THE GATEWAY
TO THE FUTURE OF PHARMACY

MPA MISSOURI PHARMACY ASSOCIATION

IPhA Illinois Pharmacists Association

USP <800>: What you need to know

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Disclosure and Conflict of Interest

- Alison Smith declares no conflicts of interest, real or apparent, and no financial interests in any company, product, or service mentioned in this program, including grants, employment, gifts, stock holdings and honoraria.

Pharmacist Objectives

At the conclusion of this program, the pharmacist will be able to:

1. Define “hazardous drug” and use the NIOSH list to identify hazardous drugs in their practice setting
2. Apply USP <800> facility design requirements to various pharmacy practice settings
3. Create an action plan for USP <800> compliant practices, policies and procedures

Technician Objectives

At the conclusion of this program, the technician will be able to:

1. Define “hazardous drug” and use the NIOSH list to identify hazardous drugs in their practice setting
2. Describe the facility and engineering controls that protect workers from exposure to hazardous drugs
3. Identify USP <800> compliant practices applicable to their work environment

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Pre-Test Questions

USP <800> standards apply to which of the following practice settings?

a) Hospital / Infusion Pharmacies Only
b) All Pharmacy Practice Settings
c) Hospitals only
d) All health care personnel or entities that handle hazardous drugs

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Pre-Test Questions

The most recent version of the NIOSH List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings was published in

a) 2016
b) 2014
c) 2010
d) 2004

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Pre-Test Questions

Which of the following characteristics is *NOT* listed in the NIOSH or ASHP definition of a hazardous drug?

a) Genotoxicity
b) Hypersensitivity
c) Teratogenicity
d) Carcinogenicity

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Pre-Test Questions

Which of the following is *NOT* a USP <800> requirement?

a) Separate storage for hazardous drugs including a separate refrigerator
b) The use of closed system transfer devices during compounding of hazardous drugs
c) A positive pressure clean room for sterile compounding
d) Gowns and gloves shown to be resist permeability to hazardous drugs

Hazardous Drugs

- Guidelines vs. Recommendations
- Definitions
- NIOSH List
- USP <800> Compliant HD List
- Risk Assessments
- Examples

History of Hazardous Drug Guidelines & Recommendations

	National Institutes of Health (NIH)	American Society of Health System Pharmacists (ASHP)	Occupational Safety and Health Administration (OSHA)	National Institute of Occupational Safety and Health (NIOSH)	United States Pharmacopeia (USP)
1980s	*Recommendations* for the safe handling of injectable antineoplastic drug products (1981) *Recommendations* for the Safe Handling of Parenteral Antineoplastic Drugs (1983)	Technical *assistance bulletin* (TAB) published on handling cytotoxic drugs in hospitals (1985)	*Guidelines* for Cytotoxic (Antineoplastic) Drugs (1986)		
1990s	*Recommendations* for the Safe Handling of Parenteral Antineoplastic Drugs Updated (1999)	Defined "**Hazardous Drug**" for the first time (1990)	*Controlling* Occupational Exposure to Hazardous Drugs (1995)		
2000s		ASHP *guidelines* on handling hazardous drugs (2006)		**Alert:** Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care Settings (2004)	USP <797> published (2004) USP 797 updated (2008)
2010s				NIOSH list updates 2010, 2012, 2014, 2016 pending	**USP <800> published (2016) USP <800> effective (2018)**

Recommendations & Guidelines

Requirements

- 1981

Expand

Recommendations for the safe handling of injectable antineoplastic drug products

PF Zimmerman, RK Larsen, EW Barkley and JF Gallelli

Abstract

Routes through which health-care workers may be exposed to injectable antineoplastic drug products are reviewed, and recommendations developed by the National Institutes of Health for the safe handling of such products are presented. Routes of exposure are primarily through inhalation of the aerosolized drug product and by direct skin contact. The potential risks from repeated contact with injectable antineoplastic drug products can be controlled by the use of specific containment equipment and certain work techniques. It is recommended that all procedure involved in the preparation of injectable antineoplastics be performed in a Class II laminar flow biological safety cabinet.

- Zimmerman, P.F., et al. Am. J. Hosp. Pharm. 1981. 38:1693-5.

- 2004

NIOSH ALERT

Preventing Occupational Exposures to Antineoplastic and Other Hazardous Drugs in Health Care Settings

Warning!

Working with or near hazardous drugs in health care settings may cause skin rashes, infertility, miscarriage, birth defects, and possibly leukemia or other cancers.

- National Institute for Occupational Safety and Health [NIOSH]. NIOSH alert: Preventing Occupational Exposure to Antineoplastic and Other Hazardous Drugs in Health Care Settings; 2004. http://www.cdc.gov/niosh/docs/2004-165/pdfs/2004-165.pdf (accessed August 22, 2016)

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July 1, 2018

‹800› HAZARDOUS DRUGS—HANDLING IN HEALTHCARE SETTINGS

(Chapter to become official July 1, 2018.)

1. INTRODUCTION AND SCOPE

This chapter describes practice and quality standards for handling hazardous drugs (HDs) to promote patient safety, worker safety, and environmental protection. Handling HDs includes, but is not limited to, the receipt, storage, compounding, dispensing, administration, and disposal of sterile and nonsterile products and preparations.

This chapter applies to all healthcare personnel who handle HD preparations and all entities that store, prepare, transport, or administer HDs (e.g., pharmacies, hospitals and other healthcare institutions, patient treatment clinics, physicians' practice facilities, or veterinarians' offices). Personnel who may potentially be exposed to HDs include, but are not limited to: pharmacists, pharmacy technicians, nurses, physicians, physician assistants, home healthcare workers, veterinarians, and veterinary technicians.

Entities that handle HDs must incorporate the standards in this chapter into their occupational safety plan. The entity's health and safety management system must, at a minimum, include:

- A list of HDs

- *‹800› Hazardous Drugs—Handling in Healthcare Settings.* USP Compounding Compendium. Current with USP 39-NF 34 through First Supplement. Rockville, MD: The United States Pharmacopeial Convention; 2016: 85-103

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USP: U.S. Pharmacopeial Convention

- Not a government entity
  - A scientific nonprofit organization
- Sets standards for the identity, strength, quality, and purity of medicines, food ingredients, and dietary supplements
- USP Council of Experts and Expert Committees developing and revise standards
- Standards are enforceable by the FDA
- State Boards of Pharmacy may adopt USP compounding standards into their regulations

- The United States Pharmacopeial Convention. Available at http://www.usp.org/about-usp. Accessed 9.11.16

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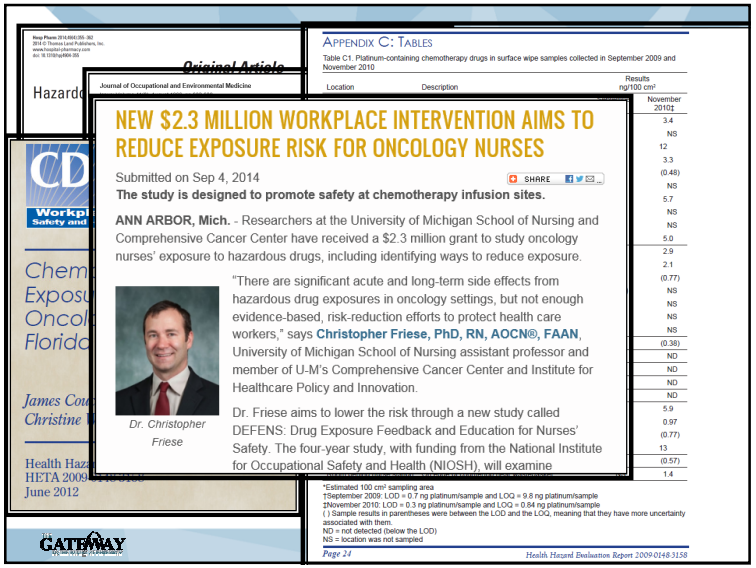

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Hazardous Drug (HD) Definition

ASHP 1990 Criteria	NIOSH 2004 Criteria
Carcinogenicity in animal models, in the patient population, or both as reported by the International Agency for Research on Cancer	Carcinogenicity
Teratogenicity in animal studies or in treated patients	Teratogenicity or developmental toxicity
Fertility impairment in animal studies or in treated patients	Reproductive toxicity
Evidence of serious organ or other toxicity at low doses in animal models or treated patients	Organ toxicity at low doses
Genotoxicity (i.e., mutagenicity and clastogenicity in short-term test systems)	Genotoxicity
	Structure and toxicity profile of new drugs that mimic existing drugs determined hazardous by the above criteria

- ASHP (American Society of Health System Pharmacists). Guidelines on handling hazardous drugs. Am J Health Syst Pharm 2006; 63: 1172—1193

USP <800> Requirement: Create a Hazardous Drugs List

- Each entity must maintain a list of hazardous drugs that the entity handles
- Drugs included on the entity's list of hazardous drugs ***must be handled according to the requirements in USP Chapter <800>***
- **Before trying to apply USP <800> standards you need to identify your hazardous drugs!** This will help you design appropriate facilities / workflows / policies

- USP Compounding Compendium February 2016. Accessed February 19, 2016

Creating a USP <800> Compliant HD List

- Must use the NIOSH List of Antineoplastic and Other Hazardous Drugs as a basis for your Hazardous Drug List
  - **2016 NIOSH List Published September 13, 2016**
  - **Available at: https://www.cdc.gov/niosh/docs/2016-161/**
  - **Contains FDA approved drugs through *December 2013***
  - **3 Tables of Hazardous Drugs**
    - **Table 1: AHFS classified antineoplastic drugs**
    - **Table 2: Meet one or more NIOSH criteria for a hazardous drug**
    - **Table 3: Reproductive risk only**

NIOSH list of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016. Available at https://www.cdc.gov/niosh/docs/2016-161/ Accessed 12.31.16

NIOSH List FYIs

- List has been published 5 times (2004, 2010, 2012, 2014, 2016)
- Pre-amble contains useful information on how NIOSH determines whether a medication is Hazardous
- Tables 1 & 2 also list whether the drug has Manufacturer Safe Handling Guidance (MSHG) listed in the prescribing information
  - Typically section 16 of the package insert
- All tables include both parenteral and oral medications (if available as both oral and parenteral, may only be listed once)
- Drugs are classified as antineoplastic agents by the American Hospital Formulary Service (AHFS) http://ahfs.ashp.org/drug-assignments.aspx
  - Can see new drug classifications on this website

NIOSH list of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016. Available at https://www.cdc.gov/niosh/docs/2016-161/ Accessed 12.31.16

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USP <800> says…

- All antineoplastics that *require manipulation* and are included on the NIOSH list **must** be on the entity's list
- All active pharmaceutical ingredients (APIs) included on the NIOSH list and handled by the entity must be on the entity's list
- If Manufacturer Safe Handling Guidance, include on entity's list
- Other agents on the NIOSH list
  - Perform risk assessment and document other containment strategies or work practices necessary to reduce exposure
  - If no risk assessment performed, must handle as hazardous and according to USP 800 requirements
- Must use NIOSH criteria to assess new drugs that enter the market place after most recent NIOSH list update (2014 – now)

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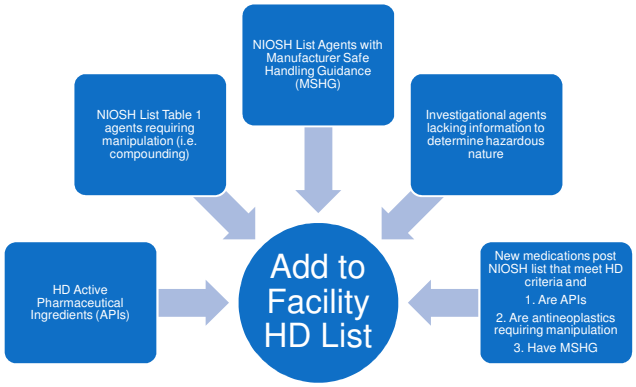
Create your Facility HD List



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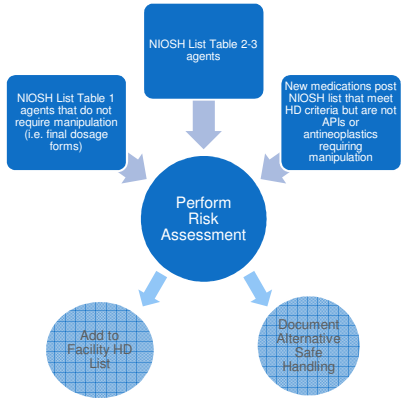
Risk Assessments



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USP <800> Risk Assessments

- Consider the following during an Assessment of Risk
  - Type of HD (e.g. antineoplastic, non-antineoplastic, reproductive risk only)
  - Dosage Form
  - Risk of Exposure
  - Packaging
  - Manipulation
- If an assessment of risk approach is taken, must document what alternative containment strategies and/or work practices are being employed to minimize occupational exposure
- Review risk assessments every 12 months and document review

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Two Paths to Compliance

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Final Dosage Forms

- Hazardous Drugs that only require counting or repackaging of final dosage forms ***may be prepared for dispensing without any further requirements for containment***
  - unless required by the manufacturer (MSHG)
  - or if visual indicators of HD exposure hazard are present (i.e. dust / leakage)
- Counting / repackaging of HDs should be done carefully
  - Use clean equipment dedicated for use with HDs
  - Decontaminate equipment after each use
  - Do not place HD tablets / capsules in automated counting machines
- Healthcare personnel should avoid crushing tablets or opening capsules of HDs
  - If manipulation is required, must wear PPE and use a plastic pouch to contain any dust or particles

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NIOSH List Table 1 Agents Requiring Manipulation

Ado-Trastuzumab	Cyclophosphamide	Idarubicin	Pertuzumab
Amsacrine	Cytarabine	Ifosfamide	Pralaxtrexate
Arsenic Trioxide	Cytarabine Liposomal	Irinotecan	Romidepsin
Azacitidine	Dacarbazine	Irinotecan (Liposomal)	Streptozocin
Bacillus Calmette Guerin	Dactinomycin	Ixabepilone	Temozolomide
Belinostat	Daunorubicin	Mechlorethamine	Temsirolimus
Bendamustine	Decitabine	Melphalan	Teniposide
Bleomycin	Docetaxel	Methotrexate	Thiotepa
Bortezomib	Doxorubicin	Methotrexate	Topotecan
Brentuximab Vedotin	Doxorubicin Liposomal	Mitomycin	Valrubicin
Busulfan	Epirubicin	Mitoxantrone	Vinblastine
Cabazitaxel	Eribulin	Nab-Paclitaxel	Vincristine
Carboplatin	Etoposide	Nelarabine	Vinorelbine
Carfilzomib	Floxuridine	Omacetaxin	Ziv-aflibercept
Carmustine	Fludarabine	Oxaliplatin	Talimogene laherparepvec
Cisplatin	Fluorouracil	Paclitaxel	Trabectedin
Cladribine	Gemcitabine	Pemetrexed	
Clofarabine	Gemtuzumab ozogamicin	Pentostatin	

Note – Majority of Monoclonal Antibodies are not Hazardous

NIOSH list of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016. Available at https://www.cdc.gov/niosh/docs/2016-161/ Accessed 12.31.16

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NIOSH List Table 1 Oral Agents

Drug	AHFS Classification	MSHG?	Reason for Listing on NIOSH List	Facility HD List
Anastrazole (Arimidex)	10:00 antineoplastic agents	No	FDA Pregnancy Category X	Perform Risk Assessment
Capecitabine (Xeloda)	10:00 antineoplastic agents	Yes	Metabolized to 5-fluorouracil; FDA Pregnancy Category D	Add to HD List due to MSHG
Imatinib (Gleevec)	10:00 antineoplastic agents	Yes	FDA Pregnancy Category D	Add to HD List due to MSHG
Letrozole (Femara)	10:00 antineoplastic agents	No	FDA pregnancy Category X	Perform Risk Assessment
Megestrol (Megace)	10:00 antineoplastic agents	No	Nursing should be discontinued if megestrol is required. Women at risk of pregnancy should avoid exposure; FDA Pregnancy Category X	Perform Risk Assessment

NIOSH list of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016. Available at https://www.cdc.gov/niosh/docs/2016-161/ Accessed 12.31.16

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Risk Assessments

Drug	Hazardous Risk	Dosage Form	Risk of Exposure	Packaging / Manipulation	Alternative Safe Handling
Anastrazole (Table 1)	Reproductive (pregnancy category X)	Film Coated Tablets	May occur during counting	30 or 90 count vials or unit dose	Dispense in original container and do not repackage
Megestrol (Table 1)	Reproductive (pregnancy category X)	Tablets / Suspension Tablets scored for splitting	May occur during counting and repackaging	Must count Often must pour suspension May split tablets	Reproductive age staff do not handle Separate counting tray cleaned before & after Wear gloves
Cyclosporine (Table 2)	IARC Group 1 carcinogen; FDA Pregnancy Category C	Oral, IV, Oral Solution	During sterile compounding Pouring of oral solution May occur during counting	Sterile compounding for IV doses Must count Often must pour suspension	Use of CSTDs during sterile compounding Priming IV line with saline Additional PPE

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NIOSH list of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016. Available at https://www.cdc.gov/niosh/docs/2016-161/ Accessed 12.31.16

Possible Strategy for HD List

- Divide Hazardous Drugs into Risk Levels and define requirements for each risk level

Risk Level 1 HD	• Antineoplastic Agents requiring sterile compounding
Risk Level 2 HD	• Non-antineoplastic Agents requiring sterile compounding
Risk Level 3 HD	• Final dosage forms with possible administration risks
Risk Level 4 HD	• Final dosage forms: oral tablets and capsules

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USP <800> Requirements

- **Designated Person**
- **Facility and Engineering Controls**
- **Environmental Wipe Sampling**
- **Closed System Transfer Devices (CSTDs)**
- **Personal Protective Equipment (PPE)**
- **Deactivating, Decontaminating, Cleaning and Disinfecting**
- **Personnel Training**
- **Medical Surveillance**
- **SOPs**

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USP <800> Requirement: Designated Person

- Each entity must designate a person responsible for overseeing compliance with USP <800>
- Responsibilities would include
  - Implementing procedures
  - Assessing competency of personnel
  - Ensuring environmental control of storage and compounding areas
  - Monitoring facility reports of testing / sampling performed

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USP <800> Requirement: Facility & Engineering Controls

Hazardous Drug Activity	Non-Sterile Compounding	Sterile Compounding
Receipt	• Receipt and unpacking must occur in a neutral or negative pressure area	
Storage	• HDs and APIs requiring manipulation **must be stored separately** from non hazardous medications (separate refrigerator) in an externally ventilated, negative-pressure room with at least 12 air changes per hour (ACPH) • Non-antineoplastic, reproductive risk only drugs and final dosage forms of antineoplastic HDs may be stored with other inventory if permitted by entity policy	

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USP <800> Requirement: Facility & Engineering Controls

Hazardous Drug Activity	Non-Sterile Compounding	Sterile Compounding

Compounding	• In a C-PEC located in a C-SEC
	• C-PEC must be
	  • Externally vented (preferred) or have a redundant HEPA filter
	• C-SEC must
	  • Be externally vented
	  • Be physically separate
	  • Have 12 ACPH
	  • Have a negative pressure of 0.01 – 0.03 inches of water column relative to adjacent areas
		• In a C-PEC located in a C-SEC
		• C-PEC must
		  • Be externally vented
		  • Provide an ISO Class 5 or better environment
		• C-SEC can be either an
		  • An externally vented, negative pressure ISO Class 7 buffer room/ante room with 30 ACPH or
		  • A negative pressure containment segregated compounding area that is externally vented with 12 ACPH

C-PEC = containment primary engineering control
C-SEC = containment secondary engineering control

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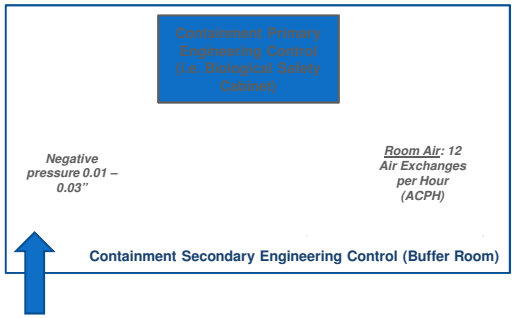
USP <800> Optimal Facility Design for Non-Sterile Compounding



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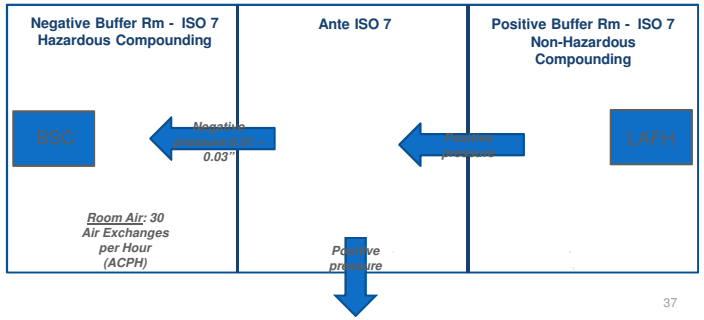
USP <800> Optimal Facility Design for Sterile Compounding



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Types of Containment Primary Engineering Controls (C-PECs)

Type of C-PEC	Protection		
	Personnel	Environmental	Product
Containment Ventilated Enclosure	Yes	Yes	No
Class I Biological Safety Cabinet	Yes	Yes	No
Class II Biological Safety Cabinet	Yes	Yes	Yes
Class III Biological Safety Cabinet *(Total Containment Cabinets, gas tight, used for working with carcinogens, diseases etc.)*	Yes	Yes	Yes

Class II BSCs	
Class II A1 / A2	70% of air is recirculated 30% of air is exhausted
Class II B1	40% of air is recirculated 60% of air is exhausted
Class II B2	0% of air is recirculated 100% of air is exhausted

Introduction to Biological Safety Cabinets. Available at: https://www.bakerco.com/introduction-biological-safety-cabinets. Accessed 7.12.17
Air Science Vented Enclosure Brochure. Available at: http://www.airscience.com/lib/sitefiles/pdf/SalesLit/Vented-Enclosure-Ventilation-Enclosures.pdf. Accessed 7.12.17

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Containment Primary Engineering Controls (C-PECs)

- Which C-PECs are allowed for **non-sterile compounding** of Hazardous Drugs according to USP 800?

LAFH | CVE | Class I BSC | Class II A2 BSC

Photos from left to right
1. https://www.nuaire.com/products/laminar-airflow-workstations
2. http://www.airscience.com/vented-enclosures
3. https://www.nuaire.com/labgard-nu-813-bench-top-class-i-biosafety-containment-ventillated-enclosure
4. https://www.nuaire.com/cellgard-es-hazardous-drug-nu-481-class-ii-type-a2-biosafety-cabinet

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Containment Primary Engineering Controls (C-PECs)

- Which C-PECs are allowed for **=sterile compounding** of Hazardous Drugs according to USP 800?

Must be externally vented!

LAFH | CVE | Class I BSC | Class II A2 BSC | Class II B1 BSC | Class II B2 BSC

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2. http://www.airscience.com/vented-enclosures
3. https://www.nuaire.com/labgard-nu-813-bench-top-class-i-biosafety-containment-ventillated-enclosure
4. https://www.nuaire.com/cellgard-es-hazardous-drug-nu-481-class-ii-type-a2-biosafety-cabinet
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6. https://www.nuaire.com/labgard-nu-430-class-ii-type-b2-biosafety-cabinet

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Non-Sterile and Sterile Compounding

- Ideally separate rooms with separate primary engineering controls for sterile and non sterile compounding
- Allowed to compound non-sterile medications in sterile compounding rooms and C-PEC IF room can maintain ISO 7 classification during the non-sterile compounding activity
- If the C-PECs used for sterile and nonsterile compounding are placed in the same room, they must be placed at least 1 meter apart and particle-generating activity must not be performed when sterile compounding is in process

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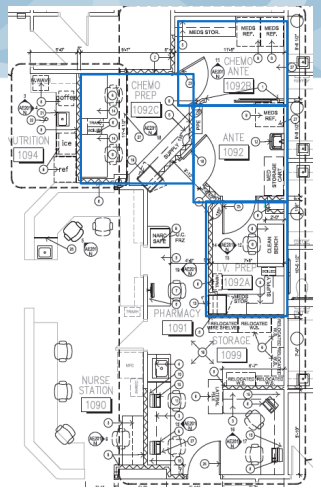
Layout with Negative Pressure Hazardous Drug Storage Room



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Non Hazardous Ante Room

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Non Hazardous Clean Room

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Hazardous Ante Room

Hazardous Clean Room

USP <800> Requirement: Closed System Transfer Devices & Environmental Sampling

- Closed system transfer devices *should* be used for compounding HDs when the dosage form allows
- Closed system transfer devices *must* be used when administering antineoplastic HDs
- Environmental wipe sampling for HD surface residue
  - Every 6 months
  - Include areas where contamination from HDs likely
  - If measurable contamination found → identify, document and contain contamination then repeat wipe test

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Closed-System Transfer Devices (CSTDs)

- Offer an additional level of protection during compounding / administration
- No certainty that all CSTDs will perform adequately
- Which Closed-System Transfer Device is recommended by USP <800>?

  No universal performance standards to evaluate CSTDs – users should do their own evaluation

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Closed-System Transfer Devices (CSTDs)

1. Texium™

2. PhaSeal™

3. ChemoClave®

4. EquaShield®

5. OnGuard®

1. http://www.bd.com/en-us/offerings/capabilities/hazardous-drug-safety/texium-system/texium-closed-male-luer
2. http://www.bd.com/en-us/offerings/capabilities/hazardous-drug-safety/bd-phaseal-system/bd-phaseal-drug-vial-access-device
3. http://www.icumed.com/products/oncology/hazardous-drug-closed-systems-and-cstds/chemoclave.aspx
4. https://www.equashield.com/system-components/
5. http://www.bbraunusa.com/products.html?prid=PRID00006969

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USP <800> Requirement: Personal Protective Equipment (PPE)

PPE	Sterile Compounding	Non-Sterile Compounding	Cleaning	Unpacking Orders	Administering	Cleaning up Spills
Gowns	✓	✓	✓	*Per institutional SOPs*		
Head / Hair Covers	✓	✓	*Per institutional SOPs*			
Shoe Covers	2 pairs	2 pairs	*Per institutional SOPs*			
Chemotherapy gloves	2 pairs (outer must be sterile)	2 pairs	2 pairs	✓	2 pairs	*Per institutional SOPs*
Eye / Face Protection	*Per institutional SOPs*		If splashing likely	*Per institutional SOPs*		✓
Respiratory Protection	*Per institutional SOPs*		Yes when cleaning under surface of C-PEC	Yes if HDs not contained in plastic	*Per institutional SOPs*	Yes when spills to large for a spill kit

- *Institutional SOPs for PPE must be designed based on risk of exposure, types of activities performed, and an assessment of risk*

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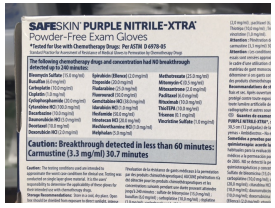
Chemotherapy Gloves

- When chemotherapy gloves are required they must meet American Society for Testing and Materials (ASTM) standard D6978
- Chemotherapy gloves *should* be worn for handling all HDs including non-antineoplastics
- Should be powder free
- For sterile compounding, outer glove must be sterile
- Change gloves every 30 minutes unless otherwise recommended by manufacturer's documentation



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Gowns, Head, Hair, Shoe & Sleeve Covers

- Gowns
  - Must be disposable
  - Must be shown to resist permeability by HDs
  - Must close at the back, be long sleeved and have closed cuffs that are elastic or knit
  - Change per manufacturer's recommendations or every 2-3 hours & always after a spill / splash
- Head, Hair, Shoe & Sleeve Covers
  - When compounding, second pair of shoe covers must be donned before entering the C-SEC and taken off when exiting
- PPE worn when handling hazardous drugs should be disposed of as hazardous drug waste

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Eye / Face / Respiratory Protection

- Eye and Face Protection
  - Must be worn when there is a risk for spills or splashes of HDs (i.e. working in a surgical suite, cleaning a spill)
  - Googles
  - Face shields
  - Full-facepiece respirator
- Respiratory Protection
  - A fit tested NIOSH-certified N95 mask provides protection form airborne particles
    - Sufficient for "most activities requiring respiratory protection"
  - An elastomeric half-mask with a multi-gas cartridge and P100 filter
    - When unpacking HD orders not contained in plastic
  - A full-facepiece, chemical cartridge-type respirator or powered air-purifying respirator (PAPR) should be worn when there is a risk of exposure such as
    - Cleaning up spills
    - Deactivating, decontaminating and cleaning underneath the work surface of a C-PEC
    - There is known or suspected airborne exposure to powders / vapors

GATEWAY

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USP <800> Requirement: Deactivating, Decontaminating, Cleaning and Disinfecting

- ***All areas*** where hazardous drugs are handled and all reusable equipment must be deactivated, decontaminated, and cleaned
  - Sterile compounding areas and devices must be subsequently disinfected

Cleaning Step	Purpose	Example Agents
Deactivation	Render compound inert / inactive	EPA registered oxidizers (peroxide formulations, sodium hypochlorite)
Decontamination	Remove HD residue	Alcohol, water, peroxide, sodium hypochlorite
Cleaning	Remove organic and inorganic material	Germicidal detergent
Disinfection	Destroy Microorganisms	EPA registered disinfectant, sterile alcohol

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USP <800> Requirement: Personnel Training

- All personnel who handle hazardous drugs must be trained and pass competency before they handle HDs and every 12 months
- Training / competency assessment must be documented and must include
  - An overview of the entity's HD list
  - Review of the entity's HD SOPs
  - Proper use of PPE
  - Proper use of equipment and devices (engineering controls)
  - Response to known or suspected HD exposure
  - Spill management
  - Proper disposal of HDs and trace-contaminated materials

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USP <800> Requirement: Medical Surveillance

- Healthcare workers who handle HDs should be enrolled in a medical surveillance program
- Baseline and after HD exposure
- Assess
  - Labs
  - Medical history
  - Work history (previous hazardous drug exposure)
  - Estimated amount of HD handling
  - Symptoms that arise post handling of HDs

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GATEWAY

USP <800> Requirement: SOPs

- Entity must maintain SOPs for the safe handling of HDs for all situations
- Must be reviewed annually by the designated person

USP <800> Required SOPs	
Hazard Communication Program	Occupational Safety Program
Designation of HD Areas	Receipt
Storage	Compounding
Use and Maintenance of Proper Engineering Controls	Hand Hygiene, use of PPE based on activity (receipt, transport, compounding, administration, spill, disposal etc.)
Deactivation, Decontamination, Cleaning and Disinfection	Dispensing
Transport	Administering
Environmental Monitoring (including wipe sampling)	Disposal
Spill Control	Medical Surveillance

USP Compounding Compendium February 2016. Accessed February 19, 2016

GATEWAY

USP <800> Requirements: THERE ARE MORE!

This presentation was not an all inclusive summary of USP <800> Requirements

GATEWAY

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GATEWAY

Post Test: Question #1

A new FDA approved monoclonal antibody comes to market for lung cancer. You review applicable literature and determine that the medication is not carcinogenic, does not produce developmental or reproductive toxicity and has no end organ toxicity or genotoxicity. You review section 16 of the product package insert and it does not list manufacturer safe handling guidance. The most likely safe handling for this medication at your institution would be

A. Add it to your institution's hazardous drug list and treat it according to USP <800> requirements
B. Perform a risk assessment and determine what other safe handling requirements may be necessary
C. Do not add it to the hazardous drug list or perform a risk assessment
D. Do not add it to formulary

GATEWAY

Question 1 Justification

- The medication does not meet any hazardous drug criteria as outlined by NIOSH so is unlikely to be considered a hazardous drug by NIOSH and therefore would not be subject to USP <800> requirements

Post Test: Question #2

My institution prepares both sterile and non-sterile compounds with hazardous drugs. My facilities should be set up as follows (select ALL correct answers)

A. Separate refrigerators for hazardous and non-hazardous medications
B. A positive pressure room for unpacking hazardous medications
C. An externally vented, negative pressure ISO class 7 clean room for sterile compounding
D. Non-sterile compounds are prepared in the ISO class 7 negative pressure clean room because we've verified the room maintains ISO class 7 during non-sterile compounding

Question 2 Justification

- USP <800> requires separate refrigerators for hazardous and non-hazardous medications
- A neutral or negative pressure room is required for unpacking hazardous medications
- The ISO class 7 clean room must be negative pressure for sterile compounding of hazardous drugs
- Ideally non-sterile compounding would be performed in a separate, negative pressure room; however, USP <800> allows non-sterile compounding in a sterile compounding ISO 7 clean room as long as the clean room is able to maintain ISO 7 conditions during compounding

Post Test: Question #3

For sterile compounding of hazardous medications, the following is true

A. 2 pairs of gloves are required
B. Chemotherapy rated gloves are required (compliant with ASTM standard D6978)
C. The outer gloves must be sterile
D. All of the above

Question 3 Justification

- USP <800> lists PPE requirements for various activities including sterile and non-sterile compounding, receiving, administering, and cleaning.
- 2 pairs of chemotherapy rated gloves are required for handling all hazardous drugs most hazardous drugs handling activities.

Post Test: Question #4

All of the following are required by USP <800> except

A. A hazardous drugs list
B. Training for all staff that handles hazardous drugs
C. Environmental wipe sampling monthly
D. Use of closed system transfer devices
E. A medical surveillance program

Question 4 Justification

- USP <800> requires environmental wipe sampling every 6 months to detect areas contaminated with hazardous drugs
- All other answers are required as a part of USP <800> compliance

Take Home Points

USP <800> is effective July 1, 2018!!!

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