

# Oncology Policy – Usage of Personal Protective Equipment among Oncology Nurses



**Denise Menonna- Quinn DNP, RN-BC, AOCNS,  
BMTCN**

**Clinical Level 4 Oncology Nurse/Educator at  
Hackensack Meridian Healthcare Cancer  
Center**

**Clinical Adjunct Professor at  
William Paterson University & Felician  
University**

# Objectives



- Identify the usage of Personal Protective Equipment among Inpatient and Outpatient Oncology Nurses
- Explain the importance of PPE and its relationship to the USP 800 mandate for safe practice.
- Recognize strategies to implement PPE and ensure compliance with USP 800.

# Chemotherapy



- **Hazardous Material**
- Antineoplastic Agents
- Cytotoxic Agents
  - Chemotherapy
  - Biotherapy
  - Anti-viral
  - Hormones



# Hazardous Drug Definition

Any drug identified by at least one of the following six criteria:

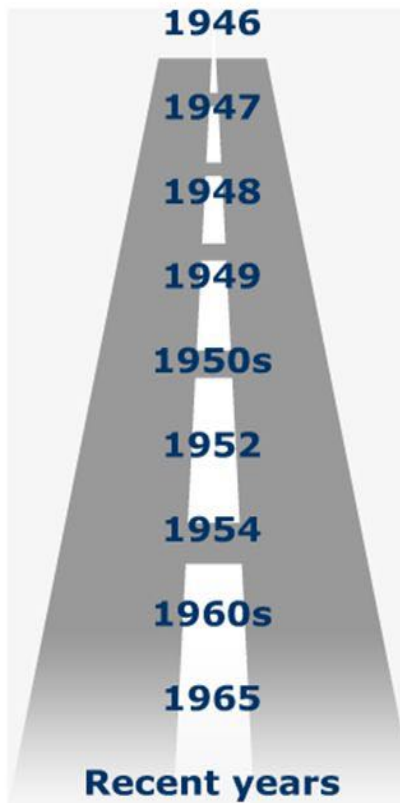
- Carcinogenicity
- Teratogenicity or developmental toxicity
- Reproductive toxicity in humans
- Organ toxicity at low doses in humans or animals
- Genotoxicity

New drugs that mimic existing hazardous drugs in structure or toxicity

# Evolution of Chemotherapy

- World War I
- World War II
- 1970
  - MAB'S
- 1990
  - Taxanes
- 2000
  - Biotherapy
  - Targeted Therapy

## History of chemotherapy development



- **1946** Nitrogen mustard given to treat lymphomas
- **1947** Antifolates introduced
- **1949** Methotrexate introduced
- **1950s** 5-Fluoro-uracil synthesised
- **1952** 6-mercaptopurine described
- **1954** Actinomycin D introduced
- **1960s** Combination chemo cured childhood ALL and HD
- **Recent Years** Many new agents  
Focus changes to optimising timing and usage and modulating toxicity



# Exposure Health Risks

## ACUTE SIDE EFFECTS

- Nausea/Vomiting
- Eye Irritation
- Metallic Taste
- Dizziness
- Headache
- Sore Throat

## LONG TERM SIDE EFFECTS

- Reproductive Difficulties
- Carcinogenic Affects
- Chromosomal Changes

### Health Experts Know

The risks of exposure are well-documented:

**Cancer • Miscarriage • Birth Defects**



World Health  
Organization

Learn more at:

[www.cytotoxicitysafety.org/cytotoxic-chemicals-findings-fact](http://www.cytotoxicitysafety.org/cytotoxic-chemicals-findings-fact)



# Who is At Risk for Chemotherapy Exposure?

- Manufacturing
- Transportation
- Distribution
- Preparation
- Administration
- Nurses
- Physicians
- Pharmacist and Pharmacy Assistants
- Ancillary Nursing Staff
- Transport Aids
- Patients and Families
- Housekeeping Staff





# Caution Chemotherapy

- Warning Signs
- Concerns
- Compliance Issues
- Exposure Routes





# Oral Exposure

- Ingestion
- Food
- Cosmetics
- Smoking
- Drinking



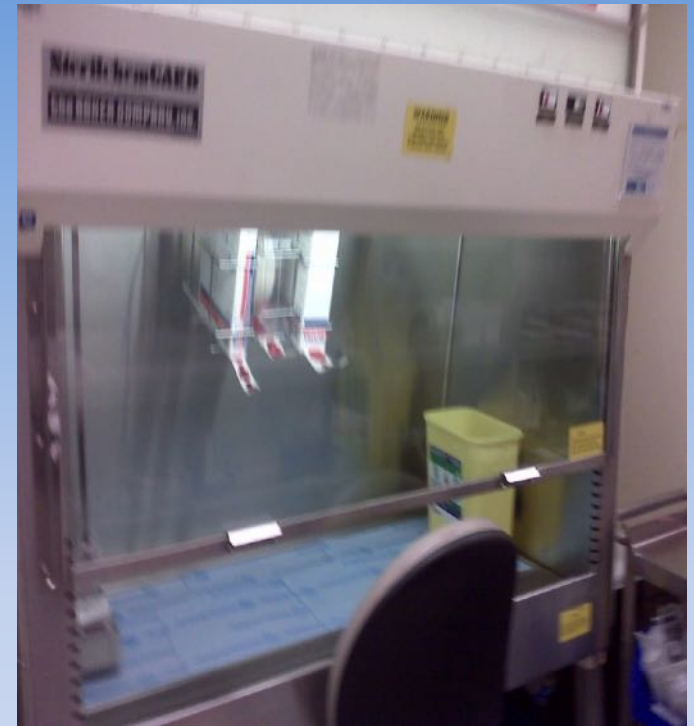
# Dermal Exposure

- Major Route
- Appropriate Gloves
- Surface Contamination



# Inhalation Exposure

- Biologic Safety Cabinet
- Droplets
- Spiking IV  
Chemotherapy
- Spills
  - Small
  - Large







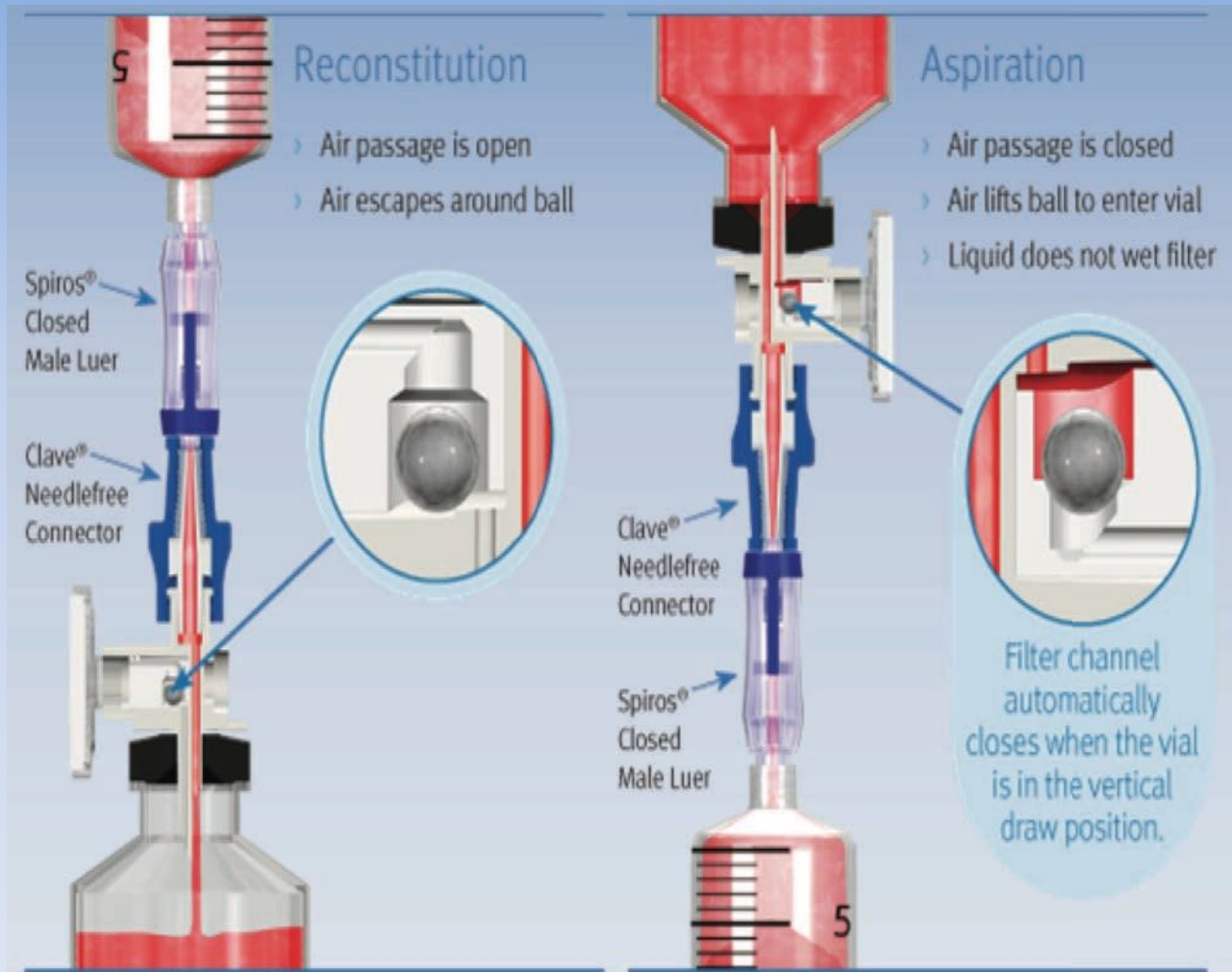
# Personal Protective Equipment PPE

- Must be Followed
- Check Institutions Policy
- Gloves
- Gown
- Mask
- Eye and Face Protection





# Closed System Devices



# Chemotherapy Tested Gloves



- Powder free feature eliminates powder-induced irritation and powder stains
- Extra thickness for added protection against incidental splash exposure to certain chemotherapy drugs and chemicals
- Anatomically shaped to reduce hand fatigue on prolonged usage
- Textured surface for enhanced grip
- Beaded cuff ensures easy donning
- Minimum level of Natural Rubber latex proteins and undetectable chemical residues greatly reduce skin allergic reactions

BS EN ISO 1001:2006  
BRITISH STANDARDS INSTITUTION  
CERTIFICATE NO. FM 1304

BS EN 274-2  
Micro-organisms  
Hazards

BS EN 274-3  
Chemical  
Hazards

BS EN 288  
Mechanical  
Hazards

0010

CE  
COUNCIL DIRECTIVE 93/42/EEC  
COUNCIL DIRECTIVE 89/686/EEC



# Waste Containers

- Special Containers
- Hospital Policy
- Safety Mechanism



# History of Guidelines/Standards

- First Published (1986)- OSHA
- Center for Disease Control - CDC (2000)
- Environmental Protection Agency EPA - (2001)
- Oncology Nursing Society – ONS (2001)
- National Institute for Occupational Safety and Health – NIOSH (2004)
- American Society of Clinical Oncology & Oncology Nursing Society –(2009 and 2011)

# US Pharmacopeia Convention- Policy Change

- USP 800 – practice quality standards for handling hazardous drugs to promote patient safety, worker safety and environmental protection.
- Organization Wide Initiative
  - Receiving, Pharmacy, Nursing Environmental and Leadership



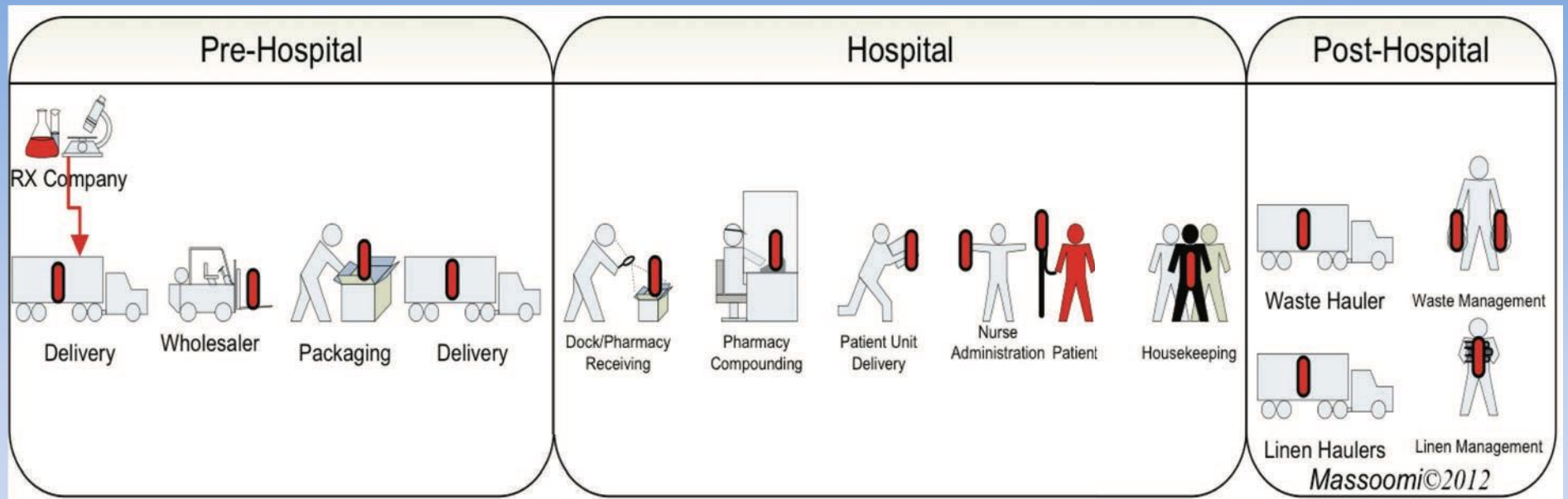


# Major Policy Changes

- USP <800> is now a separate chapter addressing hazardous drug receiving, preparation, storage and administration
- Current Hazardous Drug List
- Engineering Controls for safe preparation
- No “low volume providers”; everyone must be compliant
- Personnel training for all healthcare providers involved with hazardous agents must include:
  - Evaluating and providing a list of HDs (Hazardous Drugs)
  - Proper Use of PPE (Personal Protective Equipment)
  - Spill Management
  - Response to potential HD exposure
- Use of Closed System Transfer Devices (CSTD)

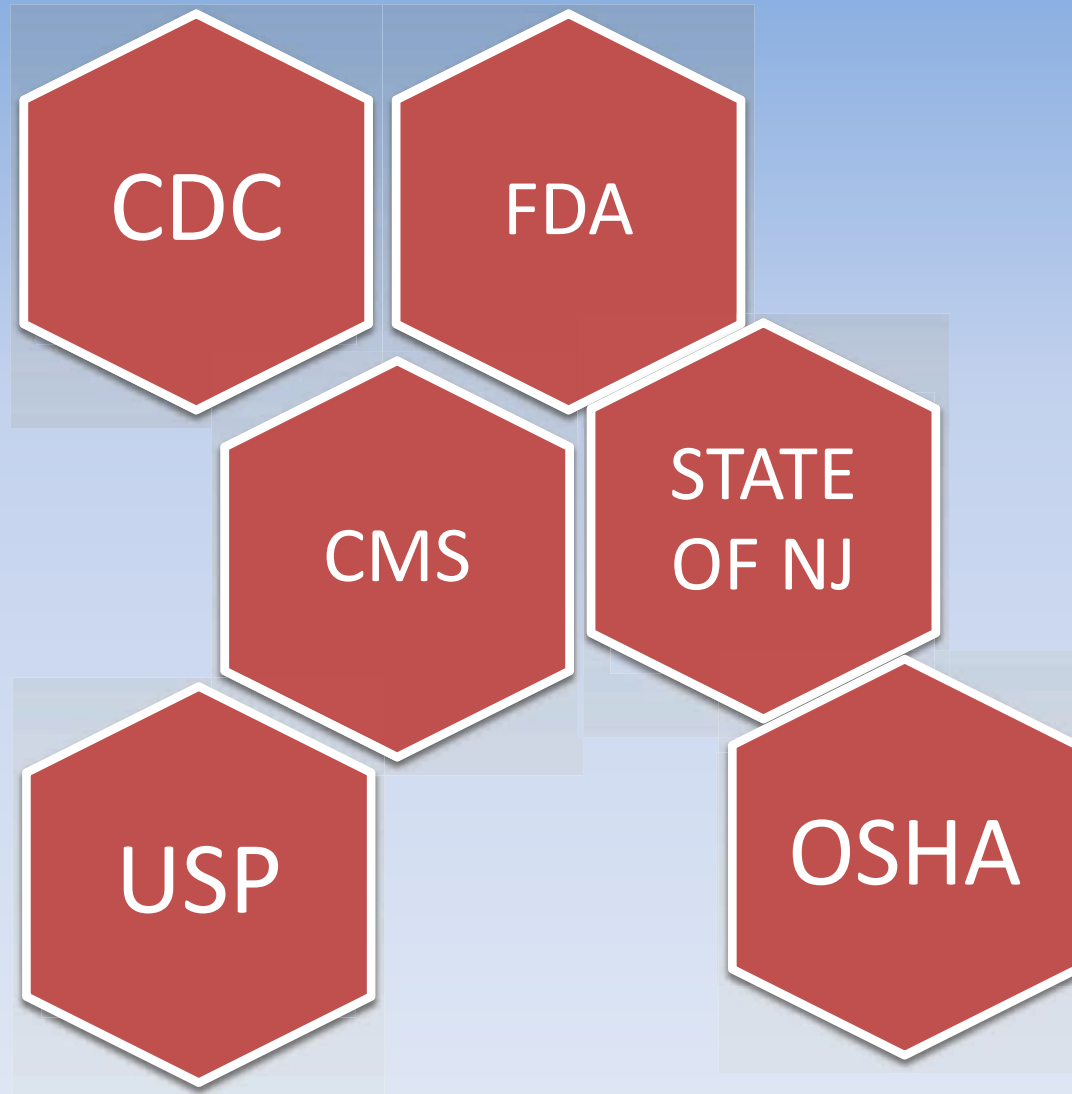


# Mapping out the Hazardous Drug Process



- **WHO** Pharmacists, pharmacy technicians, nurses, physicians, physician assistants, EVS, home healthcare workers, vets, and vet technicians
- **Not listed** Manufacturers; Wholesale Personnel; Researchers; Family

# Why Compliance Matters?



**POSSIBLE FINES, WITHHOLDING OF  
MEDICARE REIMBURSEMENT, AND  
JEOPARDIZING OF ACCREDITATION STATUS  
IF NOT COMPLIANT WITH USP 800**



# **DNP Prepared Nurses Assist with Policy Change.....**



- 1. Understand the Policy**
- 2. Identify the Gaps of Knowledge**
- 3. Assess Organizations Present Structure of Policy**
- 4. Develop a Plan to Implement Change**
- 5. Inter Disciplinary Team**

# RESEARCH STUDY



## Research Method/ Design

A descriptive, non-experimental, study to examine the Usage of Personal Protective Equipment Among Inpatient and Outpatient Oncology Nurses.

## Sample and Setting

A non-randomized convenience sample of volunteer inpatient and outpatient oncology nurses

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## Tool

### Chemotherapy Handling Questionnaire

- Divided into Three Phases
  - Preparation
  - Administration
  - Disposal

(Permission Granted)

(Polovich & Clark, 2011)

(Polovich & Martin ,2012)



# Study Results

## • Data Collection

Surveys were distributed to all oncology units both inpatient and outpatient via clinical level 2 nurses and educators.

### Demographic Data

- Years of experience in oncology
- Education
- Age
- Inpatient
- Outpatient
- Member of Professional Organization
- Certification in Oncology

## • Analysis

Descriptive Statistics was analyzed to determine the chemotherapy safety practices of inpatient and outpatient nurses.

SPSS 24 was used to perform the following statistical analysis.

- Frequencies
- Descriptive analysis
- Cross Tabulations
- Independent T-Test
- ANOVA's

# Demographics

| Characteristic        | Total sample (N) | Inpatient nurses  | Outpatient nurses   |
|-----------------------|------------------|---|---|
| Gender                | N=94             | 25 female nurses<br>2 male nurses   | 60 female nurses<br>6 male nurses   |
| Mean Age              | N=85             | 30 years of age   | 42 years  |
| Race                  | N=92             | 2 Hispanic/Latino<br>2 Two or More<br>2 Asian<br>0 Other<br>1 Black<br>19 White | 2 Hispanic/Latino<br>2 Two or More<br>2 Asian<br>3 Other<br>1 Black<br>46 White |
| Education             | N=92             | 0 Diploma<br>21 BSN<br>0 Doctoral<br>0 Associate<br>4 Masters                   | 6 Diploma<br>46 BSN<br>2 Doctoral<br>3 Associate<br>7 Masters                   |
| Mean Years experience | N= 89            | 5 years   | 15 years  |
| Certification         | N= 92            | 16 Not Certified<br>1 AOCN<br>0 NP<br>6 OCN<br>1 AOCNS<br>2 Other               | 27 Not Certified<br>1 AOCN<br>1 NP<br>24 OCN<br>1 AOCNS<br>2 Other              |



# Percentage of Use of PPE During Chemotherapy Administration



| Time Frame    | Closed transfer Device | Chemo-Designated Gloves | Other Gloves | Double Gloves | Chemo-Designated Gowns | Other Gowns | Re-Usable Gowns | Eye Protection | Respirator Mask |
|---------------|------------------------|-------------------------|--------------|---------------|------------------------|-------------|-----------------|----------------|-----------------|
| Never         | 3.2%                   | 2.1%                    | 87.2%        | 30.9%         | 18.1%                  | 97.9%       | 77.7%           | 76.6%          | 44.7%           |
| 1-25%         | 3.2%                   | 1.1%                    | 1.1%         | 11.7%         | 6.4%                   | 1.1%        | 19.1%           | 16.0%          | 24.5%           |
| 26-50%        | 4.3%                   | 2.1%                    | 8.5%         | 8.5%          | 5.3%                   | 1.1%        | 3.2%            | 3.2%           | 5.3%            |
| 51-75%        | 1.1%                   | 3.2%                    | 3.2%         | 5.3%          | 9.6%                   | 0%          | 0%              | 0.9%           | 4.3%            |
| 76-99%        | 19.1%                  | 9.6%                    | 0%           | 12.8%         | 13.8%                  | 0%          | 0%              | 3.2%           | 5.3%            |
| <b>Always</b> | <b>69.1%</b>           | <b>81.9%</b>            | <b>0%</b>    | <b>30.9%</b>  | <b>46.8%</b>           | <b>0%</b>   | <b>0%</b>       | <b>1.1%</b>    | <b>16.0%</b>    |

# Percentage of the of Use PPE During the Disposal Phase of Chemotherapy Administration



| Time Frame    | Chemo-Designated Gloves | Other Gloves | Double Gloves | Chemo-Designated Gowns | Other Gowns | Re-Usable Gowns | Eye Protection | Respirator Mask |
|---------------|-------------------------|--------------|---------------|------------------------|-------------|-----------------|----------------|-----------------|
| Never         | 2.1%                    | 85.1%        | 42.6%         | 22.3%                  | 92.6%       | 83.0%           | 74.5%          | 48.9%           |
| 1-25%         | 0.0%                    | 11.7%        | 11.7%         | 14.9%                  | 6.4%        | 14.9%           | 16.0%          | 20.2%           |
| 26-50%        | 4.3%                    | 3.2%         | 7.5%          | 17.0%                  | 1.1%        | 2.1%            | 3.2%           | 10.6%           |
| 51-75%        | 5.3%                    | 0%           | 3.2%          | 5.3%                   | 0%          | 0%              | 1.1%           | 3.2%            |
| 76-99%        | 13.8%                   | 0%           | 13.8%         | 9.6%                   | 0%          | 0%              | 1.1%           | 4.3%            |
| <b>Always</b> | <b>74.5%</b>            | <b>0%</b>    | <b>20.2%</b>  | <b>30.9%</b>           | <b>0%</b>   | <b>0%</b>       | <b>4.3%</b>    | <b>12.8%</b>    |

# Percentage of Use of PPE While Handling Excreta Post Chemotherapy Administration



| Time Frame    | Chemo-<br>Designated<br>Gloves | Chemo-<br>Designated<br>Gowns | Other<br>Gowns | Re-<br>Usable<br>Gowns | Eye<br>Protection | Respirator<br>Mask |
|---------------|--------------------------------|-------------------------------|----------------|------------------------|-------------------|--------------------|
| Never         | 41.5%                          | 36.2%                         | 87.2%          | 94.7%                  | 61.7%             | 52.1%              |
| 1-25%         | 10.6%                          | 12.8%                         | 11.7%          | 4.3%                   | 27.7%             | 28.7%              |
| 26-50%        | 23.4%                          | 22.4%                         | 1.1%           | 1.1%                   | 1.1%              | 2.1%               |
| 51-75%        | 4.3%                           | 2.1%                          | 0%             | 0%                     | 3.2%              | 3.2%               |
| 76-99%        | 3.2%                           | 2.1%                          | 0%             | 0%                     | 6.4%              | 2.1%               |
| <b>Always</b> | <b>17.0%</b>                   | <b>24.5%</b>                  | <b>0%</b>      | <b>0%</b>              | <b>0%</b>         | <b>11.7%</b>       |

# CONCLUSION

## IMPLICATION FOR PRACTICE

- Chemotherapy agents and regimens are toxic, hazardous material which has the potential to cause acute and chronic side effects.
- PPE has been determined as best practice and should include, chemotherapy designated gowns, and double gloving of chemotherapy tested gloves and respirator mask when appropriate.
- The study identified the need to review PPE in the outpatient department, especially in light of the initiation of USP 800 mandates.
- Peer to Peer and/or nursing education on PPE to oncology departments- (focus on double gloving, gown use and respirator masks)
- Investigate the availability of resources – specifically gowns in outpatient setting.
- Development of strategies to ensure compliance of USP 800.



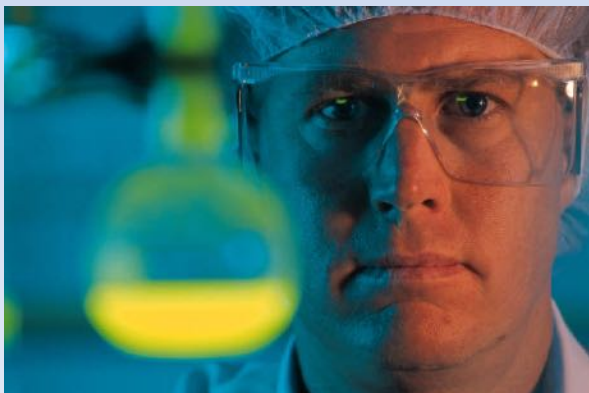


| Drug Name                    | Classification                                  | Hazardous Category                                       |
|------------------------------|---|--|
| Abacavir                     | Nucleoside and Reverse Transcriptase Inhibitors | FDA – Pregnancy Category D                               |
| Acitretin                    | Vitamin A                                       | FDA Pregnancy Category X                                 |
| Adalimumab                   | Monoclonal Antibody                             | FDA – Pregnancy Category B                               |
| Afatinib                     | Monoclonal Antibody                             | FDA – Pregnancy Category D                               |
| Alemtuzumab                  | Monoclonal Antibody                             | FDA – Pregnancy Category B                               |
| Alitretinoin                 | Skin and Mucous Membrane agents                 | FDA Pregnancy Category X                                 |
| Alefacept                    | Skin and Mucous Membrane Agent                  | FDA – Pregnancy Category C                               |
| Amatuximab                   | Monoclonal Antibody                             | FDA – Pregnancy Category B                               |
| Apomorphine                  | Nonergot-derivative Dopamine Receptor Agonists  | FDA – Pregnancy Category C                               |
| Arsenic Trioxide             | Antineoplastic Agent                            | Group 1  |
| Axitinib                     | Monoclonal Antibody                             | FDA -Pregnancy Category D                                |
| Azathioprine                 | Immunosuppressant Agent                         | Group 1 - FDA Pregnancy Category D                       |
| Bacillus Calmette Guerin BCG | Vaccine   | Category C –FDA pregnancy and Safe Handling Requirements |
| Bendamustine                 | Antineoplastic Agent                            | FDA -Pregnancy Category D                                |
| Bevacizumab                  | Monoclonal Agent                                | FDA – Pregnancy Category D                               |
| Bicalutamide                 | Antineoplastic Agent                            | FDA Pregnancy Category X                                 |
| Bleomycin                    | Antineoplastic Agent                            | Group 2  |
| Brentuximab                  | Antineoplastic Agent                            | FDA – Pregnancy Category D                               |
| Bosentan                     | Vasodilating Agent                              | FDA Pregnancy Category X                                 |
| Bosutinib                    | Monoclonal Agent                                | FDA – Pregnancy Category D                               |
| Bortezomib                   | Antineoplastic Agent                            | FDA -Pregnancy Category D                                |
| Busulfan                     | Antineoplastic Agent                            | FDA -Pregnancy Category D                                |
| Cabazitaxel                  | Antineoplastic Agent                            | FDA -Pregnancy Category D                                |
| Cabergoline                  | Ergot-Derivative Dopamine Receptor Agonists     | FDA -Pregnancy Category B                                |
| Cabozantinib                 | Monoclonal Agent                                | FDA – Pregnancy Category D                               |
| Capecitabine                 | Antineoplastic Agent                            | FDA -Pregnancy Category D                                |
| Carbamezapine                | Anticonvulsants                                 | FDA -Pregnancy Category D                                |
| Carboplatin                  | Antineoplastic Agent                            | FDA -Pregnancy Category D                                |

# Safety Is Key

## DNP Leaders

- Mentorship
- No Safe Levels
- Avoid Short Cuts
- Follow Policy and Procedures



# DNP GOAL....Take the Chemotherapy Challenge!!!

- Safety
- Quality Care
- Education
- Support Health Care Providers

Make A  
Difference  
with Policy  
Change



**“Working Safely May  
Get Old, But So Do  
Those Who Practice  
It.”**

**~Author Unknown**

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