

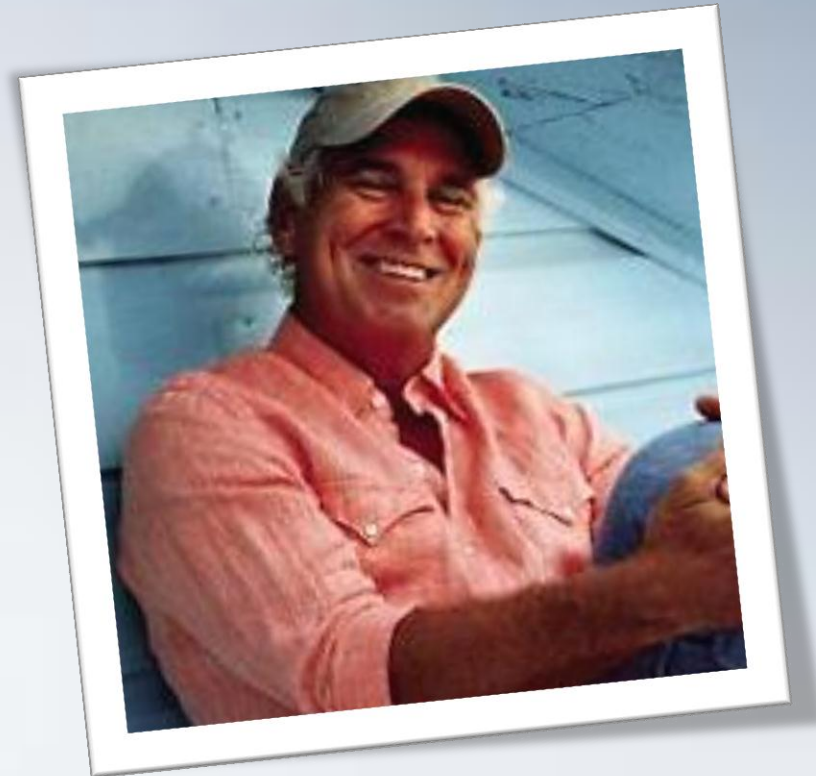


# Objectives

- Describe why extra safety measures are needed with chemotherapy
- Recognize common oral chemotherapy medications and understand oral chemotherapy safety precautions
- Describe the role of the pharmacy technician in maintaining chemotherapy safety

# Safety

- Highly prevalent in today's society
- Key component of good healthcare
- Self-explanatory?



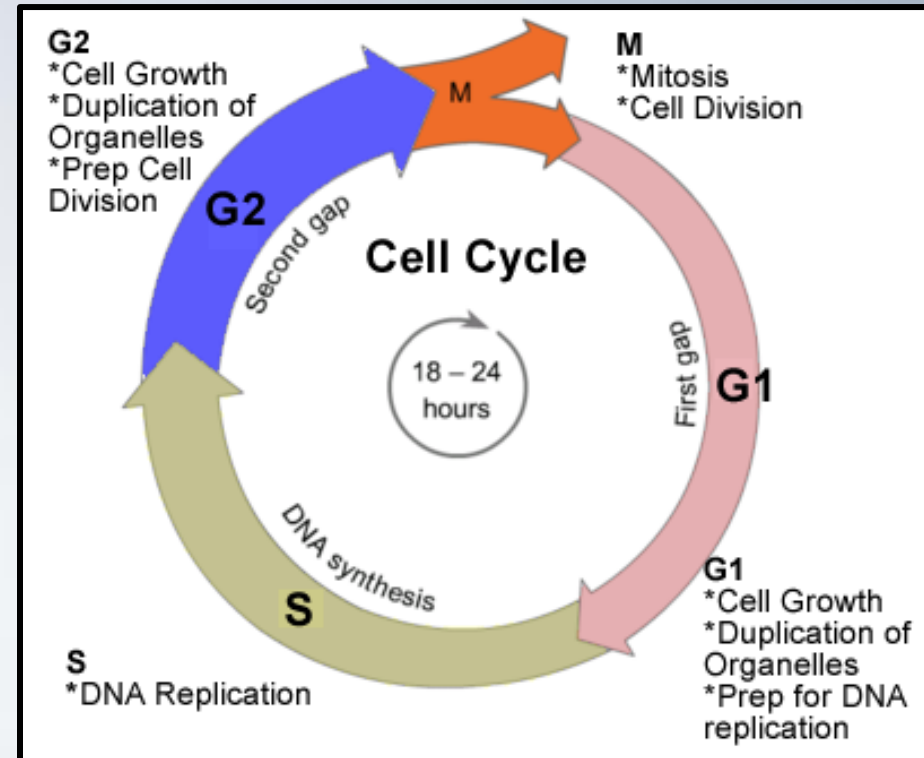
# Chemotherapy: Changing Times

- Initial Meaning: chemical treatment of disease
  - Antibiotics
  - Painkillers
- Current Meaning: antineoplastic agents
  - Individual drugs
  - Regimens



# Chemotherapy Concepts

- Anti-neoplastic?
- Target: **rapidly dividing cells**
- Types of Chemotherapy
  - Cell Cycle Specific
  - Cell Cycle Non-specific



# Goals of Chemotherapy

**DESTROY CANCER**

# *“Hazardous Drug”*

- NIOSH/ASHP Definition:
  1. Carcinogenicity
  2. Teratogenicity/Developmental Toxicity
  3. Reproductive Toxicity
  4. Organ Toxicity at low doses
  5. Genotoxicity

# Chemotherapy Concerns

Can I get chemo into my system by mixing IVs or counting pills?

Will I be hurt if chemo splashes on me?

What are the long-term risks of working with chemo every day?

If I am pregnant, can chemo harm my baby?

What will happen if I stuck with a needle used to prepare chemo?

Can the chemo I am exposed to *cause* cancer?





# Chemotherapy Safety

- ASCO/ONS Chemotherapy Standards
  - Multi-disciplinary focus
  - Address safe use of chemotherapy
    - Ordering/Prescribing
    - Preparation
    - Administration
- USP <797>
  - Pharmacy-specific focus
  - Governs preparation of sterile products
    - IV medications
    - Chemotherapy



# Chemotherapy Safety Roles

- **Physician**

- Assess patient
- Diagnose type of disease
- Determine appropriate chemotherapy

- **Pharmacist**

- Review physician orders; serve as double-check
- Educate and counsel patients
- Serve as drug information resource

# Chemotherapy Safety Roles

- **Pharmacy Technician**

- Prepare chemotherapy and pre-meds
- Serve as double-check for pharmacist
- Maintain sterility of compounded preparations

- **Nurse**

- Administer medications
- Assess patient for response and reactions
- Serve as double check to physician & pharmacist

# Chemotherapy Safety Roles

- **Patient**
  - Consent to treatments, if desired
  - Play active role in understanding treatment
  - Ask questions

# Forms of Chemotherapy

- Intravenous (IV)
- Oral (PO)
- Intrathecal (IT)
- Intra-arterial
- Intra-cavitary



# **INTRAVENOUS CHEMOTHERAPY**


# IV Chemotherapy

- Most commonly used form of chemotherapy
- Regimens for wide variety of cancers
- Extra safety precautions are paramount
  - Special equipment
  - Hazardous drugs



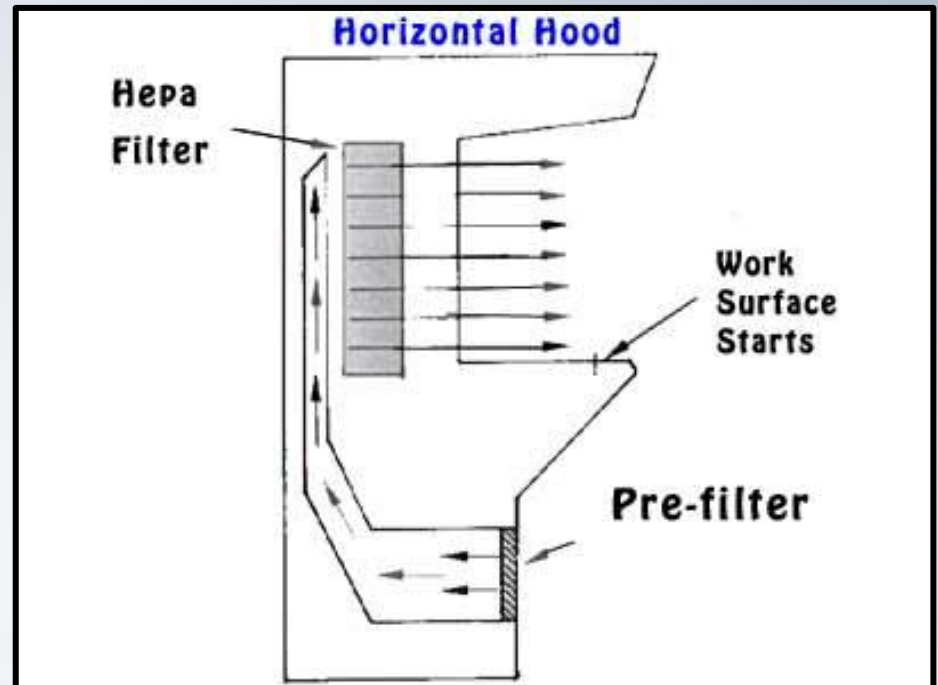


# Preparing IV Chemotherapy

- Sterile Compounding Hood
    - Vertical airflow
    - Negative pressure
  - Personal Protective Equipment (PPE)
    - Gloves
    - Gowns
    - Eye protection
- Chemotherapy-specific**
- 

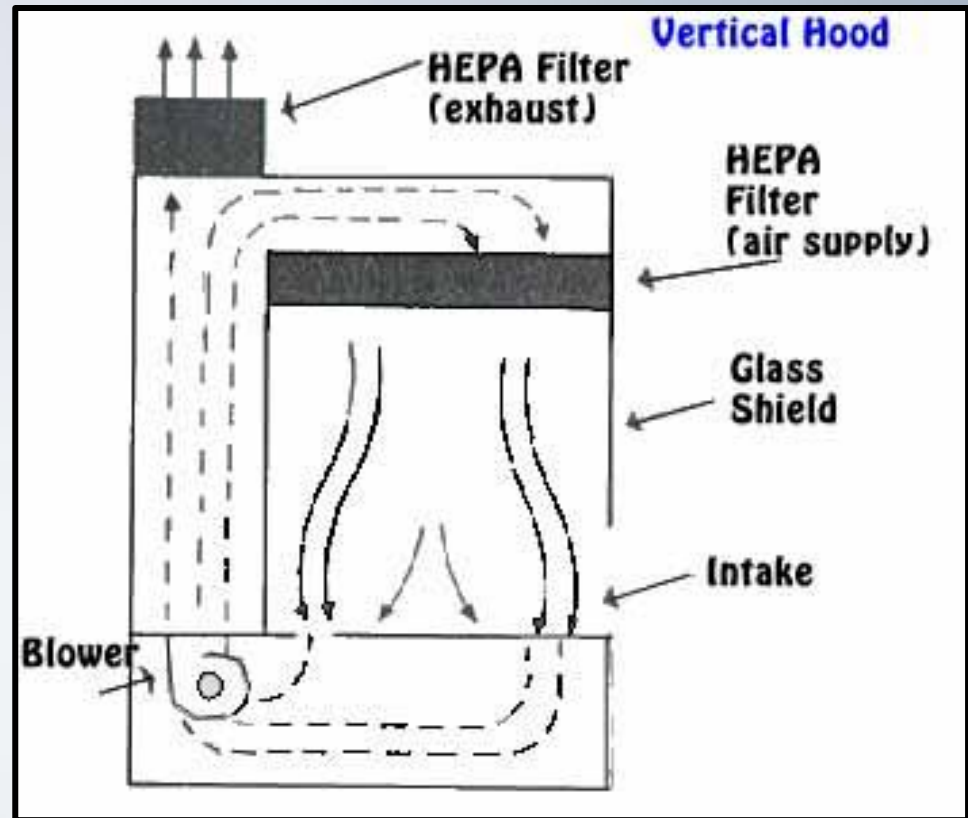
# Sterile Compounding Hoods

- Laminar Flow
- Compounding non-hazardous sterile preparations
- Not for use with chemotherapy



# Sterile Compounding Hoods

- Vertical-flow
- Compounding hazardous sterile preparations
- For use with chemotherapy



# Personal Protective Equipment

## Chemotherapy specific products

1. Gloves → no permeability
  - Chemotherapy can permeate standard gloves
  - Double gloving recommended (NIOSH)
2. Gown → low permeability material
3. Goggles



# ASCO/ONS Labeling Requirements

- Chemotherapy is labeled immediately upon preparation with:
  - 2 patient identifiers
  - Full generic name
  - Route
  - Total dose to be given
  - Total volume
  - Date and time of preparation
  - Date and time of expiration if not for immediate use

# IV Chemotherapy Trivia

## Common Drugs

- Cisplatin
- Vincristine
- Paclitaxel
- Rituximab
- Cyclophosphamide

## Which drug...

- Is fatal if given intrathecally?
- Requires special tubing and IV bags?
- Causes hypersensitivity reactions?
- Is absorbed through the skin?
- Cannot be mixed in D5W?

# **ORAL CHEMOTHERAPY**

# Oral Chemotherapy

- Rapidly growing area of cancer treatments
  - 25% of developmental chemotherapies
  - Ease of use
- Used in treatment of:
  - Brain Cancer
  - Lung Cancer
  - Colon Cancer
  - Breast Cancer





# Oral Chemotherapy Safety

- **Misconception of Safety**
  - Familiarity with oral medications
  - Self-administration
  
- **Ease of Exposure**
  - Tablets/Capsules
  - Storage



# Oral Chemotherapy Precautions

- Handling
  - Use gloves
  - Wash hands before and after gloving
- Counting
  - Hand counting only
  - DO NOT use automatic counting machines
  - Wash counting trays, etc after use
- Storage
  - Separate from non-chemotherapy agents
  - Follow manufacturer's instructions

# Common Oral Chemotherapy Agents

- Xeloda<sup>®</sup> → Capecitabine (Colon/Breast)
- Temodar<sup>®</sup> → Temozolomide (Brain)
- Tarceva<sup>®</sup> → Erlotinib (Lung)
- Zytiga<sup>®</sup> → Abiraterone (Prostate)
- Gleevec<sup>®</sup> → Imatinib (Lung)

# Five Rights



# Review Questions

- Which of the following medication(s) requires oral chemotherapy safety precautions?
  - i. Lisinopril (Prinivil)
  - ii. Imatinib (Gleevec)
  - iii. Cyclophosphamide (Cytosan)
  - iv. Temozolomide (Temodar)
  
- A. I only
- B. III only
- C. II,III,IV
- D. II and IV
- E. I,II,III,IV

# Review Questions

- What type of hood is used to prepare IV chemotherapy?
  - A. Laminar-Flow hood
  - B. Vertical-Flow hood
  - C. Monk's hood
  - D. Biologic Safety Cabinet

# Review Questions

- In which of the following situations should a technician intervene and question a prescription for chemotherapy?
  - A. When the dose is unusually large
  - B. If the usual pre-medications for an IV chemotherapy are missing
  - C. If the medication is new or unfamiliar
  - D. All of the above

# Questions?



Pike's Peak, from Colorado Springs



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