USP Chapter 800 Hazardous Drugs – Handling in Healthcare Settings

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DISCLOSURE

Ms. Busroe has reported that she has nothing to disclose with regard to potential conflicts of interest for this activity.

OBJECTIVES

- Identify compliance expectations of the Kentucky Board of Pharmacy
- Discuss implications of USP Chapter 800 on pharmacies that handle commercially available hazardous drugs.
- Define implications of USP Chapter 800 on pharmacies that compound nonsterile preparations using hazardous drugs.
- Identify implications of USP Chapter 800 on pharmacies that compound sterile preparations using hazardous drugs.
MISSION STATEMENT

The Kentucky Board of Pharmacy serves the Commonwealth to promote, preserve, and protect the public health, safety, and welfare through effective regulation of the practice of pharmacy.

USP

- United States Pharmacopeia
  - Published in 1820
  - Volunteers on Expert Committees to set standards
- Chapters less than 1000 are enforceable
  - State Boards of Pharmacy
  - FDA
  - Accreditation bodies
- Chapters greater than 1000 are reference

USP CHAPTERS

- USP Chapter 7 – labeling
- USP Chapter 795 – nonsterile compounding
- USP Chapter 797 – sterile compounding
- USP Chapter 800 – hazardous drugs
  - Final dosage forms
  - Nonsterile compounding
  - Sterile compounding
Kentucky Compounding Discussion

- **201 KAR 2:076**
  - May 10, 2017 Board voted to adopt regulation 201 KAR 2:076
  - January 1, 2018:
    - Compliance with June 1, 2008 version of USP Chapter 797
    - Compliance with January 1, 2014 version of USP Chapter 795
    - Unless specified portions submitted by pharmacist have been waived by the Board
  - Hearing June 28, 2017
  - Board voted to adopt version presented May 10, 2017
  - In process, posted on website: www.pharmacy.ky.gov
    - Health and Welfare Committee hearing September 20, 2017

Kentucky Compounding Discussion

- **USP Chapter 795** – nonsterile compounding
  - Does not address hazardous drugs
- **USP Chapter 797** – sterile compounding
  - Has one paragraph addressing hazardous drugs
  - Does not delineate types of hazardous drugs, treats all hazardous drugs the same
  - 2017 – USP will replace this paragraph with a reference to USP Chapter 800

USP Chapter 800 Task Force

- July 12, 2017 Board Meeting, President appointed a Task Force to make a recommendation to the Board regarding USP Chapter 800
- 27 people on the Task Force
  - August 8 – over 100 people in attendance
  - September 12 – over 50 people in attendance and live streaming
- Information on Board website, www.pharmacy.ky.gov
  - Board Information – Calendar – USP Chapter 800 Task Force
USP Chapter 800 Task Force

- Recommendation: Task Force to continue meeting to write Kentucky hazardous drug regulation.
  - Large portions of USP 800 may be used
  - Vote was 16 to 4 with 4 absent (3 nonvoting members)
    - No votes: adopt USP 800 with a waiver process
- Will be presented at the November 8, 2017 Board meeting. The Kentucky Board of Pharmacy may decide to adopt the USP Chapter 800 Task Force recommendation or not.
- No time frame

Do We Have to Comply?

- Federal compliance expected July 1, 2018
  - FDA
  - NIOSH
  - OSHA
  - Other states
  - Accreditation bodies
    - The Joint Commission
    - PCAB
  - CMS
  - Insurance payers
  - Liability insurance
- Kentucky Board of Pharmacy ????????
Progression to USP 800

USP 800 Sections

- 19 Sections
  - Some are requirements
  - Some are recommendations
- 3 Parts
  - Commercially available in final dosage form hazardous drug products
  - Nonsterile compounded hazardous drug preparations
  - Sterile compounded hazardous drug preparations

Section 1

INTRODUCTION AND SCOPE
Section 1: Purpose of USP 800

- Describe practice and quality standards for handling hazardous drugs in healthcare settings to minimize exposure

- Goal to help promote:
  - Patient safety
  - Worker safety
  - Environmental protection

Section 1: Scope of USP 800

USP 800 applies to all pharmacies that have hazardous drugs whether compounded or commercially available

- Applies to all healthcare personnel
- Applies to all healthcare facilities
  - Receipt
  - Store
  - Prepare
  - Transport
  - Administer
  - Disposal
- Applies to sterile and nonsterile hazardous drug products (commercially available) and preparations (compounded)
Section 2: What is a Hazard Drug?

- National Institute for Occupational Safety and Health (NIOSH) maintains a list of hazardous drugs used in healthcare setting
- Not OSHA Hazardous Drugs
- Not EPA Hazardous Drugs

Any drug exhibiting at least one of the following criteria:
- Carcinogenicity
- Teratogenicity
- Reproductive toxicity in humans
- Organ toxicity at low doses in humans or animals
- Genotoxicity
- New drugs that mimic existing hazardous drugs in structure or toxicity
Section 2: Classification of Hazardous Drugs

- Updated every other year in even years
- Most recent version September 2016

Section 2: List of Hazardous Drugs

- Format of NIOSH List revised in 2014 to include three groups of hazardous drugs (HD):
  - Antineoplastic HD (Table 1/Group 1)
  - Non-antineoplastic HD (Table 2/Group 2)
  - Drugs with reproductive effects (Table 3/Group 3)

Section 2: Examples of Hazardous Drugs

- Antineoplastic Drugs (Table 1/Group 1)
  - Fluorouracil
  - Hydroxyurea
  - Megestrol
  - Methotrexate
  - Tamoxifen
### Section 2: Examples of Hazardous Drugs

#### Non-antineoplastic Drugs (Table 2/Group 2)
- Carbamazepine
- Estrogens
- Progesterone
- Phenytoin
- Spironolactone
- Risperidone

#### Drugs with Reproductive Effects (Table 3/Group 3)
- Clonazepam
- Fluconazole
- Paroxetine
- Testosterone
- Topiramate
- Warfarin

### Section 2: Containment Requirements

- Review NIOSH list
- Make list of NIOSH drugs and dosage forms
  - Reviewed annually, documented
  - Reviewed anytime new drug introduced in pharmacy
- Determine containment strategy
  - Follow all USP 800 required containment
  - Assessment of risk
Section 2: Containment Requirements

- Example of a list of HDs
  - Methotrexate – tablet
  - Topiramate – tablet
  - Clonazepam – tablet
  - Paroxetine – tablet
  - Megestrol – liquid
  - Progesterone – API

- Date reviewed 07/01/2018 by Signature of Designated Person

- Date reviewed 08/18/2018 by Signature of Designated Person
  - Ordered Spironolactone tablets on 10/18/16

- Must follow all containment requirements:
  - Any antineoplastic HD (Table 1/Group 1) requiring manipulation
    - Exception: final antineoplastic dosage forms not requiring manipulation other than counting
  - Any HD Active Pharmaceutical Ingredient (API)
  - Not performing an assessment of risk

- Assessment of risk performed for:
  - All other hazardous drugs on NIOSH list:
    - Determine alternative containment strategies and work practices

- Antineoplastic HD in final dosage form requiring no manipulation
- Non-antineoplastic HD
- Reproductive risk HD
Section 2: Assessment of Risk

- Type of HD (antineoplastic, non-antineoplastic, reproductive risk)
- Dosage form (tablet, capsule, API)
- Risk of exposure
- Packaging
- Manipulation
- Documentation of alternative containment strategies and/or work practices
- Reviewed annually, documented

Section 2: Assessment of Risk

- Drug Package Insert
  - Harm may be restricted to a limited time such as third trimester of pregnancy
- Safety Data Sheets (SDS)
  - Formerly Material Data Safety Sheets (MSDS)

Section 3

TYPES OF EXPOSURE
Section 3: Types of Exposure

- Dispensing
- Compounding
- Administration
- Patient-care activities
- Spills
- Receipt
- Transport

Compounding:
- Crushing tablets or opening capsules
- Pouring oral or topical liquids from one container to another
- Weighing or mixing components
- Constituting or reconstituting powdered or lyophilized HDs
- Withdrawing or diluting injectable HDs from parenteral containers
- Expelling air or HDs from syringes
- Contacting HD residue present on PPE or other garments
- Deactivating, decontaminating, cleaning, and disinfecting HD areas
- Maintenance activities for potentially contaminated equipment and devices

Section 4

RESPONSIBILITIES OF PERSONNEL HANDLING HAZARDOUS DRUGS
Section 4: Designated Person

- Qualified and trained to be responsible for:
  - Developing and implementing appropriate procedures
  - Overseeing entity compliance
  - Ensuring competency of personnel
  - Ensuring environmental control of storage and compounding areas
  - Monitoring of facility
  - Maintaining reports of testing and/or sampling performed

Section 4: Designed Person

- Must understand:
  - Rationale for risk-prevention policies
  - Risks to themselves and others
  - Risks of noncompliance that may compromise safety
  - Responsibility to report potentially hazardous situations to management

Examples

ASSESSMENT OF RISK
Containment Strategies, Example 1

- **DRUG(S):** Yaz, Ocella, Yasmin, Prempro
- **TYPE OF HD:** Non-antineoplastic HD
- **DOSE FORM:** Tablet
- **RISK OF EXPOSURE:** None, tablets are unit dosed & employees are not exposed directly to the tablet
- **PACKAGING:** Unit dosed
- **MANIPULATION:** None, will dispense in unit dose containers

**DOCUMENTATION OF ALTERNATIVE CONTAINMENT STRATEGIES AND/OR WORK PRACTICES:**
Tablets will not be removed from unit dose packaging

**REVIEWED ANNUALLY, DOCUMENTED:**
Reviewed 07/01/18 by: Signature of Designated Person

Containment Strategies, Example 2

- **DRUG(S):** Tamoxifen
- **TYPE OF HD:** Antineoplastic HD
- **DOSE FORM:** Enteric coated tablet
- **RISK OF EXPOSURE:** Counting manufactured tablets with no further manipulation
- **PACKAGING:** Stock bottle to prescription vial
- **MANIPULATION:** Counting only
Containment Strategies, Example 2

- **DOCUMENTATION OF ALTERNATIVE CONTAINMENT STRATEGIES AND/OR WORK PRACTICES:**
  - Employee will use dedicated counting tray and spatula to count
  - Employee will immediately clean dedicated counting tray/spatula with alcohol by spraying the paper towel and wiping the tray/spatula or washing the tray/spatula with warm water and soap
  - If paper towel used, will be placed in a baggie to be discarded

- **REVIEWED ANNUALLY, DOCUMENTED:** Reviewed 07/01/18 by: Signature of Designated Person

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**Containment Strategies, Example 3**

- **DRUG(S):** Topiramate
- **TYPE OF HD:** Reproductive risk HD
- **DOSAGE FORM:** Suspension made from tablets
- **RISK OF EXPOSURE:** Crushing tablets to compound a suspension
- **PACKAGING:** Amber 4 ounce vial
- **MANIPULATION:** Crushing tablets

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**Containment Strategies, Example 3**

- **DOCUMENTATION OF ALTERNATIVE CONTAINMENT STRATEGIES AND/OR WORK PRACTICES:**
  - Only employee of non-reproductive age will compound
  - Use ASTM rated chemo gloves & face mask
  - Use dedicated mortar & pestle to crush in designated back corner of pharmacy out of traffic
  - No topiramate tablets will be pre-crushed. Only crush amount needed for compound
  - Wipe down all drug containers touched during the compounding (outside of topiramate stock bottle, outside of cherry syrup bottle, outside of dispensing bottle)
  - Discard gloves & face mask in hazardous waste
  - Immediately clean mortar & pestle with soap and warm water

- **REVIEWED ANNUALLY, DOCUMENTED:** Reviewed 07/01/18 by: Signature of Designated Person
Containment Strategies, Example 4

- **DRUG(S):** Progesterone
- **TYPE OF HD:** Non-antineoplastic HD
- **DOSAGE FORM:** First Progesterone VGS Vaginal Suppository Kit (API, powder)
- **Cannot use alternate strategy, must follow all USP 800 Containment Requirements**
  - Must compound in a negative pressure room with at least 12 ACPH
  - Must compound in an appropriate C-PEC
  - Must use appropriate PPE

Summary

**APPLIES TO ALL PHARMACIES THAT HAVE HAZARDOUS DRUGS**

Summary for All Pharmacies with HD

- Goes into effect Federally on July 1, 2018
  - No decision by Kentucky Board of Pharmacy
- Designate a person to be responsible for HD
- Make a list of HD in pharmacy, including dosage form
  - Review and document annually
- Perform an assessment of risk
  - Review and document annually
  - If not done, must follow all containment strategies
Section 5: Facilities

- Designated areas for:
  - Receipt and unpacking of antineoplastic HDs or HD APIs
    - Does not apply to antineoplastic HD that are not manipulated other than counting
    - Does not apply to commercially available non-antineoplastic and reproductive risk HD
  - Storage of HD
  - Nonsterile compounding, if performed
  - Sterile compounding, if performed

- No exemption for low volume hazardous sterile compounding (USP Chapter 797)
Section 5.1: Receipt

- Manipulated antineoplastic HD and HD APIs
  - Unpack = remove from external shipping container
  - Must be done in neutral/normal or negative pressure area
    - Does not apply to antineoplastic HD that are not manipulated other than counting
    - Does not apply to antineoplastic HD with no manipulation other than counting and non-antineoplastic and reproductive risk HD
- For sterile compounding:
  - Cannot unpack in sterile compounding areas
  - Cannot unpack in positive pressure areas

Section 5.2: Storage

- Stored to prevent breakage or spillage
  - All HD
- Cannot store on the floor
  - All HD
- Can be stored with other drugs:
  - Non-antineoplastic HD
  - Reproductive risk only HD
  - Final dosage forms with no further manipulation of antineoplastic HD
- Stored separately in a negative pressure room 0.01 to 0.03 with at least 12 Air Changes Per Hour (ACPH) vented to the outside
  - Antineoplastic HDs requiring manipulation
  - HD APIs
5.2: Storage, continued

- HDs used in sterile and nonsterile compounding may be stored together
  - Exception: Only HDs used for sterile compounding may be stored in the negative pressure buffer room
- Refrigerated antineoplastic HDs that will be manipulated must be stored in a dedicated refrigerator in a negative pressure room 0.01 to 0.03 with at least 12 ACPH vented to the outside
  - May place refrigerator in negative pressure buffer room for sterile compounding

797 vs 800 Storage

<table>
<thead>
<tr>
<th>USP 797</th>
<th>USP 800 Antineoplastic and API HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Must be stored separately from other drugs</td>
<td>Must be stored in a negative pressure room</td>
</tr>
<tr>
<td></td>
<td>Vented to the outside</td>
</tr>
<tr>
<td></td>
<td>At least 12 ACPH</td>
</tr>
<tr>
<td></td>
<td>0.01 to 0.03 negative pressure</td>
</tr>
</tbody>
</table>

Section 5.3

COMPOUNDING

5.3.1 – NONSTERILE COMPOUNDING
5.3.2 – STERILE COMPOUNDING
**Section 5.3 Compounding: Facility Design for Compounding**

- Containment primary engineering control (C-PEC)
  - Ventilated device used when directly handling HDs

- Containment secondary engineering control (C-SEC)
  - External ventilation
  - Physically separated
  - Appropriate ACPH
  - Negative pressure relative to all adjacent areas

- Supplemental engineering controls
  - E.g., Closed-system drug-transfer device (CSTD)

**Nonsterile Compounding**

- Externally vented or redundant-HEPA filters in series
- CVE, Class I or II BSC, CACI
- Is not required to have unidirectional airflow or ISO classification

**Section 5.3.1: Non-Sterile Compounding**

<table>
<thead>
<tr>
<th>C-PEC</th>
<th>C-SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Externally vented or</td>
<td>Externally vented</td>
</tr>
<tr>
<td>redundant-HEPA filters</td>
<td>12 ACPH</td>
</tr>
<tr>
<td>CVE, Class I or II BSC</td>
<td>Negative pressure (0.01 to 0.03</td>
</tr>
<tr>
<td>CACI</td>
<td>inches of water column)</td>
</tr>
<tr>
<td>Is not required to</td>
<td>Surfaces: smooth, impervious,</td>
</tr>
<tr>
<td>have unidirectional</td>
<td>free from cracks and crevices,</td>
</tr>
<tr>
<td>airflow or ISO</td>
<td>and non-shedding</td>
</tr>
<tr>
<td>classification</td>
<td></td>
</tr>
</tbody>
</table>
Section 5.3.1:
Non-sterile C-SEC

795 vs 800 Nonsterile Compounding SEC

<table>
<thead>
<tr>
<th>USP 795</th>
<th>USP 800 C-SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Does not address HD</td>
<td>• Manipulated antineoplastic and API HD</td>
</tr>
<tr>
<td></td>
<td>• Negative pressure room</td>
</tr>
<tr>
<td></td>
<td>□ Vented to the outside</td>
</tr>
<tr>
<td></td>
<td>□ At least 12 ACPH</td>
</tr>
<tr>
<td></td>
<td>□ 0.01 to 0.03 negative pressure</td>
</tr>
</tbody>
</table>

795 vs 800 Nonsterile Compounding PEC

<table>
<thead>
<tr>
<th>USP 795</th>
<th>USP 800 C-PEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Does not address HD</td>
<td>• CVE, BSC, CACI</td>
</tr>
<tr>
<td></td>
<td>□ 2 Redundant HEPA filters OR</td>
</tr>
<tr>
<td></td>
<td>□ Vented to the outside</td>
</tr>
</tbody>
</table>
Section 5.3.2: Sterile Compounding C-P EC

- BSC or CACI
- ISO 5 Classification
- Externally Vented
- Located within Clean Room setup or Containment Segregated Compounding Area (C-SCA)

Section 5.3.2: Sterile Compounding C-SEC

<table>
<thead>
<tr>
<th>Clean Room</th>
<th>C-SCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ISO 7 buffer room entered from ISO 7 room</td>
<td></td>
</tr>
<tr>
<td>• Externally vented</td>
<td></td>
</tr>
<tr>
<td>• At least 30 ACPH</td>
<td></td>
</tr>
<tr>
<td>• Negative pressure (0.01 to 0.03 inches of water column)</td>
<td></td>
</tr>
<tr>
<td>• Unclassified air</td>
<td></td>
</tr>
<tr>
<td>• Externally vented</td>
<td></td>
</tr>
<tr>
<td>• At least 12 ACPH</td>
<td></td>
</tr>
<tr>
<td>• Negative pressure (0.01 to 0.03 inches of water column)</td>
<td></td>
</tr>
<tr>
<td>• Limited BUD</td>
<td></td>
</tr>
<tr>
<td>• Low and medium risk CSP</td>
<td></td>
</tr>
</tbody>
</table>
Section 5.3.2: Sterile Compounding Clean Room

Non-preferred Setup
- Requires additional containment measures

Section 5.3.2: C-SCA
### 797 vs 800 Sterile Compounding SEC

<table>
<thead>
<tr>
<th>USP 797 SEC</th>
<th>USP 800 C-SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applies to all HD</td>
<td>Applies to antineoplastic HD and API HD</td>
</tr>
<tr>
<td>Antineoplastic</td>
<td>Allows assessment of risk for</td>
</tr>
<tr>
<td>Non-antineoplastic</td>
<td>Non-antineoplastic HD</td>
</tr>
<tr>
<td>Reproductive risk</td>
<td>Reproductive risk HD</td>
</tr>
<tr>
<td>Does not allow for an assessment of risk</td>
<td></td>
</tr>
</tbody>
</table>

### 797 vs 800 Sterile Compounding SEC

<table>
<thead>
<tr>
<th>USP 797 SEC</th>
<th>USP 800 C-SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 7</td>
<td>ISO 7</td>
</tr>
<tr>
<td>Negative pressure</td>
<td>Negative pressure</td>
</tr>
<tr>
<td>At least 0.01</td>
<td>0.01 to 0.03</td>
</tr>
<tr>
<td>At least 30 ACPH</td>
<td>At least 30 ACPH</td>
</tr>
<tr>
<td>Recommended to be vented to the outside</td>
<td>Required to be vented to the outside</td>
</tr>
</tbody>
</table>

### 797 vs 800 Sterile Compounding SEC

<table>
<thead>
<tr>
<th>USP 797 SEC</th>
<th>USP 800 C-SEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low volume exemption</td>
<td>Containment Segregated Compounding Area (C-SCA)</td>
</tr>
<tr>
<td>5 HD CSP per 2 weeks</td>
<td>Separate room</td>
</tr>
<tr>
<td>2 forms of containment</td>
<td>Externally vented</td>
</tr>
<tr>
<td></td>
<td>Non-classified air</td>
</tr>
<tr>
<td></td>
<td>Negative pressure</td>
</tr>
<tr>
<td></td>
<td>0.01 to 0.03</td>
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### 797 vs 800 Sterile Compounding PEC

<table>
<thead>
<tr>
<th>USP 797</th>
<th>USP 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>● ISO 5</td>
<td></td>
</tr>
<tr>
<td>● BSC or CACI</td>
<td></td>
</tr>
<tr>
<td>● Recommended to be vented to the outside</td>
<td></td>
</tr>
<tr>
<td>● ISO 5</td>
<td></td>
</tr>
<tr>
<td>● BSC or CACI</td>
<td></td>
</tr>
<tr>
<td>● Required to be vented to the outside</td>
<td></td>
</tr>
</tbody>
</table>

### Combined Compounding

**NON-Sterile AND STERILE COMPOUNDING IN THE SAME ROOM**

- Both non-sterile and sterile in same C-SEC
  - No particle-generating activity when sterile compounding
  - Maintain ISO 7 throughout non-sterile compounding activity (clean room)
  - C-PECs 1 meter apart

### Section 5.3: Combined Compounding

- Non-sterile in sterile C-PEC
  - Not at same time as sterile compounding
  - Occasional use
  - Decontaminated, cleaned, and disinfected before resuming sterile compounding

- Both non-sterile and sterile in same C-SEC
  - No particle-generating activity when sterile compounding
  - Maintain ISO 7 throughout non-sterile compounding activity (clean room)
  - C-PECs 1 meter apart
Section 5.3: Combined Compounding

USP 795 and USP 797
- Not allowed
- Nonsterile and sterile compounding must be performed in separate rooms

USP 800
- Allows:
  - Nonsterile and sterile compounding in the same C-PAC
  - Nonsterile and sterile compounding in the same C-SEC

Section 5.4

CONTAINMENT SUPPLEMENTAL ENGINEERING CONTROLS (CLOSED SYSTEM TRANSFER DEVICE CSTD)
Section 5.4: Containment Supplemental Engineering Controls

- CSTD should be used when compounding, if dosage form allows
- CSTD must be used when administering, if dosage form allows
- NIOSH has published a proposed performance protocol

USP 797 vs 800 CSTD

<table>
<thead>
<tr>
<th>USP 797</th>
<th>USP 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Should be used in compounding</td>
<td>Should be used in compounding</td>
</tr>
<tr>
<td>Does not address administration</td>
<td>Must be used in administration, if drug allows</td>
</tr>
</tbody>
</table>

Section 6

ENVIRONMENTAL QUALITY AND CONTROL RECOMMENDED
Section 6: Surface Wipe Sampling RECOMMENDED

- Recommended practice to detect surface HD residue
- Useful tool to evaluate exposure controls and verify containment
- Done initially and at least every 6 months
  - C-PEC interior; equipment; pass-through; work areas near and adjacent to C-PEC; areas immediately outside HD buffer room/C-SCA; and administration areas
- Data is lacking regarding sampling method and contamination limits
- If measurable contamination is detected, action must be taken and validated by repeat wipe sampling
- Verify sampling kits have been properly tested (none currently certified)

Section 7: PPE

PERSONAL PROTECTIVE EQUIPMENT (PPE)

7.1 – GLOVES
7.2 – GOWNS
7.3 – HEAD, HAIR, SHOE, AND SLEEVE COVERS
7.4 – EYE AND FACE PROTECTION
7.5 – RESPIRATORY PROTECTIONS
7.6 – DISPOSAL OF USED PPE

- NIOSH provides some guidance for possible scenarios
- Gloves, gowns, head, hair, shoe covers required for sterile and nonsterile compounding
- Gloves required for administering antineoplastic HD
- Gowns required for administering injectable antineoplastic HD
Section 7: PPE

- Appropriate PPE worn during:
  - Receipt
  - Storage
  - Transport
  - Compounding (sterile and nonsterile)
  - Administration
  - Deactivation/Decontamination, Cleaning, Disinfecting
  - Spill Control

797 vs 800 PPE

<table>
<thead>
<tr>
<th>USP 797</th>
<th>USP 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Must be worn during:</td>
<td>• Must be worn during:</td>
</tr>
<tr>
<td>○ Sterile Compounding</td>
<td>○ Receipt</td>
</tr>
<tr>
<td>○ Deactivation, Decontamination, Cleaning, Disinfecting</td>
<td>○ Storage</td>
</tr>
<tr>
<td>○ Transport</td>
<td>○ Compounding (sterile and nonsterile)</td>
</tr>
<tr>
<td>○ Administration</td>
<td>○ Administration</td>
</tr>
<tr>
<td>○ Deactivation, Decontamination, Cleaning, Disinfecting</td>
<td>○ Deactivation, Decontamination, Cleaning, Disinfecting</td>
</tr>
<tr>
<td>○ Spill Control</td>
<td>○ Spill Control</td>
</tr>
</tbody>
</table>

Section 7.1: Gloves

- Tested to American Society for Testing and Materials (ASTM) standard D6978 (or successor)
- Powder-free
- Inspected for physical defects before use
- Must be changed:
  - Every 30 minutes
  - When torn, punctured, or contaminated
### Section 7.2: Disposable Gowns
- Must be shown to be resist permeability
- Made of polypropylene or other laminate materials
- Close in the back
- Long sleeved
- Closed cuffs (elastic or knit)
- No seams or closures that could allow HDs to pass through
- Changed per manufacturer information for permeation
- If not manufacturer information, change every 2-3 hours
- Change immediately after spill or splash
- Cannot be worn in other areas

### 7.3 – Head, Hair, Shoe, Sleeve Covers
- Must wear head, hair, beard, shoe covers
- Shoe covers cannot be worn in other areas
- Sleeve covers – RECOMMENDED
- Sterile compounding:
  - Second pair of shoe covers donned before entering buffer room
  - Remove second pair of shoe covers when leaving buffer room

### 7.4 and 7.5: Eye and Respirators
- Must wear if working outside a C-PEC (spills)
  - Goggles, not safety glasses, are appropriate
  - Face shield with goggles provide protection against a splash versus face shield alone
  - Fit tested NIOSH certified respirator
7.6 – Disposal of Used PPE

• PPE used in compounding should be disposed of in proper waste container before leaving C-SEC
• Gloves worn during compounding must be removed and discarded in the C-PEC or contained in a sealable bag for discarding outside the C-PEC
• Potentially contaminated clothing must not be taken home

797 vs 800 PPE

<table>
<thead>
<tr>
<th>USP 797</th>
<th>USP 800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemo gloves</td>
<td>ASTM rated gloves</td>
</tr>
<tr>
<td>2 pairs recommended</td>
<td>2 pairs required</td>
</tr>
<tr>
<td>Chemo gown</td>
<td>Chemo gown</td>
</tr>
<tr>
<td>More defined</td>
<td></td>
</tr>
<tr>
<td>Shoe covers</td>
<td>Shoe covers</td>
</tr>
<tr>
<td>2 pairs required</td>
<td>2 pairs required</td>
</tr>
<tr>
<td>Hair cover</td>
<td>Hair cover</td>
</tr>
<tr>
<td>Face cover</td>
<td>Face cover</td>
</tr>
<tr>
<td>Beard cover</td>
<td>Beard cover</td>
</tr>
<tr>
<td>Goggles outside PEC</td>
<td>Goggles outside PEC</td>
</tr>
<tr>
<td>Disposal</td>
<td>Disposal</td>
</tr>
</tbody>
</table>

Section 8

HAZARD COMMUNICATION PROGRAM
Section 8: Hazard Communication Program

- Policy and Procedures
  - Ensure worker safety during all aspects of handling HD
  - Training
    - Proper labeling
    - Transport
    - Storage
    - Use of Safety Data Sheets (SDS, formerly MSDS)
    - Readily accessible for every hazardous chemical used

Section 9: Personnel Training

- Applies to all personnel based on job function
  - Receipt, storage, compounding, repackaging, dispensing, administering, disposing
- Must occur before independently handles HD
- Must be demonstrated by each employee
- Reassessed:
  - Every 12 months
  - When new HD or new equipment is used
  - With a new or significant change in process or PrP
- Confirm in writing that personnel of reproductive capabilities understand the risks of HDs
Section 9: Personnel Training

- Training must include:
  - Overview of pharmacy’s list of HD and their risks
  - Review of PnP related to HD
  - Proper use of PPE
  - Proper use of equipment and devices (e.g., engineering controls)
  - Spill management
  - Response to known or suspected HD exposure
  - Proper disposal
  - Documentation of training

Section 10: Receiving of Manipulated Antineoplastic and API HD

- Have PnP for receiving
- Should come from supplier sealed in plastic
- Must be delivered to HD storage area immediately
- Must wear appropriate PPE, including ASTM-tested, powder-free chemotherapy gloves
- Spill kit accessible in receiving area
- Table 4 Summary of Requirements for Receiving and Handling Damaged HD Shipping Containers
Section 11: Labeling, Packaging, and Transport

11.1 – Labeling

- HD requiring special handling precautions must be clearly labeled at all times during their transport throughout the facility.
Section 11.2: Packaging

- PnP on appropriate shipping containers and insulating material
  - Based on information from:
    - Product specifications
    - Vendors
    - Mode of transport
    - Experience of compounding personnel

- Containers and materials must maintain:
  - Physical integrity
  - Stability
  - Sterility (if needed)
  - Protect HD from:
    - Damage
    - Leakage
    - Contamination
    - Degradation
  - Protect healthcare workers who transport HD

Section 11.3: Transport

- HD being transported must be labeled, stored and handled according to all applicable laws
- Must be transported in containers to minimize breakage or leakage
  - Cannot be transported in a pneumatic tube
- When shipping outside facility:
  - Consult transport information from SDS
  - Ensure labels and accessory labeling include:
    - Storage instructions
    - Disposal instructions
    - HD category information in format consistent with courier’s policies
Section 12: Dispensing Final Dosage Forms

- HD requiring no manipulation other than counting final dosage form may be dispensed without any further requirements for containment, unless:
  - Manufacturer requires containment
  - Visual indicators of HD exposure is present
    - HD dust
    - HD leakage
  - Assessment of risk

Section 13

COMPOUNDING
Section 13: Compounding

- Must follow USP Chapters 795 and 797
- Must be done in proper engineering controls
- Sterile and nonsterile compounding must use plastic-backed preparation mat on work surface of C-PEC
  - Change mat immediately after a spill
  - Change mat regularly during use
  - Discard at end of daily compounding
- Must use disposable or clean dedicated equipment:
  - Mortars, pestles, spatulas
- Labeling cannot introduce contamination into non-HD areas

Section 14: Administering

- Must use protective medical devices and techniques
  - Needleless and closed systems
  - Crushing tablets in plastic sleeves
- Must wear appropriate PPE
  - Dispose of PPE appropriately
- Oncology Nursing Society (ONS) Safe Handling of Hazardous Drugs publication
Section 15: Deactivation/Decontamination, Cleaning, and Disinfection

- All areas where HDs are handled must be routinely deactivated/decontaminated and cleaned
  - During receiving, compounding, transport, administering and disposal
- All reusable equipment and devices must be routinely deactivated/decontaminated and cleaned
  - C-PEC, carts, trays
- Personnel
  - Must be trained
  - Must wear appropriate PPE
    - Two pairs of ASTM-tested chemotherapy gloves
    - Impermeable disposable gowns
    - Eye protection and face shields if splashing is expected
    - Respiratory protection if warranted

Section 15: Deactivation/Decontamination, Cleaning, and Disinfection

- PnP
  - Decontamination
  - Deactivation
  - Cleaning
    - Procedures
    - Agents used
    - Dilutions used
    - Frequency
    - Documentation requirements
  - Disinfection, for sterile compounding
- Must follow USP Chapters 795 and 797
Section 15: Summary

<table>
<thead>
<tr>
<th>Step</th>
<th>Purpose</th>
<th>Example Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deactivation</td>
<td>Render compound inert or inactive</td>
<td>Oxidizer – peroxide formulations, sodium hypochlorite</td>
</tr>
<tr>
<td>Decontamination</td>
<td>Remove HD residue</td>
<td>Alcohol, water, peroxide, sodium hypochlorite</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Remove organic and inorganic material</td>
<td>Germicidal detergent</td>
</tr>
<tr>
<td>Disinfecting (sterile)</td>
<td>Destroy microorganisms</td>
<td>Sterile alcohol</td>
</tr>
</tbody>
</table>

Section 15.3 – Cleaning the Compounding Area

**Cleaning and Disinfecting the Compounding Area**

- section in USP 797 applies to both sterile and nonsterile HD compounding areas.
- Decontamination must be done:
  - Between compounding different HDs
  - Any time a spill occurs
  - Before and after certification
  - Any time voluntary interruption occurs
  - If ventilation tool is moved

- May decrease HD contamination introduced into C-PEC if wipe down HD containers:
  - Use alcohol, sterile water, peroxide, or sodium hypochlorite
  - Spray the wiper not the HD container
  - Solution used cannot alter the HD container label
- Areas under work tray of C-PEC must be cleaned monthly
  - Last area to be cleaned
  - May need to wear NIOSH-approved respirator
Section 16

SPILL CONTROL

Personnel must be trained in handling spills
Spills must be contained and cleaned immediately on by qualified personnel with appropriate PPE
Qualified personnel must be available at all times
Signs restricting access to spill area must be available
Spill kits must be readily available in all areas HDs are handled
Dispose of spill kits as hazardous waste

Section 16: Spill Control

- Document circumstances and management of spills
- PrPs
  - Prevent spills
  - Direct clean-up of spills
  - Location and capacity of spill kits
  - Address size and scope of spill
  - Specify who is responsible for spill management and type of PPE to be used
  - Appropriate respirators if the capacity of the spill kit is exceeded or if there is exposure to vapors or gases
Section 17: Disposal

- Disposal of HD must comply with all applicable federal, state and local regulations
- Personnel removing hazardous waste must be trained

Section 18

DOCUMENTATION AND STANDARD OPERATING PROCEDURES (POLICIES AND PROCEDURES, PNP)
Section 18: PnP

- Acquisition
- Preparation
- Dispensing
- Training
- Use and maintenance of equipment and supplies
- Safe handling of HD throughout facility
- Reviewed at least annually, documented

Summary of Policies and Procedures Required

- Training
  - Overview of pharmacy’s list of HDs and their risks
  - Review of HD PnP
  - Proper use of PPE
  - Proper use of equipment and devices
  - Spill management
  - Response to known or suspected HD exposure
- Receiving HD
- Labeling HD
- Handling HD
- Packaging HD
- Transport of HD

Summary of Policies and Procedures Required

- Prevention of accidental exposures or spills
- Personnel training on response to exposure
- Use of spill kit
- Appropriate shipping containers and insulating materials
- Written procedures for decontamination, deactivation, cleaning and disinfecting
- Written procedures for cleaning:
  - Procedures
  - Agents used
  - Dilutions used
  - Frequency
  - Documentation requirements
Summary of Policies and Procedures Required

- To prevent spills
- Direct the clean-up of HD spills
  - Size and scope of spill
  - Who is responsible for spill management and type of PPE required
  - Address location and capacity of spill kits and clean-up materials
  - Use of appropriate full facepiece, respirator if capacity of spill kit is exceeded or have exposure to vapors or gases

Section 19

MEDICAL SURVEILLANCE
RECOMMENDED

Section 19: Medical Surveillance

**Goal:** Minimize adverse health effects in personnel potentially exposed to hazardous drugs through early detection of health problems

- Useful for identifying gaps in compliance with established policies and procedures
- Provides framework for ongoing evaluation of exposure control program:
  - Engineering and Administrative Controls
  - Work Processes
  - Personal Protective Equipment
  - Personnel Training/Education
Section 19: Medical Surveillance

Program Elements:

Data Collection and Documentation
- Baseline assessment of a worker’s health status, medical and work history, detailed history of exposure to HDs

Monitoring
- Periodic physical assessment, lab testing, updating exposure history, recording symptom complaints
- Comparing abnormal values and findings to baseline data and expected norms to identify exposure prevention failure

Follow-Up Plan
- Exposure-related health changes should prompt immediate re-evaluation of primary prevention measures
- Verify and Document:
  - Operational engineering controls
  - Compliance with existing policies
  - Proper use of PPE
  - Plan of action to prevent additional exposure
  - Confidential communication with employees
  - Follow-up medical survey and ongoing surveillance to determine effectiveness of plan

ADDITIONAL RESOURCES FOR HD

- ASHP Guidelines on Handling HD
- NIOSH Alert 2004
- NIOSH List of HD 2016
  - https://www.cdc.gov/niosh/topics/antineoplastic/_/hazardous-drugs-list_2016-151.pdf
- NIOSH Occupational Exposure
  - https://www.cdc.gov/niosh/topics/hazdrugs
- NIOSH Workplace Solutions
  - https://www.cdc.gov/niosh/topics/hazdrugs/workplace_data_dose_nonhazardous_numbers.html
- Oncology Nursing Society (ONS) Safe Handling of HD
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