

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Electrolyte Point of Care Testing for Patients with Dehydration or Electrolyte Abnormalities: Clinical Utility, Cost-Effectiveness and Guidelines

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Research Questions

1. What is the clinical utility of electrolyte point of care testing for patients with dehydration or electrolyte abnormalities in non-emergency department or long-term care settings?
2. What is the cost-effectiveness of electrolyte point of care testing for patients with dehydration or electrolyte abnormalities in non-emergency department or long-term care settings?
3. What are the evidence-based guidelines regarding the use of electrolyte point of care testing in non-emergency department or long-term care settings?

Key Findings

One economic evaluation was identified regarding the cost-effectiveness of electrolyte point of care testing for patients with dehydration or electrolyte abnormalities in non-emergency department or long-term care settings. In addition, one evidence-based guideline was identified regarding the use of electrolyte point of care testing in non-emergency department or long-term care settings. No relevant clinical evidence was identified.

Methods

A limited literature search was conducted by an information specialist on key resources including Medline, Embase, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were electrolytes and point-of-care (PoC) testing. Search filters were applied to limit retrieval to guidelines for Q3 only. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2015 and March 23, 2020. 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	Patients with dehydration or electrolyte abnormalities in non-emergency department or long-term care settings
Intervention	Electrolyte point of care testing (e.g., i-STAT system)
Comparator	Q1-2: Central laboratory testing or no testing Q3: Not applicable

Outcomes	Q1: Clinical utility (e.g., reduce hospital stay, hospital admission, morbidity, mortality) Q2: Cost-effectiveness (e.g., cost per health benefit) Q3: Recommendations regarding the appropriate use of point of care electrolyte testing for ongoing monitoring
Study Designs	Health technology assessments, systematic reviews, randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports and systematic reviews are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

One economic evaluation¹ was identified regarding the cost-effectiveness of electrolyte point of care testing for patients with dehydration or electrolyte abnormalities in non-emergency department or long-term care settings. In addition, one evidence-based guideline² was identified regarding the use of electrolyte point of care testing in non-emergency department or long-term care settings. No relevant health technology assessments, systematic reviews, randomized controlled trials, or non-randomized studies were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

One economic evaluation¹ was identified regarding the cost-effectiveness of electrolyte point of care (PoC) testing for patients with dehydration or electrolyte abnormalities in non-emergency department or long-term care settings. The authors of the identified economic evaluation¹ aimed to determine the cost-effectiveness of PoC testing with the Abbott i-STAT device for patients presenting common acute conditions at remote health centers. The authors utilized a decision-analysis simulation model and found that electrolyte PoC testing resulted in significant cost savings by preventing unnecessary medical evacuations.¹

The identified guideline by the National Institute for Health and Care Excellence recommends electrolyte PoC testing when IV fluids are needed for children and young people in critical care.²

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

No literature identified.

Economic Evaluations

1. Spaeth BA, Kaambwa B, Shephard MD, Omond R. Economic evaluation of point-of-care testing in the remote primary health care setting of Australia's Northern Territory. *Clinicoecon Outcomes Res.* 2018 May 29;10:269-277.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5985789/>

Guidelines and Recommendations

2. National Institute for Health and Care Excellence. Intravenous fluid therapy in children and young people in hospital. (NICE guideline NG29). 2015:
<https://www.nice.org.uk/guidance/ng29>
See: Recommendation 1.2.6

Appendix — Further Information

Non-Randomized Studies — Alternative Outcomes

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4. Lopez A, Garcia B, Gomez A, et al. Concordance of the ions and GAP anion obtained by gasometry vs standard laboratory in critical care. *Med Intensiva*. 2019 12;43(9):521-527.
[PubMed: PM30193741](https://pubmed.ncbi.nlm.nih.gov/30193741/)
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<https://pubmed.ncbi.nlm.nih.gov/28477952/>
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[PubMed: PM26396233](https://pubmed.ncbi.nlm.nih.gov/26396233/)
10. Srinivasa S, Kumar SP, Krishnamurthy S. Electrolytes from the blood gas analyzer-Are they comparable to serum electrolytes from the lab? *Indian J Crit Care Med*. 2015 March;19 (13 Supplement 1):S51.
<https://www.ijccm.org/doi/IJCCM/pdf/10.5005/ijccm-19-13-24>

Economic Evaluations – Alternative Setting

11. Whitney RE, Santucci K, Hsiao A, Chen L. Cost-effectiveness of point-of-care testing for dehydration in the pediatric ED. *Am J Emerg Med*. 2016 Aug;34(8):1573-1575.
[PubMed: PM27289438](https://pubmed.ncbi.nlm.nih.gov/27289438/)

Additional References

12. Delanghe JR. Management of electrolyte disorders: also the method matters! *Acta Clin Belg.* 2019 Feb;74(1):2-6.
[PubMed: PM29757121](#)