

A Systematic Review of economic evaluations of healthcare associated infection prevention and control interventions in long term care facilities

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Background

Long-term care facilities (LTCFs) serve a vulnerable population where healthcare-associated infections (HCAIs) are common and burdensome. Infection prevention and control (IPC) measures aim to protect residents and staff, and include the clinical best practices (CBPs) of 1. hand hygiene, 2. hygiene and sanitation, 3. screening, and 4. basic and additional precautions.

Methodology

We conducted a systematic review of the literature. Two reviewers conducted study selection, data extraction, and quality assessment of studies. We applied discounting rates of 3%, 5% and 8%, and presented all costs in 2022 Canadian dollars. The Dominance Ranking Matrix classification tool was used to determine if interventions should be rejected, favored, or if the decision remained unclear. The protocol of this review was registered and published.

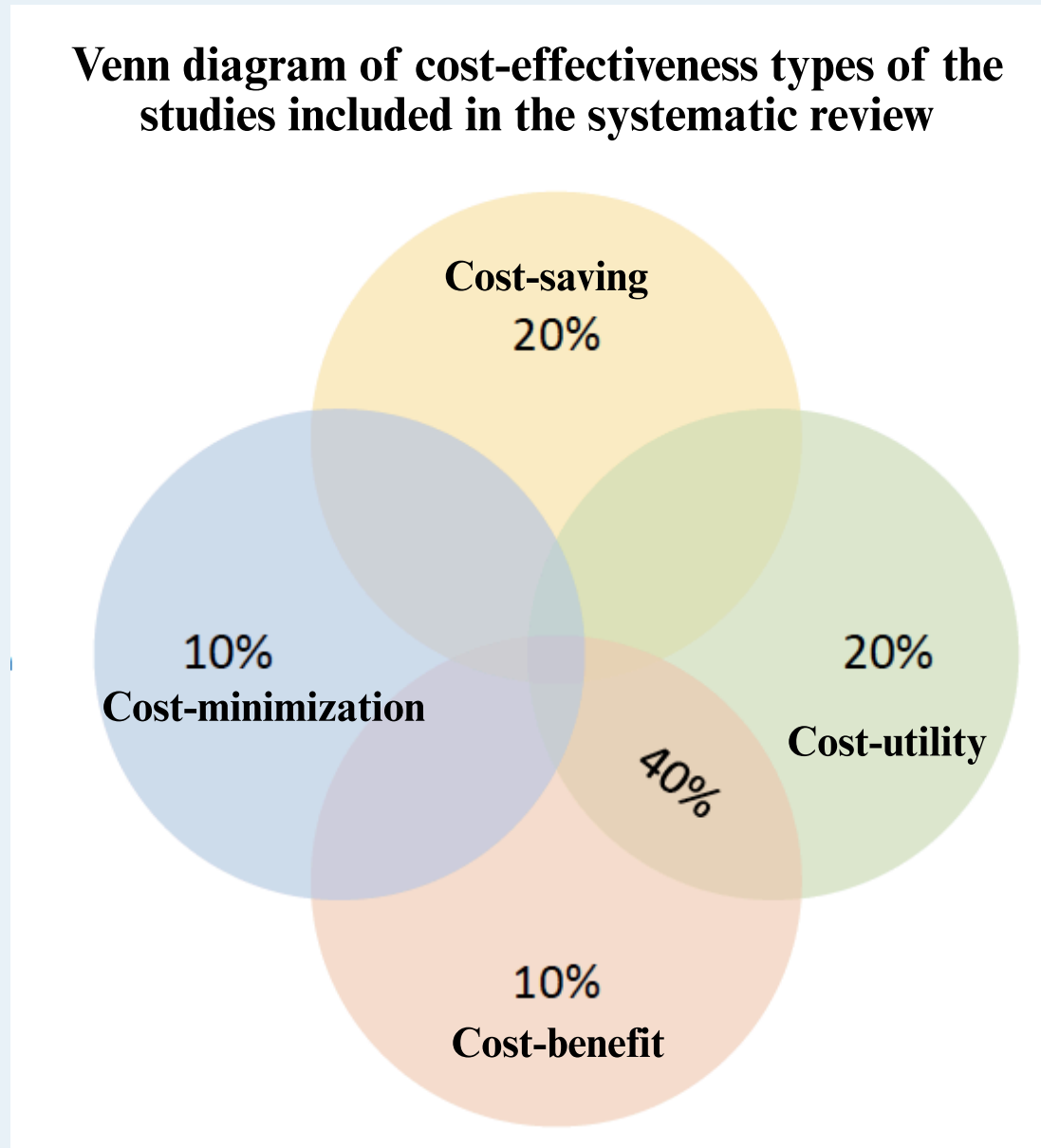
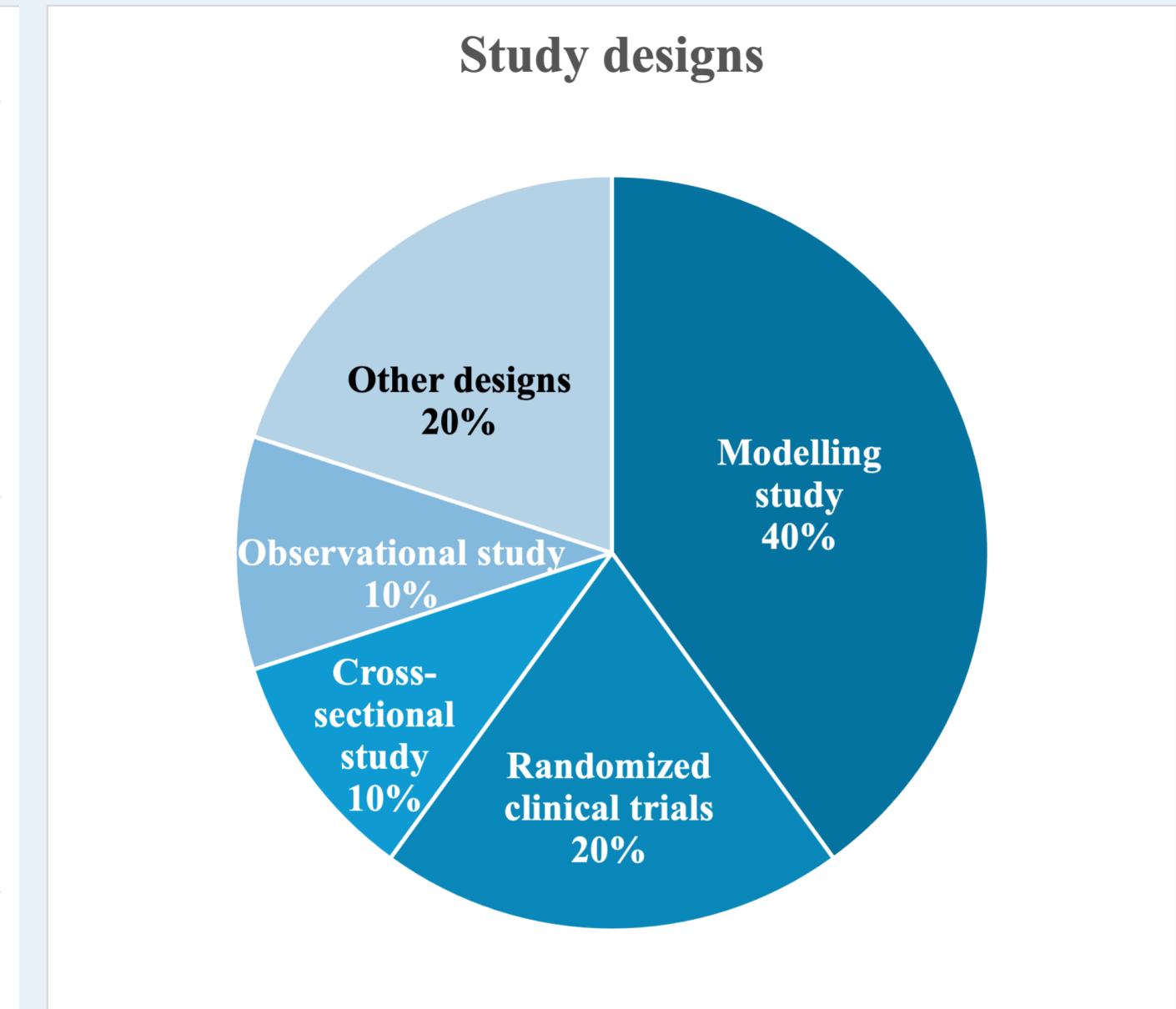
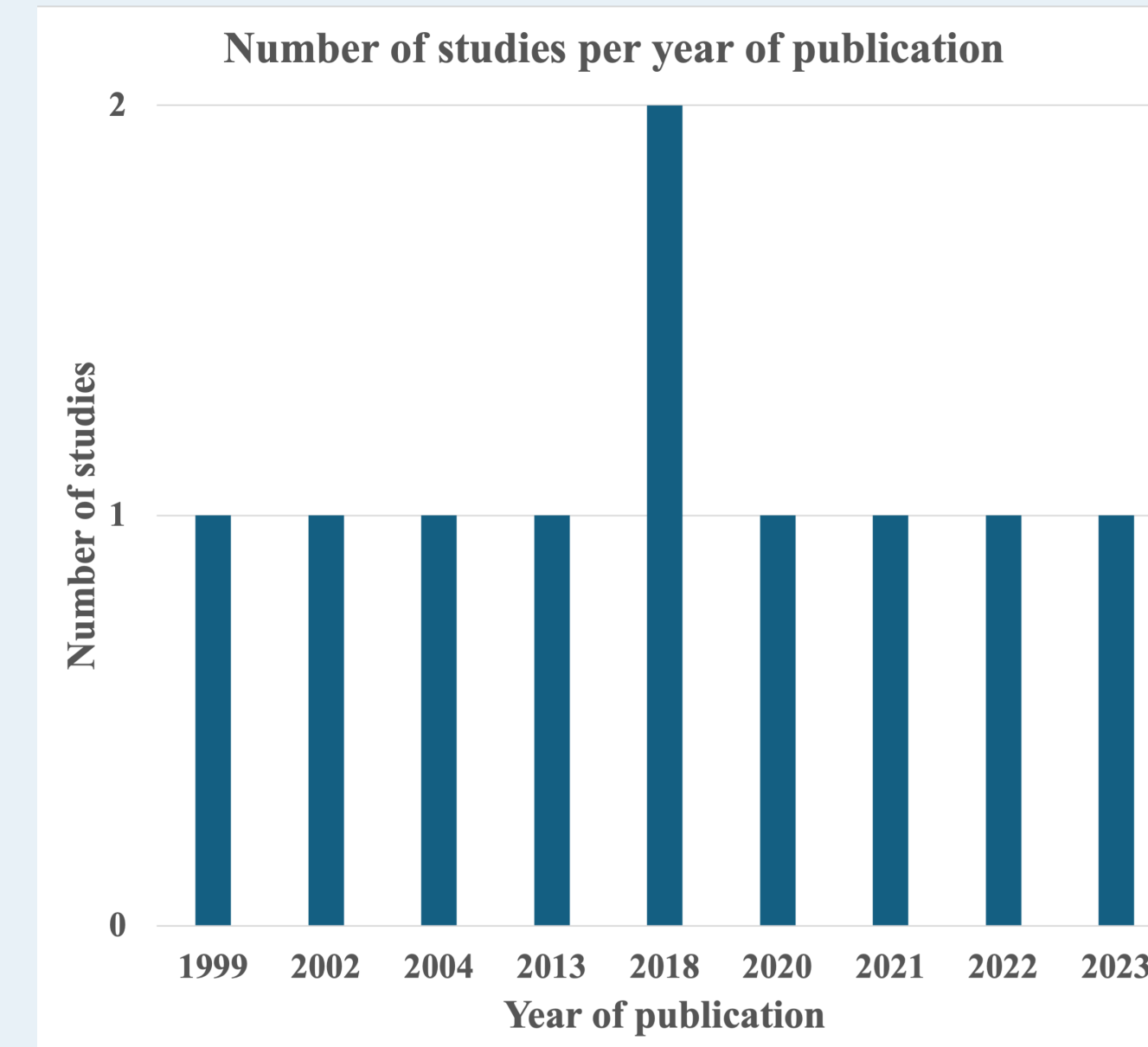
Inclusion and exclusion criteria based on Population, intervention, comparators and designs, outcomes and time (PICOT) framework

		Included	Excluded
Population	Geographic area	All countries	
	Establishment	Long-term care: nursing homes, assisted-living facilities, homes for the aged, retirement homes	
	Residents	All residents of LTCFs	Residents infected upon admission to LTCF
Intervention		Clinical best practices (Hand hygiene; hygiene and sanitation; screening on admission; basic and additional precautions)	Other interventions (antibiotics, medications)
Comparators and designs		Quantitative studies: controlled clinical trials, randomised clinical trials, cohort studies, longitudinal studies, follow-up studies, prospective studies, retrospective studies, cross-sectional studies, mathematical/statistical modelling, and simulations	Qualitative studies, literature reviews (systematic reviews, meta-analyses, meta-syntheses, scoping reviews)
Outcomes		Cost-minimization analysis (CMA), cost-effectiveness analysis (CEA), cost-utility analysis (CUA), cost-benefit analysis (CBA), or cost-consequences analysis (CCA)	Technological assessments, purely clinical studies, pharmacological studies
Time		January 1 st 1990 – September 1 st 2023	Other dates of publication

Objective

This study synthesized the existing scientific literature describing economic evaluations of IPC measures using CBPs in LTCFs through a systematic review.

Results



Study	Main Result
Hutton et al., 2018	Rapid influenza A diagnostic services saved \$11,612 CAD annually and significantly shortened outbreak duration by up to 2.2 days
Church et al., 2002	A targeted CAUTI prevention program in nursing homes saved up to \$44,000CAD while improving Quality Adjusted Life Years (QALY)
Lee et al., 2021	A multi-drug-resistant organism registry and Carbapenem-resistant Enterobacteriaceae prevention bundle achieved up to 68.7 million USD societal costs saving and reduced infections and deaths
Salmerón et al., 2022	Quarterly COVID-19 screening avoided unnecessary sick leave and quarantine, saving \$14, 753 USD annually
Sansone & Bravo, 2023	A care bundle targeting urinary tract infections (UTIs) reduced UTI costs by \$33,907 USD and decreased UTI rates by 3.3%
Trick et al., 2004	Routine glove use was less costly than contact isolation, with similar infection rates for antimicrobial resistant organisms

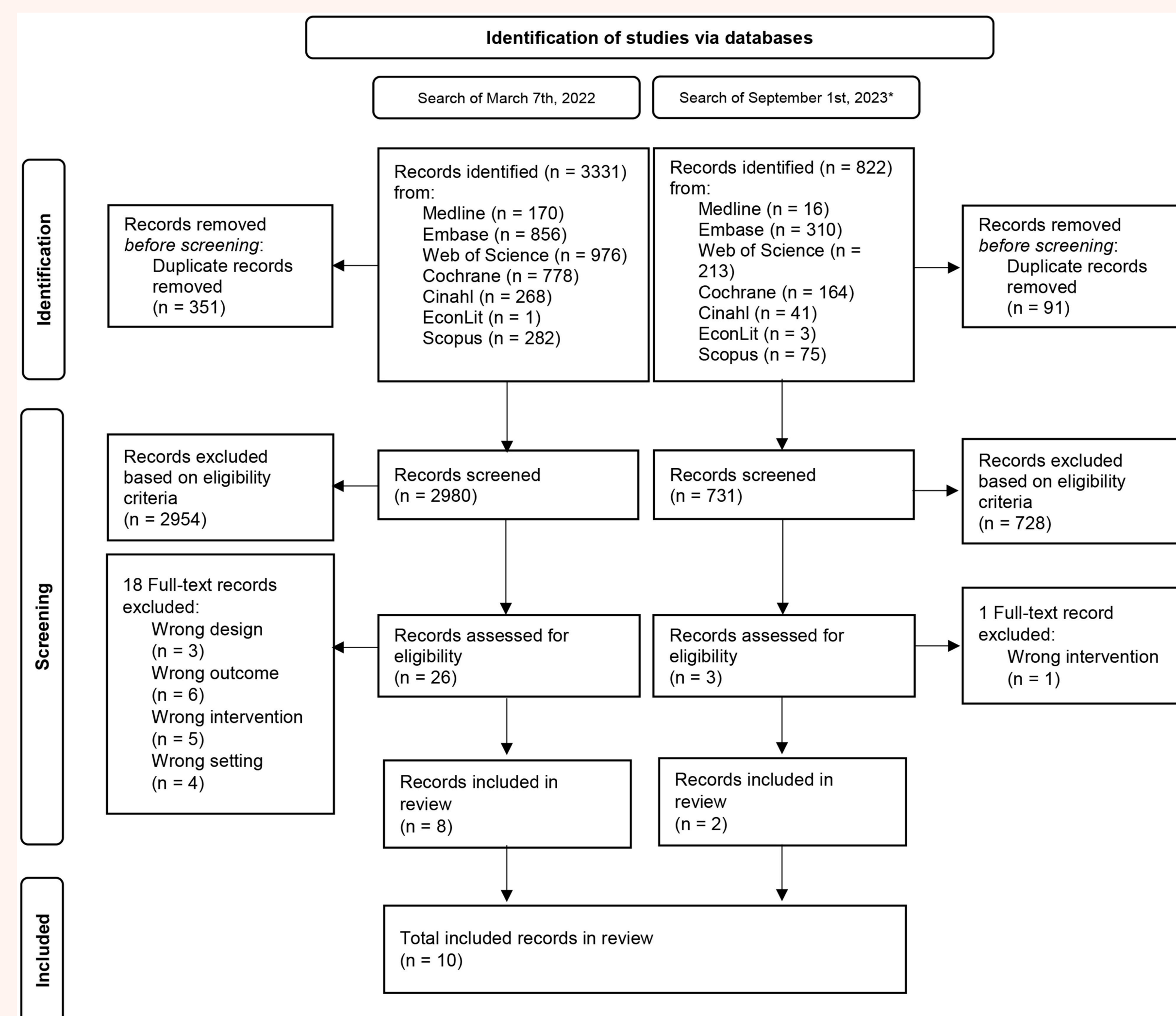
Note: CAD: Canadian dollars. CAUTI: Catheter associated urinary tract infections. USD: United States Dollars.

Dominance Ranking Matrix JBI	Campbell et al., 2020	Church et al., 2002	Hutton et al., 2018	Lee et al., 2021	Li et al., 2018	Marchand et al., 1999	Trick et al., 2004	Salmerón et al., 2022	Sansone & Bravo, 2023	Verma et al., 2013
Delta costs	+	-	-	-	+	+	-	-	-	+
Health benefits	+	+	+	+	+	+	0	0	+	+
Implication for decision makers	Unclear	Favor intervention	Favor intervention	Favor intervention	Unclear	Unclear	Favor intervention	Favor intervention	Favor intervention	Unclear

Discussion

- Most of the included studies were published between 2018 and 2021 (60%), demonstrating the increased recent interest in IPC cost-evaluation studies in LTCF, which has become particularly relevant after the Covid-19 pandemic.
- All the included studies agreed on the effectiveness of their IPC intervention in reducing HCAI; 6 of 10 demonstrated cost-effectiveness of practicing IPC.
- Only modelling and simulation studies calculated an incremental cost effectiveness ratio (ICER). Studies should explicitly define the ICER equation, specifying the numerator and denominator to facilitate comparison between studies. The ICER is important as it provides decision-makers with the knowledge of whether an intervention is "worth it", helping to establish a willingness-to-pay threshold.
- Our study highlights a lack of cost-effectiveness analyses in IPC studies, and methodological weaknesses that future evaluations should address

Flow diagram of study selection to include in the systematic review



*Search limited to records published in 2022 and 2023



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