Cost and risk management in critical care: reducing the use of colloids

Provided by: City Hospitals Sunderland NHS Foundation Trust

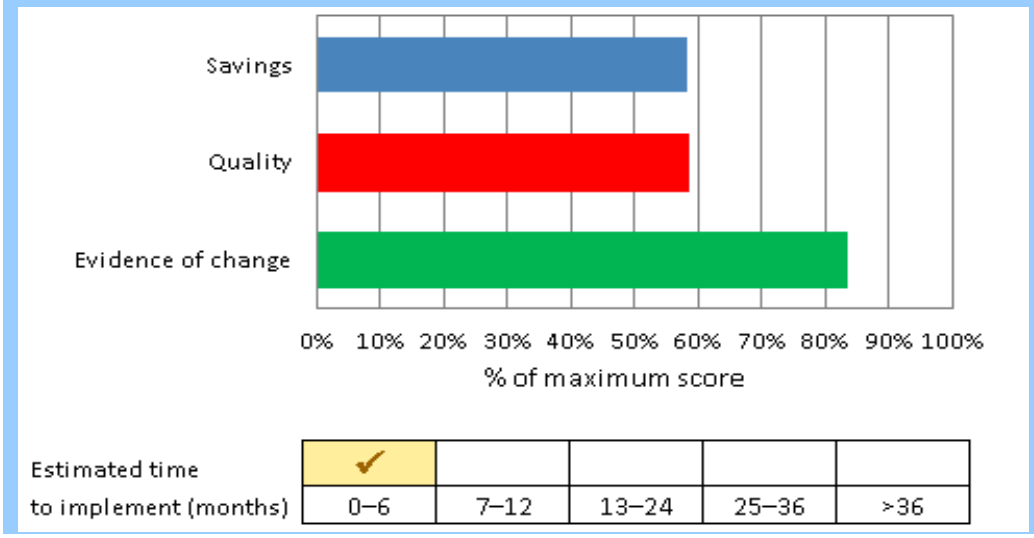
Publication type: Quality and productivity example

Sharing good practice: What are 'Proven Quality and Productivity' case studies?

The NICE Quality and Productivity collection provides users with practical case studies that address the quality and productivity challenge in health and social care. All examples submitted are evaluated by NICE. This evaluation is based on the degree to which the initiative meets the NICE Quality and Productivity criteria: savings, quality, evidence and implementability. The first 3 criteria are given a score which are then combined to give an overall score. The assessment of the degree to which this particular case study meets the criteria is represented in the summary graphic below.

Proven Quality and Productivity examples are case studies that show evidence of implementation and can demonstrate efficiency savings and improvements in quality.

Evidence summary



Estimated time to implement (months)	✔ 0–6	7–12	13–24	25–36	>36

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Changes since the previous version

Published Quality and Productivity case studies are reviewed annually. One year after the case study has been published on the NICE Evidence search website, the submitter of the case study is contacted to ask if there is further information relevant to the case study, and the case study updated as required. Any changes to this case study are outlined in the table below.

Case study section	Update
Introduction	No change
Savings	Provided extra details of the relative costs of colloid and crystalloids. This does not affect the scoring.
Quality	No change
Evidence	Added details of annual results demonstrating a sustained reduction in colloid use. Added that colloid use has fallen across the hospital.
Implementation	Added that annual figures demonstrate a sustained reduction in colloid use.

Details of initiative

Purpose	To prevent harm and reduce costs associated with using colloid fluid administration in critical care patients.
Description (including scope)	In the past, colloid fluid therapy was used as the primary resuscitation fluid in critically ill people. Increasing evidence (in this case from the Cochrane Database of Systematic Reviews. See contacts and resources) suggests that crystalloid fluids are equivalent in effectiveness and cost considerably less. This project aimed to reduce colloid use by removing them from the clinical area and making them available by consultant prescription only. After a successful pilot called 'the colloid holiday', colloids were removed from critical care. Exceptions were made for some patients for whom the treating physician considered them effective (generally patients with fluid- and vasoconstrictor-resistant shock). Consultant-only prescription was made mandatory for all colloid administration. Despite the exceptions, colloid use dropped dramatically. This example is from an 18-bedded critical care unit.
Topic	Medicines use and procurement, right care, safe care and urgent and emergency care.
Other information	Colloids are protein-rich fluids for intravenous use. Colloid solutions are widely used in fluid resuscitation of critically ill patients. The Cochrane review assessed the effects of colloids compared to crystalloids for fluid resuscitation in critically ill patients. There are several choices of colloid and there is ongoing debate about the relative effectiveness of colloids compared to crystalloid fluids. The Cochrane review considered randomised controlled trials (RCTs) of colloids compared to crystalloids, in patients requiring volume replacement. The assessment excluded cross-over trials and trials in pregnant women and neonates. The authors of the Cochrane review concluded there is no evidence from RCTs that resuscitation with colloids reduces the risk of death, compared to resuscitation with crystalloids, in patients with trauma, burns or following surgery. As colloids are not associated with an improvement in survival, and as they are more expensive than crystalloids, it is hard to see how their continued use in these patients can be justified outside the context of RCTs.

Savings delivered

Amount of savings delivered	Savings are from reduced spending on intravenous fluids, due to switching from colloids to crystalloids. Colloids vary widely in cost per litre depending on the type, but the most commonly used colloid in this case study is Volplex®. The BNF list price of Volplex® is £9.09 per litre, but locally agreed discounts are often significant. The crystalloids used in this case study cost on average £0.65 per litre. Colloids can now only be used by consultant prescription. Savings are approximately £17,000 per year. This is equivalent to £5667 per 100,000 population.
Type of saving	Real cash savings are achieved as a result of switching from colloids to crystalloids.
Any costs required to achieve the savings	Change can be achieved with minimal additional resources.
Programme budget	Circulation problems. Realistically this project affects all patients requiring fluid resuscitation in critical care areas and not just circulation issues.
Supporting evidence	The results show a reduction in costs in an 18-bedded general critical care unit serving a population of 300,000. These savings were achieved with minimal costs and no adverse effects on patient care.

Quality outcomes delivered

Impact on quality of care or population health	No impact on care quality. Patients are treated using the most suitable fluid (crystalloids rather than colloids).
Impact on patients, people who use services and/or population safety	Patient safety is not adversely affected and may be improved in some critically ill patients: the evidence shows no adverse effects from the pilot and Cochrane review. Avoiding rare adverse events from allergic reaction to colloid is likely to generate small safety gains. No adverse effects seen on Intensive Care Unit (ICU) mortality or length of stay.
Impact on patients, people who use services, carers, public and/or population experience	No impact on patient experience. Patient is rehydrated with the most suitable fluid.
Supporting evidence	Improvement in patient outcomes is expected because fewer rare

	adverse events from allergic reaction to colloid are likely to generate small safety gains. However, some critically ill patients may benefit because of a possible decreased risk of renal injury. No adverse effects likely.

Evidence of effectiveness

Evidence base for case study	Published Cochrane review (Perel and Roberts 2012). See Contacts and resources section.
Evidence of deliverables from implementation	Systematic follow-up and reporting of results. Annual figures demonstrate a sharp reduction in colloid use that has been maintained. Before implementation the annual cost of colloid in the ICU peaked at £17,880. The year after implementation the cost of colloid had fallen to £290. The latest figures show negligible colloid use costing just £21 in 2014. Units of colloid have been replaced by units of crystalloid, which is much cheaper per unit.
Where implemented	City Hospitals Sunderland NHS Foundation Trust.
Degree to which the actual benefits matched assumptions	Same as expected.
If initiative has been replicated how frequently/widely has it been replicated	It is not known if similar initiatives have been implemented elsewhere, however annual data shows that colloid use halved across the hospital in the year following implementation in the ICU. By the end of 2014 its use had fallen to just 2.5% of its peak level, although it is not known if the reduction is due to this initiative.
Supporting evidence	Annual data on colloid use in the ICU and the wider hospital (unpublished data).

Details of implementation

Implementation details	The proposal was implemented in less than 3 months in a general intensive care unit. The following steps were followed: 1. Medical and nursing staff opinion was sought. 2. Education of nursing staff and removal of colloid for 1 month, the so-called ‘colloid holiday’. 3. No adverse events reported and staff happy with change. No increase in mortality is consistent with the published data. No comments were made about any increases in the

	number of ventilated bed days. 4. Colloid removed from unit. Full implementation within 3 months. There has been annual follow-up showing sustained reduction in colloid use in the unit.
Time taken to implement	Implementation can be immediate. It is dependent on use of crystalloids over the use of colloids in intensive care units.
Ease of implementation	This case study describes the effect on an intensive care unit. A pilot period reducing colloid usage was implemented immediately and the results of the pilot demonstrated no adverse effects.
Level of support and commitment	Initially a mixed reception. Dependent on clinician attitude toward colloid use versus the evidence of effectiveness. Once the 'colloid holiday' had been implemented and assessed all medical staff supported the initiative.
Barriers to implementation	In this case study the initiative was fully supported by the consultant medical staff on the unit. No financial barriers existed because the alternative fluids were less costly.
Risks	No risks were identified.
Supporting evidence	No further evidence provided.

Further evidence

Dependencies	It is dependent on medical staff believing the evidence and adhering to use of crystalloids over colloids. In this case study the outcome of the 'colloid holiday' demonstrated the conclusion from the Cochrane review in practice.

Contacts and resources

Contacts and resources	If you require any further information please email: qualityandproductivity@nice.org.uk and we will forward your enquiry and contact details to the provider of this case study. Please quote reference 12/0006r in your email. British National Formulary (2015) Volplex® Colloids versus crystalloids for fluid resuscitation in critically ill patients. Cochrane quality and productivity topics Perel P, Roberts I (2012) Colloids versus crystalloids for fluid resuscitation in critically ill patients. Cochrane Database of

Systematic Reviews issue 6: CD000567. DOI: 10.1002/14651858.CD000567.pub5

Reinhart K, Perner A, Sprung CL et al. (2012) Consensus statement of the ESICM task force on colloid volume therapy in critically ill patients. Intensive Care Medicine 38: 368–83

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