CADTH Reference List

Safe Handling of Cytotoxic Drugs and Medications

August 2023
Key Message
We found 5 evidence-based guidelines about the safe handling of cytotoxic drugs and/or medications.

Research Question
What are recommendations regarding the safe handling of cytotoxic drugs and/or medications?

Methods

Literature Search Methods
An information specialist conducted a literature search on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the International HTA Database, as well as a focused internet search. The search approach was customized to retrieve a limited set of results, balancing comprehensiveness with relevancy. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine’s MeSH (Medical Subject Headings), and keywords. Search concepts were developed based on the elements of the research questions and selection criteria. The main search concepts were cytotoxic drugs, health care staff, and terms for safety, handling, exposure, or protection. CADTH-developed search filters were applied to limit retrieval to guidelines. The search was completed on July 26, 2023, and limited to English-language documents published since January 1, 2018. Internet links were provided, where available.

Selection Criteria and Summary Methods
One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in Table 1. Full texts of study publications were not reviewed. The Overall Summary of Findings was based on information available in the abstracts of selected publications. Open access full-text versions of evidence-based guidelines were reviewed when available, and relevant recommendations were summarized.

Table 1: Selection Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
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<tbody>
<tr>
<td>Population</td>
<td>Individuals who handle cytotoxic drugs and/or medications</td>
</tr>
<tr>
<td>Intervention</td>
<td>Safe handling policies and/or practices</td>
</tr>
<tr>
<td>Comparator</td>
<td>Not applicable</td>
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<tr>
<td>Outcomes</td>
<td>Recommendations to reduce the risk of cytotoxic hazard, including endocrine and/or reproductive risk</td>
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<tr>
<td>Study designs</td>
<td>Evidence-based guidelines</td>
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</table>
Results
Five evidence-based guidelines about the safe handling of cytotoxic drugs and/or medications were identified.\textsuperscript{1-5}

Additional references of potential interest that did not meet the inclusion criteria are provided in Appendix 1.

Overall Summary of Findings
Five evidence-based guidelines\textsuperscript{1-5} were identified regarding the safe handling of cytotoxic drugs and/or medications. Three guidelines were developed internationally\textsuperscript{1-3} and 2 were developed or intended for use within Canada.\textsuperscript{4,5}

One guideline\textsuperscript{3} focused on the prescribing, dispensing, and administration of systemic cancer drugs with a section focused on safe handling of intrathecal drugs, 1 guideline\textsuperscript{5} focused on oral anticancer agents in a community pharmacy setting, and 3 guidelines\textsuperscript{1,2,4} focused on the safe handling of hazardous drugs at all stages from reception to disposal. Some general themes that emerged from recommendations provided in the guidelines were training and education of staff involved with cytotoxic agents;\textsuperscript{1,3-5} drug reception, delivery, unpacking, and storage;\textsuperscript{1,3-5} preparation and dispensing of cytotoxic drugs;\textsuperscript{4} administration of cytotoxic agents to patients;\textsuperscript{1,3,4} personal protective equipment required for handling and administration of drugs; best practices on donning and removal;\textsuperscript{1,3-5} and waste clearance and disposal.\textsuperscript{1,3-5}

Furthermore, the Clinical Oncology Society of Australia provides specific recommendations for the safe handling of cytotoxic agents for health care professionals who provide care to patients at home.\textsuperscript{4} The American Society of Clinical Oncology provides a standard for alternative duty whereby workers actively trying to conceive, are pregnant, or breastfeeding should be offered alternative work options that do not involve the handling of cytotoxic agents.\textsuperscript{2} Additionally, 2 of the identified guidelines\textsuperscript{2,4} provide recommendations with respect to engineering controls regarding the air-conditioning, heating, and ventilation of rooms where preparation of cytotoxic drugs occurs. The same 2 guidelines\textsuperscript{2,4} also provide recommendations regarding medical surveillance to investigate potential health effects of individuals who handled cytotoxic drugs.

A summary of guideline recommendations can be found in Table 2.

Table 2: Summary of Recommendations in Included Guidelines

<table>
<thead>
<tr>
<th>Guideline development group or author (year)</th>
<th>Guideline development group region</th>
<th>Summary of recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liu et al. (2023)\textsuperscript{1}</td>
<td>China</td>
<td>Specific recommendations for handling antineoplastics can be found in the full text (p. 3-7). Recommendations cover the following areas:</td>
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<tr>
<td></td>
<td></td>
<td>* Emergency spill treatment facilities (i.e., spill kit during the delivery, mixture,</td>
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<tr>
<td>Guideline development group or author (year)</td>
<td>Guideline development group region</td>
<td>Summary of recommendations</td>
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<td></td>
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<td>administration, and disposal of the antineoplastic drug)</td>
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<tr>
<td></td>
<td></td>
<td>• Procedures for managing an accidental spill</td>
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<td></td>
<td></td>
<td>• Personnel exposure prevention training, including the contents of the training curriculum</td>
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<td></td>
<td></td>
<td>• Measures to avoid exposure to antineoplastic drugs and medications during drug delivery, reception, and storage</td>
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<td></td>
<td></td>
<td>• Measures to avoid exposure to antineoplastic drugs when dispensing both oral and IV formulations</td>
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<td></td>
<td></td>
<td>• Preventive measures to be taken when administering antineoplastic drugs and medications to patients</td>
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<td></td>
<td></td>
<td>• Measures to avoid exposure when disposing of antineoplastics</td>
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<tr>
<td>ASCO (2019)²</td>
<td>US</td>
<td>Standards for the safe handling of hazardous drugs including cytotoxic drugs and medications can be found in the full text. Recommendations cover:</td>
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<tr>
<td></td>
<td></td>
<td>• Medical surveillance (p. 602)</td>
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<td></td>
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<td>• Testing CSTDs (p. 604)</td>
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<td></td>
<td></td>
<td>• The external ventilation of C-SECs or C-SCAs (p. 606)</td>
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<td></td>
<td></td>
<td>• Alternative work options for health care workers who are actively trying to conceive, are pregnant, or are breastfeeding (p. 606)</td>
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<tr>
<td>COSA (2018)³</td>
<td>Australia</td>
<td>Specific recommendations and practice points regarding the handling of cytotoxic drugs can be found in the full text. Recommendations include, but are not limited to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Precautions and measures that health care professionals should follow (i.e., training, PPE, and policies and procedures organizations should develop and implement, p. 36 to 37)</td>
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<td></td>
<td></td>
<td>• Training needs required for medical staff in prescribing and administering intrathecal therapy (p.41)</td>
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<td></td>
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<td>• Safety processes to follow when delivering and storing cytotoxic drugs and medications (p. 48)</td>
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<td></td>
<td></td>
<td>• Precautions to follow handling patient waste (p.60)</td>
</tr>
<tr>
<td>Ontario Health-Cancer Care Ontario (2022)⁴</td>
<td>Ontario, Canada</td>
<td>Specific recommendations for the safe handling of hazardous drugs can be found in the full text (p. 1-16). Recommendations cover the following areas:</td>
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<tr>
<td></td>
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<td>• Continuing education required for staff involved with hazardous drugs</td>
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<td>• PPE required for handling drugs and best practices when handling hazardous drugs</td>
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<td>• Handling damaged containers upon reception of drugs</td>
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<td></td>
<td>• The unpacking and storage of hazardous drugs</td>
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<td>• Requirements for the oncology pharmacy, including air-conditioning, heating, and ventilation, systems</td>
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<td>• The preparation of all hazardous drugs — parenteral, oral, and topical preparations</td>
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<td></td>
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<td>• Transportation of hazardous drugs after they have been prepared</td>
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<td>• Technique for the safe administration of drugs to limit exposure</td>
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<td></td>
<td>• Best practices for health care professionals providing home care to patients, including waste clearance</td>
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<td></td>
<td></td>
<td>• Hazardous waste management</td>
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<tr>
<td></td>
<td></td>
<td>• Accidental exposure of hazardous drugs to a staff member’s skin or clothing</td>
</tr>
<tr>
<td>Guideline development group or author (year)</td>
<td>Guideline development group region</td>
<td>Summary of recommendations</td>
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</table>
| • Management of spills and the use of the spill kit  
• Medical surveillance to investigate potential health effects | Vu et al. (2018)  
Canada | Recommendations regarding the safe use and handling of oral anticancer drugs can be found throughout the text (p. 242-250). Recommendations cover the following areas:  
• Reception and unpacking of shipments  
• Storage  
• Preparation of oral drugs and equipment needed  
• Verification and dispensing of oral agents  
• PPE requirements  
• Disposal and waste management  
• Spill protocol including what a spill kit should include  
• Training and education required for the community pharmacy team |
References

Guidelines and Recommendations

International
Refer to Recommendations 3-11, and 14 (pages 3-7)

Refer to Bottom line box (pages 599-600); Medical surveillance standard (page 602); Alternative duty standard (page 606)

Refer to recommendations Q3.1.19 (page 36); Practice points for Q3.1.19 (pages 36-37); Q3.1.26 recommendation 2 (page 41); Q3.1.32 recommendation 4 (page 48); Q3.1.40 recommendation 5 (page 59); Q3.1.41 recommendation 2 (page 60)

Canada

Appendix 1: References of Potential Interest

Systematic Reviews
Closed-system transfer-devices for limiting exposure to cytotoxic anti-cancer drugs in healthcare professionals, patients and visitors.

Systematic Review of Guidelines

Guidelines and Recommendations
Unclear Methodology — International


Refer to Management of Extravasation (pages 3-4) and Prevention of Extravasation (pages 4-5)


Unclear Methodology — Canada


Alternative Methodology — International
Refer to Pre-administration- safe handling precautions; Administration- Oral anti-cancer drug administration

Refer to Consensus statements 2-3 (page 1570) and 7-8 (page 1573)


**Alternative Methodology — Canada**

**Position Statements**


**Additional References**

**Flowchart**

**Compendium of Policy Levers**

**Policy Lever Comparison**
User Guide

Qualitative study

Toolkit

Training Module
Authors: Candice Madakadze, Melissa Walter

Contributor: Weiyi Xie


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Questions or requests for information about this report can be directed to requests@cadth.ca