2019 surveillance of intravenous fluid therapy in children and young people in hospital (NICE guideline NG29)

Surveillance proposal

We will not update the guideline on intravenous fluid therapy in children and young people in hospital.

Reasons for the proposal

We found new evidence covering 2 sections of the guideline: fluid resuscitation, and routine maintenance. This evidence was considered alongside topic expert feedback.

Balanced crystalloids for fluid resuscitation and fluid maintenance

Topic experts involved with the current surveillance review queried whether there is a role for balanced crystalloids (particularly for resuscitation) and noted they were being used more widely in practice. The original guideline committee noted a lack of evidence to recommend one isotonic crystalloid over another for fluid resuscitation, and therefore chose not to specify which isotonic fluid to use. For maintenance fluids, the committee found no studies comparing isotonic solutions (including sodium chloride or balanced crystalloids) directly against each, so did not consider it appropriate to specify a particular isotonic fluid. New evidence was identified which suggested that balanced crystalloids could have some benefits over 0.9% sodium chloride for both fluid resuscitation and fluid maintenance. However, the evidence was from 2 single trials in specific conditions and did not include outcomes deemed critical by the original guideline committee. A third trial identified showed that balanced crystalloids had no benefit over 0.9% sodium chloride for resuscitation, but were more costly. Overall, we did not find sufficient new evidence to support an update of the guideline in this area at this point in time.

Resuscitation fluid rate

When developing the original guideline, the committee noted that current practice for fluid resuscitation was to administer a bolus over less than 10 minutes and they found no evidence to suggest this should change. New evidence on resuscitation found by the current surveillance review suggested a fluid bolus over 15–20 minutes had some benefits versus a bolus over 5–10 minutes, though these benefits were for outcomes not deemed critical or important by the original guideline. As the study also found no effect on outcomes of death, length of stay, or resolution of shock that were deemed critical or important by the original guideline, we decided there was currently no impact on the guideline. We identified another study that found no benefit of rapid rehydration over 3–6 hours versus slower rehydration over 8 hours, which is unlikely to affect the guideline as it does not recommend either of these strategies.

Resuscitation fluid volume

Evidence examined by the original guideline committee included the FEAST trial in African children (which found that fluid boluses increased mortality versus no bolus), but the committee disregarded it because it was not directly applicable to the UK clinical setting. Instead, the committee based their recommendation on current practice for fluid resuscitation to administer a 20 ml/kg bolus, having found no evidence to suggest this should change. Topic experts involved with the current surveillance review questioned whether a 20 ml/kg fluid resuscitation bolus volume was still correct or if a smaller volume should be used. New evidence in this area found by the current surveillance review included a Cochrane review suggesting that liberal fluid therapy for resuscitation might increase mortality versus conservative therapy. But the results were based predominantly on the FEAST trial, and so had the same limitations already identified by the original committee. We also identified a UK trial that found no benefit of a 10 ml/kg versus a 20 ml/kg bolus, and another trial that found no difference between a rehydration strategy with or without boluses. Overall, we found no new evidence to support an update of the guideline in this area at this time.

Other aspects of intravenous fluid therapy

New evidence for other aspects of intravenous fluid therapy was identified:

- hypertonic (>0.9%) versus isotonic (0.9%) sodium chloride for resuscitation
- standard versus restricted volumes for routine fluid maintenance
- liberal versus restricted intraoperative maintenance infusion
- balanced crystalloid versus 0.45% sodium chloride for maintenance infusion
- isotonic (0.9%) versus hypotonic (<0.9%) sodium chloride for maintenance infusion
- 3.3% versus 5% dextrose for maintenance infusion.

However, the evidence examining these therapies did not indicate a need to update the guideline because results were either: consistent with existing recommendations, of limited relevance to the guideline, from single trials, or based on outcomes not deemed to be critical or important by the original guideline committee.

For further details and a summary of all evidence identified in surveillance, see the summary of evidence from surveillance.

Overview of 2019 surveillance methods

NICE's surveillance team checked whether recommendations in intravenous fluid therapy in children and young people in hospital (NICE guideline NG29) remain up to date.

The surveillance process consisted of:

- Feedback from topic experts via a questionnaire.
- A search for new or updated Cochrane reviews.
- Examining related NICE guidance and quality standards and NIHR signals.
- A search for ongoing research.
- Examining the NICE event tracker for relevant ongoing and published events.
- Literature searches to identify relevant evidence.

- Assessing the new evidence against current recommendations to determine whether or not to update sections of the guideline, or the whole guideline.
- Consulting on the proposal with stakeholders, except if we propose to update and replace the whole guideline (this document).

For further details about the process and the possible update proposals that are available, see ensuring that published guidelines are current and accurate in developing NICE guidelines: the manual.

Evidence considered in surveillance

Search and selection strategy

We searched for new evidence related to the whole guideline.

We found 23 studies in a search for randomised controlled trials and Cochrane reviews published between 22 December 2014 and 31 August 2019.

See the summary of evidence from surveillance for details of all evidence considered, and references.

Selecting relevant studies

We included randomised controlled trials of children and young people. Although the original guideline allowed evidence from adult populations, this was excluded from the surveillance review.

Ongoing research

We checked for relevant ongoing research; no relevant ongoing studies were identified.

Intelligence gathered during surveillance

Views of topic experts

We considered the views of topic experts who were recruited to the NICE Centre for Guidelines Expert Advisers Panel to represent their specialty. For

this surveillance review, topic experts completed a questionnaire about developments in evidence, policy and services related to the guideline.

We sent questionnaires to 9 topic experts and received 5 responses. The topic experts who provided feedback were: a consultant nurse in paediatric emergency medicine, an advanced paediatric nurse practitioner, a specialist clinical pharmacist, a consultant paediatric nephrologist and a consultant neonatologist.

Overall, 1 topic expert thought that the guideline should be updated and 4 thought that an update was not necessary. The issues that topic experts thought could be addressed in an update were: whether outcomes are worse with larger versus reduced fluid resuscitation bolus volumes; and whether there is a role for balanced crystalloids as they were being used more widely in practice. The surveillance review identified evidence in these areas, but it was decided not to update the guideline in these areas at this point in time. The rationale for the decision is explained in the previous section 'Reasons for the proposal'.

Views of stakeholders

Stakeholders are consulted on all surveillance reviews except if the whole guideline will be updated and replaced. Because this surveillance proposal is to not update the guideline, we are consulting with stakeholders.

See ensuring that published guidelines are current and accurate in developing NICE guidelines: the manual for more details on our consultation processes.

Implementation of the guideline

During the surveillance review we identified variations in the information about fluids across recommendations, footnotes and the table of example fluids. Via NICE's field team, we queried with a paediatric clinical group whether this was an issue in practice. The group reassured us that they had no concerns about inconsistencies in the guideline.

Other sources of information

We considered all other correspondence received since the guideline was published.

An enquiry to NICE raised concerns about the absence from NICE guideline NG29 recommendation 1.3.1 of a specific maximum resuscitation bolus volume for children and young people (whereas NICE guideline CG174 intravenous fluid therapy in adults in hospital gives a figure of 500 ml). This was discussed by the NG29 guideline committee during development of the original guideline. At the time, the committee felt that including a maximum value would not be consistent with clinical practice or with other guidance (such as Advanced Paediatric Life Support – a course run by the Advanced Life Support Group). Additionally, NG29 recommendation 1.3.1 is qualified by stating 'take into account pre-existing conditions as smaller fluid volumes may be needed', which allows healthcare professionals to reflect the needs of individual patients. Topic experts involved in the current surveillance review agreed that it was correct not to state a maximum bolus volume.

Equalities

No equalities issues were identified during the surveillance process.

Editorial amendments

During surveillance of the guideline, we identified the following points in the guideline that should be amended:

Recommendation 1.1.1 cross-refers to the principles and protocols for intravenous fluid therapy section of NICE guideline CG174 intravenous fluid therapy in adults in hospital. However, the hyperlink goes to the introduction section of CG174; it will be changed to link to the principles and protocols for intravenous fluid therapy section of CG174.

The guideline currently has 3 footnotes related to unlicensed use in children and young people of the following intravenous fluids: glucose-free crystalloids; isotonic crystalloids with 5–10% glucose; and hypotonic solutions. These will

be replaced by the following single footnote to ensure that all the many intravenous infusion solutions currently available in the UK are covered:

- At the time of review ([Month] 2019), some intravenous fluid therapy preparations may not have a UK marketing authorisation for this indication in all ages of children and young people. Please refer to the individual summary of product characteristics for licensing information. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's Prescribing guidance: prescribing unlicensed medicines for further information.

The table 'Intravenous fluid types for children and young people' has a footnote which links to the British national formulary for children. However, the link goes to www.bnf.org – it will be replaced with a link to the section of the BNFc website on fluids and electrolytes.

The section of the guideline 'Intravenous fluid therapy in children and young people in hospital implementation: getting started' has the following issues:

- The first paragraph states: 'We identified these with the help of stakeholders and guideline committee members (see section 9.4 of the manual).' However, the manual has since been updated and the link now directs to the wrong section of the manual. This will be amended to link to section 10.1 of the manual (subsection 'Approaches to additional consultation').
- In 'Recording fluid and electrolyte status to ensure appropriate prescribing', there is a link to the Department of Health, Social Services and Public Safety (DHSSPS) in Northern Ireland. However, this has now been renamed Department of Health and has a new URL. This will be amended.
- In 'Raising awareness of training and education resources' there is a link to the NICE online learning tool. This link is broken and will be removed.

See the summary of evidence from surveillance for full details.

Overall proposal

After considering all evidence and other intelligence and the impact on current recommendations, we decided that no update is necessary.