Chemical Safety – Special Hazards

Safe Work Procedure (SWP – 011)

Hazardous Drugs

Last revised: May 22, 2025

Revision History

	Revision Date	*Author*	*Position*
1.	25-May-2023	Paraskevi Lagaditis	OHSE consultant
2.	06-Aug-2024	Paraskevi Lagaditis	OHSE consultant
3.	22-May-2025	Paraskevi Lagaditis	OHSE consultant

Document Approval

Approved by: Laboratory Safety Committee

*Chris Papadopoulos*_____ __*May 22 2025*_____

Chair, Laboratory Safety Committee *Date Approved*

**This revision replaces all previous versions of this document. If a copy is printed, it is the users' responsibility to verify the copy is the most current version of the document.*

PURPOSE

To provide guidance and instruction of the safe use in laboratories of hazardous drugs. This guidance replaces the former Cytotoxic Drug Safe Work Procedure (SWP). This guidance classifies hazardous drugs into two groupings based on level of risk and also includes safe use of cytotoxic drugs, a specific type of hazardous drug as defined by WorkSafeBC. In addition to this general SWP, each lab must develop both an Exposure Control Plan (ECP) and a lab-specific SWP unique to the experiments and activities being performed. The Lab ECP and SWP must be reviewed by OHSE (see Procedures, #7)

SCOPE

The SWP applies toward the storage, handling and disposal of hazardous drugs.

TRAINING

The following training is required to be completed prior to working with hazardous drugs:

- WHMIS
- Lab Safety for Lab Workers
- Hazardous Drug Awareness
- Lab SWP with documented signoff by the individual and their supervisor.

Refresher training in the General and Lab SWP and ECP must be provided when:

- there has been an extended timeframe of inactivity, or
- there has been an incident or injury, or
- 2 years has elapsed since the original training.

REGULATION AND POLICY

The University of Victoria will follow WorkSafeBC Occupational Health and Safety Regulation Part 6.42 – 6.58 and the University of Victoria Occupational Health, Safety & Environment Department.

RESPONSIBILITY

It is the responsibility of personnel undertaking activities with special hazards to complete all required training and adhere to these safe work procedures, including any additional lab or job-specific procedures.

It is the PI's or supervisor's responsibility to:

- Maintain and update inventory of hazardous drugs annually
- Ensure that individuals working with special hazards have been trained prior to commencing work and have demonstrated competency in safely performing all duties associated with the special hazard in accordance with these procedures. Training records are to be maintained for 3 years from the date of training.

- Maintain records of all workers who prepare or administer hazardous drugs, including the names of the drugs handled, and when practicable, the number of preparations administered per week. These records must be maintained for the duration of employment plus 10 years. Record keeping templates are found in the Exposure Control Plan (ECP) template (see below).

  Develop and implement an ECP if a worker has the potential to be occupationally exposed to a hazardous drug. An ECP template is available on the OHSE website.

DEFINITIONS & ABBREVIATIONS

BSC – biosafety cabinet

Class II Type B2 BSC – non-recirculating, hard ducted and vented to the exterior of the building

PPE – personal protective equipment

ECP – exposure control plan

SDS – safety data sheet

NIOSH – National Institute for Occupational Safety and Health

IARC – International Agency for Cancer Research on Cancer

HAZARD

A hazardous drug is any chemical that will be used for **drug administration or is an active pharmaceutical ingredient** and meets various criteria outlined below. At UVic hazardous drugs are grouped into two levels based on their risk.

Group II hazardous drugs are moderate risk and have one or more of the following criteria:

1) Has one or more of the following characteristics as found in the literature or SDS Category 1 or 2 hazard classification:
   - Carcinogenicity – ability to cause cancer
   - Teratogenicity – ability to cause fetal abnormalities
   - Genotoxicity - ability to cause damage to DNA
   - Reproductive toxicity – ability to adversely affect both male and female fertility
   - Organ toxicity – ability to adversely affect organs
2) A new drug that mimics in structure or toxicity an existing known hazardous drug according to the characteristics listed in 1
3) Is identified in the NIOSH List of Hazardous Drugs in Healthcare Settings as a hazardous drug.

Group I hazardous drugs criteria 1-3 and may pose or are known to pose greater risks to workers. Group I hazardous drugs must also meet one or more of the following additional criteria:

4) Identified in the NIOSH list as being antineoplastic
5) For which the manufacturer recommends ventilated engineering controls
6) Classified by the IARC Monographs as Group 1 or Group 2A carcinogens.

Group I hazardous drugs require additional controls to safely handle. Refer to the flow chart in Appendix 1 for assessing if an experimental drug meets the definition of a hazardous drug and whether it is Group I or II.

Workers who are pregnant or have intention to conceive a child and will be handling a hazardous drug that is a reproductive toxin can consult with OHSE (ohs@uvic.ca) regarding protective reassignment.

Cytotoxic drugs, a type of Group I hazardous drugs, are defined as agents that possesses a specific destructive action on certain cells or hazardous to cells in any way. Cytotoxic drugs include most anti-cancer drugs and are also referred to as antineoplastics and chemotherapy. Cytotoxic drugs may pose a risk to researchers through acute or chronic exposure.

Some common drugs that meet criteria as cytotoxic drugs are listed below. This is not an exhaustive list, contact OHSE to assess if a chemical may be a cytotoxic drug or use the flow chart in Appendix 1.

Altretamine	Dacarbazine	Idarubicin	Nafarelin
Aminoglutethimid	Dactinomycin	Ifosfamide	Paclitaxel
Azathioprine	Daunorubicin	Interferon-A	Pipobroman
L-Asparaginase	Diethyl-stilbestrol	Isotretinoin	Plicamycin
Bleomycin	Docetaxel	Leuprolide	Procarbazine
Busulfan	Doxorubicin	Levamisole	Ribavirin
Carboplatin	Estradiol	Lomustine	Streptozocin
Carmustine	Estramustine	Mechlorethamine	Tamoxifen
Chlorambucil	Ethinyl	Medroxy-progesterone	Testolactone
Chloramphenicol	Estradiol	Megastrol	Thioguanine
Chlorotianisene	Etoposide	Melphalan	Thiotepa
Chlorozotocin	Floxuridine	Mercaptopurine	Uracil Mustard
Cyclosporin	Fluorouracil	Methotrexate	Vidarabine
Cisplatin	Flutamide	Mitomycin	Vinblastine
Cyclo-phosphamide	Ganciclovir	Mitotane	Vincristine

MATERIALS

Administration sets used with hazardous drugs include syringes, intravenous (IV) set, or other common devices used for delivery of hazardous drug via injection. Only use Luer-lock connections in the preparation and administration of hazardous drugs.

Hazardous drug caution sign to post at work areas where Group I hazardous drugs are handled The sign is optional for Group II hazardous drugs (see Appendix 2).

Group I and Group II hazardous drug labels are available from the self-serve hazardous waste room (Petch 035) to label all containers/bottles or storage areas (see Appendix 3).

a. Label storage bins, drawers, shelving areas, and transport containers with a Group I or Group II hazardous drug label

b. Place any waste containers or bags labeled with the Group I or Group II hazardous drug within a cytotoxic pail for final disposal (See Section 6. Waste disposal)

Cytotoxic sticker labels are available from the self-serve hazardous waste room (Petch 035) to label all waste containers and pails contaminated with Group I and/or Group II hazardous drugs (see Section 6. Waste Disposal and Appendix 3)

a. Avoid using cytotoxic labels for containers or bottles of Group I or Group II hazardous drugs that are stored in laboratories

b. If wastes pails are not already labeled, use cytotoxic stickers to label all filled waste pails containing either Group I or Group II hazardous drugs

c. Use cytotoxic sticker to label sharps containers dedicated to collect sharps and needles contaminated with hazardous drugs.

PROCEDURES

1. Handling

a. Always consult the Safety Data Sheet (SDS) before handling

b. Ensure a clearly labeled spill kit is within reach of preparation area

c. Ensure adequate PPE, as outlined in the SDS, is worn when directly handling hazardous drugs or contaminated equipment, animals and/or bedding

   i. Wear resilient gloves, such as nitrile gloves

   ii. Wear a moisture resistant gown with cuffs

   iii. Wear approved respirator cartridges if there is a risk of contact with aerosols and ensure respirators are fit tested annually by OHSE.

   iv. Wear eye protection

   v. Wear a face protection shield if there is a risk of a splash

d. Ensure PPE is not worn outside the preparation area

e. Open packages of received hazardous drugs in a fume hood or Class II Type B2 BSC in case of a spill

f. Cover or line the work surface with a disposable bench protector

g. Assemble all materials, equipment, sharps containers and waste containers around the immediate work area before handling hazardous drugs

    i. Ensure the sharps container is dedicated to hazardous drug contaminated sharps to not mix with sharps contaminated with biohazardous material

h. Ensure when transporting hazardous drugs within the lab or to another lab that:

    i. Materials are within a sealed container, labelled with a unique and recognizable identifier to distinguish the hazardous drug from other drugs, and

    ii. Materials are packaged in a manner that minimizes the risk of environmental contamination if there is a spill, leak or uncontrolled release of the hazardous drug.

    iii. Include a spill kit while transporting to another lab.

    iv. Where possible, use a rolling cart to transport and place all hazardous drugs in secondary containment.

i. Perform the following activities for Group I hazardous drugs only in one centralized area within a fume hood or Class II Type B2 BSC:

    i. Mix, prepare and prime administration sets

    ii. Dilute for further experimentation

j. Obtain approval from OHSE to handle diluted Group I hazardous drugs outside of a fume hood or Class II Type B2 BSC.

k. Post a caution sign (see Appendix 3) where Group I hazardous drugs are handled (recommended for Group II hazardous drugs)

l. Keep caution sign posted until area is decontaminated

2. Storage

a. Post a list of all hazardous drugs present at storage and preparation areas

b. Ensure a spill kit is within or adjacent to storage area

c. Separate hazardous drugs from other chemicals by using a labeled secondary containment bin

d. Ensure all containers, shelves or secondary containment bins are labeled with Group I or Group II hazardous drugs stickers (available from OHSE).

3. Spills

a. Follow OHSE's general spill response instructions.

b. Do not attempt to clean up any spill if not trained or comfortable. Seek assistance or call Campus Security (250-721-7599)

c. Refer to SDS before attempting spill clean up even if trained

d. For powder spills within the Class II Type B2 BSC or fume hood work area:

   i. Use wet or moist towels or pads to cover spill to avoid aerosols (refer to SDS for compatible solvent)

   ii. Cover and wipe the spill with the wet/moisten towels

   iii. Collect and double bag contaminated towels or pads

   iv. Clean surface with a dilute (~10%) bleach solution

   v. Clean surface with detergent and water

   vi. Collect all materials used in the clean and place in designated cytotoxic waste pail for disposal through the hazardous waste system

e. For liquid spills within the Class II Type B2 BSC or fume hood work area:

   i. Gently cover the spill with absorbent pads

   ii. Collect and double bag contaminated absorbent pads.

   iii. Clean surface with a dilute (~10%) bleach solution

   iv. Clean surface with detergent and water

f. For a hazardous drug spill of any size outside of the Class II Type B2 BSC or fume hood area:

   i. Secure the area and warn others

   ii. Immediately evacuate the area

   iii. Post "do not enter" signs on the doors of the lab

   iv. Contact Campus Security at 250-721-7599

g. Complete a Department Incident & Investigation Report to document and review the spill incident.

4. Decontamination

a. Ensure laboratory work surfaces are cleaned at the conclusion of each procedure and at the end of each workday.

b. Ensure proper PPE is worn as outlined under (1) Handling

c. Refer to SDS of specific hazardous drug for proper decontamination protocol

d. Complete decontamination with detergent and water

e. Collect all decontamination washings into a user supplied container to dispose via hazardous waste

5. Emergencies and First Aid

a. Call 911 to summon an ambulance if there is a medical emergency.

b. Call Campus Security at 250-721-7599 for first aid.

c. Refer to SDS for specific first aid response measures

   i. In general, for eye exposure use emergency eyewash and flush for at least 15-20 minutes.

   ii. In general, for skin contact flush affected area with running water for at least 15-20 minutes.

6. Waste Disposal

a. Separate all hazardous drug waste from other waste streams.

b. Both Group I and II hazardous drugs are to be disposed in the same waste stream as cytotoxic drug waste.

   i. Use red pails with the cytotoxic symbol to collect all solid or liquid waste. If pails are missing the cytotoxic symbol, stickers to label pails are available in Petch 035

   ii. Use green hazardous waste pick up stickers for all sealed pails ready for removal

c. Dispose all solid waste materials contaminated with hazardous drugs, such as absorbent pads, PPE, animal waste, animal bedding, into cytotoxic waste pails provided by OHSE

   i. Do not fill more than 3/4 full

   ii. Do not overfill or compress waste in pails

d. Dispose sealed sharps containers when full into a cytotoxic waste pail.

   i. Do not dispose loose needles within the cytotoxic waste pail

e. Dispose all liquid waste containing hazardous drugs into one of the following options

   i. For small dilute volumes (4L or less) or concentration solutions

      - Pour liquid into a user supplied container or bottle
      - For concentrated Group I hazardous drugs, collect solutions only in a Class II Type B2 biosafety cabinet or fume hood
      - Seal container/bottle and place container into a cytotoxic waste pail

ii. For large dilute volumes (e.g. >4L)

- Do not use this method for concentrated Group I hazardous drug waste solutions.
- Either
  a) Pour directly into a cytotoxic pail dedicated for liquid contaminated waste with the lid securely in place and the threaded cap on the lid removed. Ensure cap is screwed back in place before submitted for hazardous waste pick up OR
  b) Collect solution in smaller containers, seal and place all in the cytotoxic waste pail. This can be combined with cytotoxic pails with solid waste
- Do not fill more than 3/4 full

7. Lab SWP and ECP

Each lab that is using a hazardous drug requires a Lab SWP that includes specific procedures for

a. Amount of hazardous drug and dilution concentrations permitted to handle
b. Personal protective equipment to wear
c. How to decontaminate any surface or reusable lab ware
d. Spill containment and response
e. Disposal procedure
f. Emergency first aid

Each lab is also required to complete a Lab ECP with the following elements:

a. A statement of purpose and responsibilities
b. Risk identification, assessment and control
c. Education and training
d. Written work procedures, when required
e. Hygiene facilities and decontamination procedures, when required
f. Health monitoring, when required
g. Documentation, when required

REFERENCES

1. WorkSafe BC *OHS Regulations Part 6.42-6.58 Hazardous Drugs*. https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-regulation/part-06-substance-specific-requirements#SectionNumber:6.42

2. WorkSafe BC *OHS Regulations Part 5.48-5.59 Controlling Exposure*. Retrieved from https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-regulation/part-05-chemical-and-biological-substances#SectionNumber:5.48

3. WorkSafe BC *OHS Guidelines G6.42-G6.58 Hazardous Drugs* https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-guidelines/guidelines-part-06#SectionNumber:G6.42

4. WorkSafe BC *Safe Work Practices for Handling Hazardous Drugs* Retrieved from: https://www.worksafebc.com/en/resources/health-safety/books-guides/best-practices-safe-handling-hazardous-drugs?lang=en

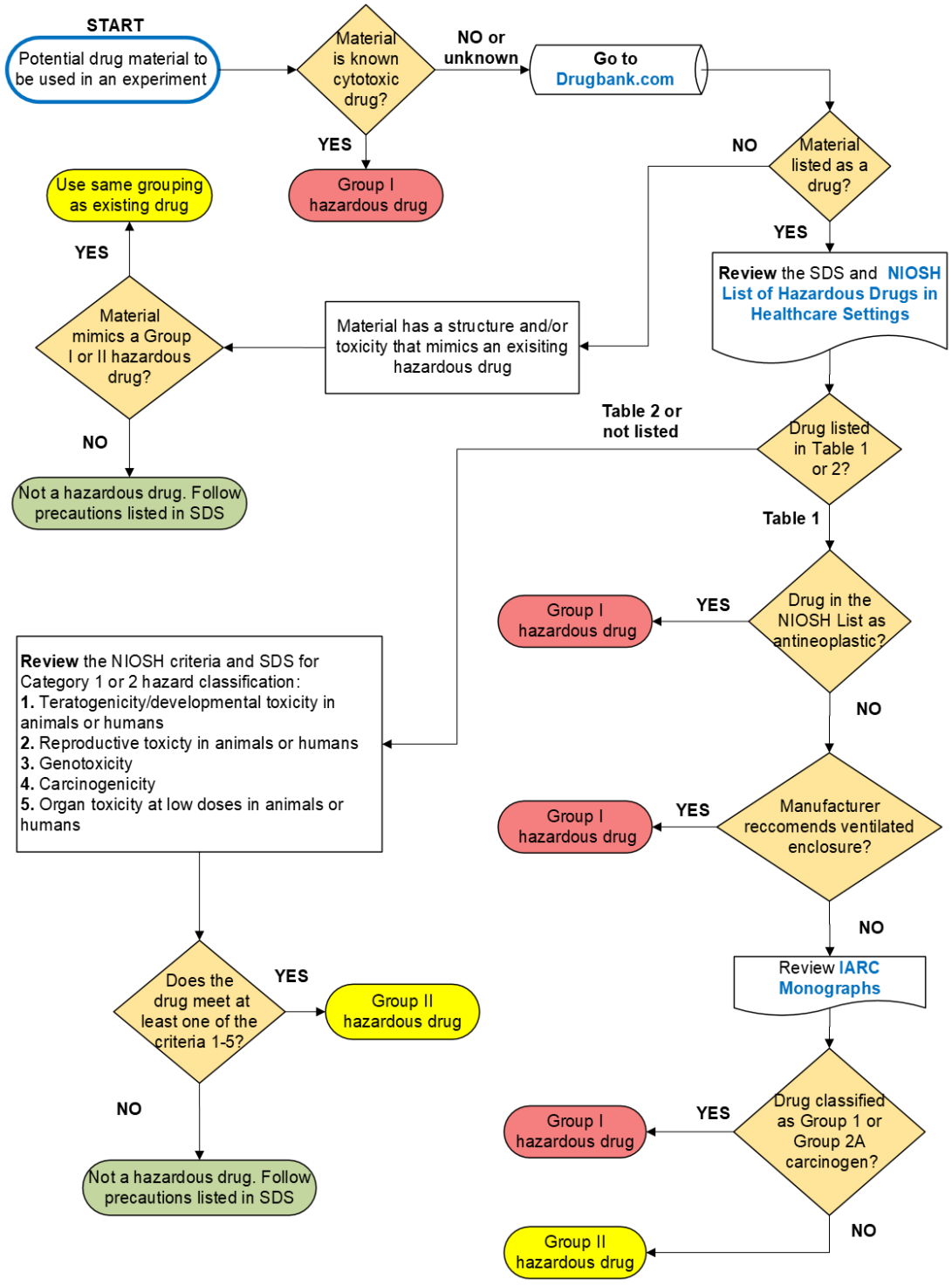
5. Drugbank Online. Database for Drug and Drug Target info. https://go.drugbank.com/

6. NISOH List of Hazardous Drugs in Healthcare Settings, 2024. Retrieved from https://www.cdc.gov/niosh/docs/2025-103/default.html

7. IARC Monographs on the Identification of Carcinogenic Hazards to Humans. Retrieved from https://monographs.iarc.who.int/list-of-classifications

APPENDIX 1

Flow chart to determine if experimental drug is a Group I or II hazardous drug



APPENDIX 2

Warning Labels and Symbols

All labels are available form the self-serve hazardous waste room Petch 035 (code 4670)

Group I hazardous drug label for labelling containers, bottles, or bins within the laboratory

Group II hazardous drug label for labelling containers, bottles, or bins within the laboratory

Cytotoxic drug label for labelling waste pails

APPENDIX 3

Signage for work area – Class II Type B2 biosafety cabinet (mandatory) or fume hood (mandatory) or bench top (optional)