



TITLE: Filtered Needles for Withdrawing Medication from Glass Ampoules: A Review of the Cost-Effectiveness and Incidence of Complications

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CONTEXT AND POLICY ISSUES:

Glass particle contamination can occur when opening single use glass ampoules of medication, and injection of these particles has been associated with phlebitis, pulmonary thrombi or micro-emboli, and end organ granulomas or inflammation.^{1,2} Use of a 5 micron filter needle or straw to withdraw medication from the ampoule can reduce the number of particles aspirated,^{1,2} however the incidence of complications from glass particle administration and cost-effectiveness of using filtered needles are not known.

RESEARCH QUESTIONS:

1. What is the cost-effectiveness of using filtered needles for withdrawing medication from glass ampoules?
2. What is the incidence of complications if non-filtered needles are used for withdrawing medication from glass ampoules?

METHODS:

A limited literature search was conducted on key health technology assessment resources, including PubMed, Cinahl, Embase, The Cochrane Library (Issue 1, 2010), University of York Centre for Reviews and Dissemination (CRD) databases, ECRI, EuroScan, international health technology agencies, and a focused Internet search. The search was limited to English language articles published between 2000 and February 2010. No filters were applied to limit the retrieval by study type. The search was supplemented by hand searching reference lists of relevant articles.

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SUMMARY OF FINDINGS:

The literature search identified no systematic reviews, health technology assessments, randomized controlled trials, or observational studies published in the last 10 years that addressed the incidence of complications from injection of glass particles from ampoules. No cost-effectiveness studies were identified.

A number of potentially relevant studies published prior to the search date limits were identified when hand searching the reference lists of review articles. These have been listed in the appendix. All of these were published more than 10 years ago and therefore have not been appraised as part of this HTIS report.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING:

Due to the lack of recent published literature, no conclusions can be drawn on the incidence of complications from glass particle administration, or the cost-effectiveness of using a filtered needle when withdrawing medication from a glass ampoule.

PREPARED BY:

Health Technology Inquiry Service

Email: htis@cadth.ca

Tel: 1-866-898-8439

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2. Zabir AF, Choy CY, Rusdan R. Glass particle contamination of parenteral preparations of intravenous drugs in anaesthetic practice. *Southern African Journal of Anaesthesia and Analgesia*. 2008;14(3):17-9.

APPENDIX: REFERENCES PUBLISHED MORE THAN 10 YEARS AGO

Note: these articles were identified from hand searching reference lists of review and other articles found in our limited literature search and therefore this list cannot be considered exhaustive.

Cost-effectiveness of filtered needles

1. Zbrozek AS, Agbara E, Head M. Mannitol injections: with or without filter needles? A cost-effectiveness analysis. *Nurs Econ*. 1994 Jul;12(4):196-200. [PubMed: PM8945274](#)

Complications from particulate administration

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3. Furgang FA. Letter: Glass particles in ampules. *Anesthesiology*. 1974 Nov;41(5):525. [PubMed: PM4429225](#)
4. Garvan JM, Gunner BW. The harmful effects of particles in intravenous fluids. *Med J Aust*. 1964 Jul 4;2:1-6. [PubMed: PM14175312](#)
5. Lockhart JD. The medical significance of particulate matter in large volume parenteral solutions. Safety of large volume parenteral solutions. In: National Symposium Proceedings, FDA. Washington (DC): U.S. Food and Drug Administration (FDA); 1966. p.28-30.
6. Michaels L, Poole RW. Injection granuloma of the buttock. *CMAJ* [Internet]. 1970 Mar 28 [cited 2010 Feb 22];102(6):626-8. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1946600> [PubMed: PM5437395](#)
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10. Zacher AN, Zornow MH, Evans G. Drug contamination from opening glass ampules. *Anesthesiology*. 1991 Nov;75(5):893-5. [PubMed: PM1952213](#)