



# Suspension of Hip Surveillance for Children with Cerebral Palsy During the COVID-19 Outbreak: The Benefit of Hip Surveillance Does Not Outweigh the Risk of Infection

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The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has spread quickly throughout the world with the World Health Organization (WHO) declaring a global pandemic on March 11, 2020 [1]. As community transmission has increased, health officials and governments are recommending or requiring people to stay home for all but essential needs. The definition of essential can be challenging to define and often differs across jurisdictions. While the healthcare system strives to treat the rising number of people with coronavirus disease-2019 (COVID-19), the need to provide medical care remains for persons with chronic health conditions. During this period of rapid viral spread, the benefit of each medical intervention requires careful evaluation and must clearly outweigh the risk of increased rate of infection.

Hip surveillance for children with cerebral palsy (CP) aims to identify hip displacement at an early stage to allow for early orthopaedic intervention before a hip becomes painful. As part of a population-based hip surveillance in the province of British Columbia (BC), Canada, children visit local hospitals, healthcare centres, or the province's children's hospital to obtain radiographs and clinical exams completed by local physical therapists [2]. In response to the pandemic, elective surgeries and non-urgent ambulatory patient appointments at the province's tertiary care paediatric hospital have been cancelled. To lower the risk

of community transmission and, in keeping with health officials' recommendations for physical distancing, the provincial hip surveillance program also suspended activities in early March.

The impact of COVID-19 on children, in particular those with underlying chronic condition or co-morbidities, remains unclear. Dong et al. [3] reported a case series of 2143 paediatric cases, aged less than 18 years, with laboratory-confirmed or suspected COVID-19 in China. Most cases were mild with only one death reported. While the results suggest that clinical manifestations of COVID-19 in children may be less severe than in adults, there is no mention in this case series about children with underlying health conditions. In a review of paediatric inpatients with COVID-19, 7 of 20 patients had previous history of congenital or acquired diseases, suggesting that children with underlying diseases may be more susceptible to infection [4].

Cerebral palsy (CP) is an umbrella term used to describe a group of permanent disorders of the development of movement and posture, causing activity limitation, due to a non-progressive disturbance to the developing fetal or infant brain [5]. Co-morbidities are common in children with CP, particularly those who are more severely affected, and may include epilepsy, respiratory compromise, and dysphagia [6]. In a recent review of over 200 children with CP or similar conditions at our institution, BC Children's Hospital, 30% (66/221) reported an admission to hospital in the last 12 months while 42% (92/221) reported visiting an emergency room.

There are over 1000 children with CP currently enrolled in the Child Health BC Hip Surveillance Program, of which 780 are under active hip surveillance. We reviewed the number of children due for hip surveillance clinical exams and radiographs in the upcoming weeks and months. The number of children at Gross Motor Function Classification System (GMFCS) levels IV and V, who are at highest risk for hip displacement and presumably highest risk for more

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severe COVID-19 disease, was also determined [7]. Between March and May, 142 children are due for hip surveillance with 97 of these being children at GMFCS levels IV and V. By the end of July, a total of 234 children, including 162 at GMFCS levels IV and V, will require hip surveillance.

Modelling was completed to estimate the number of contacts that children at GMFCS levels IV and V would have should surveillance continue during the next 5 months (Table 1). Recognizing that jurisdictions may be reducing patient visits, estimates were completed at low, moderate, and typical patient volumes. Similarly, restrictions have been placed on the number of caregivers allowed to attend clinical visits and this was incorporated into the modeling scenarios. It was anticipated that each child and their caregiver(s) would come in contact with multiple care providers, including unit clerk(s), radiographer(s), and health professionals completing a clinical exam.

Even at reduced caseloads, where only emergent cases such as trauma are followed, the number of contacts that individual healthcare workers come into contact with is conservatively estimated at 4500 in a 5-month period. Healthcare providers would not be symptomatic and capable of transmitting COVID-19 for this 5-month period, but would still be expected to have over 1000 contacts in a 3-week period during which viral transmission may be possible. This demonstrates that while the child and their caregiver may come into direct contact with only a few providers, their risk of exposure to COVID-19 is high. As shown in Table 1, the number of contacts increases rapidly with increasing volume.

The aim of hip surveillance is to ensure that children at risk for hip displacement are seen by a paediatric orthopaedic surgeon in a timely manner to ensure early, appropriate management. Evidence supports the use of hip surveillance, together with timely orthopaedic intervention, to prevent the need for salvage hip procedures [8–10]. However, the ideal timing for orthopaedic interventions remains unclear and, certainly, a delay of a few months in receiving orthopaedic

care is unlikely to significantly change long-term outcomes. In addition, if non-emergent surgeries have been cancelled to increase capacity for COVID-19 patients, as has occurred in British Columbia, identification of increasing hip displacement will not change immediate management.

Population-based hip surveillance programs for children with CP exist in Scandinavia, Australia, and in the United Kingdom. The Child Health BC Hip Surveillance Program for Children with Cerebral Palsy is the only province or state-wide surveillance program in North America. However, hip surveillance may also be completed locally within regions, facilities, or clinic settings. This modeling applies to all applications of hip surveillance. With an overall prevalence estimate of 2.1 per 1000 live births, CP is one of the most common causes of childhood physical disability [11]. The impact of suspending hip surveillance could impact millions of children and thus contribute to slowing the spread of COVID-19. Furthermore, this modeling is also applicable to other paediatric chronic healthcare conditions that require ongoing monitoring and similar patient loads.

During the period of suspended hip surveillance, it is important to ensure that families continue to have access to needed medical care and advice. All children due for hip surveillance in our program are contacted and advised that hip surveillance has been temporarily paused. Caregivers are advised to contact the program coordinator should there be any new clinical concern, particularly pain, to discuss whether more urgent imaging is recommended.

Once physical distancing restrictions are relaxed, children at highest risk for hip displacement, including those with high migration percentages at last follow-up or recent increases in migration percentage, should be prioritized for imaging and consultation with paediatric orthopaedic surgeons. Travel restrictions and physical distancing recommendations are expected to be in place until either a treatment or vaccine for COVID-19 is available. Strategies to mitigate risk while completing surveillance will likely be required. When possible, completing imaging at local

**Table 1** Projections of contacts of children at GMFCS levels IV and V during 5-month period

	Low patient volume	Moderate patient volume	Typical patient volume
Number of children at GMFCS levels IV and V requiring hip surveillance	50	100	162
Number of accompanying parents and/or care providers (average)	1	1.5	2
Number of interactions with health care workers	3	4	5
Daily interactions per health care worker with other patients and parents (not children at levels IV and V)	10	30	100
Direct interaction between children at GMFCS levels IV and V plus family with healthcare workers (total in 5 months)	300	1000	2430
Number of individuals healthcare worker contacts	30/day or 4500/5 months	120/day or 18,000/5 months	500/day or 75,000/5 months

hospitals or health care centres in the child's home community would allow children and families to stay close to home and reduce orthopaedic clinic visits. While our surveillance program already uses this strategy, orthopaedic surgeons who typically complete hip surveillance in their clinic may consider this strategy if images can be viewed remotely [2]. Additionally, virtual healthcare visits could be used to screen children to determine who needs to be seen within the clinic setting. Children awaiting surgery, experiencing pain, and those for whom surgical intervention is anticipated should be prioritized. When virtual clinical examination or radiographic results require in-person assessment with an orthopaedic surgeon, precautions should be in place to protect patients and staff, including reduced clinic numbers, staggered appointments, and systematic screening for symptomatic visitors and staff. A reduction in frequency of surveillance, in particular for those at low risk of progression, should also be strongly considered to reduce the burden on the medical system and reduce contacts.

While the risk of COVID-19 transmission is high, suspension of hip surveillance for children with CP is appropriate to minimize immediate risk to children, families, and society at large. It is recommended that all centres consider the impending risk of COVID-19 to children with chronic health conditions, particularly those who are medically complex, and suspend non-emergent surveillance. A gradual return to services is anticipated once community transmission is low but precautions to reduce exposure to the virus will be required. A safe re-start plan is necessary to ensure that children with CP do not suffer unintended consequences from the pandemic.

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### Compliance with Ethical Standards

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**Ethical standard statement** This article does not contain any studies with human or animal subjects performed by the any of the authors.

**Informed consent** For this type of study, informed consent is not required.

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