

Surveillance Highlights

A Canadian Paediatric Surveillance Program study to guide safe integration of virtual care for children

Shelley Vanderhout, RD, PhD^{1,2}, Daniel Rosenfield, MD, MHI, FRCPC^{3,4},
Ellen B. Goldbloom, MD, FRCPC^{1,5,6}

¹Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada;

²Trillium Health Partners, Mississauga, Ontario, Canada;

³The Hospital for Sick Children, Toronto, Ontario, Canada;

⁴Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada;

⁵Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada;

⁶Children's Hospital of Eastern Ontario, Ottawa, Ontario, Canada

Correspondence: Ellen Goldbloom, Children's Hospital of Eastern Ontario, 401 Smyth Rd., Ottawa, Ontario, K1H 8L1. Telephone: 613-737-7600, e-mail: egoldbloom@cheo.on.ca

Keywords: Child; Safety; Telemedicine.

CLINICAL VIGNETTES

Case 1

A 6-year-old previously healthy male presented to the emergency department in shock with a rash and fever. Upon arrival he looked unwell, was febrile (38.8°C), tachycardic (HR 160) and hypotensive (80/60) with petechial rash on his legs. He was also noted to have a markedly enlarged liver and spleen. While being fluid resuscitated, given antibiotics and awaiting bloodwork, his parents reported that he had been unwell for 2 weeks with intermittent fever and progressive rash. They attended a telephone appointment with their paediatrician 1 week prior. They reported the rash and were advised that it was caused by the same virus causing the fever. The laboratory investigation revealed platelets $< 1 \times 10^9/L$, hemoglobin 65 g/L, and leukocytes $85 \times 10^9/L$ with 22% blasts. He was stabilized and admitted to the PICU with a presumptive diagnosis of leukemia and septic shock.

Case 2

A 16-year-old female arrived at the emergency department by ambulance with abdominal pain and vomiting. She was accompanied by her mother, who found her in pain in her bedroom when she returned home from work. She reported that her daughter had been diagnosed with depression and anxiety 2 years prior, and had a virtual appointment with her new psychiatrist that morning. Subsequent information revealed that the visit had been difficult and the patient had ended the visit prematurely. The psychiatrist was worried for her safety based on their

interaction and had been trying to call her back but was unable to reach her. The secondary number on file for her mother was tried but found to be out of service. It turned out that the phone number on file was off by one digit. The parent brought the child to medical attention the next day when her pain persisted. Bloodwork revealed severe acetaminophen toxicity and liver damage, outside of the window for *N*-acetyl-cysteine treatment.

LEARNING POINTS

- These cases describe examples of adverse events, associated with harm, that may have been related to virtual care. In Case 1, the delayed diagnosis of leukemia, and septic shock requiring PICU admission may have been avoided if the preceding encounter had been in-person allowing for a physical exam. In Case 2, the liver toxicity due to the acetaminophen overdose may have been prevented if the preceding encounter was in-person, thus allowing the psychiatrist respond to the mental health emergency.
- With this CPS Highlights article, we highlight a new Canadian Paediatric Surveillance Program (CPSP) surveillance study to understand the burden and nature of adverse events (defined as missed, incorrect, or delayed diagnoses or clinical or social emergencies where a provider is unable to provide timely care), that are suspected to be related to virtual care among children in Canada (1).
- Virtual care offers benefits to children and families, including improved access to care, convenience, increased patient

Received: February 27, 2023; Accepted: August 15, 2023

© The Author(s) 2023. Published by Oxford University Press on behalf of the Canadian Paediatric Society. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com

and caregiver satisfaction, cost savings, and an opportunity to receive flexible, culturally sensitive care (2). Virtual care may also facilitate improved patient-centred care by allowing a visual assessment of a child's home environment, and many patients, families, and providers have voiced that virtual care should continue post-pandemic and optimization of virtual care should align with national health care priorities (3,4).

- Limitations of virtual care include a lack of ability to conduct a physical examination, discern non-verbal cues, or always ensure privacy, in addition to connectivity issues, inequitable access, and potential for emergency situations where providers are not able to intervene. These limitations can negatively impact the quality of care and result in adverse events (5), but there is a lack of evidence about whether such limitations of virtual care can lead to adverse medical outcomes that would not occur if care was delivered in-person.
- Currently, only anecdotal data exist regarding the perils of virtual care in paediatrics (5). Data collected in this CPSP study will help describe any associations between clinical and sociodemographic characteristics and the likelihood of adverse events related to virtual care. This surveillance is also intended to increase awareness of adverse events related to virtual care and promote reporting to existing institutional systems to enable continuous care quality improvement.
- A lack of validated evaluation tools, consistent terminology, user-friendly evaluative frameworks, and harmonized surveillance across clinical areas and health systems makes it challenging to identify and understand the risk of adverse events related to virtual care.
- Published recommendations provide some guidance for appropriate virtual care (6–8), but provinces and territories are variably restricted by different remuneration models. Therefore, health systems are left poorly equipped to discern where and when virtual care can be financially viable while providing a safe, patient-centred, and effective option for children and families.
- For more information on the study protocol and to report a case, please visit the following website: <https://www.cpsp.cps.ca/surveillance/current-studies>.
- Findings from this CPSP study will help inform when and for whom virtual care is not an adequate replacement for

in-person care. Results will contribute to the evidence base on paediatric virtual care and help inform guidelines outlining the safe and effective use of virtual care in paediatric practice.

FUNDING

No funding to report.

POTENTIAL CONFLICT OF INTEREST

All authors: No reported conflicts of interest. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

REFERENCES

1. Canadian Paediatric Surveillance Program. Adverse Events Related to Virtual Care—CPSP. <https://cpsp.cps.ca/surveillance/study-etude/adverse-events-related-to-virtual-care> (Accessed March 26, 2023).
2. Brophy PD. Overview on the challenges and benefits of using telehealth tools in a pediatric population. *Adv Chronic Kidney Dis* 2017;24(1):17–21. doi:10.1053/j.ackd.2016.12.003
3. Ontario Health Teams. Ontario Health Teams: Digital Health Playbook. 2019. https://health.gov.on.ca/en/pro/programs/connectedcare/oht/docs/dig_health_playbook_en.pdf (Accessed June 27, 2023).
4. Canadian Medical Association. Virtual Care in Canada: Discussion Paper | Canadian Medical Association. 2019. <https://www.cma.ca/virtual-care-canada-discussion-paper> (Accessed August 12, 2022).
5. Balmuri N, Onel KB. Glitches in the utilization of telehealth in pediatric rheumatology patients during the COVID-19 pandemic. *Pediatr Rheumatol* 2020;18(1):78. doi:10.1186/s12969-020-00477-y
6. Canadian Medical Association, Royal College of Physicians and Surgeons of Canada, College of Family Physicians of Canada. VIRTUAL CARE RECOMMENDATIONS FOR SCALING UP VIRTUAL MEDICAL SERVICES. Published online February 2020. <https://www.cma.ca/sites/default/files/pdf/virtual-care/ReportoftheVirtualCareTaskForce.pdf> (Accessed May 2023).
7. Telehealth and virtual care. Canadian Medical Protective Agency. <https://www.cmpa-acpm.ca/en/covid19/telehealth-and-virtual-care> (Accessed February 9, 2023).
8. Clinician Change Virtual Care Toolkit. Healthcare Excellence Canada. 2022. https://www.infoway-inforoute.ca/en/component/edocman/6378-clinician-change-virtual-care-toolkit/view-document?utm_source=website&utm_medium=hec&utm_campaign=change-management. (Accessed February 9, 2023).