

An Insider's Look into the Life of a Chemo Compounding Technician

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10.01.20

The speaker and mentor have no actual or potential conflicts to disclose.



Learning Objectives for Technicians

- ❖ Select the appropriate garbing supplies in order to correctly don PPE for chemotherapy compounding.
- ❖ Prepare a clean chemotherapy hood for compounding by organizing the cleaning supplies in the correct order.
- ❖ Conduct a simulation of compounding a chemotherapy product by outlining the steps of compounding chemotherapy from label order to completed product.
- ❖ Calculate the drug and total volumes of a chemotherapy product given the drug concentration.



Personal Protective Equipment⁽¹⁾

Protects Patient

- ❖ Microbial shedding
- ❖ Cross contamination with other hazardous agents
- ❖ Reduces potential leaking / bag puncture

Protects Employee

- ❖ Inhalation - aerosolized chemo
- ❖ Absorption - chemo spillage
- ❖ Injection - needle sticks
- ❖ Ingestion - accidental face splash



Chemotherapy PPE Garbing⁽¹⁾

Dirtiest to Cleanest

- ❖ Feet - Booties
- ❖ Hair - Bonnet
- ❖ Mouth - Mask
- ❖ Body - Gown

Protects Employee

- ❖ Booties non-skid elasticized over shoes
- ❖ Bonnet contains hair
- ❖ Mask N95 for cleaning
- ❖ Gown chemo spill resistant

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Hand Hygiene

- ❖ Antiseptic hand soap up to elbows
- ❖ Lint-free wipes reduces particles in anteroom
- ❖ Sterile gown - solid part in front for splashes
- ❖ Tie around waist and at neck. Move freely but snug to keep contaminants in/out

- ❖ Hand sanitizer
- ❖ Gloving sterile within cleanroom open pull up and over gown cuffs
- ❖ Packaged to not touch the sterile parts
- ❖ Spray with SIPA
- ❖ Agar plate fingertip testing

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Chemotherapy PPE Gowns and Gloves⁽¹⁾

Gowns

- ❖ Hazardous drug permeability resistant
- ❖ Reusable during shift
- ❖ Must be left in negative pressure room to avoid cross contamination in positive areas

Gloves

- ❖ Powder-free
- ❖ ASTM approved
- ❖ Changed Q30 min during compounding

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Chemotherapy PPE Booties and Masks⁽¹⁾

Booties

- ❖ Skid resistant
- ❖ Double booties worn in negative pressure room and outer pair removed upon returning to anteroom

Masks

- ❖ N95 is acceptable for hazardous compounding
- ❖ PAPR must be used for chemotherapy spills greater than can be absorbed by a spill kit

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What is the correct order of PPE garbing?

- A. gown, booties, bonnet, mask
- B. booties, bonnet, mask, gown
- C. mask, booties, bonnet, gown
- D. bonnet, mask, gown, booties

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Hood Cleaning Steps and Products specific to Northwestern Memorial Hospital Chicago, IL

Cleaning Step Purpose

- ❖ **Deactivation** - inactivates harmful compound
- ❖ **Decontamination** - removal of hazardous residue
- ❖ **Cleaning** - removal of inorganic/organic substances
- ❖ **Disinfection** - kills microorganisms

Cleaning Product Ingredient Steps

- Sodium Hypochlorite Oxidizer (Surface Safe 1™)
- Sodium Thiosulfate w/benzyl alcohol (Surface Safe 2™)
(Water w/lint-free wipes to remove residue)
- Germicidal detergent (Opticide³⁶)
- Sterile 70% Isopropyl Alcohol (Pharma-Hol™)

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Various EPA Approved Decontaminating, Disinfecting, and Cleaning Agents for Compounding Surfaces

Cavi-Wipes™ 2.0

Pharma-Hol™

Contec® IPA

PREempt™

Opti-cide^{3S}

Surface Safe™

PeridoxRTU®

Wolf-Pak® IPA



Hood Cleaning Demo Process and Products specific to Northwestern Memorial Hospital Chicago, IL



What is the correct order of chemo hood cleaning?

- A. Cleaning, Deactivation, Decontamination, Disinfection
- B. Decontamination, Cleaning, Deactivation, Disinfection
- C. Deactivation, Decontamination, Cleaning, Disinfection
- D. Deactivation, Cleaning, Decontamination, Disinfection



Closed System Transfer Devices (CSTDs)

- ❖ Needleless system to protect personnel and patients
- ❖ Different sizes to accommodate many vial types
- ❖ Utilize male-female connections to keep needle transfer enclosed
- ❖ Connect tubing product or push syringes to patient lines/ports

Chemo Workflow Triage Considerations

- ❖ Chemo can be concentration dependent
Must calculate Drug dose (mg) / Total infusion volume
- ❖ Chemo can be short stability dependent
Vidaza is stable one hour from beginning of compounding through infusion time
- ❖ Chemo can be protect from light
Must use UVL covering
- ❖ Chemo may need to be refrigerated
Dacogen - use cold bag stable 4hrs

Math Time! - the How-To Guide

1. Determine the volume of the appropriate diluent bag along with overfill prn
2. Calculate the drug concentration if the vial is lyophilized and requires reconstitution
3. Calculate the dose volume
4. Add the drug volume to the diluent bag volume
5. Compare to the Total volume on the label
6. Double check your math by comparing the total volume to the rate over the run time

Easy Peasy Math Time Example Part 1

Given dose:

decitabine 48mg in 100 Normal Saline
 NS bag has 10mL overfill
 decitabine vial is 50mg
 Reconstitute with 10mL SW
 Infusion bag runs over 60 min.
 Rate is 119.6mL/hr.

1. Determine the volume of the appropriate diluent bag along with overfill prn
 $100\text{mL} + 10\text{mL} = 110\text{mL}$
2. Calculate the drug concentration if the vial is lyophilized and requires reconstitution
 $50\text{mg} / 10\text{mL} = 5\text{mg/mL}$



Easy Peasy Math Time Example Part 2

Given dose:

decitabine 48mg in 100 Normal Saline
 NS bag has 10mL overfill
 decitabine vial is 50mg
 Reconstitute with 10mL SW
 Infusion bag runs over 60 min.
 Rate is 119.6mL/hr.

3. Calculate the dose volume on the label
 $48\text{ mg} / (5\text{mg/mL}) = 9.6\text{mL}$
4. Add the drug volume to the diluent bag volume
 $9.6\text{mL} + 110\text{mL}$



Easy Peasy Math Time Example Part 3

Given dose:

decitabine 48mg in 100 Normal Saline
 decitabine vial is 50mg
 Reconstitute with 10mL SW
 NS bag has 10mL overfill
 Infusion bag runs over 30 min.
 Rate is 119.6mL/hr.

5. Compare to the Total volume on the label
 $TV=119.6\text{mL}$
6. Double check your math by comparing the total volume to the rate over the run time
 $119.6\text{mL/hr} \times 1\text{hr} = 119.6\text{mL}$



Real Deal Math Time Example Part 1

Given dose:

busulfan 261.25mg in 500mL NS to **TV=522.5mL**

NS 500mL bag has 40mL overflow
busulfan 10mL vial is 6mg/mL

Infusion bag runs over 180 min.
Rate is 174.2 mL/hr.

1. Determine the volume of the appropriate diluent bag along with overflow pm

$$500\text{mL} + 40\text{mL} = 540\text{mL}$$

2. Calculate the drug concentration if it the vial is lyophilized and requires reconstitution N/A

3. Calculate the dose volume
 $261.25\text{mg} / 6\text{mg/mL} = 43.5\text{mL}$

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Real Deal Math Time Example Part 2

Given dose:

busulfan 261.25mg in 500mL NS to **TV=522.5mL**

NS 500mL bag has 40mL overflow
busulfan 10mL vial is 6mg/mL

Infusion bag runs over 180 min.
Rate is 174.2 mL/hr.

4. Add the drug volume to the diluent bag volume

$$43.5\text{mL} + 540\text{mL} = 583.5\text{mL}$$

5. Compare to the Total volume on the label

Label TV=522.5mL TV=583.5mL
-> Remove 61mL

6. Double check your math by comparing the total volume to the rate over the run time

$$174.2\text{mL/hr} \times 3\text{hr} = 522.5\text{mL}$$

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Math Question

What is the infusion concentration?

Given dose:

etoposide 200mg in 500 Normal Saline
etoposide is 20mg/mL in liquid form
NS bag has 40mL overflow

Infusion Concentrations >0.35mg/mL require an in-line filter

Infusion bag runs over 60 min.
Rate is 550mL/hr.

Reminder How-to Guide

1. Determine the volume of the appropriate diluent bag along with overflow pm
2. Calculate the drug concentration if it the vial is lyophilized and requires reconstitution
3. Calculate the dose volume
4. Add the drug volume to the diluent bag volume
5. Compare to the Total volume on the label
6. Double check your math by comparing the total volume to the rate over the run time

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What is the infusion concentration?

- A. 0.18mg/mL
- B. 0.27mg/mL
- C. 0.36mg/mL
- D. 0.45mg/mL

Gathering Supplies

- | | |
|--|-------------------------------|
| ❖ Base solution | ❖ Chemo dose label |
| ❖ Drug | ❖ Alcohol swabs |
| ❖ Drug diluent PRN | ❖ Waste bin |
| ❖ Tubing | ❖ CSTD vial adapters |
| ❖ Port wrap IVA seal | ❖ CSTD syringes |
| ❖ Auxiliary labels for chemotherapy / refrigerate labels / UVL bag | ❖ CSTD female tubing end caps |

Chemo Waste⁽³⁾

- | | |
|--|---|
| ❖ Chemo waste needs to go into appropriate waste streams per EPA | ❖ Bulk chemo is collected in Stericycle black bins |
| ❖ Protects the environment and drinking water | ❖ Yellow bin waste for empty chemo vials and syringes |

Which statement about chemo compounding is **TRUE**?

- A. Gowns are the best way to prevent cross contamination
- B. CSTDs increase potential for needle sticks
- C. Chemo total volumes do not need to be verified
- D. Some special chemo considerations are light, concentration, and stability



Questions?



References

- (1) <http://www.usp.org/compounding/general-chapter-hazardous-drugs-handling-healthcare> Accessed 02/15/20
- (1) Video used with permission Northwestern Memorial Hospital 04/18
- (1) <https://www.hercenter.org/hazmat/tenstepblueprint.pdf> Accessed 02/11/20

