

## EVIDENCE REPOSITORIES

This evidence repository is a collection of best available resources and evidence collated by a knowledge synthesis team at Alberta Research for Health Evidence ([ARCHE](#)) and the clinical content team.

The knowledge synthesis team utilizes a pyramid-shaped framework, built upon the [“4S” hierarchy of evidence model](#), to provide detailed evidence appropriate to meet stakeholders’ needs. They search a combination of databases (Cochrane Library, PubMed, TRIP Database) and web-based search engines (Google, Google Scholar) to locate evidence for the knowledge pyramids. Publication types sought in the initial topic searches are organized into five levels that determine the order in which resources are presented:

- (1) Bottom Line Recommendations
- (2) Clinical Practice Guidelines and Pathways
- (3) Overviews and Summaries of Systematic Reviews
- (4) Systematic Reviews
- (5) Key Studies

Where applicable resources for families and parents are also listed.

The knowledge synthesis team collaborates with the clinical content team to select the most relevant guidelines, reviews, and key studies, which can be found below. This evidence repository is not intended to be an exhaustive list of resources for a topic, but rather a curated list of current, evidence-based resources, based on expert consensus of relevance and usability for a general emergency department setting. Every effort is made to identify resources that are open access (i.e. publicly available, free of charge, not requiring a subscription).

More information about the creation of our evidence repositories can be found [here](#).

## CONTENT TEAM

Thank you to the following clinical content experts and Knowledge Synthesis team who led the development of this evidence repository.

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TREKK developed resources for healthcare providers and parents & families can be found [here](#).

## Clinical Practice Guidelines and Pathways

1. Kwon H, Lee JH, Jeong JH, et al. [A practice guideline for postreduction management of intussusception of children in the emergency department](#). *Pediatr Emerg Care*. 2019;35(8):533-8.
2. Le Saux N. [Recommendations for the use of rotavirus vaccines in infants](#). *Paediatr Child Health*. 2017;22(5):290-4.
3. Ito Y, Kusakawa I, Murata Y, et al. [Japanese guidelines for the management of intussusception in children, 2011](#). *Pediatr Int*. 2012;54(6):948-58.

## Overviews and Summaries of Systematic Reviews

1. SickKids. [Intussusception care pathway](#). SickKids. 2022.
2. Sutcliffe J. [BMJ Best practice: Intussusception](#). BMJ. 2022.
3. Raymond-Dufresne É, Ghanayem H. [Towards evidence-based emergency medicine: Best BETS from the Manchester Royal Infirmary. BET 2: Can emergency physicians safely rule in or rule out paediatric intussusception in the emergency department using bedside ultrasound?](#) *Emerg Med J*. 2012;29(10):854-5.
4. Cachat F, Ramseyer P. [Towards evidence-based medicine for paediatricians. Question 3. Does the administration of glucagon improve the rate of radiological reduction in children with acute intestinal intussusception?](#) *Arch Dis Child*. 2012;97(4):389-91.
5. Best evidence topic reports. Bet 4. [Role of plain abdominal radiograph in the diagnosis of intussusception](#). *Emerg Med J*. 2008;25(2):106-7.
6. Applegate KE. [Clinically suspected intussusception in children: Evidence-based review and self-assessment module](#). *AJR Am J Roentgenol*. 2005;185(3 Suppl):S175-83.

## Systematic Reviews

1. Shavit I, Levy N, Dreznik Y, Soudack M, Cohen DM, Kuint RC. [Practice variation in the management of pediatric intussusception: a narrative review](#). *Eur J Pediatr*. 2024 Nov;183(11):4897-4904.
2. Liu L, Zhang L, Fang Y, Yang Y, You W, Bai J, Zhang B, Xie S, Fang Y. [Air enema reduction versus hydrostatic enema reduction for intussusceptions in children: A systematic review and meta-analysis](#). *PLoS One*. 2024 Mar 18;19(3):e0297985.
3. Hailemariam T, Sisay S, Mebratu Y, Belay F, Getinet T, Solomon S, Belina M, Abebe A, Hilawi Tewodros B, Manyazewal T. [Effects of sedatives on radiologic enema reduction in children with ileocolic intussusception: A systematic review and meta-analysis](#). *Eur J Radiol*. 2024 Jan;170:111237.
4. Attoun MA, Albalawi SMD, Ayoub A, Alnasser AK, Alkaram EH, Khubrani FA, Alzahrani KJ, Alatawi KA, Almutairi N, Alnami AG. [The Management of Intussusception: A Systematic Review](#). *Cureus*. 2023 Nov 27;15(11):e49481.

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5. Wang G, Zhang K, Zhang R, Kong X, Guo C. [Impact of vaccination with different types of rotavirus vaccines on the incidence of intussusception: a randomized controlled meta-analysis](#). Front Pediatr. 2023 Jul 31;11:1239423.
6. Rahmani E, Amani-Beni R, Hekmatnia Y, et al. [Diagnostic Accuracy of Ultrasonography for Detection of Intussusception in Children; a Systematic Review and Meta-Analysis](#). Arch Acad Emerg Med. 2023 Feb 28;11(1):e24.
7. Bergman H, Henschke N, Hungerford D, Pitan F, Ndwandwe D, Cunliffe N, Soares-Weiser K. [Vaccines for preventing rotavirus diarrhoea: vaccines in use](#). Cochrane Database of Systematic Reviews 2021, Issue 11. Art. No.: CD008521.
8. Kim PH, Hwang J, Yoon HM, et al. [Predictors of failed enema reduction in children with intussusception: A systematic review and meta-analysis](#). Eur Radiol. 2021;31(11):8081-97.
9. Kelley-Quon LI, Arthur LG, Williams RF, et al. [Management of intussusception in children: A systematic review](#). J Pediatr Surg. 2021;56(3):587-96.
10. Lin-Martore M, Kornblith AE, Kohn MA, et al. [Diagnostic accuracy of point-of-care ultrasound for intussusception in children presenting to the emergency department: A systematic review and meta-analysis](#). West J Emerg Med. 2020;21(4):1008-16.
11. Tsou PY, Wang YH, Ma YK, et al. [Accuracy of point-of-care ultrasound and radiology-performed ultrasound for intussusception: A systematic review and meta-analysis](#). Am J Emerg Med. 2019;37(9):1760-9.
12. Amuddhu SK, Chen Y, Nah SA. [Inpatient admission versus emergency department management of intussusception in children: A systemic review and meta-analysis of outcomes](#). Eur J Pediatr Surg. 2019;29(1):7-13.
13. Long B, April MD. [What measures improve reduction of intussusception in pediatric patients?](#) Ann Emerg Med. 2018;71(2):236-8.
14. Koch J, Harder T, von Kries R, et al. [Risk of intussusception after rotavirus vaccination](#). Dtsch Arztebl Int. 2017;114(15):255-62.
15. Kassim P, Eslick GD. [Risk of intussusception following rotavirus vaccination: An evidence based meta-analysis of cohort and case-control studies](#). Vaccine. 2017;35(33):4276-86.
16. Chew R, Ditchfield M, Paul E, et al. [Comparison of safety and efficacy of image-guided enema reduction techniques for paediatric intussusception: A review of the literature](#). J Med Imaging Radiat Oncol. 2017;61(6):711-7.
17. Carroll AG, Kavanagh RG, Ni Leidhin C, et al. [Comparative effectiveness of imaging modalities for the diagnosis and treatment of intussusception: A critically appraised topic](#). Acad Radiol. 2017;24(5):521-9.
18. Gluckman S, Karpelowsky J, Webster AC, McGee RG. [Management for intussusception in children](#). Cochrane Database of Systematic Reviews 2017, Issue 6. Art. No.: CD006476.
19. Fiegel H, Gfroerer S, Rolle U. [Systematic review shows that pathological lead points are important and frequent in intussusception and are not limited to infants](#). Acta Paediatr. 2016;105(11):1275-9.
20. Sadigh G, Zou KH, Razavi SA, et al. [Meta-analysis of air versus liquid enema for intussusception reduction in children](#). AJR Am J Roentgenol. 2015;205(5):W542-9.
21. Gray MP, Li SH, Hoffmann RG, et al. [Recurrence rates after intussusception enema reduction: A meta-analysis](#). Pediatrics. 2014;134(1):110-9.



22. Yang G, Wang X, Jiang W, et al. [Postoperative intussusceptions in children and infants: A systematic review](#). *Pediatr Surg Int*. 2013;29(12):1273-9.
23. Beres AL, Baird R. [An institutional analysis and systematic review with meta-analysis of pneumatic versus hydrostatic reduction for pediatric intussusception](#). *Surgery*. 2013;154(2):328-34.
24. Bucher BT, Hall BL, Warner BW, et al. [Intussusception in children: Cost-effectiveness of ultrasound vs diagnostic contrast enema](#). *J Pediatr Surg*. 2011;46(6):1099-105.

### Key Studies

1. Mertiri L, Sher AC, Sammer MB, Ngan E, Seghers VJ, Madueke UM, Stafford S, Kraus SJ, Kan JH. [Association of Time Since Diagnosis of Pediatric Ileocolic Intussusception with Success of Attempted Reduction: Analysis in 1065 Patients](#). *AJR Am J Roentgenol*. 2024 Sep 4.
2. Johnston W, Mak Croughan A, Hwang R, Myers SR, Davis C, Nace G, Allukian M. [Ileocolic Intussusception: Iterative Quality Improvement to Address a Recurring Problem](#). *J Surg Res*. 2024 Sep;301:623-630.
3. Carter M, Afework J, Pitt JB, Ayala SA, Goldstein SD. [Scoring System to Evaluate Risk of Nonoperative Management Failure in Children with Intussusception](#). *J Surg Res*. 2024 Aug;300:503-513.
4. Katz-Dana H, Harel-Sterling M, Vincent D, Dana E, Navarro OM, McLean LJ. [A POCUS-first pathway to streamline care for children with suspected ileocolic intussusception](#). *CJEM*. 2024 Apr;26(4):235-243.
5. Delgado-Miguel C, García A, Delgado B, Muñoz-Serrano AJ, Miguel-Ferrero M, Barrena S, López-Santamaría M, Martínez L. [Intussusception Management in Children: A 15-Year Experience in a Referral Center](#). *Indian J Pediatr*. 2023 Dec;90(12):1198-1203.
6. Poonai N, Cohen DM, MacDowell D, Mistry RD, Mintegi S, Craig S, et al. [Sedation and Analgesia for Reduction of Pediatric Ileocolic Intussusception](#). *JAMA Netw Open*. 2023 Jun 1;6(6):e2317200.
7. Tonson la Tour A, Desjardins MP, Gravel J. [Evaluation of bedside sonography performed by emergency physicians to detect intussusception in children in the emergency department](#). *Acad Emerg Med*. 2021;28(8):866-72.
8. Arroyo AC, Zerzan J, Vazquez H, et al. [Diagnostic accuracy of point-of-care ultrasound for intussusception performed by pediatric emergency medicine physicians](#). *J Emerg Med*. 2021;60(5):626-32.
9. Vo A, Levin TL, Taragin B, et al. [Management of intussusception in the pediatric emergency department: Risk factors for recurrence](#). *Pediatr Emerg Care*. 2020;36(4):e185-e8.
10. Lee JY, Byun YH, Park JS, et al. [Lactic acid level as an outcome predictor in pediatric patients with intussusception in the emergency department](#). *BMC Pediatr*. 2020;20(1):184.
11. Trigylidas TE, Hegenbarth MA, Patel L, et al. [Pediatric emergency medicine point-of-care ultrasound for the diagnosis of intussusception](#). *J Emerg Med*. 2019;57(3):367-74.
12. Sujka JA, Dalton B, Gonzalez K, et al. [Emergency department discharge following successful radiologic reduction of ileocolic intussusception in children: A protocol based prospective observational study](#). *J Pediatr Surg*. 2019;54(8):1609-12.
13. Levinson H, Rimon A, Scolnik D, et al. [Fever as a presenting symptom in children evaluated for ileocolic intussusception: The experience of a large tertiary care pediatric hospital](#). *Pediatr Emerg Care*. 2019;35(2):121-4.



14. Lampl BS, Glaab J, Ayyala RS, et al. [Is intussusception a middle-of-the-night emergency?](#) *Pediatr Emerg Care*. 2019;35(10):684-6.
15. Kwon H, Lee JH, Jeong JH, et al. [A practice guideline for postreduction management of intussusception of children in the emergency department](#). *Pediatr Emerg Care*. 2019;35(8):533-8.
16. Xie X, Wu Y, Wang Q, et al. [A randomized trial of pneumatic reduction versus hydrostatic reduction for intussusception in pediatric patients](#). *J Pediatr Surg*. 2018;53(8):1464-8.
17. Kimia AA, Williams S, Hadar PN, et al. [Positive guaiac and bloody stool are poor predictors of intussusception](#). *Am J Emerg Med*. 2018;36(6):931-4.
18. Savoie KB, Thomas F, Nouer SS, et al. [Age at presentation and management of pediatric intussusception: A pediatric health information system database study](#). *Surgery*. 2017;161(4):995-1003.
19. Kaplan SL, Magill D, Felice MA, et al. [Intussusception reduction: Effect of air vs. Liquid enema on radiation dose](#). *Pediatr Radiol*. 2017;47(11):1471-6.
20. Huang HY, Huang XZ, Han YJ, et al. [Risk factors associated with intestinal necrosis in children with failed non-surgical reduction for intussusception](#). *Pediatr Surg Int*. 2017;33(5):575-80.
21. Feldman O, Weiser G, Hanna M, et al. [Success rate of pneumatic reduction of intussusception with and without sedation](#). *Paediatr Anaesth*. 2017;27(2):190-5.
22. Efrati Y, Klin B, Kozler E, et al. [The role of dexamethasone in decreasing early recurrence of acute intussusception in children: A retrospective study](#). *J Pediatr Surg*. 2017;52(7):1141-3.
23. Zhang Y, Dong Q, Li SX, et al. [Clinical and ultrasonographic features of secondary intussusception in children](#). *Eur Radiol*. 2016;26(12):4329-38.
24. Tate JE, Yen C, Steiner CA, et al. [Intussusception rates before and after the introduction of rotavirus vaccine](#). *Pediatrics*. 2016;138(3).
25. Tareen F, Mc Laughlin D, Cianci F, et al. [Abdominal radiography is not necessary in children with intussusception](#). *Pediatr Surg Int*. 2016;32(1):89-92.
26. Puckett Y, Greenspon J, Fitzpatrick C, et al. [Utility of hospital admission for pediatric intussusceptions](#). *Pediatr Surg Int*. 2016;32(8):805-9.
27. Ntoulia A, Tharakan SJ, Reid JR, et al. [Failed intussusception reduction in children: Correlation between radiologic, surgical, and pathologic findings](#). *AJR Am J Roentgenol*. 2016;207(2):424-33.
28. Gfroerer S, Fiegel H, Rolle U. [Ultrasound-guided reduction of intussusception: A safe and effective method performed by pediatric surgeons](#). *Pediatr Surg Int*. 2016;32(7):679-82.
29. Flaum V, Schneider A, Gomes Ferreira C, et al. [Twenty years' experience for reduction of ileocolic intussusceptions by saline enema under sonography control](#). *J Pediatr Surg*. 2016;51(1):179-82.
30. Wong CW, Chan IH, Chung PH, et al. [Childhood intussusception: 17-year experience at a tertiary referral centre in Hong Kong](#). *Hong Kong Med J*. 2015;21(6):518-23.
31. Vega García L, Fuentes-Leonarte V, Tenías JM, et al. [Association between medication and intestinal intussusception in children: A case-crossover study](#). *Pediatr Emerg Care*. 2015;31(4):250-4.
32. Raval MV, Minneci PC, Deans KJ, et al. [Improving quality and efficiency for intussusception management after successful enema reduction](#). *Pediatrics*. 2015;136(5):e1345-52.
33. Lessenich EM, Kimia AA, Mandeville K, et al. [The frequency of postreduction interventions after successful enema reduction of intussusception](#). *Acad Emerg Med*. 2015;22(9):1042-7.



34. Lautz TB, Thurm CW, Rothstein DH. [Delayed repeat enemas are safe and cost-effective in the management of pediatric intussusception.](#) J Pediatr Surg. 2015;50(3):423-7.
35. Esposito F, Ambrosio C, De Fronzo S, et al. [Fluoroscopy-guided hydrostatic reduction of intussusception in infancy: Role of pharmacological premedication.](#) Radiol Med. 2015;120(6):549-56.
36. Nguyen HN, Kan JH, Guillerman RP, et al. [Intussusception revisited: Is immediate on-site surgeon availability at the time of reduction necessary?](#) AJR Am J Roentgenol. 2014;202(2):432-6.
37. Beres AL, Baird R, Fung E, et al. [Comparative outcome analysis of the management of pediatric intussusception with or without surgical admission.](#) J Pediatr Surg. 2014;49(5):750-2.
38. Chien M, Willyerd FA, Mandeville K, et al. [Management of the child after enema-reduced intussusception: Hospital or home?](#) J Emerg Med. 2013;44(1):53-7.
39. Mandeville K, Chien M, Willyerd FA, et al. [Intussusception: Clinical presentations and imaging characteristics.](#) Pediatr Emerg Care. 2012;28(9):842-4.
40. Al-Tokhais T, Hsieh H, Pemberton J, et al. [Antibiotics administration before enema reduction of intussusception: Is it necessary?](#) J Pediatr Surg. 2012;47(5):928-30.
41. Weihmiller SN, Buonomo C, Bachur R. [Risk stratification of children being evaluated for intussusception.](#) Pediatrics. 2011;127(2):e296-303.
42. Gilmore AW, Reed M, Tenenbein M. [Management of childhood intussusception after reduction by enema.](#) Am J Emerg Med. 2011;29(9):1136-40.
43. Morrison J, Lucas N, Gravel J. [The role of abdominal radiography in the diagnosis of intussusception when interpreted by pediatric emergency physicians.](#) J Pediatr. 2009;155(4):556-9.
44. Herwig K, Brenkert T, Losek JD. [Enema-reduced intussusception management: Is hospitalization necessary?](#) Pediatr Emerg Care. 2009;25(2):74-7.
45. Munden MM, Bruzzi JF, Coley BD, et al. [Sonography of pediatric small-bowel intussusception: Differentiating surgical from nonsurgical cases.](#) AJR Am J Roentgenol. 2007;188(1):275-9.
46. Hadidi AT, El Shal N. [Childhood intussusception: A comparative study of nonsurgical management.](#) J Pediatr Surg. 1999;34(2):304-7.
47. Daneman A, Alton DJ, Lobo E, et al. [Patterns of recurrence of intussusception in children: A 17-year review.](#) Pediatr Radiol. 1998;28(12):913-9.

### Resources for Families

1. Casas-Melley AT. [Intussusception.](#) Nemours KidsHealth. 2023