Costing statement

Intravenous fluid therapy in adults in hospital

Published: December 2013

http://guidance.nice.org.uk/CG174
1 Introduction

1.1 This costing statement considers the cost implications of implementing the recommendations made in Intravenous fluid therapy in adults in hospital (NICE clinical guideline 174). This guideline contains recommendations about general principles for managing intravenous (IV) fluids, and applies to a range of conditions and different settings. It does not include recommendations relating to specific conditions. The commissioners of healthcare services related to this guideline are clinical commissioning groups (CCGs) and NHS England.

1.2 A costing statement has been produced for this guideline because of variation in clinical practice across the country and also in the different hospital settings that this guidance encompasses. Organisations are encouraged to evaluate their own practices against the recommendations in the NICE guideline and assess costs locally. Some of the resource effects to be considered locally are discussed in this statement. Overall, it is anticipated that implementing the guidance will improve patient safety and may create savings at a local level.

2 Background

2.1 In 2012/13, there were over 15 million hospital admissions, of which around 87% were related to people aged over 18 years. Approximately 5.3 million were emergency admissions. For all hospital admissions it is estimated that the mean average length of stay was 5.2 days where the median average length of stay was 1 day (HES Online). There is no information regarding what proportion of these admissions included IV fluid therapy as part of treatment, however it is assumed that a significant amount would have because IV fluid therapy spans many medical and surgical disciplines.

2.2 The average spend over the last 5 financial years on IV fluids is estimated at around £156 million per annum across the NHS (using the IMS Health: Hospital Pharmacy Audit Index [IMS HPAI]). This estimate is based on IV
fluids purchased via the pharmacy purchase and supply route only, and is based on the cost of the medicines at NHS list price and not necessarily the price the hospital paid.

2.3 It is widely accepted that errors in prescribing, leading to insufficient or excessive provision of IV fluids or electrolytes, are common and have adverse effects on patient morbidity and mortality. The NICE guideline highlights that these prescribing errors are particularly likely to arise in emergency departments, acute admission units and general ward areas, where prescription and initiation of IV fluids may be undertaken by less expert staff.

2.4 The National Confidential Enquiry into Perioperative Deaths report in 1999 highlighted that mismanagement of fluid therapy is rarely reported as being responsible for patient harm. However, it is likely that as many as 1 in 5 patients on IV fluids and electrolytes suffer complications or morbidity due to their inappropriate administration.

3 Recommendations with potential resource impact

IV fluid management plan

3.1 Patients should have an IV fluid management plan, which should include details of:

- the fluid and electrolyte prescription over the next 24 hours
- the assessment and monitoring plan.

Initially, the IV fluid management plan should be reviewed by an expert daily. IV fluid management plans for patients on longer-term IV fluid therapy whose condition is stable may be reviewed less frequently. [Recommendation 1.1.6]

3.2 In the guideline, the term ‘expert’ refers to a healthcare professional who has core competencies to diagnose and manage acute illness. These competencies can be delivered by a variety of models at a local level,
such as a critical care outreach team, a hospital-at-night team or a specialist trainee in an acute medical or surgical specialty.

3.3 Having an expert review IV fluid management plans means that there is a potential need for more specialist hours. It is recommended that this is reviewed locally across all the different medical and surgical disciplines that IV fluid therapy encompasses to assess whether this will result in a change in current practice and what additional hours may be needed and at what level. In particular, emergency departments, acute admission units and general ward areas may need local staffing reviews.

3.4 However, expert reviews of IV management plans every 24 hours could result in savings if they encourage hospitals to stop IV fluid therapy earlier and switch to oral fluid intake.

**Training and education**

3.5 Hospitals should establish systems to ensure that all healthcare professionals involved in prescribing and delivering IV fluid therapy are trained on the principles covered in this guideline, and are then formally assessed and reassessed at regular intervals to demonstrate competence in:

- understanding the physiology of fluid and electrolyte balance in patients with normal physiology and during illness
- assessing patients’ fluid and electrolyte needs (the 5 Rs: Resuscitation, Routine maintenance, Replacement, Redistribution and Reassessment)
- assessing the risks, benefits and harms of IV fluids
- prescribing and administering IV fluids
- monitoring the patient response
- evaluating and documenting changes **and**
- taking appropriate action as required.

[Recommendation 1.6.1]
3.6 Currently, there is little formal education and training in IV fluid management to support correct prescribing. It is thought that the training around the principles covered in the guideline for IV fluid therapy should be incorporated in mandatory training for relevant healthcare professionals. Hospitals need to review their local training systems including assessment of training; however, it is anticipated that any increase in training costs is not likely to be significant. In the medium to longer term, the training should be primarily through undergraduate training.

3.7 NICE have commissioned the development of an online learning module to support implementation of this guideline. The aim of this module is to support all prescribers and trainee prescribers to safely and effectively assess, prescribe for and review adult patients requiring IV fluids. This module is due to publish at the end of February 2014.

4 Potential savings

4.1 There are various critical consequences of fluid mismanagement including:

- hypovolaemia
- pulmonary oedema
- hyponatraemia
- hypernatraemia
- peripheral oedema
- hyperkalaemia
- hypokalaemia

The identifying features of each of these consequences are detailed in the guideline. By implementing the recommendations (including the algorithms and training guidance), it is expected that IV fluid therapy protocols will become standardised and safety of care improved. As a result, it is anticipated that the number of prescribing errors will be
4.2 Published observational evidence suggests that the incidence of IV fluid-associated complications is high in post-operative patients. It appears that fluid-associated morbidity is widely observed; specifically, cardiovascular complications including tachyarrhythmia and dysrhythmia, fluid overload, and pulmonary oedema. These fluid-related complications were observed in at least 7% to as many as 54% of post-operative patients (De Silva 2010, Walsh 2008 and Walsh 2005). Patients with complications appeared to spend an additional 2.5 days in hospital compared with patients without complications (Walsh 2008). Assuming that the cost per extra day is £239 (using the average of all inpatient healthcare resource group (HRG) tariff’s excess bed day charges), it can be estimated that the cost per complication on average is £598. In one study, 2 out of 3 patients who developed pulmonary oedema experienced unplanned critical care admissions (Walsh 2005). Using reference costs the average unit cost per adult critical care is £1,223 (2 organs supported XC05Z).

4.3 Expert opinion is that implementing the guideline will produce significant cost savings across the NHS because it is likely to reduce the number of hospital bed days due to a reduction in complications created by IV fluid mismanagement. For commissioners, this may reduce excess bed day charges and also avoid being charged for higher cost tariffs associated with complications and comorbidities. From a provider perspective implementing the guidance may lead to a reduction in length of stay, improving bed management and free up bed capacity. Table 1 below shows an example of the differentiation of costs of a HRG for people with complications and comorbidities and those without. It also details the cost of excess bed days.
Table 1: Healthcare resource group example of cost differentiation associated with complications and comorbidities

<table>
<thead>
<tr>
<th>HRG code</th>
<th>HRG name</th>
<th>Combined day case / ordinary elective spell tariff (£)</th>
<th>Ordinary elective long-stay trimpoint (days)</th>
<th>Non-elective spell tariff (£)</th>
<th>Non-elective long-stay trimpoint (days)</th>
<th>Per day long-stay payment (for days exceeding trimpoint) (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GC16A</td>
<td>Non-Malignant Pancreatic and Biliary Disorders with Catastrophic CCs</td>
<td>6,435</td>
<td>79</td>
<td>5,591</td>
<td>64</td>
<td>217</td>
</tr>
<tr>
<td>GC16B</td>
<td>Non-Malignant Pancreatic and Biliary Disorders with Severe CCs</td>
<td>2,820</td>
<td>40</td>
<td>3,389</td>
<td>33</td>
<td>217</td>
</tr>
<tr>
<td>GC16C</td>
<td>Non-Malignant Pancreatic and Biliary Disorders with Major CCs</td>
<td>1,508</td>
<td>16</td>
<td>2,211</td>
<td>16</td>
<td>217</td>
</tr>
<tr>
<td>GC16D</td>
<td>Non-Malignant Pancreatic and Biliary Disorders without Major CCs</td>
<td>831</td>
<td>5</td>
<td>1,540</td>
<td>11</td>
<td>217</td>
</tr>
</tbody>
</table>

Abbreviations: CC, complications and comorbidities; HRG, healthcare resource group.

4.4 The cost difference between non-malignant pancreatic and biliary disorders with catastrophic complications and comorbidities and without major complications and comorbidities is £5,604 for elective and £4,051 for non-elective spell tariffs. The price per excess bed day is £217. These highlight the potential cost savings if there are no complications caused by fluid mismanagement compared with if there are adverse events caused by fluid mismanagement.

4.5 Other potential cost savings as a result of implementing the guideline is related to the type of IV fluid recommended and lower volumes of IV fluids prescribed. Lower cost crystalloid IV fluids are recommended for resuscitation. According to expert opinion this is expected to significantly reduce the use of colloids such as gelatin, which may create cost savings. The guideline also recommends stopping IV fluids for patients that are able to take oral fluid and also prescribing lower volumes of IV fluid than is current practice according to expert opinion, which may also create savings.
5 Conclusion

5.1 NHS organisations are advised to assess the resource implications of this guidance locally. Potential areas for additional costs include the possible need for additional specialist hours so that expert reviews of fluid management plans can be completed daily. In particular, emergency departments, acute admission units and general ward areas may need local staffing reviews to see if this requirement is met.

5.2 The recommendations in the guideline should be incorporated in mandatory training for relevant healthcare professionals. Hospitals need to review their local training systems including assessment of training; however, it is thought that any increase in training costs is not likely to be significant. In the medium to longer term, the training should be primarily through undergraduate training.

5.3 As a result of implementing the guidance, it is expected that the number of prescribing errors will be reduced, as well as the subsequent adverse effects on morbidity and mortality, while improving patient safety. This is expected to generate savings locally by reducing the number of hospital bed-days and for commissioners, may reduce the number of charges for higher-tariff costs associated with complications and comorbidities, as well as avoid being charged for excess bed-days.
6 References


IMS Health: Hospital Pharmacy Audit Index (IMS HPAI), provided by Health and Social Care Information Centre (Prescribing). To obtain the hospital prescribing data the search used the Anatomical Therapeutic Chemical classification system provided by the World Health Organisation. The classification used was K.


About this costing statement

This costing statement accompanies the clinical guideline: Intravenous fluid therapy in adults in hospital (NICE clinical guideline 174).

**Issue date:** December 2013

This statement is written in the following context

This statement represents the view of NICE, which was arrived at after careful consideration of the available data and through consulting healthcare professionals. It should be read in conjunction with the NICE guideline. The statement is an implementation tool and focuses on those areas that were considered to have potential impact on resource utilisation.

The cost and activity assessments in the statement are estimates based on a number of assumptions. They provide an indication of the potential impact of the principal recommendations and are not absolute figures.

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