



Issue Note

What are the impacts of COVID-19 public health interventions on child development?

Contributions: David Loutfi, Rosa Stalteri, Vivek Goel, Nazeem Muhajarine, Sue Horton, Lisa Puchalski Ritchie, Katrina Milaney, Clémence Ongolo Zogo, Susan Law

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Executive Summary

Question: What are the impacts of COVID-19 public health interventions on child development?

Definitions: **Child development** consists of the physical, language, thought and emotional changes experienced during childhood (1). It is a multifaceted concept that is typically measured through surveys that assess numeracy & literacy, social, emotional, and physical development, among other factors (2). **COVID-19 public health interventions** include lockdown, school closure, social and physical distancing.

Summary of Included Resources

Our rapid review identified 11 reviews, eight individual studies, 35 instances of ongoing research, seven online resources for child development, and a list of 17 experts in child development. Most of the evidence was from cross-sectional surveys and is of low quality. Public Health Ontario carried out a review on which we drew heavily. We may have missed resources due to the time frame of this review.

What do we know?

The mental health of children and of adolescents have been negatively impacted by COVID-19 public health interventions. However, it is difficult to separate the negative impacts of public health measures from fear of the virus. Adolescents have reported increased anxiety, depression, and suicidal thoughts. Younger children had more behavioural difficulties. Other factors reported that may have an impact on child development included decreased physical activity, weight gain, increased sedentary behaviours and screen time, increased household food insecurity, negative educational outcomes (e.g. reading ability improving slower than in previous years), and increased reports of child maltreatment (3).

What are the notable gaps?

- The negative impacts of public health measures on child development may not be fully evident for years so there is a need for longitudinal studies.
- Most of the emphasis has been on mental health. There is less research on the physical and developmental impacts of public health measures.
- We found limited research on social changes and their implications for adolescents, including for sexual health.

What is on the horizon? What are the studies that are underway to address the gaps?

There are many studies being conducted on mental health, and a few on healthcare delivery, deferred care, families, play, substance use, disabilities and maternal health (table 3). Importantly, some longitudinal studies are underway: Dr. Patte at Brock University is studying the mental health impacts of the pandemic over time among youth (a group defined as ages 15-24). Dr. Uher at the Nova Scotia Health Authority is building on an existing longitudinal study to examine impact of the pandemic on families that already have mental health issues. Dr. Azad at the University of Manitoba will use an ongoing study of families with children born 2008-2010 to study their physical and mental health, their behaviours, and emotions. Dr. Jonathon Maguire at Unity Health Toronto will use an ongoing study to determine child and parent mental health outcomes. Dr. Mark Ferro at the University of Waterloo is using an ongoing study of children with multimorbidity (including physical and cognitive conditions) to examine impacts on mental health and service provision to this group. Finally, the Early Childhood Education Journal is currently putting together a special issue on COVID-19 and child development that will be published in September 2021 (4). We can therefore expect more research findings in the coming year.

Concluding statement:

The public health measures associated with COVID-19 have had negative impacts on children. The quality of evidence is low due to the methods and limited amount of time to conduct studies. However, there is a lot of research on child development its determinants (education, physical activity, mental health, etc.) that is underway.

CanCOVID Rapid Review

What are the impacts of COVID-19 public health interventions on child development?

The following is a summary of evidence related to the impacts of COVID-19 public health interventions on child development. It includes 11 reviews, eight individual studies, 35 instances of ongoing/funded research, seven online resources for child development, and a list of 17 potential experts/researchers. This Rapid Review is based on information found through PubMed, Google Scholar, and the University of Toronto library COVID-19 resources prioritizing higher-level evidence (i.e., systematic reviews, rapid reviews, and meta-analyses). Additional resources were obtained through consultation with content experts. The comprehensiveness of this scan may be limited given the rapid timeline for our search, and it is possible that we have missed relevant evidence. The report includes all relevant reviews but only a sample of individual studies selected to highlight the range of emerging evidence on topics related to child development that could be pursued for further investigation on particular topics. The short summaries for each resource listed below provide an overview of the main results.

Child development

Child development is a broad concept that includes multiple domains. For children, important domains of development include physical health and well-being, social competence, emotional maturity, language and cognitive development, and communication skills and general knowledge (5). For adolescents, key domains include social, physical, and mental health (6). We use the terms *children* and *adolescent* broadly since the definitions of child, adolescent, and youth vary by study. Children are often defined as being under 18 while adolescents are often 10-19 years of age. Youth can include people up to 25 or 30. Some studies use terms like early childhood (until the age of eight) to refer to specific sub-groups.

Potential impacts on children and adolescents

Early in the pandemic, reviews outlined the potential risks of public health measures on children and adolescents. Based mostly on data from before COVID-19, they showed that epidemics can lead to increased stress, anxiety, and depression among children (7). There were also risks of domestic violence, child maltreatment, food insecurity, decreased physical activity (including play), increased obesity, and increased screen time (8–12). Parents may experience anxiety, depression, and burnout that may increase the risk of child maltreatment (7,13). Groups of children that could be at risk include those with disabilities, trauma experiences, existing mental health problems, migrant background, and low socio-economic status (8,14). We expected different impacts on younger children, whose primary affiliation is with their family, and adolescents who are at a life-stage where interaction with peers is paramount, and there is a greater degree of risk-taking and experimentation.

These risks could lead to “developmental delays and health problems in adulthood, such as cognitive impairment, substance abuse, depression, and non-communicable diseases” (7). However, many of the impacts will not be felt for many years. For example, a study of children whose mothers were pregnant during the Quebec Ice storm had lower cognitive and language abilities than other children at age five (15).

Actual impacts on children and adolescents

There were few papers that measured child development during COVID-19, which may be attributed to the possibility that the impacts are long-term. However, many reviews and individual studies examined determinants of child development including mental health, nutrition, physical activity and sedentariness, domestic violence and child maltreatment, education, injuries, and health-service use.

Mental Health

A report by Ontario Public Health (Jan 2021) found that “Children’s mental health and behaviour have been overall negatively impacted by the COVID-19 public health measures. Young children and adolescents were affected differently. Parents of young children reported more behavioural difficulties, hyperactivity, and conduct problems, while adolescents were more likely to have increased anxiety and depressive symptoms, increased suicidal ideation, and increased frequency of alcohol consumption for those reporting any use.”(3)

Nutrition

The report from Ontario Public Health found increased food insecurity at household level, and increased food intake, including more unhealthy foods, at an individual level (3). Stavridou et al. (2021) carried out a review and found 15 studies that showed that adolescents and children have gained weight during the pandemic likely due to an increase in the number of meals, as well as fried foods and sweets, and because of decreased physical activity (16).

Physical activity and sedentariness

Public Health Ontario found that physical activity has generally decreased, screen time has increased, and the effects on sleep are varied (3). Studies have reported an initial disruption to sleep duration and quality with a stabilization by the second month of the pandemic. A Canadian study reported a small increase in sleep duration and a small decrease in sleep quality. A Canadian survey showed that almost half of children and adolescents were going outside less than once a day. Although screen time has increased, it worth noting that this often includes both leisure and online learning (3).

Domestic violence and child maltreatment

Public Health Ontario reported on three studies that found that parents who lost their jobs were more likely to psychologically maltreat their children, and that there was a decrease in reporting of child maltreatment, likely because much of the reporting happens in schools (3). One systematic review did not find evidence of an increase in maltreatment, but the authors suspect this is due to diminished reporting (17).

Education

A report from the British Columbia Centres for Disease Control found that families reported impaired learning during school closures (18). A handful of studies identified by Public Health Ontario also point to decreased engagement, spending less time on schoolwork, increased stress, and diminished ability to concentrate during school closures. The switch to remote learning was challenging for rural and low-socio-economic status families who did not always have access to technology (3,18). Ongoing research at University of Alberta showed that those children in Grades 2, 3 and 4 who were already “struggling readers” were most adversely affected by the shift to online learning (not published, work by George Georgiou).

Injury

The number of home-based injuries increased in one study, and the proportion of burn injuries increased among two to five year-olds and among females (3). The increased amount of time at home likely contributes to these findings.

Health service use

The report by Public Health Ontario found that emergency department visits and hospitalization decreased. This may be due to fear of COVID-19, and therefore parents may be delaying seeking care for

their children, leading to more serious illness (3); On the other hand, children are at home more and may be exposed less to other infections (19).

Date of last update: April 5, 2021

Table 1: Reviews

Type of Evidence	Author	Resource	Last updated	Summary
Rapid Review	Public Health Ontario	Negative Impacts of Community-based Public Health Measures on Children, Adolescents and Families During the COVID-19 Pandemic: Update	Jan 2021	<ul style="list-style-type: none"> • Rapid review of negative impacts of public health measures on children, adolescents, and families. • Only includes studies published during COVID-19 (May to Oct 2020). • “Children’s mental health and behaviour have been overall negatively impacted by the COVID-19 public health measures. Young children and adolescents were affected differently. Parents of young children reported more behavioural difficulties, hyperactivity, and conduct problems, while adolescents were more likely to have increased anxiety and depressive symptoms, increased suicidal ideation, and increased frequency of alcohol consumption for those reporting any use.” • “Parental stress was a mediator in the association between exposure to COVID-19 public health measures and negative child outcomes. The level of parents’ perceived stress due to the COVID19 pandemic may exacerbate or buffer mental health and behaviour problems in children.” • “Other child outcomes negatively impacted by the pandemic included movement behaviours (decreased physical activity, increased sedentary behaviour and screen time), increased food insecurity, negative educational outcomes, increased injuries occurring at home, and increased reports of child maltreatment.” • “Health service utilization of tertiary care services (emergency department visits and hospitalizations) decreased substantially during the early months of the pandemic. However, it was reported that illness severity increased, and visits for mental health reasons increased in the later weeks of the pandemic. There may have been some parents delaying care for their children

Type of Evidence	Author	Resource	Last updated	Summary
				<p>due to fear of acquiring COVID-19 infection in the hospital.”</p> <ul style="list-style-type: none"> “Although this review identified many relevant studies, most were convenience samples. As such, families from diverse ethnicities or racialized communities, who are more likely to experience greater social and health inequities which may be exacerbated during the pandemic, are systematically underrepresented.”
Rapid Review	BC Centre for Disease Control	Impact of School Closures on Learning, Child and Family Well-Being During the COVID-19 Pandemic	Sept 2020	<ul style="list-style-type: none"> “Evidence from global literature and available BC and Canadian data suggest children and youth experience a range of adverse effects from school closures including interrupted learning, increased child stress, decreased connection, increased loneliness and mental health effects, decreased access to health promoting environments and declining healthy behaviours, decreased food access and a lack of detection and support in situations of family violence.”
Mental Health				
Review/ Meta-Analysis	Panda et al.	Psychological and Behavioral Impact of Lockdown and Quarantine Measures for COVID-19 Pandemic on Children, Adolescents and Caregivers: A Systematic Review and Meta-Analysis	Dec 2020	<ul style="list-style-type: none"> The authors searched a variety of databases for articles related to psychological impacts in children related to COVID-19. They found 15 studies describing 22 996 participants. “Overall, 34.5%, 41.7%, 42.3% and 30.8% of children were found to be suffering from anxiety, depression, irritability and inattention.”

Type of Evidence	Author	Resource	Last updated	Summary
Review	Nearchou et al.	Exploring the Impact of COVID-19 on Mental Health Outcomes in Children and Adolescents: A Systematic Review	Nov 2020	<ul style="list-style-type: none"> The authors conducted a systematic review on youth mental health and COVID-19. They found 12 studies with 12,262 participants. COVID-19 is associated with depression and anxiety in adolescent cohorts. The quality of included studies were low or moderate.
Review	Marques de Miranda et al.	How is COVID-19 pandemic impacting mental health of children and adolescents?	Dec 2020	<ul style="list-style-type: none"> The authors conducted a non-systematic review about the effects of the pandemic on children's and adolescent's mental health. They included 51 studies. "High rates of anxiety, depression, and post-traumatic symptoms were identified among children." This varied by age.
Review	Singh et al.	Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations	Nov 2020	<ul style="list-style-type: none"> The authors conducted a narrative review on mental health of children and adolescents during COVID-19 and lockdown. "Findings show that quality and magnitude of impact is determined by vulnerability factors like developmental age, educational status, pre-existing mental health condition, being economically underprivileged or being quarantined due to infection or fear of infection." Most studies were cross-sectional. There is a need for longitudinal and developmental studies.
Review	Loades et al.	Rapid Systematic Review: The Impact of Social Isolation and Loneliness on the Mental Health of	Nov 2020	<ul style="list-style-type: none"> The authors conducted a systematic review on the impact of loneliness and disease containment measures on mental health in children and adolescents. They found 83 articles, including pre-COVID studies.

Type of Evidence	Author	Resource	Last updated	Summary
		Children and Adolescents in the Context of COVID-19		<ul style="list-style-type: none"> “Social isolation and loneliness increased the risk of depression, and possibly anxiety at the time at which loneliness was measured and between 0.25 and 9 years later. Duration of loneliness was more strongly correlated with mental health symptoms than intensity of loneliness.” “Children and adolescents are probably more likely to experience high rates of depression and most likely anxiety during and after enforced isolation ends. This may increase as enforced isolation continues. Clinical services should offer preventive support and early intervention where possible and be prepared for an increase in mental health problems.”
Systematic Review	Fong et al.	Child and Family Outcomes Following Pandemics: A Systematic Review and Recommendations on COVID-19 Policies	Oct 2020	<ul style="list-style-type: none"> A systematic review of mental health outcomes for children and families following pandemics. They found 17 studies, including pre-COVID-19 studies. “Studies examining child outcomes indicate that social isolation and quarantining practices exert a substantial negative impact on child anxiety, post-traumatic stress disorder, and fear symptoms. Potential risk factors such as living in rural areas, being female, and increasing grade level may exacerbate negative mental health outcomes for children.”
Domestic violence				
Review	Abdo et al.	Domestic violence and substance abuse during COVID19: A systematic review	Sept 2020	<ul style="list-style-type: none"> The authors conducted a systematic review on domestic violence, substance abuse and COVID-19. They found 6 studies. They did not find enough evidence to show an increase in domestic violence. They note that this may be due to diminished reporting.

Type of Evidence	Author	Resource	Last updated	Summary
Nutrition				
Review	Stavridou et al.	Obesity in Children and Adolescents during COVID-19 Pandemic	Feb 2021	<ul style="list-style-type: none"> Literature review to evaluate obesity in children, adolescents, and young adults during COVID-19. They found 15 articles. They found that these populations gained weight during the pandemic. This was likely due to increased food intake, decreased physical activity. Food insecurity was another concern.

Table 2: Individual studies

Type of Evidence	Author	Resource	Last updated	Summary
Study	Zhang et al.	Acute stress, behavioural symptoms and mood states among school-age children with attention-deficit/hyperactive disorder during the COVID-19 outbreak	June 2020	<ul style="list-style-type: none"> Children's ADHD behavior significantly worsens during pandemic compared to their normal state. Children's negative mood states were linked with ADHD symptoms. School closures may have elevated difficulties and stress in both children and parents, as parent mood state also impacts child's ADHD symptoms. ADHD symptoms were reduced with longer study time.
Study	McElroy et al.	Demographic and health factors associated with pandemic anxiety in the context of COVID-19	Aug 2020	<ul style="list-style-type: none"> Adolescent females & older adolescents more likely to worry about the consequence of the pandemic. Females scored significantly higher than males on consequence-anxiety. Age is positively associated with consequence-anxiety, indicates the pandemic is a source of anxiety amongst older adolescents.

Type of Evidence	Author	Resource	Last updated	Summary
Study	Hawke et al.	Impacts of COVID-19 on Youth Mental Health, Substance Use, and Well-being: A Rapid Survey of Clinical and Community Samples	Oct 2020	<ul style="list-style-type: none"> Youth are concerned about their mental health and perceive a deterioration since before the pandemic, likely meeting diagnosis criteria. Concerns about mental health were about loved ones or themselves falling ill or financial/job concerns.
Study	Oosterhoff et al.	Adolescents' Motivations to Engage in Social Distancing During the COVID-19 Pandemic: Associations With Mental and Social Health	May 2020	<ul style="list-style-type: none"> The motivation for adolescents (ages of 13 and 18) to socially distance is related to their mental and social health during the pandemic. Those that distanced to avoid illness reported greater anxiety. Those that socially distanced to prevent judgement reported greater depressive symptoms.
Study	Hou et al.	Prevalence of and factors associated with mental health problems and suicidality among senior high school students in rural China during the COVID-19 outbreak	July 2020	<ul style="list-style-type: none"> Senior high school students in rural China reported a higher prevalence of anxiety, depression, and PTSD symptoms. Of these students, a considerable proportion of students have presented suicidal ideation and suicidal attempts.
Study	Patra et al.	COVID-19 lockdown and school closure: Boon or bane for	Dec 2020	<ul style="list-style-type: none"> Telephone survey of parents of children in eastern India asking about their children's mental health during COVID-19. Note that children were not interviewed.

Type of Evidence	Author	Resource	Last updated	Summary
		child mental health, results of a telephonic parent survey		<ul style="list-style-type: none"> More than 90% reported that their children's mental was the same or had improved during the pandemic. Few reported a worsening. Authors suggest this might be due to decreased academic stress and lack of strict lockdown measures (children allowed to go out and play).
Study	Kuhfeld et al.	Learning during COVID-19: Initial findings on students' reading and math achievement and growth	Nov 2020	<ul style="list-style-type: none"> In the fall of 2020, students in the USA (grades 3-8) performed 5-10% less well in math but performed similarly in reading when compared to same-grade students in 2019.
Study	Moore et al.	Impact of the COVID-19 virus outbreak on movement and play behaviours of Canadian children and youth: a national survey	July 2020	<ul style="list-style-type: none"> Survey of 1472 parents of children to assess changes in physical activity, play, sedentary behaviour, and sleep. Only 4.8% of children (5-11 years) and 0.6% of youth 12-17 years) were meeting behaviours guidelines during COVID-19 restrictions. Parental encouragement, parental engagement in physical activity and dog ownership were associated with health movement behaviour.
Study	Nelson et al.	"Physical Sex Is Over for Now": Impact of COVID-19 on the Well-Being and Sexual Health of Adolescent Sexual	Oct 2020	<ul style="list-style-type: none"> Online survey carried out between March and May 2020 assessed changes in well-being and sexual health among adolescent sexual minority males. "In the past 3 months, participants reported seeing sexual partners in person less often, masturbating and viewing pornography more often, and sexting and messaging on

Type of Evidence	Author	Resource	Last updated	Summary
		Minority Males in the U.S.		<p>men-seeking-men websites/phone applications about the same amount.”</p> <ul style="list-style-type: none"> “Many described being physically distanced from sexual partners, and some noted an increase in their use of virtual ways to connect with partners (e.g., video chatting).”
Study	Rogers et al.	Adolescents' Perceived Socio-Emotional Impact of COVID-19 and Implications for Mental Health: Results From a U.S.-Based Mixed-Methods Study	Jan 2021	<ul style="list-style-type: none"> A mixed method study with surveys completed before (Oct 2019) and during (April 2020) COVID-19. 407 US adolescents report on their experiences with COVID-19 and reports of their mental health. Adolescents perceived changes in their relationships (less perceived friend support). They reported increases in negative affect and decreases in positive affect. The perceived changes were associated with depressive symptoms, anxiety, and loneliness.
Study	Georgiou	Has Covid-19 Impacted Children's Reading Scores?	To be published Spring 2021 (Partially funded by Alberta Education grant (#2019-0022))	<ul style="list-style-type: none"> 2 surveys of students in Alberta to assess their reading ability. Both studies included multiple surveys (i.e., before and after school closures). Grade 2-3 students performed less well at reading than students from previous years though they were only 2 to 5 points (or 4 to 8 months) behind so the decline could be reversible. Students from Grades 4 through 9 did not decrease suggesting that students in grades 2-3 are at a critical period for learning language.

Table 3: Current Research in Canada

PI/Author	Resource	Title
Child Development		
Duffett-Leger, Linda A	University of Calgary	ATTACH™ & VID-KIDS: Rapid User-Informed Web and Mobile Interface Development, Adaptation and Pilot Testing to Support Children's Mental Health and Development.
Maguire, Jonathon L	Unity Health Toronto	TARGet Kids! COVID-19 Study of Children and Families: Safe Return to School, Work, and Play.
Corkum, Penny V	Dalhousie University (Nova Scotia)	Pragmatic trial of two novel pathways for implementation of the Better Nights, Better Days (BNBD) online program to promote and protect the sleep, mental health, psychosocial wellbeing, and family resiliency of children and families during and after COVID-19 pandemic.
Uher, Rudolf I	Nova Scotia Health Authority	Impact of the COVID-19 pandemic on Canadians living with mental illness, and their children.
Azad, Meghan	University of Manitoba	Rapid research in the CHILD Cohort to inform Canada's response to the COVID-19 pandemic: investigating the prevalence and predictors of SARS-CoV-2 infection, and the health and psychosocial impact of the COVID-19 pandemic on Canadian families.
Kobor, Michael	University of British Columbia	How will the pandemic affect children's brains, immune systems, and ability to thrive?
Determinants of Child Development		
Muhajarine, Nazeem	University of Saskatchewan	See Us, Hear Us: Children, youth and families in Saskatchewan coping with mental health during the first years of COVID-19 pandemic. <ul style="list-style-type: none"> Mental Health
Ferro, Mark	University of Waterloo (Ontario)	COVID-19 Effects on Mental Health and Service Provision Effects on Children and Families: The MY LIFE Experience. <ul style="list-style-type: none"> Mental Health
Guttmann, Astrid	Hospital for Sick Children (Toronto)	Deferred Care Outcomes in Canadian Children and Youth: Measuring and Mitigating Risk during COVID-19. <ul style="list-style-type: none"> Deferred Care

PI/Author	Resource	Title
Korczak, Daphne	Hospital for Sick Children (Toronto)	Population-based virtual mental health interventions for children, youth and families during COVID-19: If we build it, will they come? <ul style="list-style-type: none"> Mental Health
Maximova, Katerina	University of Alberta	Weathering adversity: toward mitigating the impact of prolonged school closure and social isolation on mental health and lifestyle behaviours of elementary school children. <ul style="list-style-type: none"> Mental Health
McIsaac, Jessie-Lee D	Mount Saint Vincent University (Halifax)	Transitions to a new normal: The health of young children in the Maritimes during COVID-19. <ul style="list-style-type: none"> Family life
Meherali, Salima M	University of Alberta	Mental health and substance use among children and adolescents amidst COVID-19- A Systematic Review. <ul style="list-style-type: none"> Mental Health, Substance Use
Montreuil, Marjorie	McGill University	Supporting children and adolescents' mental health in the context of pandemic and confinement: A scoping review of interventions and ethical challenges. <ul style="list-style-type: none"> Mental Health Interventions
Patte, Karen	Brock University (Ontario)	Mental health effects of COVID-19 on Canadian adolescents over time: a mixed methods study. <ul style="list-style-type: none"> Mental Health
Van Lieshout, Ryan J	McMaster University	Online 1-Day Cognitive Behavioral Therapy-Based Workshops for Postpartum Depression. <ul style="list-style-type: none"> Mothers, Postpartum depression
Zwicker, Jennifer D	University of Calgary	Nothing without us: Towards inclusive, equitable COVID-19 policy responses for youth with disabilities and their families. <ul style="list-style-type: none"> Mental Health, Disabilities
Campbell, Leslie A	Dalhousie University (Nova Scotia)	Our Virtual Reality: Rapidly Responding to Changing Mental Health Needs among Children and Adolescents. <ul style="list-style-type: none"> Mental Health
Henderson, Joanna L	Centre for Addiction and Mental Health (Toronto)	Youth mental health and substance use in the context of COVID-19: A rapid response multi-component program of youth-engaged research and action.

PI/Author	Resource	Title
		<ul style="list-style-type: none"> Mental Health
Kimber, Melissa S	McMaster University	Psychological First Aid Training to Address COVID-19 Related Stressors. <ul style="list-style-type: none"> Mental Health
Milne, Lise	University of Regina (Saskatchewan)	Translating Knowledge for Child Welfare Organizations Across the Prairies: Managing the Impacts of COVID-19 on the Mental Health of Children, Families, and Workers. <ul style="list-style-type: none"> Mental Health
Nicholas, David B	University of Calgary	Exploring the Psychosocial and Health Service Consequences of Coronavirus on Children and their Families: Lessons Learned for Pediatric Health Care Practice and Policy. <ul style="list-style-type: none"> Healthcare delivery
Saunders, Natasha R	Hospital for Sick Children (Toronto)	Equity of virtual mental health care uptake for children and youth during the COVID-19 pandemic. <ul style="list-style-type: none"> Mental Health
Stinson, Jennifer N	Hospital for Sick Children (Toronto)	Stepped care solutions to reduce impact of the COVID-19 pandemic on youth living with chronic pain, their families, and health care providers: A pan-Canadian study. <ul style="list-style-type: none"> Healthcare delivery
Weiss, Jonathan A	York University (Toronto, Ontario)	The Impact of COVID-19 on the Mental Health and Well-being of Caregivers and Families Living with Autism. <ul style="list-style-type: none"> Mental Health
Williams, Tricia	Hospital for Sick Children (Toronto)	Stepping up to COVID-19: Examining a virtual mental health stepped care approach to addressing needs of at-risk children and families. <ul style="list-style-type: none"> Mental Health
Young, Nancy L	Laurentian University of Sudbury	Valuing Indigenous Emotional Wellness -- Reviewing programs to enhance support for children in rural and remote communities. <ul style="list-style-type: none"> Mental Health
Couturier, Jennifer L	McMaster University	The COVID-19 Pandemic and Eating Disorders in Children and Adolescents: Recommendations from the Canadian Consensus Panel. <ul style="list-style-type: none"> Eating disorders

PI/Author	Resource	Title
Da Costa, Deborah M	Research Institute of the McGill University Health Centre	Acceptability and Impact of a Prenatal Internet Intervention for Promoting Maternal Mental Health in the COVID-19 Context. <ul style="list-style-type: none"> • Mothers, Mental Health
Birnie, Kathryn A	University of Calgary	Rapid evidence and gap map of virtual care solutions for youth and families to mitigate the impact of the COVID-19 pandemic on pain, mental health, and substance use. <ul style="list-style-type: none"> • Pain, Mental Health
Camden, Chantal	Université de Sherbrooke	Quelles sont les répercussions de la pandémie du COVID-19 sur la santé mentale des enfants de 5-12 ans, et quels sont les enjeux particuliers pour les enfants handicapés ou ayant une maladie chronique? Une scoping review des problématiques vécues et des pistes d'interventions prometteuses. <ul style="list-style-type: none"> • Mental Health
Couturier, Jennifer L	McMaster University	Adapting and adopting highly specialized pediatric eating disorder treatment to virtual care: Implementation research for the COVID-19 context and beyond. <ul style="list-style-type: none"> • Mental Health, Eating Disorders
Moretti, Marlene M	Simon Fraser University (Burnaby, B.C.)	Reducing Risk and Promoting Health Among Vulnerable Teens and their Families in the Context of COVID-19: A Multisite National and International Implementation and Evaluation Study. <ul style="list-style-type: none"> • Mental Health
Schwartz, Kelly D	University of Calgary	Screening Student Resiliency and Mental Health Indicators During School Re-Entry. <ul style="list-style-type: none"> • Mental Health
Hechtman, Lily	McGill University	Factors affecting positive and negative adaptation to quarantine in children and their families during the COVID-19 pandemic. <ul style="list-style-type: none"> • Mental Health
Blaisdell, Whitney	University of Regina	Towards Play at Home <ul style="list-style-type: none"> • Play

Table 4: Resources on Child Development

Institution/Author	Resource	Summary
ECDAN Early Childhood Development Action Network	ECDAN Early Childhood Focused COVID-19 Resources	Extensive list of ECD resources for parents, educators, administrators, child protection workers, health practitioners, and policymakers.
Aaniish Naa Gegii: the Children's Health and Well-being Measure (ACHWM)	COVID-19 Resources for Parents	Culturally appropriate resources for Indigenous parents and children to manage COVID-19.
Harvard Center on the Developing Child	A Guide to COVID-19 and Early Childhood Development	"This guide pulls together information on COVID-19, what it means for child development, and easy-to-share resources that can help parents and caregivers, as well as child care providers, pediatricians, and others who work with families."
Child Development Institute	Child Development Institute COVID-19	Canadian resources for parents to help their children during COVID-19
Center for Disease Control and Prevention (CDC USA)	COVID-19 Parental Resources Kit	Resources for parents to help their children during COVID-19. Support available by age category (early childhood, childhood, adolescence, and young adulthood).
UNICEF	Coronavirus (COVID-19) guide for parents	Resources for parents to help their children during COVID-19.
Offord Centre for Child Studies	Offord Centre	Canadian research centre specializing in children at McMaster University. General resources (not COVID-19 specific)

Table 5: Experts on Child Development

Expert	Affiliation	Summary of Research Topics	Contact Information
Katholiki (Kathy) Georgiades	Associate professor, Department of Psychiatry and Behavioural Neurosciences, McMaster University David R. (Dan) Offord Chair in Child Studies	<ul style="list-style-type: none"> Inequities in child and adolescent health Children and adolescents from immigrant and racial/ethnic backgrounds 	georgik@mcmaster.ca 905-525-9140 Ext.21500

Expert	Affiliation	Summary of Research Topics	Contact Information
		<ul style="list-style-type: none"> Contextual influences (family, school, community) on child and adolescent health 	
Michel Boivin	<p>Professor, Psychology at Université Laval.</p> <p>Canada Research Chair in Children's Social Development</p> <p>Director of the Research Unit on Children's Psychosocial Maladjustment (GRIP)</p>	<ul style="list-style-type: none"> Parental behaviors and cognitions Child development Development of social difficulties related to rejection and victimization by peers Early Childhood Development Longitudinal study Twin studies Behavioral genetics School preparation and educational trajectories Behavior problems Psychology Relationships between children Temperament, behavioral inhibition and stress response 	<p>Michel.Boivin@psy.ulaval.ca</p> <p>418 656-2131, ext 402825</p>
Michael Boyle	<p>Professor emeritus</p> <p>Canada research chair in the Social Determinants of Child Health</p>	<ul style="list-style-type: none"> Determinants of child health, measurement of childhood psychopathology, research study design 	boylem@mcmaster.ca
Ian Colman	<p>Associate Professor, Faculty of Medicine, University of Ottawa</p> <p>Canada Research</p> <p>Chair in Mental Health Epidemiology</p>	Modifiable causes of depression and suicidality in three vulnerable populations: children and adolescents, military personnel, and prisoners.	<p>icolman@uottawa.ca</p> <p>613-562-5800 ext./poste 8715</p>
Sheri Madigan	<p>Assistant Professor, Department of Psychology</p> <p>University of Calgary,</p> <p>Canada Research Chair in Determinants of Child Development</p>	<ul style="list-style-type: none"> Central determinants of child and youth development. Influence of social stressors and adversities on child socio-emotional development. Understanding resilience versus vulnerability to stressors in mothers, children and youth 	<p>sheri.madigan@ucalgary.ca</p> <p>+1 (403) 220-6826</p>

Expert	Affiliation	Summary of Research Topics	Contact Information
Mark Ferro	Associate Professor, School of Public Health and Health Systems at the University of Waterloo. Canada Research Chair in Youth Mental Health Director Advancing Research in Children's Health Lab	<ul style="list-style-type: none"> Child multimorbidity – the co-occurrence of physical and mental illness in children, youth and young adults. Use of clinical and epidemiological studies and a developmental approach to estimating the burden of child multimorbidity; expounding the multilevel determinants of child multimorbidity; modelling biological and psychosocial mechanisms leading to the onset of child multimorbidity. Use of data linkage activities to explain how children with multimorbidity interface with the mental health care system. 	mark.ferro@uwaterloo.ca 519-888-4567, ext. 43664
Michael Steffen Kobor	Professor, Department of Medicine, University of British Columbia Senior Scientist. Centre for Molecular Medicine and Therapeutics at BC Children's Hospital Research Institute (BCCHR) Tier 1 Canada Research Chair in Social Epigenetics	<ul style="list-style-type: none"> Human population epigenetics aimed at deciphering the mechanisms by which environmental exposures and early-life experiences can “get under the skin” to regulate gene activity and contribute to health and disease across the life course. Lead: A bio-ecological integrative approach to understand the hidden costs of COVID-19 on children. (https://www.med.ubc.ca/news/three-faculty-of-medicine-researchers-to-study-long-term-effects-of-covid-19-on-children/). 	msk@cmmt.ubc.ca 604-875-380
Marlene Moretti	Professor, Department of Psychology Simon Fraser University	<ul style="list-style-type: none"> Developmental psychopathology. violence/aggression. 	moretti@sfu.ca

Expert	Affiliation	Summary of Research Topics	Contact Information
	Tier 1 CRC in Youth Clinical Psychological Science	<ul style="list-style-type: none"> sex and gender differences. Attachment. self-regulation. intervention for children and adolescents. program evaluation. knowledge translation. 	
Magdalena Janus	<p>Professor, Department of Psychiatry and Behavioural Neurosciences, McMaster University</p> <p>Offord Centre for Child Studies</p> <p>Ontario Chair in Early Child Development</p>	<ul style="list-style-type: none"> Population-level measurement of children's developmental health at school entry: methodology, outcomes, and correlates. Individual, neighbourhood, community, and policy impact on children's development. Transition to school for children with special needs. 	<p>905-521-9140x21418</p> <p>janusm@mcmaster.ca</p>
Gina Dimitropoulos	Associate Professor at University of Calgary	<ul style="list-style-type: none"> Studying adolescent and transition-aged youth with mental health issues and complex health needs. Development and evaluation of family-based treatments for eating disorders. Clinical and community trials for youth with mental health, disabilities, and chronic health conditions. Identifying barriers and facilitators to investigating and supporting children who have been affected by child sexual abuse material and online sexual exploitation. Building knowledge of social work practice in the context of the health care setting and interdisciplinary teams. 	<p>+1 (403) 220-7332</p> <p>gdimit@ucalgary.ca</p>

Expert	Affiliation	Summary of Research Topics	Contact Information
George Georgiou	Professor at University of Alberta	<ul style="list-style-type: none"> • Dimensions of literacy acquisition: (a) the factors (cognitive and non-cognitive) that facilitate or impede reading and spelling acquisition across languages, and (b) the diagnosis and remediation of reading difficulties in elementary school children. • The role of rapid naming on reading ability across languages • Mechanisms that are responsible for the rapid naming-reading relationship. • Distal cognitive processing skills, such as executive functioning and intelligence. 	georgiou@ualberta.ca (780) 492-8247
Lise Milne	Assistant Professor, Faculty of Social Work (Saskatoon campus) University of Regina. Full Faculty member, McGill Centre for Research on Children and Families	Trauma-informed practices in child-serving organizations, the neurobiological impacts of trauma, and practice and policy responses to intimate partner violence.	Lise.Milne@URegina.ca
David B. Nicholas	Professor, Faculty of Social Work, University of Calgary Member, O'Brien Institute for Public Health in the Cumming School of Medicine.	<ul style="list-style-type: none"> • Child & Adolescent Development • Child Welfare, • Child Trauma, • Youth in the Criminal Justice System • Clinical Practice • Disabilities • Participatory Action Research 	nicholas@ucalgary.ca
Lily Hechtman	Professor, Department of Psychiatry, Department of Pediatrics, Faculty of Medicine, McGill University	<ul style="list-style-type: none"> • Attention deficit disorders in children, • Adolescents and adults. • Treatment development and efficacy. 	lily.hechtman@mcgill.ca 514 412 4449

Expert	Affiliation	Summary of Research Topics	Contact Information
		<ul style="list-style-type: none"> Long-term prospective controlled follow-up. 	
Jonathon Maguire	<p>Associate Professor, Department of Pediatrics, University of Toronto</p> <p>Scientist, Li Ka Shing Knowledge Institute of St. Michael's Hospital Staff Pediatrician, Department of Pediatrics, St. Michael's Hospital</p>	<ul style="list-style-type: none"> Mutritional child health promotion. Evaluation and advancement of evidence informed practice, medical decision making, Determinants of child health. <p>Co-lead: TargetKids</p>	jonathon.maguire@utoronto.ca
Lisa Hawke	<p>Assistant Professor, the University of Toronto Department of Psychiatry</p> <p>Project Scientist, the Margaret and Wallace McCain Centre for Child, Youth & Family Mental Health</p> <p>Cundill Scholar, the Cundill Centre for Child and Youth Depression at CAMH.</p>	<ul style="list-style-type: none"> Psychosocial aspects of youth mental health and substance use challenges and service access issues. 	lisa.hawke@camh.ca
Joanna Henderson	<p>Associate Professor in the Department of Psychiatry at the University of Toronto</p> <p>Director of the Margaret and Wallace McCain Centre for Child, Youth & Family Mental Health and Interim Implementation Director of the Cundill Centre for Child and Youth Depression at CAMH.</p> <p>Senior Scientist, the Child, Youth and Emerging Adult Program at CAMH</p>	<ul style="list-style-type: none"> Improving service delivery and access to care for youth with substance use, mental health or concurrent disorders and their families, through collaborative models of service delivery and knowledge translation and exchange. 	Joanna.Henderson@CAMH.ca (416) 535-8501 34959

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