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Chronic diseases and population mental health promotion for children and youth

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This discussion paper describes the complex relationship between chronic health conditions and mental health among children and youth. Mental illness can itself be a chronic health condition, and both physical and neurocognitive conditions, such as attention deficit hyperactive disorder and fetal alcohol syndrome disorder, can contribute to mental illness or poor mental health. Good mental health can be a protective factor against chronic health conditions across the lifespan. 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*.

FRAMING THE LINKS BETWEEN CHRONIC HEALTH CONDITIONS AND MENTAL HEALTH PROMOTION IN CHILDREN AND YOUTH

A century ago, infectious diseases posed the major threat to health, but today, in developed countries such as Canada, chronic health conditions take a greater toll on individuals, families and

communities as well as on services and systems (*Institute for Health Metrics and Evaluation, 2010*). In 2014, for example, 38.4% of the population 20 years and older in Canada had at least one of 10 main chronic diseases, including heart disease, stroke, cancer, asthma, diabetes, arthritis, depression and anxiety (*Public Health Agency of Canada, 2016*). Similarly, 17.9% of people 20 years of age and older had arthritis, and close to 24.9% were living with high blood pressure (*Statistics Canada, 2015*) (*Public Health Agency of Canada, 2016*). Close to one-third (32.7%) of Canadians

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12 years and older reported that their daily activities were limited by a disability (*Public Health Agency of Canada, 2016*). Chronic diseases are among the leading causes of both mortality and morbidity in Canada (*Statistics Canada, 2015*). It is not surprising, therefore, that chronic health conditions have become a primary concern of public health policy makers and practitioners.

Chronic diseases in children

Research and action on chronic diseases have often focused on adults because many of these illnesses are associated with aging (*Schor & Cohen*). Yet significant numbers of children and youth in Canada experience a variety of chronic health conditions (*Public Health Agency of Canada, 2009*). In 2014, for example, approximately 20% of youth aged 12-19 reported having a disability that limited their daily activities (*Public Health Agency of Canada, 2016*). In the same year, nearly one-quarter (23%) of all new HIV diagnoses were in youth aged 15-24 (*Public Health Agency of Canada, 2014b*). According to the Canadian Pain Society, one in five Canadian children experiences weekly or more frequent bouts of pain, most often headaches, stomach aches, and muscle, joint or back pain. An estimated 5% - 8% of children and youth have chronic pain severe enough to interfere with schoolwork, social development and physical activity (*Canadian Pain Society, 2014*). In 2011-12, 15.3% of children and youth aged 1-19 were living with asthma, while 0.3% were living with diabetes (*Public Health Agency of Canada, 2016*). In many instances, statistics on the health of children and youth are not disaggregated by sex, making it difficult to determine who might be at greatest risk of developing chronic health conditions. Increasingly, data are being collected and reported by sex. For example, in 2011-12, rates of diabetes were similar for females and males aged 1-19 years (41.5 and 40.3 per 100,000 respectively) while rates of asthma were higher among males than females (1,234.8 versus 925.9 per 100,000).

Four ways chronic diseases connect with mental health and illness in children and youth

Chronic diseases are linked with mental health and illness in children and youth in a number of complex ways. Firstly although we may tend to think of chronic health conditions as physical, they may also be neurological and psychological. For example, some neurocognitive disorders, such as autism, epilepsy, schizophrenia, attention deficit hyperactive disorder (ADHD) and fetal alcohol spectrum disorder (FASD), typically manifest during childhood and youth and persist throughout life (*Roy et al.*). Mood disorders, including depression and anxiety, are common in children and youth, affecting 9.3% of girls and boys between the ages of 12 and 19 in Canada (*Statistics Canada, 2015*). These conditions may become chronic during childhood and persist into or recur during adulthood (*Carballo et al.*). Not everyone who lives with a neurocognitive or mood disorder has poor mental health. When these conditions are understood and well-managed, they can coincide with good mental health, but they can undermine mental health when they affect social and self-acceptance.ⁱ

Secondly, chronic physical health conditions can compromise mental health and contribute to mental illness (*Prince et al., 2007*). Researchers have amply demonstrated that children and youth with chronic illnesses are at higher risk of mood and other psychiatric disorders as compared with healthy peers (*Barnes, Eisenberg, & Resnick, 2010; Ferro & Boyle, 2015; Hysing, Elgen, Gillberg, Lie, & Lundervold, 2007; Barlow & Ellard, 2006*). For instance, one Canadian study found that rates of major depressive disorder among youth with type 1 diabetes were at least two to three times greater than rates among non-diabetic youth (*Korczak, Pereira, Koulajian, Matejcek, & Giacca, 2011*). Further, the likelihood of mental illness rises with the severity of symptoms from chronic conditions (*Goodwin et al., 2013*) (*Doherty et al., 2013*). School-aged children and youth who experience chronic and recurring abdominal pain have high rates of anxiety and depression (*Shelby et al., 2013*). While any physical health condition that results in painful and debilitating symptoms may predispose children and youth to mental health problems, illnesses that are highly stigmatized,

ⁱ For more information, please see [*Environmental influences on population mental health promotion for children and youth*](#); [*Considerations for Indigenous child and youth population mental health promotion in Canada*](#); [*Healthy public policies and population mental health promotion for children and youth*](#); and [*Infectious diseases and population mental health promotion for children and youth*](#) in this Collection.

such as HIV and Hepatitis C, carry the risk of emotional and psychological problems, even in the absence of symptoms (Mellins & Malee, 2013; Shelby et al., 2013; Schaefer et al., 2012). Some medications used to manage chronic diseases may provoke or exacerbate mental illness (Public Health Agency of Canada, 2014a; Doherty et al., 2013). In one study, 56% of epileptic adolescents reported that treatments were a threat to emotional well-being (Hanghøj & Boisen, 2014).

Thirdly, poor mental health and mental illness can complicate the management of chronic diseases. Peer acceptance and support are particularly important to child and youth mental health. Adolescents and children with chronic physical and mental health conditions may find it hard to fit in or fear that their peers will reject them (Hanghøj & Boisen, 2014). Social stigma can, in turn, reduce effective control of chronic diseases if children and adolescents try to hide their illness and treatments from friends. According to one study, social anxiety – which involves fear and avoidance of social situations as well as self-criticism – has been associated with poor adherence to diet and insulin treatment schedules among diabetic adolescent boys (Di Battista, Hart, Greco, & Gloizer,

2009). Mental illnesses can also interfere with chronic disease management. For example, research with diabetic children and youth indicates that those with major depressive disorder have more diabetes-related complications as well as increased frequency of emergency department visits – all of which are related to poor treatment adherence (Korczak et al., 2011). Neurocognitive conditions, such as schizophrenia, bipolar disorder and ADHD, can also interfere with treatment compliance for chronic mental and physical health conditions. Finally, a growing body of evidence has linked poor mental health in the early years with increased risk of chronic physical health conditions across the lifespan (Hanson & Gluckman, 2011; G. Miller, Chen, & Parker, 2011). Early and persistent adversity, sometimes referred to as “toxic stress”, during childhood and youth can lead to permanent over-activation of the immune and neuroendocrine systems, with lasting implications for mental and physical health (Fagundes, Glaser, & Kiecolt-Glaser, 2013; Johnson, Riley, Granger, & Riis, 2013; J. P. Shonkoff, Garner, Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, & Section on Developmental and Behavioral Pediatrics, 2012).ⁱⁱ For example,

ⁱⁱ For more information, please see [Healthy public policies and population mental health promotion for children and youth](#) in this Collection.



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chronic elevated levels of cortisol – a stress hormone – in children and youth have been linked to the development of hypertension, insulin resistance, obesity, type 2 diabetes and cardiovascular diseases later in life (*Johnson et al., 2013; J. P. Shonkoff et al., 2012*) (*Naranjo, Schwartz, & Delamater, 2015*). Abuse in childhood has also been associated with heightened vulnerability to arthritis, back problems, migraine headaches, chronic respiratory disease, cancer, stroke, bowel disease and chronic fatigue syndrome in adulthood (*Afifi et al., 2016*). In one study, researchers proposed that disruption of the neuroendocrine response could be responsible for both type 1 diabetes and major depressive disorders in children and youth (*Korczak et al., 2011*). Encouragingly, good mental health in childhood and adolescence appears to have a protective effect against many chronic health conditions (*Cicchetti & Blenzer, 2006; Johnson et al., 2013; G. Miller et al., 2011; G. E. Miller et al., 2011*). For example, one study of American adults from low socio-economic backgrounds found that nurturing parents could buffer the negative effects of poverty, helping to foster resilience in children and lower rates of metabolic syndrome (*G. E. Miller et al., 2011*).

THE RELATIONSHIP BETWEEN DETERMINANTS OF MENTAL HEALTH, MENTAL ILLNESS, AND CHRONIC HEALTH CONDITIONS

Effects of social disadvantage

Research that examines the relationship between the determinants of mental health and chronic disease is uncommon. By comparison, there is ample evidence of the effects of socio-economic disadvantage on chronic physical and mental illness. The impact of poverty on children and youth has received the most attention from researchers. For example, many chronic health conditions, such as obesity and diabetes, are more prevalent among low-income children and youth (*Stewart, Masuda, Evans, Letourneau, & Edey, 2016; Williams, Sternhal, & Wright, 2009; Dean & Sellers, 2015*).ⁱⁱⁱ Similarly, girls and boys who live in poverty

tend to be at “higher risk of developing mental disorders affecting attention, anxiety and mood” (*Azma, 2013; Reiss, 2013*). Social disadvantages related to sex, race and other determinants have likewise been associated with elevated rates of chronic diseases and mental health problems in children and youth. For instance, asthma is more common in children of colour than white children in the United States, and type 2 diabetes is more prevalent among Indigenous than non-Indigenous children and youth in Canada (*Williams et al., 2009*) (*Earle, 2011*). Eating disorders and disordered eating are more common among girls as compared with boys, as well as among diabetic versus non-diabetic girls (*Colton, Olmsted, Daneman, & Rodin, 2013; Young et al., 2013*).

Often, impoverished children and youth are marginalized in other ways, making it challenging to differentiate between the effects of social disadvantage and the effects of economic disadvantage on rates and experiences of chronic physical and mental health problems. As Williams and colleagues noted in a recent study on the determinants of childhood asthma in the United States, “Race/ethnicity and SES are related but not interchangeable systems of social ordering that affect health risks” (*Williams et al., 2009*). For example, chronic health problems and mental illnesses are more common among Indigenous youth as compared with non-Indigenous youth, but it is hard to determine if these patterns are related to poverty, to historic trauma and on-going racism experienced by Indigenous communities in Canada, or to both^{iv} (*Greenwood & de Leeuw, 2012; Harris et al., 2013; National Collaborating Centre for Aboriginal Health, 2013; Gone, 2013*). Regardless of the nature and source of disadvantage, however, it seems clear that experiencing multiple forms of inequity leads to poorer mental health outcomes as well as to higher rates of chronic health problems across the lifespan. According to several studies, each additional kind of adversity experienced in childhood increased the incidence of coronary heart disease by 20%, the rate of hospitalization for autoimmune diseases by 20% for women and 10% for men, and the likelihood of a family member dying prematurely by 13% in adulthood (*G. Miller et al., 2011*).

ⁱⁱⁱ For more information, please see *Environmental influences on population mental health promotion for children and youth*, and *Considerations for Indigenous child and youth population mental health promotion in Canada* in this Collection.

^{iv} For more information, please see *Considerations for Indigenous child and youth population mental health promotion in Canada* in this Collection

Complex intersectional evidence

Lower rates of chronic physical or mental health conditions are not necessarily associated with economic or social privilege. Childhood asthma is a case in point. While American studies have documented higher rates of asthma in disadvantaged populations of children and youth (*Williams et al., 2009*), Canadian studies have found that asthma is less common among Indigenous than non-Indigenous children and youth, and lower still among Indigenous children and youth living on-reserve, in the north, or in rural settings, as compared with those living in the urban south (*Crighton, Wilson, & Senécal, 2010; Castleden et al., 2016*). Some

researchers have speculated that lower rates of asthma in rural and remote Indigenous communities might be linked to fewer pollutants and allergens in the air, but others have pointed out that asthma in Indigenous children and youth may be under-diagnosed rather than scarcer. Indigenous communities tend to have poorer access to health care services, particularly in the north, and some health care providers have limited understanding of the threat asthma poses to Indigenous children and youth^v (*Crighton et al., 2010; Castleden et al., 2016*). These findings underscore the need to examine the intersections of determinants in chronic physical and mental illnesses among children and youth.

^v For more information, please see [*Considerations for Indigenous child and youth population mental health promotion in Canada*](#) in this Collection



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Cognitive, psychological and physiological impact

Research on the determinants of chronic illness, both physical and mental, in children and youth has tended to focus on the cognitive and psychological impact of deprivation (*Cicchetti & Blender, 2006; Evans & Kim, 2013*). In this view, poverty and other forms of inequity compromise cognitive, social and emotional development, thereby putting disadvantaged boys and girls at greater risk of chronic health conditions later in life. These girls and boys are poorly equipped to escape conditions of economic and social deprivation or to make healthy choices about food, exercise and risk-taking (*Evans & Kim, 2013; Williams et al., 2009*).^{vi} Recent research on adverse childhood experiences demonstrates that the neuroendocrine and immune systems also play an important role in the development of chronic mental and physical health problems (*Evans & Kim, 2013; Johnson et al., 2013; G. Miller et al., 2011; G. E. Miller, Brody, Yu, & Chen, 2014; J. P. Shonkoff et al., 2012*). These studies are intriguing because they suggest that promoting mental health among female and male infants and young boys and girls can have tremendous benefits in the immediate term as well as across the lifespan (*Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, and Section on Developmental and Behavioral Pediatrics et al., 2011; Johnson et al., 2013*).

INTERVENTIONS

Given the limited research on the determinants and links between chronic diseases and child and youth mental health, it is not surprising that promising strategies and practices in this area are rare.^{vii} A few studies include recommendations for interventions but these tend to be quite general in nature. For example, one study on social anxiety and diabetes suggested that educators should tailor programs for boys, who seem to face greater challenges with insulin and diet adherence because of social anxiety and their fears about the effects of hypoglycaemia (*Di Battista et al., 2009*). A number of studies recommended “family-centred” approaches, and the use of programs to increase self-esteem in children and youth and reduce maternal depression (*Ferro & Boyle, 2015; Delamater, 2009*).^{viii} Similarly, research with girls and boys infected with HIV perinatally, stresses the importance of supportive caregiving relationships to foster coping and resilience (*Bhana et al., 2016; Fielden et al., 2006; Laughton, Cornell, Boivin, & Van Rie, 2013; Mellins & Malee, 2013*).

One American program, the *Collaborative HIV/AIDS Mental Health Program (CHAMP)*, may be a promising practice to promote mental health among vulnerable populations of children and adolescents infected or affected by HIV (*McKay et al., 2014; Mellins & Malee, 2013*). It consists of a 10-session family program that supports better self-esteem, peer relationships, and coping in youth as well as positive parenting. Clinical trials have consistently demonstrated improvements in both family relationships and youth mental health among those participating in the program. It could be valuable to explore the feasibility of adapting the CHAMP program for the public health and Canadian contexts.

^{vi} For more information, please see [*Environmental influences on population mental health promotion for children and youth*](#), and [*Healthy public policies and population mental health promotion for children and youth*](#) in this Collection.

^{vii} The situation is similar for strategies related to mental health promotion and infectious diseases. Please see [*Infectious diseases and population mental health promotion for children and youth*](#) in this Collection.

^{viii} For more information, please see [*Healthy public policies and population mental health promotion for children and youth*](#) in this Collection

PUBLIC HEALTH ROLES

As researchers uncover new links among chronic diseases, mental health and illness and the determinants of health, it will be important for the public health sector to incorporate this new knowledge (Perry, Presley-Cantrell, & Dhingra, 2010). While there are few models to guide the development of an expanded role for public health practitioners and policy makers in child and youth mental health promotion, The American Academy of Pediatrics (AAP) has described a promising approach to paediatric practice, the “eco-bio-developmental framework”, that might prove useful in the realm of public health (Johnson et al., 2013; J. Shonkoff, 2010; Committee on Psychosocial Aspects of Child and Family Health, Committee on Early Childhood, Adoption, and Dependent Care, and Section on Developmental and Behavioral Pediatrics et al., 2011). This framework encourages practitioners to consider how biological factors, such as genetic endowment

and immune responses, interact with social and physical environments, such as poverty, neglect and abuse, to exert a profound influence on physical and mental development in children and youth and into adulthood. The framework also underscores the critical role that clinicians can play to translate knowledge into practice, establish cross-sectoral collaborations, and advocate for changes in policies, programs and systems. According to an AAP position paper, pediatricians are uniquely placed “to lead an invigorated, science-based effort at transforming the way our society invests in the development of all children, particularly those who face significant adversity” (Johnson et al., 2013).

Public health policy makers and practitioners are similarly well-positioned to identify at-risk girls and boys, educate stakeholders, foster and support collaboration, and help transform policies and programs. As a start, clinicians could lead efforts to promote child and youth mental health for



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those living with chronic diseases by raising awareness and advocating for the inclusion of chronic health conditions are in mental health initiatives and best practice guidelines. For example, the Mental Health Commission of Canada has recently published a youth strategy that could be strengthened by greater attention to the impact of chronic diseases on mental health and illness (*Mental Health Commission of Canada, 2015*). Likewise, the Centre for Addictions and Mental Health has published guidelines on child and youth mental health promotion that could be strengthened by incorporating evidence on the role of toxic stress in risk and resilience for diverse populations of girls and boys (*Centre for Mental Health and Addictions, 2014*). The reverse is also true: mental health considerations could be included in best practice guidelines on chronic health conditions. For example, the Canadian Paediatric Society (CPS) has published practice guidelines on early childhood development and learning that could be strengthened by including information on toxic stress and chronic physical and mental health problems (<http://www.cps.ca>). CPS' guideline on chronic diseases in

children and youth is a promising example for practitioners on how to promote mental health as well as treat mental illnesses in their patients. Including discussion of the determinants of health could further strengthen these guidelines.

In keeping with public health roles to advance health equity (*National Collaborating Centre for Determinants of Health, 2013*), policy makers and practitioners could also contribute to a new vision of the burden of disease, and new indicators that capture the relationship between mental health and chronic diseases – locally, regionally, nationally and globally (*Isfeld-Kiely & Balakumar, 2015; National Collaborating Centre for Infectious Diseases, 2016*). Further, they could advocate for and contribute to policy and structural changes on the determinants of mental health and infectious disease among children and youth.^{ix} In these ways, public health policy makers and practitioners could promote mental health as both an individual and public good, and as a crucial component in the management of chronic diseases.

^{ix} For more information, please see [Healthy public policies and population mental health promotion for children and youth](#) in this Collection



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RESOURCES

Currently, there appear to be no organizations or networks that are specifically dedicated to advance understanding or address the impact of the determinants of both chronic health conditions and child and youth mental health. But many organizations and networks have mandates that relate either to child and youth mental health or to infectious diseases. Public health practitioners have an opportunity to bring together these organizations and networks to consider how they might work together to advance understanding of and action on the determinants of infectious diseases and child and youth mental health.

Resources on the determinants of chronic health conditions and mental health are few and many of them focus on adults rather than children and youth. Resources that could be

useful include the **Chronic Disease Prevention Alliance of Canada (CDPAC)** website, which identifies resources that address the mental health dimensions of chronic diseases. One webinar series on this site is devoted to reducing stigma for children and youth living with chronic health conditions. **The Canadian Mental Health Association (CMHA)** has also developed a number of resources on chronic disease prevention and management. The eco-bio-developmental framework mentioned earlier in this paper could be used to educate public health practitioners about the impact of toxic stress on child and youth mental health and infectious diseases. The APP's policy statement envisioning a new health promotion role for pediatricians might also help public health practitioners to consider new ways to promote child and youth mental health.

POPULATION MENTAL HEALTH PROMOTION FOR CHILDREN AND YOUTH

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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



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