Episode 71 – Impact of COVID-19 Pandemic on Children and Youth
October 21, 2022

Introduction
The COVID-19 pandemic has affected all children and youth. For example:
- Millions have been infected by SARS-CoV-2, with some experiencing lasting effects.
- Significant numbers have experienced death of a parent or caregiver.
- School-age children have missed years of critical education.
- Social isolation, family stress, economic loss, and social service reductions have increased risks for child maltreatment.
- School and recreation closures decreased physical activity.
- Routine childhood vaccinations were missed.
- Children's oral health and oral healthcare have declined.

SARS-CoV-2 infection[1]
Most children and youth with SARS-CoV-2 infection usually have mild or no symptoms, and generally have a lower risk of hospitalization, complications, and lower mortality rates compared with adults. [1]

However, some children and youth infected with SARS-CoV-2:
- Require hospitalization for complications.
- Are asymptomatic and spread COVID-19 to others, including individuals at high risk of serious illness.
- Experience enduring effects (i.e., long COVID).
- Develop multisystem inflammatory syndrome in children (MIS-C),[2] a rare, serious complication that can occur several weeks after SARS-CoV-2 infection. [2] [3]

Children and youth with certain medical conditions may have higher risk of severe illness from COVID-19 including:
- Obesity
- Asthma
- Down syndrome
- Neurological disorders
- Immunocompromising conditions

However, some children who become severely ill may not have any risk factors. [4]

[1] Refer to Episodes 28, 33, & 34 for additional information on SARS-CoV-2 infection in children.
[2] Refer to Episodes 28, 33, & 48 for additional information on MIS-C.

Martin et al. (2022) analyzed data from the National COVID Cohort Collaboration, which included all pediatric COVID-19 tests done at 56 US facilities up to September 24, 2021. Participants included children <19 years at initial SARS-CoV-2 testing. Researchers documented 167,262 cases of COVID-19. Of these positive cases, 10,245 children (6%) were hospitalized, and among them, 796 (8%) required mechanical ventilation, and 131 (1%) died. [5]

Allen et al. (2022) investigated hospital admission rate for COVID-19 for children <5 years to see how COVID-19 affected those not yet eligible for vaccination. They found infants <2 months were more likely to be hospitalized with COVID-19 compared to children <5 years for every variant wave (i.e., pre-Delta, Delta, and Omicron waves). [6]

Canadian COVID-19 statistics as of October 14, 2022 [7]

Age group	Cases	Hospitalizations	ICU admission	Deaths
0-11 years	413,040 (10%)	5,528 (3%)	513 (2%)	41 (0.1%)
12-19 years	329,986 (8%)	2,365 (1%)	249 (0.8%)	25 (0.1%)
Total all ages	4,120,068	196,102	30,040	46,473

Ontario COVID-19 statistics as of October 8, 2022 [8]

Age group	Cases	Hospitalizations	Deaths
0-11 years	120,543 (8%)	1,654 (0.3%)	19 (0.1%)
12-19 years	110,753 (7%)	507 (3%)	
Total all ages	1,464,162	56,951	14,470

Take home message

- There is a low but real risk of severe illness and serious complications in children.

Long COVID[3]

- After COVID-19, some children develop sequelae, such as MIS-C or long COVID.
- Long COVID is known by various names, including post-COVID syndrome, long-haul COVID, post-acute COVID-19, chronic COVID, and post-acute sequelae of SARS-CoV-2 infection (PASC).
- Long COVID symptoms can persist for weeks to months beyond a severe, mildly symptomatic, or asymptomatic infection. Symptoms can sometimes disappear and reappear. Some individuals report over-exertion, both mental and physical, can make the condition worse.
- Prevalence of long COVID symptoms in children vary between studies from 4 to 66%. There is also large variation in the reported frequency of persistent symptoms.
- Some children may have one or two symptoms, whereas others have many.
- Recent studies have suggested possible risk factors for long COVID in children may be older age, female gender, and history of allergic disease. [9] [10] [11]

[3] Refer to Episodes 28, 38, 48, & 59 for additional information on long COVID.

Common long COVID symptoms in children and adolescents [11]

Body system	Symptoms	Description
Systemic	Fatigue (generalized, exercise intolerance, post-exertional malaise)	Fatigue is a common symptom in children with long COVID. Fatigue & physical activity/exercise intolerance symptoms may include tiredness, exhaustion, feeling worn out, subjective weakness, difficulty with physical activity, deconditioning. Post-exertional malaise symptoms may worsen 12-48 hours after mild physical or cognitive exertion.
	Sleep disturbances	Sleep difficulty symptoms may include insomnia (difficulty falling asleep), sleep events (e.g., restless leg syndrome, sleep apnea), hypersomnia (excessive daytime sleepiness).
	Fever	Recurring fever.
Mental health	Anxiety, depression, low mood	Mental health concerns for individuals with long COVID may be influenced by direct effects of infection & psychosocial factors (e.g., disrupted quality of life, isolation, loss of family & routine).
	School avoidance	
	Academic or social milestone regression	
	Posttraumatic stress disorder (PTSD)	PTSD symptoms may be elevated in children with history of hospitalization, prolonged stay in intensive care, or multiple procedures.
Autonomic dysfunction	Dizziness, lightheadedness	Autonomic dysfunction & postural orthostatic tachycardia syndrome symptoms may include fatigue, lightheadedness/dizziness in upright positions, brain fog, exercise intolerance, post-exertional malaise, headaches, gastrointestinal symptoms, heart racing, palpitations, heat intolerance, hyperhidrosis (excessive sweating). Symptom burden can be significant, resulting in decreased quality of life & limited ability to participate in school, activities, &/or work.
	Orthostatic intolerance	
	Headache	
	Nausea	
	Syncope, presyncope	
Neurological	Headache	Headaches are common in children with long COVID. Cognitive symptoms may include word finding difficulties, brain fog, declining school performance.
	Tremors	
	Paresthesia, numbness	
	Dizziness, vertigo	
	Attention, concentration, or memory difficulties, cognitive fatigue	
Respiratory	Dyspnea (shortness of breath)	Respiratory symptoms are commonly reported in children & adolescents with long COVID.
	Chest pain or tightness	
	Cough	
	Difficulty with activity, exercise intolerance	

Body system	Symptoms	Description
Cardiovascular	Palpitations or tachycardia	Although palpitations are reported as a symptom in children with long COVID, arrhythmias are rare. Cardiac chest pain is rare in long COVID & needs to be differentiated from chest pain from musculoskeletal & respiratory origins. Concerning signs include chest pain with exercise; pain radiating to neck, jaw, or down arms; &/or chest pain accompanied by dizziness &/or loss of consciousness. Musculoskeletal chest pain is diagnosed by reproducible tenderness on palpation. Respiratory chest pain is often accompanied or preceded by cough, wheezing, & dyspnea.
	Dizziness, lightheadedness	
	Syncope	
	Chest pain	
	Difficulty with activity, exercise intolerance	
Chemosensory	Hyposmia, anosmia, dysgeusia, ageusia	Abnormal (or no) smell or taste.
Musculoskeletal	Weakness	Weakness may present as fatigue, refusal to move, motor impairment, irritability, & lethargy, especially in young children.
	Muscle, bone, or joint pain	Myalgias or arthralgias associated with long COVID range from 1% to 61% in children & adolescents.
Gastrointestinal	Nausea, vomiting, reflux	Presence of abdominal pain, nausea, & vomiting do not seem to be associated with disease severity. Management of GI symptoms is dependent on the symptoms.
	Abdominal pain	
	Bowel irregularities (constipation, diarrhea)	
	Weight loss	
	Lack of appetite	

Long COVID may present differently in children, so standard practices for managing the condition in adults should not automatically be applied to the pediatric population. For example, children with long COVID may have fatigue or attention problems at school or in extracurricular activities. For this reason, the American Academy of Physical Medicine and Rehabilitation developed new clinical guidance to help healthcare clinicians manage long COVID in children and adolescents. The guidance focuses on mitigating symptoms while encouraging a multidisciplinary rehabilitation approach.

Note: Not all symptoms regarding long COVID can be attributed to SARS-CoV-2 alone as studies have reported a high prevalence of enduring symptoms in children without a history of COVID-19, emphasizing the pandemic's impact as a co-contributor to some symptoms. [11]

Kikkenborg Berg et al. (2022) investigated the prevalence of long COVID symptoms in children aged 0-14 years who had been infected with SARS-CoV-2 compared to controls with no history of SARS-CoV-2 infection. The study found children in all age

groups with a history of COVID-19 reported a higher prevalence of long-lasting symptoms compared with age-sex-matched controls. However, many long-lasting symptoms were also found in the control group. There was also a tendency towards better quality of life scores in participants with history of COVID-19 than in controls in the oldest groups. [12]

Two large studies on long COVID in adolescents highlighted long-term consequences of COVID-19 in youth. Stephenson et al. (2022) reported data from 6,804 11-17-year-olds in England and Kikkenborg Berg et al. (2022) reported data from 28,270 15-18-year-olds in Denmark. The studies assessed physical and mental health, school attendance, and health-related quality of life at least two months after confirmed SARS-CoV-2 infection compared with age-matched SARS-CoV-2-negative controls. Researchers found a high burden of symptoms in both groups, indicating the pandemic has had a profound impact on all adolescents, regardless of infection status. [1] [13]

Take home messages

- Significant long-term physical, cognitive, social, and emotional limitations due to long COVID in children can disrupt child and family quality of life.
- Early recognition and treatment of symptoms and supporting return to school and other activities is essential to overall recovery of these children.
- Long COVID in children must be recognized and the burden of enduring symptoms among children with and without a history of COVID-19 requires attention and multidisciplinary care.
- Oral healthcare professionals will be part of this multidisciplinary care and therefore, must understand long COVID and be prepared to treat and support children and their families experiencing its impacts and refer as required.

Orphanhood & caregiver loss

- COVID-19-associated orphanhood and caregiver loss are major global issues.
- According to a modelling study by Hillis et al. (2022), approximately 10.5 million children worldwide have experienced the death of a parent or caregiver (e.g., grandparent or other family member), including 7.5 million who were orphaned as a result of the COVID-19 pandemic as of May 1, 2022. [14]
- Consequences for children can be devastating and enduring, including increased risk of traumatic grief, severe distress, institutionalization, poverty, sexual violence, abuse, exploitation, mental health problems, adolescent pregnancy, poor educational outcomes, and chronic and infectious diseases. [15] [16]

Pandemic response plans

- Given the magnitude and lifelong consequences of orphanhood, or the loss of a parent or caregiver, timely care for these children will help mitigate lasting adverse consequences and help children recover.
- Essential components for national pandemic response plans should include educational support, economic assistance, violence prevention, assistance for remaining parent or caregiver, preventing death of caregivers by accelerating vaccines and treatment; and preparing families to provide safe and nurturing alternative care (e.g., kinship care, foster care, adoption). [14] [17]

Take home messages

- It is critical to support children and youth who have experienced incredible loss.
- Children are generally resilient and having the right supports in place is important to help them recover.
- Effective, caring action to protect children from immediate and long-term harms of COVID-19 is an investment in the future and a public health imperative.

Education disruption

Ontario kindergarten to grade 12 students have experienced multiple, prolonged periods without in-person education during the COVID-19 pandemic. Over two million elementary and secondary school students were affected. School closures impact children's academic achievement and lead to learning losses. Ontario had the longest school closures for in-person learning compared to other Canadian provinces and territories, and many North American and European jurisdictions. [18] [19] [20]

In-person schooling is essential for children and youth for educational attainment and the development of social and life skills. It promotes play, physical activity, and positive peer relationships and mental health. Schools provide critical services that help to mitigate health disparities, including school nutrition programs, public health services (immunizations, dental screening), health care services (speech and language therapy, occupational therapy), social services, and mental health supports. Schools also play a vital role in enabling parents and guardians to work, particularly promoting labour participation of females and front-line service workers. [20] [21]

School closures disrupted access to specialized educational services and programs for students with disabilities and English language learners. Closures have affected students' educational transitions, which affect their later outcomes. There is evidence of decreased enrollment in kindergarten and reduced access to developmental services. There are concerns whether students are 'on track' in high school and their ability to access postsecondary education or employment after graduation. School closures reduced labour force participation among parents, particularly females, affecting their ability to provide for their children. [19] [22]

Access to online learning was challenging for many due to technical, economic, or other barriers. Barriers families faced included poor communication about expectations, limited engagement, and little support in building their comfort and capacity to participate in diverse modes of education. Virtual learning also significantly added to parent and caregiver responsibilities, such as motivating, organizing, instructing and monitoring their children. [19] [23] [24] [25]

Most evidence suggests school closures had a greater impact on vulnerable populations, disproportionately affecting students with lower socioeconomic backgrounds, racialized children, newcomers, and students with disabilities. [19]

Kouroupa et al. (2022) found many children with autism or intellectual disability had poor attendance or deregistered from school, often due to unmet needs, after their schools switched to online learning. [26]

The COVID-19 pandemic and restrictions placed on schools have profoundly impacted the physical, emotional, and developmental health of children and youth, which have translated to a long list of adverse outcomes for students, including:

- Reduced direct interaction between children, their peers, and teachers;
- Increased family stress;
- Regression in academic and social learning;
- Delayed speech and skill development;
- Increased student absenteeism;
- Exacerbated educational inequities;
- Increased vulnerability to abuse at home;
- Increased harm to mental health (e.g., increased anxiety, depression, eating disorders);
- Increased harm to physical health (e.g., increased sedentary behaviour and screen time);
- Reduced opportunities to address mental health and well-being;
- Reduced opportunities to detect, report, and prevent child maltreatment;
- Increased sense of isolation; and
- Deprivation from supports and activities available through schools (e.g., food programs, physical activity, sports, teams, and clubs). [21] [23] [24] [27] [28] [29] [30]

Economic impact

School closures have immediate and future economic costs. Without remediation, this impact may be felt for a very long time. It is estimated an additional year of schooling increases lifetime earnings by approximately 11-12% in Canada. School closures, which affect the total amount of schooling children received, may have lifelong negative effects on students' earnings. Based on 10 months of school instruction per year, each month of education loss is predicted to cause a ~1% drop in lifetime earnings for affected Canadian students and is estimated to decrease the national income growth by 0.5% per year, which would translate to a GDP loss for Canada of 1.6 trillion CAD. To put this into perspective, this is equal to the entire GDP of Canada in 2019. [19]

Psacharopoulos et al. (2021) mapped COVID-19 lost learning to the reduction of earnings. They conservatively estimated, in high-income countries, such as Canada, the present value lifetime loss in earnings at the individual level is 21,372 USD. Estimated losses are even greater in low- and middle-income countries. [19] [31]

In-person education is essential for the learning and overall well-being of children and youth. Schools play a central role in their lives and makes them central places for mitigating impacts and addressing unintended harms of COVID-19 measures and policies. It is therefore essential that students' needs be prioritized to ensure sustained in-person school attendance and in-person learning. [18] [21] [24]

Take home messages

- All students have likely been negatively impacted by school closures.
- Research has shown the importance of in-person schooling for children's learning and well-being reinforcing schools should remain open for in-person learning.

- School closures and virtual learning should be part of a pandemic control strategy only in most dire circumstances.
- Social and economic costs of education disruption are potentially devastating and may have lasting effects beyond the COVID-19 pandemic.

Child maltreatment

COVID-19-related social isolation, family stress, economic loss, food insecurity, loneliness, overcrowding, stay-at-home measures, and social service reductions have increased risks for child maltreatment. Disruptions to supports to prevent children from experiencing violence or to facilitate early identification and reporting of child maltreatment have occurred (e.g., closures of schools, childcare facilities, community programs). [32] [33]

There is emerging evidence the COVID-19 pandemic significantly worsened child maltreatment globally.

- Low-income and middle-income countries are particularly vulnerable to increases in child maltreatment. For example, in Uganda, there was a 1565% increase in the average number of calls per day to the Uganda Child Helpline in the first month of lockdown. [34]
- High-income countries also saw an increase in child maltreatment. A UK hospital reported a 1493% increase in cases of abusive head trauma. Abusive head trauma is one of the most severe forms of child maltreatment, with high morbidity and mortality. [35]
- In France, there was an 89% increase in national child abuse helpline calls, a 50% increase in the relative frequency of child maltreatment hospitalizations, and a 48% increase in home visits by law enforcement officers. There was also a marked increase in incidence and severity of abusive head trauma. [36] [37] [38]
- In the Netherlands, there was 32% increase in harsh parenting behaviours, including shaking and name calling. [39]
- Research by the Centers for Disease Control and Prevention (CDC) in the US found more than 11% of surveyed adolescents experienced physical abuse and more than 55% of adolescents experienced emotional abuse by a parent during the first year of the COVID-19 pandemic. Female adolescents experienced a higher prevalence of emotional abuse by a parent (63%). Adolescents who identified as gay, lesbian, or bisexual and those who identified as other or questioning experienced a higher prevalence of emotional and physical abuse by a parent compared with heterosexual adolescents. Approximately one-fourth of adolescents received telemedicine care from a doctor or nurse (26%) and some received telemedicine care for mental health or drug and alcohol counselling (8.5%). [30] [40]

Take home messages

- The COVID-19 pandemic has increased risks of child maltreatment creating a hidden pandemic for children.
- More research on the short-term and long-term effects of the pandemic (e.g., lockdowns) on child abuse and other adverse childhood experiences is required to understand the full impact on children, to mitigate the damage, and to help prevent further adverse experiences.

- All oral healthcare professionals have the duty to report.[4] The *Child, Youth and Family Services Act, 2017* (CYFSA) mandates the public, including dental hygienists and dentists, must promptly report suspected child abuse or neglect to a Children's Aid Society. Only reasonable grounds to suspect child abuse or neglect are needed to make a report under the CYFSA. Individuals must report it themselves and cannot assign the task to anyone else. Consent of the child or their caregivers is not needed to make a report. Failure to report may lead to a fine upon conviction. [41] [42] [43]

Mental health & well-being

There is growing concern about the negative effects the COVID-19 pandemic is having on the mental health and well-being of children and youth. Numerous birth cohort studies have shown poor mental health in childhood predicted future mortality and morbidity. Childhood mental health problems have been associated with lower socioeconomic status and less stable social relationships in adulthood. [44]

Contributing factors

- Several factors have contributed to mental health issues during the pandemic in children and youth, including social isolation (e.g., school closures), parental stress about the virus and employment, and an increase in adverse childhood experiences (ACEs), such as child maltreatment, cyber bullying (due to more online activities), and the trauma of losing parents and family members.
- A meta-analysis by Racine et al. (2021) found the global prevalence of depression and anxiety symptoms during the first year of the COVID-19 pandemic doubled in children and youth. [45]
- ACEs are also associated with suicidal behaviours. Increased suicidality and suicide attempts by youth during the pandemic have been reported. [46] [47] [48]
- Research by Anderson et al. (2022) found three in four high school students experienced at least one ACE during the pandemic. Students who reported one to two ACEs during the pandemic had higher prevalences of poor mental health and suicidal behaviours. A dose-response relationship between accumulating ACEs and poor mental health and suicidal behaviours was observed. Approximately 8% who reported four or more ACEs were four times more likely to experience poor mental health and more than 25 times more likely to have attempted suicide compared to those who reported no ACEs. [49]
- A systematic review of global literature by Kauhanen et al. (2022) found children and youth mental health deteriorated during the COVID-19 pandemic (e.g., increased depressive symptoms, anxiety, loneliness, psychological distress, and decreased mental well-being). [44]

[4] Refer to 'Additional Resources' for more information on the duty to report.
Note: ODHA and the Woman Abuse Council of Toronto (WomanACT) have partnered to develop the virtual course "Detecting and Responding to Gender-Based Violence for the Oral Health Professional" to help dental hygienists identify behavioural and physical signs of gender-based violence and how to respond effectively. https://womanact.thinkific.com/courses/DRGBV

Take home messages

- Oral healthcare professionals should refer clients with suspected mental health issues (e.g., depression, anxiety) to the appropriate medical practitioner. Immediate referral is indicated if suicidality is suspected. [50]
- Oral healthcare professionals have the duty to report suspected child maltreatment. Children's Aid should be contacted if the parents/guardians did not access services to prevent the child from causing or attempting to cause serious bodily harm to themselves (i.e., duty to report). [42] Local Children's Aid Societies can be contacted for more information.[5]
- Future studies are required to determine the long-term impact of the pandemic on children and youth well-being and to determine strategies to mitigate similar threats to their mental health from future pandemics, wars, and environmental catastrophes.

Physical activity

Physical activity during childhood and adolescence is associated with improved physical and cognitive outcomes and increased physical self-perception and self-esteem. Physical activity in children has been disproportionately affected during the pandemic by measures such as school and recreation closures. [51]

A systematic review and meta-analysis by Neville et al. (2022) of 22 international longitudinal studies that included 14, 216 children estimated changes in child and youth (≤18 years) physical activity during the COVID-19 pandemic. By pooling estimates, the researchers demonstrated the duration in total daily physical activity decreased by 20%, irrespective of prepandemic baseline levels. This reduction was larger for physical activity at higher intensities. Specifically, there was a decrease of 17 minutes per day in children's moderate-to-vigorous physical activity during the COVID-19 pandemic.

This represents a reduction of almost one-third of the daily dose of moderate-to-vigorous physical activity recommended by the World Health Organization (WHO)[6] for children and youth to promote good physical health and psychosocial functioning. [52] A systematic review and meta-analysis of 65 studies on the effects of the pandemic on sedentary behaviour showed sedentary behaviour among children and youth increased during the pandemic and was attributable to increased screen time. [53]

Take home message

- Physical activity should be promoted to help optimize both physical and mental health among children during and beyond the COVID-19 pandemic.

[5] Locate a Children's Aid Society https://www.oacas.org/childrens-aid-child-protection/locate-a-childrens-aid-society/

[6] WHO recommends children 3-4 years spend at least 180 minutes/day in a variety of physical activities at any intensity, of which at least 60 minutes is moderate-to-vigorous intensity, spread throughout the day. Children 5-17 years should spend an average of 60 minutes/day of moderate-to-vigorous intensity physical activity. [67] [68]

Missed routine childhood vaccinations[7]

According to the WHO and the United Nations Children's Fund (UNICEF), worldwide childhood vaccinations continued to decline in 2021 creating the largest sustained decline in childhood vaccinations in approximately 30 years.

- 25 million infants missed out on one or more doses of diphtheria, tetanus, and pertussis (DTP) in 2021 (2 million more than those who missed out in 2020, and 6 million more than in 2019).
- Over a quarter of HPV vaccine coverage that was achieved in 2019 has been lost.
- Inadequate coverage levels have resulted in avoidable outbreaks of measles and polio in the past 12 months, underscoring the vital role of immunization in keeping children, youth, adults, and societies healthy.
- Causes of immunization decline was multifactorial, including an increased number of children living in conflict and fragile settings where immunization access is challenging; increased misinformation; and COVID-19 related issues (e.g., service and supply chain disruptions, resource diversion to response efforts, containment measures that limited immunization service access and availability). [54] [55]

Public Health Ontario reported on immunization coverage for Ontario's three school-based immunization programs: hepatitis B (Hep B),[8] human papillomavirus (HPV),[9] and quadrivalent meningococcal conjugate (MCV4). As of the 2020-21 school year, only 1% of 12-year-olds in Ontario were up-to-date with their immunization against HPV. Immunization against hepatitis B and meningococcal meningitis were 17% each. By comparison, the rates for 12-year-olds for who received school-based vaccinations in 2019-20 were 5% for HPV, 25% for Hep B, and 67% for MCV4. [56]

Take home messages

- Immunization catch-up is vital to protect children from preventable diseases[10] as well as to prevent outbreaks and greater pressure on already strained healthcare systems.
- Oral health professionals can play a role by reminding parents and guardians to ensure their children are up-to-date on their routine immunizations.

COVID-19 vaccines approved for children & youth in Canada[11]

All children and youth aged 6 months to 17 years can receive a COVID-19 vaccine. Currently, only mRNA vaccines are approved for use in children and youth.[12] Vaccination remains an important tool in preventing and mitigating acute COVID-19

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[7] Refer to Episode 34 for more information on vaccine schedule disruption due to the COVID-19 pandemic.
[8] Refer to Episode 53 for additional information on Hep B vaccination.
[9] Refer to Episode 7 & 53 for additional information on HPV infection and vaccination.
[10] Refer to Episode 15 & 53 for information on vaccine-preventable diseases.
[11] Note: Anyone with questions about COVID-19 vaccines can contact the *SickKids COVID-19 Vaccine Consult Service* to book a confidential phone appointment with a SickKids pediatric registered nurse through SickKids' online booking platform or calling 1-888-304-6558. The consult service provides expert guidance for children, youth, and those who are pregnant, breastfeeding, or planning to conceive. The service is available in multiple languages using over-the-phone language interpretation. https://www.sickkids.ca/en/care-services/support-services/covid-19-vaccine-consult/
[12] For additional information on mRNA vaccines refer to Episode 39 & 40.

infection. It is important for children to stay up to date with their COVID-19 vaccines, which means getting all vaccine doses recommended for them. [2]

Vaccines authorized for use for primary vaccine series in Canada currently include:
- Pfizer-BioNTech Comirnaty® (3 formulations: ages 6 months to under 5 years, ages 5-11 years, and ages ≥12).
- Moderna Spikevax® (3 formulations: ages 6 months to 5 years, ages 6-11 years, and ages ≥12).

Vaccines currently authorized for use as booster doses in Canada include:
- Pfizer-BioNTech Comirnaty® (2 formulations: ages 5-11 years and ages ≥12). [57]

In Ontario, starting October 17, 2022 individuals aged ≥12 years can now receive a bivalent booster dose at a recommended interval of six months since the last dose, regardless of the number of doses already received. [58]

Vaccination coverage in Canada as of September 11, 2022* [57]

Age group (years)	At least 1 dose	Completed primary series	Completed primary series & 1 booster dose	Completed primary series & 2 booster doses
0 to 4	5% (89,185)	0.1% (1,481)	<0.1% (34)	0% (0)
5 to 11	55% (1,592,644)	42% (1,225,610)	2% (46,420)	<0.1% (19)
12 to 17	85% (2,154,350)	81% (2,058,862)	19% (490,618)	0.1% (2,901)

*Includes data from when COVID-19 vaccination began in December 14, 2020 to September 11, 2022

Vaccine coverage in Ontario as of October 8, 2022* [8] [59]

Age group (years)	At least 1 dose	Completed primary series	Completed primary series & 1 booster dose	Completed primary series & 2 booster doses
0 to 4	7% (48,935)	1% (7,416)	<0.1% (40)**	0% (0)**
5 to 11	53% (572,798)	40% (438,230)	3% (35,488)	<0.1% (14)**
12 to 17	84% (820,598)	80% (2,058,862)	20% (196,687)	0.2% (1,543)**

*December 14, 2020 to October 8, 2022
**December 14, 2020 to September 25, 2022

Impact on oral health[13]

- The COVID-19 pandemic has been associated with several changes in maintenance of children's oral health.

[13] Refer to Episode 27 & 34 for more information on the impact of COVID-19 pandemic on oral health.

- Bhantani et al. (2022) investigated the impact of COVID-19 pandemic-related school closures on the oral health of Canadian schoolchildren. Researchers found a significant increase in the consumption of cariogenic food, especially candy and soft drinks, and a reduction in good oral hygiene practices (e.g., brushing) associated with school closures. Results suggest the COVID-19 pandemic adversely effected diet and oral health practices of Canadian children. [60]
- Gotler et al. (2022) found during the lockdown, many children (age 1-18 years) increased frequency of eating and drinking (e.g., sugary, and carbonated drinks), decreased frequency of toothbrushing, and their oral health care appointments were postponed, increasing their risk of developing caries. [61]
- Some research found opposing results in that parental presence at home during the lockdown increased children supervision, leading to improved oral hygiene habits and more healthy food consumption. [62] [63]
- Lyu and Wehby (2022) examined effects of the COVID-19 pandemic on oral health and oral healthcare use for children in the United States by comparing nationally representative data between 2020 (first year of the pandemic) and 2019 (1 year before the pandemic). The researchers found evidence of widespread decline in oral health status and oral healthcare visits (including preventive care) among children early during the COVID-19 pandemic. [64]
- Results of these studies suggest the COVID-19 pandemic had widespread adverse effects on children's oral health and oral healthcare use. These results are consistent with other studies, which also showed the pandemic was significantly associated with reduced access to oral healthcare and poorer oral health status among children. [64]
- Increased first-time symptoms of temporomandibular disorder (TMD) in children have been reported during the lockdown. Accordingly, symptoms of TMD may serve as an indicator for children's emotional stress and the need for emotional support during times of crisis. [61]
- Since the onset of the COVID-19 pandemic in March 2020, oral screenings in the school setting of most public health units of Ontario had ceased. Oral screenings are performed on an average of 100-150 students per day at a school. The pandemic has disrupted access to oral screenings which are important for prevention and early identification of oral health problems. [65]
- ACEs (e.g., child maltreatment, household dysfunction, physical and emotional neglect, physical and emotional abuse) can have a deleterious impact on utilization of oral healthcare among children. Research has demonstrated ACEs were associated with higher odds of having poorer oral health, lower odds of using oral healthcare, and higher odds of delaying needed oral healthcare among children. Efforts must be undertaken to improve access to oral healthcare for children with a history of ACEs. [66]

Take home messages

- The COVID-19 pandemic has affected many lives, and has interrupted good health habits and daily oral self-care routines of children.
- More frequent snacking, consuming more sugary foods and beverages, and not keeping up with regular brushing and flossing are all examples. These habits,

combined with delayed oral healthcare visits adversely impact children's oral and overall health.
- Children experiencing long COVID may struggle with their homecare regimes and will need gentle reminders to persist.
- Parents or caregivers may need reminders of the importance of regular oral health check-ups for children, good homecare, and healthy eating habits.

References

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Client resources

Government of Ontario - Mental health services for children and youth
https://www.ontario.ca/page/mental-health-services-children-and-youth

SickKids COVID-19 Vaccine Consult Service
Anyone with questions about COVID-19 vaccines can contact the *SickKids COVID-19 Vaccine Consult Service* to book a confidential phone appointment with a SickKids pediatric registered nurse through SickKids' online booking platform or calling 1-888-304-6558. The consult service provides expert guidance for children, youth, and those who are pregnant, breastfeeding, or planning to conceive. The service is available in multiple languages using over-the-phone language interpretation.
https://www.sickkids.ca/en/care-services/support-services/covid-19-vaccine-consult/

Long COVID support groups
https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/symptoms/post-covid-19-condition.html

COVID-19 vaccines for children and youth factsheet, Government of Ontario
https://files.ontario.ca/moh-covid-19-children-youth-vaccination-factsheet-en-2022-08-17.pdf

COVID-19 vaccines
Provided information on Ontario's COVID-19 vaccination program
https://www.ontario.ca/page/covid-19-vaccines

Additional Resources

SARS-CoV-2 infection

Hospitalization risk for COVID-19-positive infants six times higher than other kids under 5, Allen, S; Barkley, E; Rasmussen, D; et al. *Epic Research*, April 29, 2022 https://epicresearch.org/articles/hospitalization-risk-for-covid-19-positive-infants-six-times-higher-than-other-kids-under-5

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Child Maltreatment

Detecting and Responding to Gender-Based Violence for the Oral Health Professional

- A self-paced online course designed to help dental hygienists identify physical and behavioural signs of gender-based violence in survivors and their children, and how to respond effectively. All proceeds from course purchase are directed to the charitable organization WomanACT. https://womanact.thinkific.com/courses/DRGBV

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