

# Interventions to reduce catheter-associated urinary tract infections in primary care settings: A systematic Review



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## Introduction

- ❖ Catheter-associated urinary tract infection (CAUTI) is the most common adverse event from urinary catheter use, leading to various clinical complications.
- ❖ Despite being largely preventable, CAUTI significantly impacts patient outcomes, extends hospital stays, and increases morbidity and mortality rates [1].
- ❖ In the United States (USA), the estimated annual additional costs for treating CAUTI amount to approximately \$36 billion [2].
- ❖ In the United Kingdom (UK), CAUTIs are reported to cost the National Health Service (NHS) £1.0-2.5 billion and are responsible for 2100 deaths annually [2].

## Methods

- ❖ The review adhered to a pre-defined protocol that was registered with the International Prospective Register of Systematic Reviews (PROSPERO; CRD42023474674: Rabi et al., 2023).
- ❖ Three trial registries and seven electronic databases were systematically searched to identify eligible studies published in English, from date of inception to December 2023.
- ❖ Search strategy and search terms were developed in collaboration with the Subject Librarian for Pharmacy at Queen's University Belfast.
- ❖ Randomised controlled trials (RCTs) and non-randomised studies, focusing on interventions to reduce CAUTIs in primary care, were eligible for inclusion in this review.
- ❖ Eligibility assessment was conducted by two independent reviewers (AR and CP), with any disagreements resolved by a third reviewer (CMcC).
- ❖ Risk of bias assessed using the Cochrane Risk of Bias s (ROB 2.0) tool.

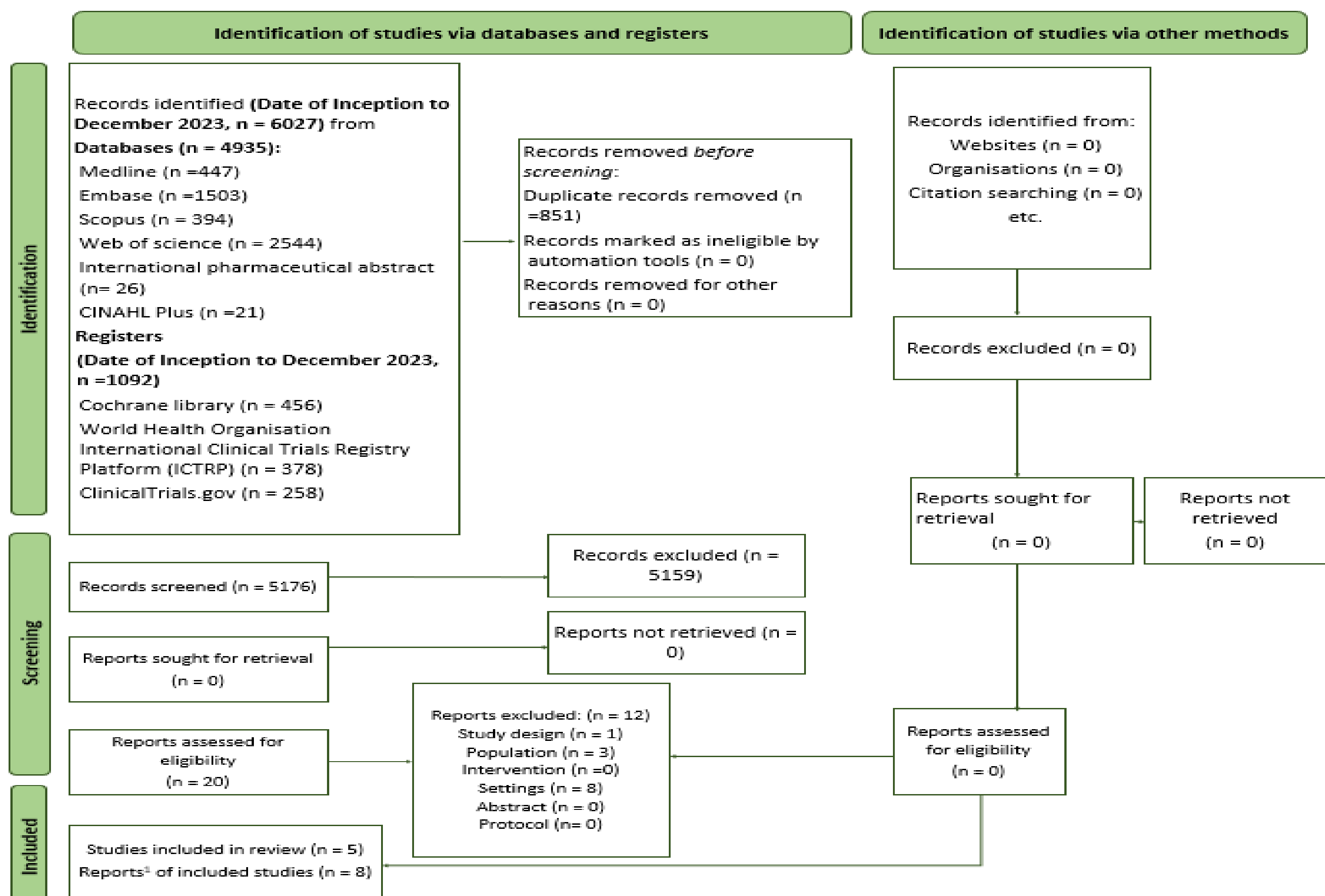


Figure 1. PRISMA flowchart showing the screening process and reasons for study exclusion

## Aims and Objectives

- ❖ The primary aim of this study was to conduct a systematic exploration of interventions specifically designed to reduce CAUTIs within primary care settings and evaluate their effectiveness.
- ❖ To accomplish this overarching aim, this systematic review was structured around the following specific objectives:
  - To identify the clinical interventions implemented to reduce CAUTIs in primary care.
  - To assess the impact and effectiveness of these interventions on clinical outcomes among urinary catheterised patients within primary care.

## Results

- ❖ As shown in Figure 1, a total of 6027 articles were retrieved through the selected databases and trial registries. After removing duplicates, 5176 articles were screened by titles and abstracts. Twenty articles underwent full-text screening, with five RCTs meeting inclusion criteria.
- ❖ Interventions included clean vs. sterile intermittent catheterisation techniques [3], sterile water vs. 0.05% chlorhexidine gluconate solution for periurethral cleansing during urinary catheterisation [4], a targeted infection prevention programs (TIP) [5], self-management education programs designed to improve catheter self-management skills [6], and continuous low-dose antibiotic prophylaxis [7].
- ❖ Clean technique was as effective as sterile technique while being more cost-effective. TIP significantly reduced CAUTI rates (adjusted hazard ratio 0.54, 95% CI 0.30-0.97) and antibiotic prophylaxis showed a 48% reduction in UTI incidence (incidence rate ratio 0.52, 95% CI 0.44-0.61). While this finding supports the use of antibiotic prophylaxis, the increased rates of antibiotic resistance observed in the prophylaxis group raise concerns about the long-term sustainability and safety of this approach. However, self-management education showed limited long-term effectiveness.

Study	Risk of bias domains					Overall
	D1	D2	D3	D4	D5	
Duffy et al., 1995	-	X	+	+	-	X
Cheung et al., 2008	-	-	+	-	-	-
Mody et al., 2015	+	+	+	+	+	+
Wilde et al., 2015	+	+	+	+	-	-
Fisher et al. 2018	+	+	+	+	+	+

Domains:  
D1: Bias arising from the randomization process.  
D2: Bias due to deviations from intended intervention.  
D3: Bias due to missing outcome data.  
D4: Bias in measurement of the outcome.  
D5: Bias in selection of the reported result.

Judgement  
X High  
- Some concerns  
+ Low

Figure 2. Risk-of-bias summary: review authors' judgments about each risk of bias item for each included RCT. (+) Low risk of bias; (-) Some concerns of bias; (X) High risk of bias

## Conclusion

This systematic review identified five RCTs evaluating clinical interventions to reduce CAUTIs in primary care settings. Targeted infection prevention programmes and continuous low-dose antibiotic prophylaxis showed the most promise, while interventions such as clean vs. sterile catheterisation, antiseptic cleansing solutions, and self-management education had limited impact. However, the heterogeneity of interventions and limited evidence base highlight the need for further high-quality research. Future studies should prioritize long-term effectiveness and sustainable non-antibiotic strategies for CAUTI prevention in primary care.

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