 2016). Heavy metal contaminants and pesticides have been linked to hyperactivity behavior, including attention-deficit/hyperactivity disorder (ADHD) (Bouchard, Bellinger, Wright, & Weisskopf, 2010; Grandjean & Landrigan, 2014; Raub & Margolis, 2016; Sioen et al., 2013). There is a direct relationship between increasing blood lead levels and risk of ADHD in children, noting that ADHD is more prevalent among boys (Braun, Kahn, Froehlich, Auinger, & Lanphear, 2006). A study showed higher risks of hyperactivity among 7 to 8 year old children from prenatal lead exposure. For girls, there was a higher risk of greater total difficulties (summed scores on emotional, conduct, hyperactivity and peer problems) from prenatal exposure to a DDT pesticide metabolite (p,p’-DDE). Boys experienced a higher risk of emotional problems related to prenatal exposure to cadmium, suggesting that sex-specific effects need to be considered in studies of environmental contaminants related to mental health (Sioen et al., 2013).

Noise and traffic-related exposures in the built environment have been associated with poor mental health outcomes. Children exposed to higher levels of traffic noise at home were shown to have increased hyperactivity (Tiesler et al., 2013) as well as emotional symptoms and conduct problems (Deger, Meyer, Fromme, & Bolte, 2015). Prenatal exposure to polyaromatic hydrocarbons, an indicator of urban air pollution, has been shown to have lasting effects across early and middle childhood on the development of self-regulation (successful cognitive, emotional and behavioral control) and social competence (Margolis et al., 2016). For young children and youth who live in low income urban neighbourhoods,
poor quality housing (with structural or maintenance deficiencies and environmental hazards) has been associated with poor emotional and behavioral functioning, when compared to other factors such as residential instability, housing type and affordability (Coley, Leventhal, Lynch, & Kull, 2013). Contaminated dust from chipping, lead-based paint in poor quality, older homes, is a major route of lead exposure in children (Braun et al., 2006).

**Protective factors**

In the built and natural environments, green space, such as parks, gardens, woods and fields, has consistently been shown to promote positive mental health and reduce mental health problems (Rugel & Ward, 2015). In children and youth, increased access to urban green space near homes and schools has been associated with increased attention, self-regulation and reduced symptoms of ADHD (Flouri, Midouhas, & Joshi, 2014; McCracken, Allen, & Gow, 2016). Greater use and presence of more green space surrounding a child’s residence has been associated with reduced scores for ADHD (Amoly et al., 2014). Young children in poorer households, with access to a higher percentage of green space in their neighbourhood, have fewer emotional problems (including conduct disorders and hyperactivity) compared with those in less green neighborhoods (Flouri, et al., 2014). Positive emotional well-being among Canadian teenagers who live in small cities has been found to be related to green space (Huynh, Craig, Janssen, & Pickett, 2013). Similarly, Inuit youth describe being on the land, connecting to their culture and participating in traditional activities which relate to the land, as protective for their mental health (Petrasek MacDonald, Cunsolo Willox, Ford, Shiwak, & Wood, 2015) (Gray, Richer, & Harper, 2016).

Green space is considered to benefit mental health through reduced exposure to air pollution, noise and stress, as well as through enhanced physical activity, social networks and social participation (Dadvand et al., 2015; Rugel & Ward, 2015). Actions that may foster positive mental health and reduce environmental health inequities among children and youth include, improving access to the quality and quantity of green space (particularly in deprived urban areas) and aiming for a healthy built environment to facilitate exercise through active outdoor play (Tost, et al., 2015). More research is needed to understand the frequency, duration, and timeframe (i.e., life stage) of exposure to green space and possibly blue-space (such as oceans and rivers) which are most beneficial to the long-term mental health of children and youth and to Indigenous populations reconnecting to traditional cultural practices on the land.

For more information, please see Considerations for Indigenous child and youth population mental health promotion in Canada in this Collection.
RISK AND PROTECTIVE FACTORS IN THE SOCIAL ENVIRONMENT

Risk factors

Exposure to strong, frequent or prolonged stressors in the home environment, and stressful living conditions in the community, such as substandard housing, food insecurity, neighborhood crime and inadequate health care, can contribute to an increased risk of behavioural problems and poor mental health (Poole-Di Salvo, Silver, & Stein, 2016; Raub & Margolis, 2016). Inequitable distribution of environmental exposures in the population according to social constructs such as race and socioeconomic status, results in an “environmental injustice” because of a greater toxic burden among socially disadvantaged groups (Landrigan, Lambertini, & Birnbaum, 2012). People of lower socio-economic status who have the same level of exposure as other groups, may have greater negative health effects and deeper consequences of illness or injury (Blas & Kurup, 2010).

Communities and individuals with fewer social, economic and political resources experience greater psychological stressors (Schulz & Northridge, 2004), and also have greater exposure to environmental hazards due to adverse conditions, such as substandard housing. Crowded living conditions have significant negative effects on children’s well-being (Solari & Mare, 2012). Living in an overcrowded household or in a community with inadequate housing and prevalent violence are particular risk factors for Inuit youth mental health (Gray, et al., 2016). Higher levels of traffic-related air pollution, which harms the development of positive mental health (Margolis et al., 2016) have been observed in the built environment of socially disadvantaged communities (based on household income, unemployment rates, immigrant population and percent of income spent on rent) (Sider, Hatzopoulou, Eluru, Goulet-Langois, & Manaugh, 2015).

Protective factors

Enhanced social networks and social supports are protective for mental health and can influence the frequency and duration of exposure to stressors (Heaney & Israel, 2008). Healthy childhood development, which includes nurturing caregivers and supportive social systems, can buffer the adverse impacts of environmental stressors (Shonkoff, et al., 2012). When children have healthy coping resources, it

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For more information, please see Chronic diseases and population mental health promotion for children and youth and Infectious diseases and population mental health promotion for children and youth in this Collection.
is possible to avoid stress-related compromises in mental health (Taylor & Stanton, 2007). Interventions to improve neighborhood social and physical conditions may lessen the burden of stress and depressive symptoms as well as improve relationships between neighbours, even in neighbourhoods where physical conditions are deteriorating (Kruger, Reischl, & Gee, 2007). Children who grow up in neighborhoods with higher levels of social cohesion and control experience lower levels of depressive and anxiety symptoms during adolescence, regardless of socio-economic disadvantage, household income and sex of the child. Policy efforts to strengthen neighborhood social cohesion and control, especially in disadvantaged communities where residents are at increased risk for poor health, combined with greater investment in community organizations could improve neighborhood collective efficacy and ultimately, adolescent mental health (Donnelly et al., 2016). Further research is needed to determine how physical and social protective factors for mental health may differ for boys and girls. Additional study could also explore how exposure to neighborhood conditions influences children’s developmental trajectories, both in Indigenous communities and in the general population.

For rural areas of Canada, collaborative approaches to care, multi-sectoral capacity-building and further engagement with informal social support networks are suggested as promising strategies for the promotion of mental health (Caxaj, 2015). Indigenous communities in remote areas of Northern Canada face additional challenges from extreme weather conditions and loss of sea ice caused by climate change. For example, Inuit youth experience challenges related to rapid changes in the land and environment, as well as social inequities such as overcrowded housing, low educational attainment and high rates of poverty. Protective factors for enhanced well-being described by Inuit youth include strong communities and relationships with family and friends (Petrasek MacDonald, et al., 2015). Pride in Inuit identity, and living in a community with greater social cohesion and greater socio-economic success are factors associated with greater mental wellness for Inuit youth (Gray, et al., 2016). Social and physical environment initiatives relevant to the mental health of Indigenous populations need to consider additional challenges of diversity, colonization, inequity and vulnerability to climate change, as well as their differential effects on girls and boys.

For more information, please see Considerations for Indigenous child and youth population mental health promotion in Canada in this Collection.
EXAMPLES OF INTERVENTIONS THAT ADDRESS ENVIRONMENTAL INFLUENCES ON THE MENTAL HEALTH OF CHILDREN AND YOUTH

This section outlines promising practices and intervention examples that public health practitioners can consider to address environmental influences on mental health promotion for children and youth within specific settings. The intention is to introduce intervention examples in the context of public health practice. This list is not meant to be exhaustive.

Family and childcare setting (prenatal care, daycare, Indigenous programs for childcare)

Strategies:
- attachment formation
- emotion and behaviour regulation
- parent-practitioner collaborations
- sleep, feeding, and activity routines
- collaborating with community resources
- daycare as well as programs for Indigenous child care

Examples of interventions:
- Handle with care. Strategies for Promoting the Mental Health of Young Children in Community-Based Child Care
- Promising practices in First Nations and Aboriginal Maternal and Child Health Programs: Community perspectives on What Works

School setting (elementary schools, middle/high school, adolescents/young adults)

Strategies:
- violence/bullying prevention
- gender-affirmative
- safe and accessible recreation
- youth engagement
- workforce and education/training for youth

Examples of interventions:
- Healthy Schools Approach. Peel Region Public Health Pilot project.
- Genderspectrum (U.S.) Resources and best practices on gender and mental health.

Community setting (living conditions, community capacity, urban planning and built environment, access to healthcare services)

Strategies:
- safe and affordable housing, neighborhood renewal and crime reduction
- acting as advisory board member or engaging in intersectoral work
- retail food environments with healthy choices, developing green spaces, accessible transportation, bike lanes and good lighting
- delivery of healthcare more accessible to vulnerable populations

Examples of interventions:
- Healthy Communities, Northern Health BC
- The City of Vancouver’s Greenest City Action Plan envisions that all residents will live within a five-minute walk of a park, greenway or other green space by 2020.
- Build Healthy Places Network promotes collaboration across health and community development sectors to improve low-income communities and the lives of people living in them.
- Winnipeg Regional Health Authority (WRHA) mental health promotion program.
PUBLIC HEALTH ROLES

Environmental health promotion interventions should serve to disrupt the complex processes that produce social inequalities, and target issues not commonly considered within the scope of the health sector, such as poverty (Schulz & Northridge, 2004). Public health professionals can integrate mental health into their work activities, such as advocacy, advisory roles, policy development, partnership development, intersectoral collaboration and ensuring regulatory compliance with standards.

Medical officers of health can ensure that mental health is emphasized as part of their overall responsibility to promote health in the community, with the goal of addressing health inequities. Environmental health officers and public health inspectors, through their focus on environmental health, are in an ideal position to influence public health practice. Managers, directors, nurses, dietitians, health promoters, dental hygienists, planners, tobacco enforcement officers, policy developers, program evaluators, psychologists and epidemiologists, among other professions, can also play a collaborative role in mental health promotion of children and youth when they plan, prioritize and implement environmental health promotion programs and interventions.

* For more information, please see Healthy public policies and population mental health promotion for children and youth in this Collection.
ACTIONS TO SUPPORT MENTAL HEALTH PROMOTION ENVIRONMENTAL PUBLIC HEALTH PROGRAMS

The NCCDH framework *Public Health Roles for Improving Health Equity* (National Collaborating Centre for Determinants of Health, 2013) helps practitioners identify actions to reduce risk factors and promote protective factors for the mental health of children and youth.

Assess and report

Incorporate the impact of environmental inequities and strategies to reduce them.

- Incorporate indicators for the mental health of children and youth into health status reports, evaluation plans and strategic plans for the public health unit/regional health authority.

- Develop guidelines on how to measure and evaluate the mental health impact of program/work plans for healthy built environments, community development, social network and social support development.

Modify and orient interventions

Plan how existing environmental interventions can include a focus on mental health for children and youth, identifying key populations affected.

- Identify key populations and strategies to reduce exposure to environmental toxins and air pollution, strengthen healthy built environments, improve housing quality, improve neighborhood conditions, strengthen social support networks and address inequitable distribution of environmental exposures.
Partner with other sectors

Identify partners from other health and non-health sectors that can support the consideration of mental health in environmental health programming.

- Consult with other public health practitioners working on healthy built environments, whole-school approach to health, preconception–early childhood programming, housing, food security programs and community development.
- Consider collaborative opportunities external to public health:
  - education–school board, principals, teachers, support workers, student development officers
  - municipalities–economic development officer, city planner, housing, parks and recreation, property management, transportation, social services and liaison with provincial government
  - community organizations–youth centres, family resource centres, coalitions focussed on social issues, Indigenous organizations

Participate in policy development

Advocate for initiatives that target structural settings that shape physical and social environments.

- Initiate or participate in internal and external efforts to advocate for basic income, improved housing conditions/availability, healthy built environments and reduced environmental exposure to toxins in vulnerable populations and Indigenous peoples.

POPULATION MENTAL HEALTH PROMOTION FOR CHILDREN AND YOUTH
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General resources
- Population mental health promotion for children and youth - a collection for public health in Canada
- Foundations: definitions and concepts to frame population mental health promotion for children and youth
- Scan Report: resources for population mental health promotion for children and youth in Canada
- Database of resources for population mental health promotion for children and youth in Canada

Topical papers
- Environmental influences on population mental health promotion for children and youth
- Chronic diseases and population mental health promotion for children and youth
- Infectious diseases and population mental health promotion for children and youth
- Healthy public policies and population mental health promotion for children and youth
- Considerations for Indigenous child and youth population mental health promotion in Canada
The following resources have been included because of their combined focus on environment and mental health, as well as their focus on children and youth. They provide a starting point to consider what public health practitioners and agencies can do to address environmental influences on mental health promotion for children and youth.

**Tools**

*Toolbox of resources to create supportive environments for youth*
- Retrieved from: Youthrive.ca

**Guidelines/Best practices**

*Best practice guidelines for mental health promotion programs: Children (7–12) & youth (13–19) 2014*
- Retrieved from: Centre for Addiction and Mental Health (CAMH)

*Social and emotional wellbeing in primary education*
- Retrieved from: National Institute for Health and Care Excellence (NICE)

*Collection of materials about child health risks from indoor and outdoor air pollution*
- Retrieved from: Canadian Partnership for Children’s Health and Environment (CPCHE)

*Connecting the Dots: How Ontario Public Health Units are Addressing Child and Youth Mental Health*, Contains case study and a focus on various environments.
- Retrieved from: Public Health Ontario

**Training/Capacity building**

*Pediatric Environmental Health Training Resources. Includes: Air Pollution Effects on Children; Children and Nature; Pesticides and Children's Health*
- Retrieved from: Children's Environmental Health Network (CEHN) Resources

**Frameworks/strategies**

*Evergreen: A child and youth mental health framework for Canada*
- Retrieved from: Mental Health Commission of Canada

- Retrieved from: Public Health Ontario

*Kids Matter: Australian early childhood framework*
- Retrieved from: Kids Matter Australian Early Childhood Mental Health Initiative

Click the links below to access each resource. Broken link? Let us know at communications@nccph-ccnsp.ca
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Population mental health promotion for children and youth is a collaborative project of the six National Collaborating Centres (NCCs) for Public Health. The NCCs work together to promote and improve the use of scientific research and other knowledge to strengthen public health practices, programs, and policies in Canada. A unique knowledge hub, the NCCs for Public Health identify knowledge gaps, foster networks and provide the public health system with an array of evidence based resources, multi-media products, and knowledge translation services.

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This publication was funded by the National Collaborating Centres for Public Health and made possible through a financial contribution from the Public Health Agency of Canada.

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