

**CADTH RAPID RESPONSE REPORT:
SUMMARY WITH CRITICAL APPRAISAL**

Disposable, Non-Sterile Gloves for Minor Surgical Procedures: A Review of Clinical Evidence

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Context and Policy Issues

Disposable glove wearing by healthcare workers is good practice for infection control for patients with minor surgical procedures such as laceration repair, Mohs surgical procedures for skin cancer in healthcare settings such as physician offices, dental offices or emergent care settings.¹⁻³ Despite this, the use of non-sterile gloves may raise the concern of infection, sterile gloves may cost 3.5 to 15 times more than non-sterile gloves,⁴ and their use as standard practice may not be necessary.

This Rapid Response review aims to compare the clinical benefits of disposable non-sterile gloves to sterile gloves for patients undergoing minor surgical procedures.

Research Question

What is the clinical evidence regarding the use of disposable, non-sterile gloves for minor surgical procedures in healthcare?

Key Findings

A meta-analysis on data from 13 studies that included outpatients undergoing cutaneous surgical procedures with healthcare professionals wearing sterile gloves or non-sterile gloves found postoperative surgical site infections (SSI) happened in 107 of 5031 patients in the non-sterile glove group (2.1%) and 121 of 6040 patients in the sterile glove group (2.0%). The risk of having SSI was not statistically different among patients when healthcare providers used sterile or non-sterile gloves.

Methods

Literature Search Methods

A limited literature search was conducted 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. No filters were applied to the main search to limit the retrieval by study type. A second broader search with the main concept of gloves only and methodological filters of health technology assessments, systematic reviews, meta-analyses was also included. For both searches, where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2007 and March 6, 2017.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients undergoing minor surgical procedures (e.g., laceration repair in urgent/emergent care settings, Mohs surgical procedure for skin cancer, minor procedures performed in medical offices)
Intervention	Disposable, non-sterile gloves worn by healthcare providers
Comparator	Disposable sterile gloves worn by healthcare providers
Outcomes	Clinical benefits, safety and harms (e.g., infection)
Study Designs	Health technology assessments (HTA), systematic reviews (SR), meta-analyses (MA), randomized controlled trials (RCTs), non-RCTs

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in Table 1, they were duplicate publications, or were published prior to 2007. Studies included in a selected systematic review were also excluded.

Critical Appraisal of Individual Studies

The included systematic review was critically appraised using the Amstar checklist.⁵ Summary scores were not calculated for the included studies; rather, a review of the strengths and limitations of each included study were described.

Summary of Evidence

Quantity of Research Available

A total of 352 citations were identified in the literature search. Following screening of titles and abstracts, 342 citations were excluded and 10 potentially relevant reports from the electronic search were retrieved for full-text review. One potentially relevant publication was retrieved from the grey literature search. Of these potentially relevant articles, 10 publications were excluded for various reasons, while one publication met the inclusion criteria and were included in this report. Appendix 1 describes the PRISMA flowchart of the study selection.

Summary of Study Characteristics

A 2016 US systematic review performed a meta-analysis on data from 13 studies (8 RCTs and 5 observational studies published between 1993 and 2015) that included 11071 outpatients undergoing cutaneous surgical procedures (Mohs surgery, outpatient dental procedures, laceration repair) with healthcare professionals wearing sterile gloves (n = 6040 patients) or non-sterile gloves (n = 5031 patients).⁶ Reported outcomes were percentage of patients in sterile glove group and non-sterile glove group having surgical site infection (SSI), and relative risk (RR) of having SSI in non-sterile glove group. Characteristics of the included SR are detailed in Appendix 2.

Summary of Critical Appraisal

The included systematic review⁶ had an a priori design provided, independent study selection and data extraction procedures in place, performed a comprehensive literature search, provided a list of included studies and study characteristics, and conducted a quality assessment of included studies which was used in formulating conclusions. There was homogeneity across trials, and conflict of interest was stated.

A list of excluded studies was not provided, and assessment of publication bias was not performed. Details of the critical appraisal of the included SR are presented in Appendix 3.

Summary of Findings

The main findings of the included study are presented in Appendix 4.

A 2016 systematic review performed meta-analysis on data from 13 studies (8 RCTs and 5 observational studies) that included 11071 outpatients undergoing cutaneous surgical procedures with healthcare professionals wearing sterile gloves (n = 6040 patients) or non-sterile gloves (n = 5031 patients).⁶Percentage of patients in sterile glove group and non-sterile glove group having SSI, and RR of having SSI in non-sterile glove group were determined.

Postoperative SSI were found in 228 patients (2.1%), including 107 of 5031 patients in the non-sterile glove group (2.1%) and 121 of 6040 patients in the sterile glove group (2.0%).

RR for SSI with non-sterile glove use was 1.06 (95% confidence interval [CI], 0.81 to 1.39). Subgroup analysis based on study design found RR 0.95 (95% CI, 0.65 to 1.40) for RCTs and 1.19 (95% CI, 0.81 to 1.73) for observational studies.

Low heterogeneity was identified among the included studies ($I^2 = 0\%$).

The authors concluded that there was no difference found in the rate of SSI between outpatient surgical procedures using sterile vs non-sterile gloves.

Limitations

Five of thirteen studies included in the systematic review were observational studies. Quality assessment was done for the included studies and showed all studies were deemed to be high quality. Risk of publication bias was not determined. Despite the low heterogeneity among the included studies, there are potential differences among the included studies on details of surgical sites antiseptic measures, use of topical or systemic antibiotics, or details of hand scrubbing or washing that the SR could not consider.

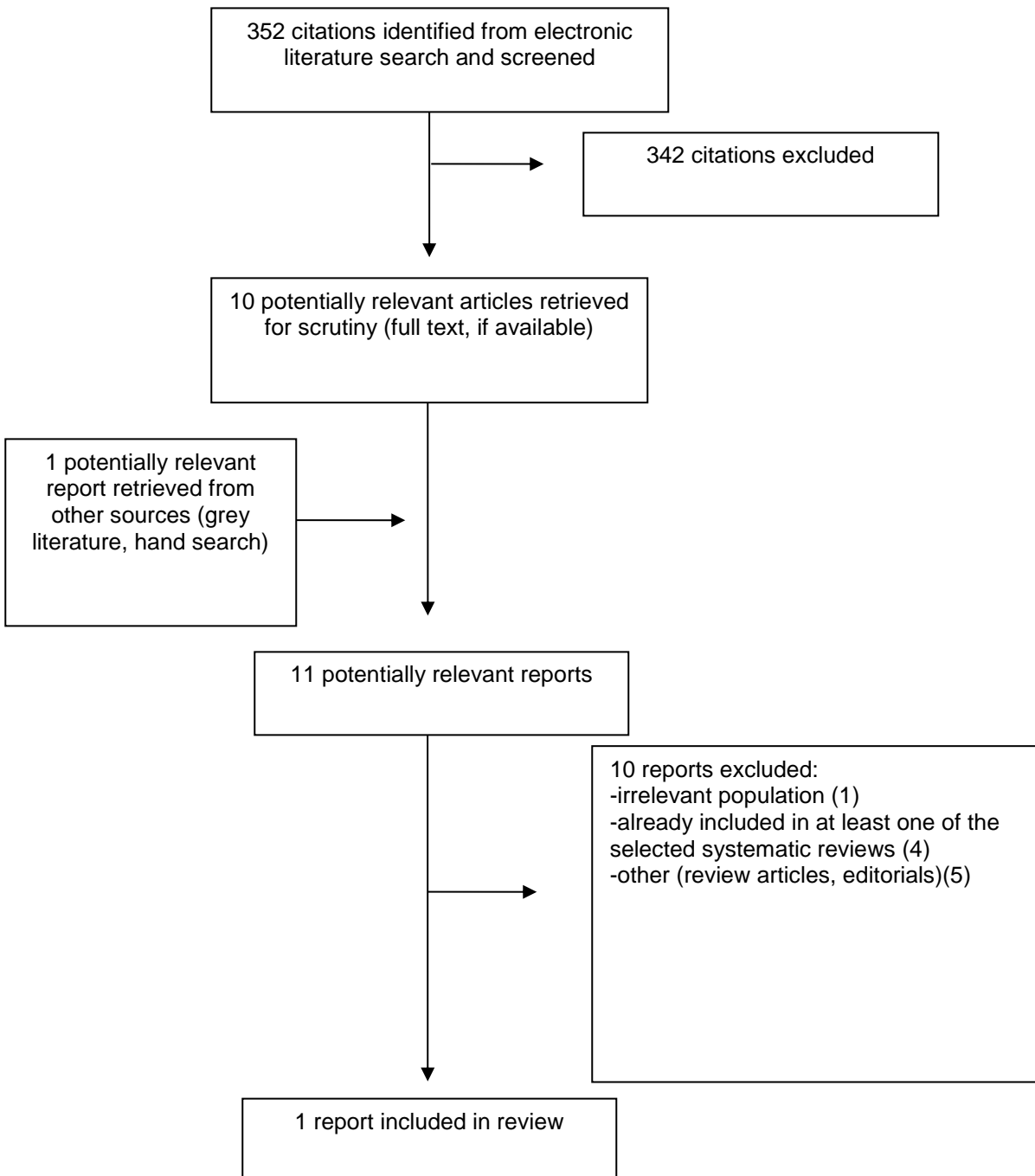
Conclusions and Implications for Decision or Policy Making

Findings from a meta-analysis that included 11071 outpatients undergoing cutaneous surgical procedures showed that postoperative SSI was 2.1% of patients in the non-sterile glove group and 2.0% in the sterile glove group. There was no difference in the risk of having SSI among patients when healthcare providers used sterile or non-sterile gloves.

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Appendix 1: Selection of Included Studies



Appendix 2: Characteristics of Included Publications

First Author, Year, Country	Literature Search Strategy	Inclusion Criteria	Exclusion Criteria	Number of studies included Main outcomes
Brewer, ⁶ 2016, US	<i>“This systematic review and meta-analysis identified studies from Ovid MEDLINE (1946 to present), Ovid Cochrane Central Register of Controlled Trials (1991 to present), Ovid EMBASE (1988 to present), EBSCO Cumulative Index to Nursing and Allied Health Literature (1980 to present), Scopus (1996 to present), and Web of Science (1975 to present).” (p1008)</i>	<i>“Studies included in this systematic review and meta-analysis were randomized clinical trials or prospective or retrospective observational comparative studies. The patients in the studies underwent an outpatient cutaneous or mucosal surgical procedure, including MMS, laceration repair, standard excisions, and tooth extractions. The procedures used sterile or nonsterile gloves, and documentation of postoperative SSI was present.” (p 1009)</i>	Studies that did not meet inclusion criteria	13 studies included in final analysis(8 RCTs, 5 observational studies) Outcomes: Percentage of patients in sterile glove group and non-sterile glove group having surgical site infection (SSI) Relative risk (RR) of having SSI in non-sterile glove group

RCTs = randomized controlled trials; SSI = surgical site infections

Appendix 3: Critical Appraisal of Included Publications

Table A2: Strengths and Limitations of Systematic Reviews and Meta-Analyses using Amstar⁵

Strengths	Limitations
Brewer ⁶	
<ul style="list-style-type: none"> • a priori design provided • independent studies selection and data extraction procedure in place • comprehensive literature search performed • list of included studies, studies characteristics provided • quality assessment of included studies provided and used in formulating conclusions • homogeneity across trials • conflict of interest stated 	<ul style="list-style-type: none"> • list of excluded studies not provided • assessment of publication bias not performed

Appendix 4: Main Study Findings and Author’s Conclusions

Table A3: Summary of Findings of Included Studies

Main Study Findings	Author’s Conclusion
Brewer, 2016 ⁵	
<p>Postoperative SSI 228 patients (2.1%)</p> <p>107 of 5031 patients in the non-sterile glove group (2.1%) 121 of 6040 patients in the sterile glove group (2.0%).</p> <p>RR for SSI with non-sterile glove use Overall: 1.06 (95%CI, 0.81-1.39)</p> <p>RCTs: 0.95 (95% CI, 0.65 – 1.40) Observational studies: 1.19 (95% CI, 0.81 – 1.73)</p> <p>Low heterogeneity was observed among the included studies ($I^2 = 0\%$)</p>	<p><i>“No difference was found in the rate of postoperative SSI between outpatient surgical procedures performed with sterile vs nonsterile gloves.” (p 1008)</i></p>

RR = relative risk; SSI = surgical site infections