



## Topic Exploration Report

Topic explorations are designed to provide a high-level briefing on new topics submitted for consideration by Health Technology Wales. The main objectives of this report are to:

1. Determine the quantity and quality of evidence available for a technology of interest.
2. Identify any gaps in the evidence/ongoing evidence collection.
3. Inform decisions on topics that warrant fuller assessment by Health Technology Wales.

Topic:	Antimicrobial barrier caps for use with haemodialysis catheter hubs to reduce catheter-related bloodstream infections
Topic exploration report number:	TER197

### Introduction and aims

Catheter-related bloodstream infections (CRBSIs) are a common complication related to haemodialysis (HD) central venous catheter (CVC) use and they contribute to increased infection-related hospitalisation, mortality, and health care costs.

ClearGuard HD antimicrobial caps for HD catheters are described by the manufacturer as being the first and only device that kills infection-causing bacteria inside a HD hub to prevent catheter contamination. The ClearGuard HD cap is CE-marked and similar to a standard CVC cap, but also contains a rod coated with chlorhexidine acetate, an antimicrobial agent, that extends into the CVC hub.

Health Technology Wales researchers searched for evidence on antimicrobial barrier caps for use with HD catheter hubs to reduce CRBSIs.

### Summary of evidence

#### Secondary evidence

##### Guidance and guidelines

According to the National Institute for Health and Care Excellence (NICE) clinical guidelines, vascular access devices should be decontaminated before and after access using chlorhexidine gluconate in 70% alcohol (NICE CG139. 2017).

##### Systematic reviews

We identified one systematic review and meta-analysis comparing the effects of antiseptic barrier cap use (Curos and the SwabCap, both with CE marks) and manual disinfection on the incidence of central line-associated bloodstream infections (CLABSIs) in adults and children. Nine studies were included in the review, all of which were non-randomised and used a before-and-after design to compare interventions. Pooled analysis found that the antiseptic barrier cap compared to manual disinfection is associated with a reduction in the incidence of CLABSIs

(incidence rate ratio = 0.59, 95% confidence interval: 0.45 to 0.77,  $P < 0.001$ ) (Voor in 't holt et al. 2017).

### **Primary evidence**

In addition to the meta-analysis of observational trials described above, the manufacturer provided evidence from two cluster-randomised trials that compared the ClearGuard HD cap to either the Tego Connector with the Curox Disinfecting Cap, or to standard MPC-125 caps in people having haemodialysis. Both trials measured the incidence of bloodstream infections as their primary outcome, and reported significantly lower rates of bloodstream infections with the ClearGuard HD cap compared to controls (Hymes et al. 2017; Brunelli et al. 2018).

### **Cost**

All studies in the systematic review that described cost concluded that use of the antiseptic barrier caps (Curox and SwabCap) is cost-saving. Net savings ranged from \$39,050 to \$3,268,990. Calculating the mean device costs per avoided CLABSI, assuming no other costs are involved such as training/implementation costs, showed that using the device is cost saving if the additional costs attributed to one CLABSI do not exceed \$1,996 to \$3,556 (Voor in 't holt et al. 2017).

## **Areas of uncertainty**

Although the systematic review we identified suggested that use of antiseptic barrier caps can lower the occurrence of CLABSIs and is cost saving, funnel plots suggested that publication bias was present. None of the studies included in the systematic review were randomised controlled trials and we did not identify evidence for use in children. The cost information provided in the systematic review did not specifically relate to ClearGuard HD caps, and so more evidence on this is required. The economic studies were reported in US dollars, and it is uncertain whether their findings could be translated to the Welsh health and care setting. Clarification is needed on the current comparators in use in Wales.

## **Conclusions**

The evidence we identified suggests that use of antiseptic barrier caps could be beneficial. However, the randomised controlled trials that we identified only include adult patients, and further studies in children would be useful. A fuller appraisal would be required to explore the clinical and cost effectiveness of antimicrobial barrier caps for use with HD catheter hubs in more detail.

## Brief literature search results

Resource	Results
HTA organisations	
<a href="#">Healthcare Improvement Scotland</a>	We did not identify any relevant evidence from this source
<a href="#">Health Technology Assessment Group</a>	We did not identify any relevant evidence from this source
<a href="#">Health Information and Quality Authority</a>	We did not identify any relevant evidence from this source
UK guidelines and guidance	
<a href="#">SIGN</a>	We did not identify any relevant evidence from this source
<a href="#">NICE</a>	Clinical guideline (CG) 139. Healthcare-associated infections: prevention and control in primary and community care. Published March 21012. Last updated: February 2017. <a href="https://www.nice.org.uk/guidance/cg139">https://www.nice.org.uk/guidance/cg139</a>
Secondary literature and economic evaluations	
<a href="#">ECRI</a>	We did not identify any relevant evidence from this source
<a href="#">EUnetHTA</a>	We did not identify any relevant evidence from this source
<a href="#">Cochrane library</a>	We did not identify any additional evidence from this source
<a href="#">Medline</a> (Ovid)	Voor in 't holt, AF, Helder OK, Vos Schafthuizen MC, Sülz L, van den Hoogen S, Ista, E. (2017). Antiseptic barrier cap effective in reducing central line-associated bloodstream infections: A systematic review and meta-analysis. International Journal of Nursing Studies, 69: 34-40. <a href="https://doi.org/10.1016/j.ijnurstu.2017.01.007">https://doi.org/10.1016/j.ijnurstu.2017.01.007</a>
Primary studies	
<a href="#">Cochrane library</a>	We did not identify any additional evidence from this source
<a href="#">Medline</a>	We did not identify any additional evidence from this source
Ongoing primary or secondary research	
<a href="#">PROSPERO database</a>	We did not identify any relevant evidence from this source
<a href="#">Clinicaltrials.gov</a>	We did not identify any relevant evidence from this source
Other	

<p><i>Evidence provided by the topic proposer</i></p>	<p>Brunelli SM, Van Wyck DB, Njord L, Killion DP, Lynch LE, Ziebol RJ. 2018. Cluster-Randomized Trial of Devices to Prevent Catheter-Related Bloodstream Infection. Journal of the American Society of Nephrology; 29:1336-1343.  <a href="https://doi.org/10.1681/ASN.2017080870">https://doi.org/10.1681/ASN.2017080870</a></p> <p>Hymes JL, Mooney A, Van Zandt C, Lynch L, Ziebol R, Killion D. 2017. Dialysis catheter-related bloodstream infections: a cluster-randomized trial of the ClearGuard HD antimicrobial barrier cap. Am J Kidney Dis 69(2): 220-227  <a href="https://doi.org/10.1053/j.ajkd.2016.09.014">https://doi.org/10.1053/j.ajkd.2016.09.014</a></p>
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<p>Date of search:</p>	<p>April 2020</p>
<p>Concepts used:</p>	<p>ClearGuard, catheter-related bloodstream infection, CRBSI, central line-associated bloodstream infections, CLABSI, antimicrobial cap, catheter cap, antimicrobial coat</p>