<800> Hazardous Drugs: What do I need to know?

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Learning Objectives

1. Describe the purpose and scope of General Chapter <800> Hazardous Drugs – Handling in Healthcare Settings

2. Identify which drugs are classified as hazardous drugs and the containment strategies that may be implemented

3. Describe the sections within General Chapter <800>
1. **General Chapter <800> becomes official and enforceable on July 1, 2018.**
   a. True
   b. False

2. **General Chapter <800> only applies to hospital and pharmacy settings.**
   a. True
   b. False

3. **Which of the following activities in within the scope of <800>?**
   a. Receiving HDs
   b. Compounding and Administering HDs
   c. Disposal of HDs
   d. All of the above
Self Assessment Questions

4. **May an entity perform an assessment of risk for methotrexate tablets?**
   a. Yes, if the methotrexate tablet will not be further manipulated
   b. Yes, if the methotrexate tablet will only be crushed
   c. No, methotrexate tablet is an antineoplastic HD
   d. Answers A & B

5. **Which HDs may be considered under an assessment of risk?**
   a. Antineoplastic drugs that only need to be counted or packaged
   b. Dosage forms of non-antineoplastic drugs
   c. Dosage forms of non-antineoplastic drugs with reproductive effects
   d. All of the above
General Chapters can be:

- **Enforceable**
  - Numbered below <1000>

- **Informational**
  - Numbered above <1000>

- **Specific for dietary supplements**
  - Numbered above <2000>

**Terminology**

- “**Shall**” OR “**Must**” requirements
- “**Should**” recommendations
**Hierarchy of USP Standards**

**General Notices** provides the basic assumptions and definitions for applying *USP–NF* compendial standards, which are applied to official articles recognized in monographs and any applicable general chapters.

**General Chapters** contain requirements applicable to monographs to which they apply. General Chapter requirements **supersede** General Notice requirements in case of conflict.

**Monograph** requirements are specific to the monograph in which they appear. Monograph requirements **supersede General Notice and General Chapter** requirements in case of conflict.
Council of Experts

- Healthcare Quality Standards Collaborative Group
  - Nomenclature & Labeling
  - Compounding

- Chemical Medicines Monographs Collaborative Group
  - Chemical Medicines Monographs 1
  - Chemical Medicines Monographs 2
  - Chemical Medicines Monographs 3

- Chemical Medicines Monographs Collaborative Group
  - Chemical Medicines Monographs 4
  - Chemical Medicines Monographs 5
  - Chemical Medicines Monographs 6

- Biologics Collaborative Group
  - BIO1 Peptides
  - BIO2 Proteins
  - BIO3 Complex Biologics
  - GC Biological Analysis

- Excipient Monographs Collaborative Group
  - Excipient Monographs 1
  - Excipient Monographs 2

- Dietary Supplements/Herbal Medicines/Foods Collaborative Group
  - Non-Botanical Dietary Supplements
  - Botanical Dietary Supplements & Herbal Medicines
  - Food Ingredients

- General Chapters Collaborative Group
  - Chemical Analysis
  - Physical Analysis
  - Statistics
  - Microbiology
  - Dosage Forms
  - Packaging and Distribution
USP Practitioner Standards

<795> Pharmaceutical Compounding – Nonsterile Preparations

<797> Pharmaceutical Compounding – Sterile Preparations

<800> Hazardous Drugs – Handling in Healthcare Settings
Purpose of <800>

- Approximately 8 million healthcare workers are potentially exposed to hazardous drugs (HDs) each year.

- <800> was developed to promote patient safety, worker safety, and environmental protection.
  - Defines practice and quality standards for handling Hazardous Drugs (HDs)
  - Builds on existing science, guidelines, and expertise
1960s
Reports in medical literature

1970s
European study found mutagenicity within urine of nurses. Beginning to evaluate occupational exposure in healthcare professionals

1980s
ASHP published TAB regarding HDs, primary focused on chemotherapy agents

2004
NIOSH published Alert on preventing occupational exposure to HDs

2011-2014
Expert panel formed, 1st and 2nd versions both published for public comment

Feb 2016
USP General Chapter <800> published

Jul 1 2018
USP General Chapter <800> enforceable
USP Standard-Setting Process

1. PUBLIC HEALTH NEED
   - Need identified by any stakeholder or USP
   - Need evaluated for possible standard development

2. DRAFT STANDARD
   - Best practices and scientific information collected

3. PUBLIC COMMENT PERIOD
   - Draft standard published for stakeholder input

4. REVIEW & APPROVAL
   - Comments evaluated and addressed
   - Comments evaluated and further revision and comment needed

5. PUBLICATION
   - Final standard published with official date at least 6 months after publication

STAKEHOLDER IMPLEMENTATION

USP PROCESS
USP convenes a committee of independent experts that are knowledgeable on the public health issue to develop the standard.

USP EXPERT COMMITTEE
- HEALTHCARE PRACTITIONERS
- ACADEMICIANS
- HEALTHCARE INDUSTRY
- REGULATORY AUTHORITIES (Non-voting Liaisons)
<800> Status

- Published in *USP-NF* and *Compounding Compendium*
- **Official Date**: July 1, 2018
- **Published Date**: February 1, 2016
Scope

Entire Life Cycle of HD

Receiving
Storing
Compounding

Dispensing
Administering
Disposal

Hospitals
Pharmacies
Veterinary offices

Skilled Nursing Facilities
Outpatient clinics

Pharmacists
Technicians
Nurses
Physicians

Veterinary personnel
Environmental Services

All Entities

All Healthcare Personnel
What is a Hazardous Drug (HD)?

- Any drug identified by ≥ 1 of the following criteria:
  - Carcinogenicity
  - Teratogenicity or other developmental toxicity
  - Reproductive toxicity
  - Organ toxicity at low doses
  - Genotoxicity
  - Structure and toxicity profiles of new drugs that mimic existing drugs determined hazardous by the above criteria
NIOSH publishes **List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings**

First published: 2004

Last published: 2016

[https://www.cdc.gov/niosh/docs/2016-161/pdfs/2016-161.pdf](https://www.cdc.gov/niosh/docs/2016-161/pdfs/2016-161.pdf)
NIOSH List of Antineoplastic and Other HDs

Table 1
Antineoplastic drugs

Table 2
Non-antineoplastic drugs

Table 3
Non-antineoplastic drugs with adverse reproductive effects
HDs that must follow all the requirements:

- Any HD API
- Any antineoplastic requiring manipulation

HDs eligible for an assessment of risk include:

- Final dosage forms of antineoplastics that do not require any further manipulation
- Dosage forms of other HDs
Tenets of Safety

- **Containment**
  - Contain hazard
- **Dilution**
  - Remove hazard
Engineering Controls protect the preparation from cross-contamination (and microbial contamination for sterile preparations)

**Primary**
- ventilated device ("hood") designed to minimize worker and environmental HD exposure when directly handling HDs

**Secondary**
- room in which the C-PEC is placed

**Supplemental**
- adjunct control that offer additional levels of protection
<800> Facilities

- Room with fixed walls that is separate from non-hazardous storage and compounding
- Vented outside the building
- Negative pressure of 0.01 to 0.03” to adjacent space
- At least 12 air changes per hour

C-SEC requirements
PPE provides worker protection to reduce exposure to HD aerosols and residues

Table 5 of NIOSH list provides general guidance on PPE based on HD handling activity
PPE Based on Type of Activity

– Chemotherapy Gloves
  • ASTM D6978 standards
– Protective Gowns
  • Polyethylene-coated polypropylene or other laminate material
– Head, Hair, Shoe, and Sleeve Covers
– Eye and Face Protection
– Respiratory Protection
Elements of the hazard communication program plan must include:

- A written plan
- Containers of hazardous chemicals labeled, tagged, or marked
- SDS for each hazardous chemical
- Personnel training
- Personnel of reproductive capability confirm understanding of risks
Transport in containers that minimize the risk of breakage or leakage

Pneumatic tubes must not be used to transport any liquid HDs or any antineoplastic HDs

Consult transport information on the SDS

Labels and accessory labeling include
  – Storage instructions
  – Disposal instructions
  – HD category information
Personnel who perform routine custodial waste removal must be trained

Disposal of all HD waste must comply with all applicable federal, state, and local regulations
  – HD waste includes but is not limited to, unused HDs and trace-contaminated PPE and other materials
Dispensing Final Dosage Forms

- HDs that only require counting and repackaging may be dispensed without any further requirements for containment unless required by the manufacturer.

Clean equipment should be dedicated for use with HDs and decontaminated after every use.

Tablet and capsule forms of antineoplastic HDs must not be placed in automated counting or packaging machines.
Administration

- Use protective medical devices and techniques
  - Needleless systems
  - Closed-system drug-transfer devices

Appropriate PPE must be worn when administering HDs

Photo courtesy of BD
C-PEC
- Ventilated device to minimize worker and environmental HD exposure when directly handling HDs
- Must operate continuously if it supplies some or all of the negative pressure in the C-SEC or if it is used for sterile compounding

C-SEC
- Room in which the C-PEC is placed
  - Be externally vented
  - Be physically separated
  - Appropriate air exchange (e.g., ACPH)
  - Negative pressure between 0.01 and 0.03 inches of water column relative to all adjacent areas
Water sources

- A sink must be available for hand washing
- An eyewash station and/or other emergency or safety precautions must be readily available
- Locate water sources and drains as to not interfere with required ISO classifications.
- Water sources and drains must be located at least 1 meter away from the C-PEC
<800> Compounding

- <795> Nonsterile Compounding

<table>
<thead>
<tr>
<th>C-PEC</th>
<th>C-SEC Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Externally vented (preferred) OR redundant HEPA-filtered in series</td>
<td>• 12 ACPH</td>
</tr>
<tr>
<td>• <strong>Examples</strong>: CVE, Class I or II BSC, CACI</td>
<td>• Externally vented</td>
</tr>
<tr>
<td></td>
<td>• Negative pressure between 0.01 and 0.03” w.c.</td>
</tr>
<tr>
<td></td>
<td>• Fixed walls</td>
</tr>
</tbody>
</table>

CVE or BSC

Negative Pressure

12 ACPH
## <797> Sterile Compounding

<table>
<thead>
<tr>
<th>Configuration</th>
<th>C-PEC</th>
<th>C-SEC</th>
<th>Maximum BUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO Class 7 buffer room with an ISO Class 7 ante-room</td>
<td>• Externally Vented&lt;br&gt;• <strong>Examples:</strong> Class II BSC or CACI</td>
<td>• 30 ACPH&lt;br&gt;• Externally vented&lt;br&gt;• Negative pressure between 0.01 and 0.03” w.c.</td>
<td>As described in &lt;797&gt;</td>
</tr>
<tr>
<td>C-SCA</td>
<td>• Externally Vented&lt;br&gt;• <strong>Examples:</strong> Class II BSC or CACI</td>
<td>• 12 ACPH&lt;br&gt;• Externally vented&lt;br&gt;• Negative pressure between 0.01 and 0.03” w.c.</td>
<td>12 hours</td>
</tr>
</tbody>
</table>
Sterile Compounding:
– ISO Class 7 buffer room with an ISO Class 7 ante-room
Containment Segregated Compounding Area

BSC or CACI

Unclassified Negative Pressure 12 ACPH
## Cleaning

<table>
<thead>
<tr>
<th>Cleaning Step</th>
<th>Purpose</th>
<th>Example Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deactivation</td>
<td>Render compound inert or inactive</td>
<td>EPA-registered oxidizers</td>
</tr>
<tr>
<td>Decontamination</td>
<td>Remove HD residue</td>
<td>Alcohol, water, peroxide, or sodium hypochlorite</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Remove organic and inorganic material</td>
<td>Germicidal detergent</td>
</tr>
<tr>
<td>Disinfection (for sterile</td>
<td>Destroy microorganisms</td>
<td>Sterile isopropyl alcohol</td>
</tr>
<tr>
<td>manipulations)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Limiting HD Contamination in the C-PEC

- Wipe down HD containers
- Do not spray around HDs
  - Spraying aerosolizes the HD
  - Apply the agent to a disposable wipe
- Take care that package label is not compromised
Healthcare workers who handle HDs should be enrolled in a medical surveillance program
– Designed to minimize adverse health effects
– Assessment and documentation
  • Symptom complaints
  • Physical findings
  • Laboratory values
<800> Medical Surveillance

- Employee health service to protect confidentiality medical information
- Pre-placement baseline assessment of health status and medical history, including
  - Reproductive history
  - Work history of exposure to HDs
  - Physical examination
  - Laboratory testing
- Periodic surveillance
- Follow-up plan for workers with health changes
Medical Surveillance

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1 USP Resources

- USP Compounding Compendium
- USP General Chapter <800> FAQs

2 USP Updates

- Healthcare Quality Standards Updates

3 USP Education & Tools

- Education.USP.org
- <800> eLearning Course
- <800> Essentials Course On-Demand
- <800> Mobile App
Thank You