

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Transfer of Acutely Ill Pediatric Patients using Pediatric Transport Teams: Clinical Evidence and Guidelines – A 2020 Update

Service Line: Rapid Response Service
Version: 1.0
Publication Date: August 5, 2020
Report Length: 8 Pages

Authors: Shannon Hill, Charlene Argáez

Cite As: *Transfer of Acutely Ill Pediatric Patients using Pediatric Transport Teams: Clinical Evidence and Guidelines – A 2020 Update*. Ottawa: CADTH; 2020 Jul. (CADTH rapid response report: summary of abstracts).

Disclaimer: The information in this document is intended to help Canadian health care decision-makers, health care professionals, health systems leaders, and policy-makers make well-informed decisions and thereby improve the quality of health care services. While patients and others may access this document, the document is made available for informational purposes only and no representations or warranties are made with respect to its fitness for any particular purpose. The information in this document should not be used as a substitute for professional medical advice or as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision-making process. The Canadian Agency for Drugs and Technologies in Health (CADTH) does not endorse any information, drugs, therapies, treatments, products, processes, or services.

While care has been taken to ensure that the information prepared by CADTH in this document is accurate, complete, and up-to-date as at the applicable date the material was first published by CADTH, CADTH does not make any guarantees to that effect. CADTH does not guarantee and is not responsible for the quality, currency, propriety, accuracy, or reasonableness of any statements, information, or conclusions contained in any third-party materials used in preparing this document. The views and opinions of third parties published in this document do not necessarily state or reflect those of CADTH.

CADTH is not responsible for any errors, omissions, injury, loss, or damage arising from or relating to the use (or misuse) of any information, statements, or conclusions contained in or implied by the contents of this document or any of the source materials.

This document may contain links to third-party websites. CADTH does not have control over the content of such sites. Use of third-party sites is governed by the third-party website owners' own terms and conditions set out for such sites. CADTH does not make any guarantee with respect to any information contained on such third-party sites and CADTH is not responsible for any injury, loss, or damage suffered as a result of using such third-party sites. CADTH has no responsibility for the collection, use, and disclosure of personal information by third-party sites.

Subject to the aforementioned limitations, the views expressed herein do not necessarily reflect the views of Health Canada, Canada's provincial or territorial governments, other CADTH funders, or any third-party supplier of information.

This document is prepared and intended for use in the context of the Canadian health care system. The use of this document outside of Canada is done so at the user's own risk.

This disclaimer and any questions or matters of any nature arising from or relating to the content or use (or misuse) of this document will be governed by and interpreted in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein, and all proceedings shall be subject to the exclusive jurisdiction of the courts of the Province of Ontario, Canada.

The copyright and other intellectual property rights in this document are owned by CADTH and its licensors. These rights are protected by the Canadian *Copyright Act* and other national and international laws and agreements. Users are permitted to make copies of this document for non-commercial purposes only, provided it is not modified when reproduced and appropriate credit is given to CADTH and its licensors.

About CADTH: CADTH is an independent, not-for-profit organization responsible for providing Canada's health care decision-makers with objective evidence to help make informed decisions about the optimal use of drugs, medical devices, diagnostics, and procedures in our health care system.

Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

Questions or requests for information about this report can be directed to requests@cadth.ca

Research Questions

1. What is the clinical evidence regarding the transport of acutely ill pediatric patients to tertiary care centres by pediatric transport teams?
2. What is the comparative clinical effectiveness regarding the transport of acutely ill pediatric patients to tertiary care centres by pediatric transport teams versus transport by an advanced care paramedic team?
3. What are the evidence-based guidelines regarding the transport of acutely ill pediatric patients to tertiary care centres?

Key Findings

Two non-randomized studies were identified for the clinical evidence regarding the transport of acutely ill pediatric patients to tertiary care centres by pediatric transport teams. Three evidence-based guidelines were identified regarding the transport of acutely ill pediatric patients to tertiary care centres. No relevant literature was identified regarding the comparative clinical effectiveness for the transport of acutely ill pediatric patients to tertiary care centres by pediatric transport teams versus transport by an advanced care paramedic team.

Methods

This report is an update of a literature search strategy developed for a previous CADTH report. For the current report, a limited literature search was conducted on key resources including Medline/PubMed, the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused internet search. The main search concepts were pediatric transport or transfer to another health facility. Search filters were applied to limit retrieval to health technology assessments, systematic reviews, meta analyses, or network meta-analyses, randomized controlled trials or controlled clinical trials, and guidelines. The initial search was limited to English-language documents published between January 1, 2013 and January 15, 2018. For the current report, database searches were rerun on July 16, 2020 to capture any articles published since the initial search date. The search of major health technology agencies was also updated to include documents published since January 2018. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Pediatric patients in acute care sites
Intervention	Transport by pediatric transport teams
Comparator	Q1: Transport by other teams (e.g., generalist transport) Q2: Transport by an advanced care paramedic team Q3: No comparator; Transport by other teams (e.g., generalist transport)

Outcomes	Q1-Q2: Clinical effectiveness, harms (e.g., mortality, morbidity, adverse events), hospital length of stay Q3: Recommendations regarding the transport of acutely ill pediatric patients to tertiary care centres
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, evidence-based guidelines

Results

Two non-randomized studies^{1,2} were identified for the clinical evidence regarding the transport of acutely ill pediatric patients to tertiary care centres by pediatric transport teams. Three evidence-based guidelines³⁻⁵ were identified regarding the transport of acutely ill pediatric patients to tertiary care centres. No relevant health technology assessments, systematic reviews or randomized controlled trials were identified.

Additional references of potential interest that did not meet the inclusion criteria are provided in the appendix.

Overall Summary of Findings

Two non-randomized studies^{1,2} were identified for the clinical evidence regarding the transport of acutely ill pediatric patients to tertiary care centres by pediatric transport teams. The first non-randomized study¹ examined the outcomes of interhospital transferring for children requiring intensive care treatment. This study compared mortality 72 hours from initial contact for children admitted to a pediatric intensive care unit by the pediatric critical care transported (PCCT) group or by the pediatric emergency department (PED) group.¹ The authors found that the odds of mortality within 72 hours of transfer were significantly higher in the PCCT group compared to the PED group and concluded that children transported from a non-pediatric hospital had a higher mortality compared to children admitted directly to a children's hospital pediatric intensive care unit through the PED.¹ The second non-randomized study² compared pediatric specialty teams versus generalist transport teams for outcomes associated with pediatric trauma victims who required interfacility transport. Comparisons were also made between air transport versus ground transport.² The authors found that hospital discharge was greater for specialty team air transport compared to generalist team air transport.² Furthermore, the authors concluded that generalist team air transport occurred more rapidly than specialty team air transport, but the generalist transport team was associated with significantly worse patient outcomes which included Pediatric Trauma Score and Glasgow Coma Score.²

Three evidence-based guidelines³⁻⁵ were identified regarding the transport of acutely ill pediatric patients to tertiary care centres. The first evidence-based guideline³ by the Royal College of Anesthesiologists provided recommendations for transferring critically ill children to specialist centres. The second evidence-based guideline⁴ was an update to the American Academy of Pediatrics and Society of Critical Care Medicine's 2004 guidelines and outlined statements regarding transports and transfers of pediatric patients. The last evidence-based guideline⁵ by the National Institute for Health and Care Excellence outlined the management of head injuries and provided recommendations regarding children transfers. Specific recommendations outlined by each evidence-based guideline are provided in Table 2.

Table 2: Recommendations for Transport of Acutely Ill Pediatric Patients

Recommendations
Royal College of Anesthesiologists (2020) ³
<ul style="list-style-type: none"> • A designated consultant responsible for providing and updating a written policy for the emergency transfers of intubated children should be used. (p. 10) • Portable monitors, transfer equipment and drugs should be readily available to transfer critically ill children. (p. 10) • Local guidelines with telephone numbers of the receiving unit should be available. (p. 10) • A doctor with competencies in the care and transfer of critically ill or intubated children should accompany the patients. The doctor should also be accompanied by a trained assistant. (p. 11) • Appropriate multidisciplinary arrangements should be in place by transport services to provide feedback to networked hospitals. (p. 11)
Frankel et al. (2019) ⁴
<ul style="list-style-type: none"> • Pediatric Intensive Care Units should provide their own critical care transport program which should include their own team, equipment, and transportation rig. (p865) • Pediatric Intensive Care Units may outsource critical care transport activities to transport services who are trained in pediatric critical and emergency care. (p865)
National Institute for Health and Care Excellence (2019) ⁵
<ul style="list-style-type: none"> • Recommendations written for adults should be applied equally to children and infants with pediatric specific modifications. (p. 34) • Child transfers to tertiary care should follow the National Service Framework for Paediatric Intensive Care principles. (p. 34) • Extracranial injuries should be considered for children with multiple injuries and children should not be transferred to any service that is unable to deal with such trauma. (p. 34) • Staff experienced in critically ill children transfer should be used when transferring children to a specialist neurosurgical unit. (p. 34) • Family members and carers should be given as much access to their child that is practical during transfer. Family members and carers should be given the opportunity to discuss the reasons for child transfer and the process of transfer with someone from the healthcare team. (p. 34)

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

1. Kawaguchi A, Saunders LD, Yasui Y, DeCaen A. Effects of medical transport on outcomes in children requiring intensive care. *J Intensive Care Med.* 2018 Sep 6:885066618796460.
[PubMed: PM30189782](https://pubmed.ncbi.nlm.nih.gov/30189782/)

2. Patel SC, Murphy S, Penfil S, Romeo D, Hertzog JH. Impact of interfacility transport method and specialty teams on outcomes of pediatric trauma patients. *Pediatr Emerg Care*. 2018 Jul;34(7):467-472.
[PubMed: PM28463947](#)

Guidelines and Recommendations

3. Cranston A, Lackie J. Chapter 10: Guidelines for the provision of paediatric anaesthesia services. In: *Guidelines for the provision of anaesthesia services*. London, England: Royal College of Anaesthetists (RCoA); 2020 Feb:
<https://www.rcoa.ac.uk/sites/default/files/documents/2020-02/GPAS-2020-10-PAEDIATRICS.pdf>
Accessed 2020 Jul 29.
See: Transfer of critically ill children, p. 10
4. Frankel L, Hsu B, Yeh TS, et al. Criteria for critical care infants and children: PICU admission, discharge, and triage practice statement and levels of care guidance. *Pediatr Crit Care Med*. 2019 Sep;20(9):847-887.
https://journals.lww.com/pccmjournal/Fulltext/2019/09000/Criteria_for_Critical_Care_Infants_and_Children_.7.aspx?PRID_PCCM_PR_090519
Accessed 2020 Jul 29.
See: Transports and Transfers, p. 865
5. NICE. Head injury: assessment and early management [*NICE clinical guideline CG176*]. London, England: National Institute for Health and Care Excellence (NICE); 2019 Sep (updated): <https://www.nice.org.uk/guidance/cg176/resources/head-injury-assessment-and-early-management-pdf-35109755595493>
Accessed 2020 Jul 29.
See: Transfer of Children, p. 34

Appendix — Further Information

Previous CADTH Report

6. Young C, Adcock L. Transfer of acutely ill pediatric patients using pediatric transport teams: clinical evidence and guidelines [*CADTH Rapid response report: summary of abstracts*]. Ottawa (ON): CADTH; 2018 Jan: <https://www.cadth.ca/sites/default/files/pdf/htis/2018/RB1184%20Pediatric%20Transport%20Teams%20Final.pdf> Accessed 2020 Jul 29.

Non-Randomized Studies

No Comparator

7. Chaichotjinda K, Chantra M, Pandee U. Assessment of interhospital transport care for pediatric patients. *Clin Exp Pediatr*. 2020 May;63(5):184-188. [PubMed: PM31477679](#)
8. Hannegård Hamrin T, Radell PJ, Fläring U, Berner J, Eksborg S. Short- and long-term outcome in critically ill children after acute interhospital transport to a PICU in Sweden. *Pediatr Crit Care Med*. 2020 Jul;21(7):e414-e425. [PubMed: PM32205664](#)

Alternative Intervention – Helicopter Emergency Transport Services

9. Moors XRJ, Van Lieshout EMM, Verhofstad MHJ, Stolker RJ, Den Hartog D. A physician-based helicopter emergency medical services was associated with an additional 2.5 lives saved per 100 dispatches of severely injured pediatric patients. *Air Med J*. 2019 Jul-Aug;38(4):289-293. [PubMed: PM31248540](#)

Alternative Outcome

10. Colyer E, Sorensen M, Wiggins S, Struwe L. The effect of team configuration on the incidence of adverse events in pediatric critical care transport. *Air Med J*. 2018 May-Jun;37(3):186-198. [PubMed: PM29735232](#)

Clinical Practice Guidelines

11. Emsden S, Parkins K, Aubrey W. Transport guidelines. Cardiff, Wales: NHS North West and North Wales Paediatric Critical Care Network; 2018 Aug.
12. Chambers M. Guideline for transferring children (0-16 years) [*guideline*]. Essex, England: Mid Essex Hospital, NHS Trust; 2018 Jun.

Additional References

13. National Clinical Programme for Critical Care & National Clinical Programme for Paediatrics. Model of care for paediatric critical care. Ireland: Children's Health Ireland at Crumlin; 2019 Sep. <https://ificmi.anaesthesia.ie/wp-content/uploads/2020/06/Final-MOC-Paediatric-Critical-Care-June-2020.pdf> Accessed 2020 Jul 29.
See: Pediatric Retrieval and Transport Medicine, p. 45-50

14. Royal College of Paediatrics and Child Health (RCPCH). COVID-19 - guidance for paediatric services. London, England: RCPCH; 2020 Mar: <https://www.ibfan.org/wp-content/uploads/2020/03/Royal-college-of-Pediatrics-and-Child-Health.pdf>
Accessed 2020 Jul 29.
See: Medical Transport for Confirmed COVID-19 Cases, p. 4