

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Additional Precautions for Vancomycin-Resistant Enterococci in Patients admitted to Hospital: Clinical Effectiveness, Cost- Effectiveness, and Guidelines

Service Line: Rapid Response Service
Version: 1.0
Publication Date: July 23, 2019
Report Length: 11 Pages

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Cite As: *Additional Precautions for Vancomycin-Resistant Enterococci in Patients admitted to Hospital: Clinical Effectiveness, Cost-Effectiveness, and Guidelines*. Ottawa: CADTH; 2019 Jul. (CADTH rapid response report: summary of abstracts).

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Funding: CADTH receives funding from Canada's federal, provincial, and territorial governments, with the exception of Quebec.

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Research Questions

1. What is the clinical effectiveness of additional precautions for patients colonized or infected with vancomycin-resistant enterococci in a hospital setting?
2. What is the cost-effectiveness of additional precautions in patients who are colonized or infected with vancomycin-resistant enterococci in a hospital setting?
3. What are the evidence-based guidelines regarding additional precautions for patients colonized or infected with vancomycin-resistant enterococci in a hospital setting?

Key Findings

Two systematic reviews with meta-analysis, nine non-randomized studies, and one evidence-based guideline were identified regarding additional precautions for patients colonized or infected with vancomycin-resistant enterococci in a hospital setting.

Methods

A limited literature search was conducted by an information specialist on key resources including PubMed, the Cochrane Library, University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were vancomycin-resistant enterococci and additional precautions. No search filters were applied to limit retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2014 and July 10, 2019. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Any pediatric and adult patients admitted to hospital
Intervention	Additional precautions (e.g., isolation)
Comparator	Q1 & Q2: Any comparator; No additional precautions; Before and after additional precautions implementation Q3: No comparator
Outcomes	Q1: Clinical effectiveness (e.g., transmission of VRE, benefits/harms, sepsis, mortality/morbidity) Q2: Cost-effectiveness Q3: Evidence-based guidelines
Study Designs	Health technology assessments, systematic reviews, meta-analyses, randomized controlled trials, non-randomized studies, economic evaluations, evidence-based guidelines

VRE = vancomycin-resistant enterococci

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

Two systematic reviews with meta-analysis, nine non-randomized studies, and one evidence-based guideline were identified regarding additional precautions for patients colonized or infected with vancomycin-resistant enterococci (VRE) in a hospital setting. No relevant health technology assessments, randomized controlled trials, or economic evaluations were identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Two systematic reviews with meta-analysis^{1,2} and nine non-randomized studies were identified³⁻¹¹ regarding the clinical effectiveness of additional precautions for patients colonized or infected with VRE in a hospital setting. Detailed study characteristics are provided in Table 2.

Overall, the majority of study authors found no significant change in the incidence of VRE after the implementation or discontinuation of contact precautions.²⁻¹⁰ The authors of one systematic review found a significant reduction in the rate of VRE infection after the discontinuation of contact precautions.¹ The authors of one non-randomized study found an increase in VRE colonization after the relaxation of screening and isolation precautions, but its statistical significance is not stated.¹¹

The authors of one non-randomized study found a significant reduction in noninfectious adverse events following the discontinuation of contact precautions, especially in patients colonized or infected with VRE.⁵

Public Health Ontario recommends that isolation and contact precautions should only be used if there is an anticipated benefit with respect to decreased morbidity and mortality.¹² The guidelines also suggest that discontinuation of contact precautions will result in an increase in VRE colonization, infection, and bacteremia.¹²

Table 2: Characteristics of Included Literature

First Author, Year	Study Characteristics	Interventions and Comparators	Outcomes	Conclusions
Systematic Reviews and Meta-analyses				
Marra, 2018¹	Six studies relevant to VRE included	Before and after discontinuation of CPs	Several, including VRE infection rate	Significant reduction after discontinuation of CPs
De Angelis, 2014²	<ul style="list-style-type: none"> • Nine studies included (1 randomized clinical trial, 3 controlled clinical trials, 5 interrupted time series) • N = 30,949 patients 	Several, including: <ul style="list-style-type: none"> • Before and after implementation of CPs • Before and after implementation of isolation 	VRE acquisition rate	<ul style="list-style-type: none"> • No significant change after implementation of CPs • No studies available on effectiveness of isolation
Non-Randomized Studies				
Bearman, 2018³	<ul style="list-style-type: none"> • Interrupted time series design • ICUs and hospital wards in academic medical centre 	Several, including before and after discontinuation of CPs	Several, including VRE infection rate	No significant change
Furuya, 2018⁴	<ul style="list-style-type: none"> • Retrospective study • Six ICUs in academic medical centre • Follow-up 9 years 	<ul style="list-style-type: none"> • Before and after implementation of CPs • CPs (3 ICUs) • No CPs (3 ICUs) 	MDRO incidence rate (including VRE)	<ul style="list-style-type: none"> • No significant change after implementation of CPs • No significant difference between groups
Martin, 2018⁵	<ul style="list-style-type: none"> • Retrospective study • Inpatients in academic medical centre • Study period of two years (one year before and after intervention) 	Before and after discontinuation of CPs	<ul style="list-style-type: none"> • Noninfectious adverse events • Infectious adverse events 	<ul style="list-style-type: none"> • Significant reduction in noninfectious adverse events, especially in patients with VRE • No significant change in infectious adverse events
Bardossy, 2017⁶	<ul style="list-style-type: none"> • Retrospective study • Inpatients in teaching hospital • Study period of two years (one year before and after intervention) 	Before and after discontinuation of CPs	Several, including: <ul style="list-style-type: none"> • VRE CAUTI rate • VRE CLABSI rate 	No significant change
Ho, 2017⁷	<ul style="list-style-type: none"> • Retrospective study • Tertiary burn unit 	Before and after implementation of CPs	ARO acquisition rate (including VRE)	No significant change

First Author, Year	Study Characteristics	Interventions and Comparators	Outcomes	Conclusions
	<ul style="list-style-type: none"> N = 340 			
Almyroudis, 2016⁸	<ul style="list-style-type: none"> Prospective cohort study Inpatients in hematology-oncology unit Study period of six years (three years before and after intervention) 	Before and after discontinuation of CPs and active surveillance	Several, including incidence of VRE bacteremia	No significant change
Martin, 2016⁹	<ul style="list-style-type: none"> Retrospective study Two hospitals Study period of two years (one year before and after intervention) 	Several, including before and after discontinuation of CPs	Average positive culture rate	No significant change
Gandra, 2014¹⁰	<ul style="list-style-type: none"> Retrospective cohort study Hospitalized patients Study period of two years (one year before and after intervention) 	Several, including before and after discontinuation of CPs	Several, including: <ul style="list-style-type: none"> Rate of falls Rate of pressure ulcers VRE transmission 	No significant change
Popiel, 2014¹¹	<ul style="list-style-type: none"> Retrospective study Hospitalized and emergency room patients in tertiary care hospital Study period of 13 years 	Before and after relaxation of screening and isolation precautions	<ul style="list-style-type: none"> VRE colonization Possible VRE infection Definite VRE infection VRE bacteremia 	<ul style="list-style-type: none"> Increase in VRE colonization after relaxation of screening and isolation precautions Initial increase in VRE infection and bacteremia, which then plateaued during 34 months of follow-up

ARO = antibiotic-resistant organism; CAUTI = catheter-associated urinary tract infection; CLABSI = central line-associated bloodstream infection; CP = contact precaution; ICU = intensive care unit; MDRO = multi-drug resistant organism; VRE = vancomycin-resistant enterococci

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

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2. De Angelis G, Cataldo MA, De Waure C, et al. Infection control and prevention measures to reduce the spread of vancomycin-resistant enterococci in hospitalized patients: a systematic review and meta-analysis. *J Antimicrob Chemother*. 2014 May;69(5):1185-1192.
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Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

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5. Martin EM, Bryant B, Grogan TR, et al. Noninfectious hospital adverse events decline after elimination of contact precautions for MRSA and VRE. *Infect Control Hosp Epidemiol*. 2018 Jul;39(7):788-796.
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[PubMed: PM25441487](#)
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[PubMed: PM24915209](#)

Guidelines and Recommendations

12. Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Evidence review and revised recommendations for the control of vancomycin-resistant enterococci in all Ontario health care facilities. Toronto (ON): Queen's Printer for Ontario; 2019:
<https://www.publichealthontario.ca/-/media/documents/recommendations-vre.pdf?la=en>. Accessed 2019 Jul 23.
See: Sections 1.4 and 3.3

Appendix — Further Information

Previous CADTH Reports

13. Additional precautions for methicillin-resistant staphylococcus aureus, vancomycin-resistant enterococci and/or extended spectrum beta-lactamase producing organisms: clinical effectiveness and guidelines. (*CADTH rapid response report: summary of abstracts*). Ottawa (ON): CADTH; 2019 Jan: <https://cadth.ca/sites/default/files/pdf/htis/2019/RA1004%20ARO%20Additional%20Precautions%20Final.pdf>. Accessed 2019 Jul 23.
14. Vancomycin-resistant enterococci isolation and screening strategies: clinical evidence and cost-effectiveness. (*CADTH rapid response report: reference list*). Ottawa (ON): CADTH; 2014 Mar: <https://www.cadth.ca/media/pdf/htis/mar-2014/RA0662%20VRE%20Screening%20final.pdf>. Accessed 2019 Jul 23.

Non-Randomized Studies

Alternative Outcomes

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Methodology Unclear

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See: Section 3.5 and Appendix A

Review Articles

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