

HISTOLOGY LABORATORY

CHEMICAL HYGIENE

PLAN

CONTENTS

1 Purpose of the Chemical Hygiene Plan	3
2 General principles	3
2.1 Chemical exposure	
2.2 Estimation of risk	
2.3 Control exposures	
2.4 Chemical hygiene program	
2.5 PELs and TLVs	
3 Responsibilities	4
3.1 Chief executive officer	
3.2 Chemical hygiene officer	
3.3 Departmental safety officer	
3.4 Laboratory supervisor	
3.5 Laboratory workers	
4 Chemical Hygiene Plan	5
4.1 Basic rules and procedures	
4.2 Procurement, distribution, and storage	
4.3 Environmental monitoring	
4.4 Inspections	
4.5 Medical program	
4.6 Records	
4.7 Signs and labels	
4.8 Training programs	
5 References	13

CHEMICAL HYGIENE PLAN

1 Purpose of the Chemical Hygiene Plan

The Chemical Hygiene Plan is intended to summarize policies and procedures regarding the use of chemicals in the histology laboratory. All personnel involved in the laboratory should be familiar with this manual and the policies which pertain to their work. Every employee is responsible to ensure these procedures and policies are followed.

The complete Histology Safety Manual is available during all work times and to any employee of this work area

2 General principles for working with laboratory chemicals

2.1 Minimize all chemical exposures

Precautions for handling all laboratory chemicals should be adopted. Exposure can occur by way of inhalation, skin absorption or ingestion. Do not smell or taste chemicals. Vent equipment which may discharge toxic chemicals (vacuum pumps, distillers, automatic stainers and coverslippers, and other equipment) into local exhaust devices. Inspect gloves before use. Use exhaust hoods when heating solutions.

2.2 Estimation of risk

Even for substances with no known significant hazard, exposure should be minimized. Unless known otherwise, assume any mixture will be more toxic than its most toxic component and all substances of unknown toxicity are hazardous.

2.3 Control exposures

If possible substitute less toxic materials, such as using xylene substitutes (aliphatic hydrocarbon clearants) instead of xylene. Minimize exposures by preventing their escape into the working atmosphere by the use of hoods and other ventilation devices. Keep lids on containers and staining dishes.

2.4 Chemical hygiene program

The chemical hygiene program is designed to minimize exposures and is required by law. It should be a regular, continuing effort, not merely a standby or short-term activity. Employees are trained at the time of hire. All employees attend additional training annually.

2.5 Observe the PELs and TLVs

The Permissible Exposure Limits (PEL) of the Occupational Safety and Health Administration (OSHA) and the Threshold Limit Values (TLV) of the American Conference of Governmental Industrial Hygienists should not be exceeded. Refer to MSDS for specific chemical information.

3 Chemical hygiene responsibilities

3.1 Chief executive officer

The chief executive officer is also the director of public safety. The director of public safety has the ultimate responsibility for chemical hygiene within the institution and must, with other administrators, provide continuing support for institutional chemical hygiene.

3.2 Chemical hygiene officer

The chemical hygiene officer is an environmental and chemical specialist from the Department of Public Safety. The chemical hygiene officer will

- work with administrators and other employees to develop and implement appropriate chemical hygiene policies and practices;
- monitor procurement, use, and disposal of chemicals used in the lab;
- see that appropriate audits are maintained;
- help project directors develop safe procedures and adequate facilities;
- know the current legal requirements concerning regulated substances;
- seek ways to improve the chemical hygiene program.

3.3 Department safety officer

The department safety officer is responsible for chemical hygiene in the unit. The department safety officer ensures that the lab supervisor and lab workers comply with safety requirements.

3.4 Histology laboratory supervisor

The histology laboratory supervisor has the overall responsibility for chemical hygiene in the histology laboratory. The lab supervisor is to

- ensure that workers know and follow chemical hygiene rules, that protective equipment is available and in working order, and that appropriate training is provided;
- provide regular formal chemical hygiene and housekeeping inspections including routine inspections of emergency equipment—inspections are documented in the monthly Histology Quality Assurance Report;
- know the current legal requirements concerning regulated substances;
- determine the required levels of protective apparel and equipment;
- ensure adequate facilities and training exist for the use of all materials used in the laboratory.

3.5 Laboratory worker

Laboratory workers

- plan and conduct each operation in accordance with laboratory's written chemical hygiene procedures;
- practice good personal chemical hygiene habits.

4 Components of the Chemical Hygiene Plan

4.1 Basic rules and procedures

The following rules and procedures should be observed in all laboratory work with chemicals. Safety is your responsibility. You are working with materials that are extremely hazardous to you and your fellow workers. *Think safety—work safely.*

Do not take chances. Avoid emergencies by carefully planning ahead before starting a job. Know every step and possible

hazards involved. Prepare for any emergency which may arise. Refer to specific chapters in this manual for more descriptive instructions and information.

4.1.1 Accidents and spills

4.1.1.1 Eye contact

Promptly flush eyes with water for at least 15 minutes and seek medical attention.

4.1.1.2 Ingestion

Encourage the victim to drink large amounts of water. Refer to the MSDS for special precautions and additional information.

4.1.1.2 Skin contact

Promptly flush the affected area with water and remove any contaminated clothing. If symptoms persist after washing, seek medical attention.

4.1.1.3 Cleanup

Promptly contain chemical spills and alert people in all parts of the facility including isolation areas. If the spill is small, clean it up using appropriate protective apparel and equipment. Remember to dispose of contaminated items as hazardous waste. For large spills or those containing extremely toxic or hazardous materials contact safety services personnel for assistance.

4.1.2 Eating, smoking, and cosmetics

Eating, smoking, drinking, gum chewing, or application of cosmetics are prohibited in areas where laboratory chemicals are present. Wash hands before conducting these activities. Avoid storing or handling food or beverages in storage areas, refrigerators, glassware, or utensils which are used for laboratory operations.

-
-
- 4.1.3 Equipment and glassware
Handle and store laboratory glassware with care to avoid damage. Damaged glassware should be discarded and not used. Use equipment only for its designed purpose. Read instructions before using laboratory equipment.
- 4.1.4 Exiting
Wash hands prior to leaving the laboratory.
- 4.1.5 Horseplay
Avoid practical jokes or other behavior that might confuse, startle or distract another worker.
- 4.1.6 Mouth suction
Do not use mouth suction for pipetting or starting a siphon. use pipet pumps.
- 4.1.7 Personal protective equipment
The MSDS will specify which protective equipment are to be used.
- 4.1.7.1 Eye protection
ANSI approved safety glasses or goggles are required in laboratories, chemical storage rooms and designated contaminated areas. They should be worn when weighing out chemicals, changing tissue processors, working with formaldehyde, and pouring solutions. Goggles and face shields are provided.
- 4.1.7.2 Gloves
Wear appropriate gloves when the potential for contact with toxic materials exists. Inspect the gloves before each use and wash them before removal. Replace them frequently to avoid contaminating yourself and other objects such as door handles. The appropriate glove can be determined by consulting MSDSs or the compatibility lists from the glove manufacturers. Do not wear gloves out of the laboratory area. One hand must be clean to open doors.

The appropriate gloves for this work area are

- nitrile when working with xylene, acetone and acids;
- latex for other materials associated with the laboratory.

4.1.7.3 Lab coats and aprons

Lab coats or scrubs are required to be worn by histology personnel. Clean lab coats are to be stored in the coat closet provided. Remove lab coats and leave them on the coat rack on the back of the door to be laundered by linen services. Contaminated lab coats should not be worn out of the laboratory. Remove laboratory coats immediately upon significant contamination.

Non-permeable aprons are required when working with formaldehyde.

4.1.7.4 Respirators

Representatives from safety administration have determined that when chemical exposures are below permissible levels, a fit-checked respirator is not required. Two types of NIOSH approved nuisance odor masks are provided. Dust/mist masks are to be used when working with chemicals and a charcoal filter mask when working with organic solvents and formalin.

4.1.7.5 Personal apparel

Open toed shoes are not allowed in the laboratory area. Steel toed shoes are not necessary in this work area.

Confine long hair and loose clothing.

Avoid wearing contact lenses.

4.1.7.6 Personal housekeeping

Keep the work area clean and uncluttered. Chemicals and equipment should be properly labeled and stored. Clean up the work area at the completion of each operation and at the end of each day. Replace microtome blades in the original box.

4.1.7.7 Activities which require protection
Activities which require personal protective equipment include

- working with formaldehyde
- hazardous waste and associated contaminants
- working with acids, bases, or organic material
- changing processors
- grossing and cassetting specimens
- making reagents and solutions

4.1.8 Use of hoods

Use the hood when performing operations which might result in the release of toxic chemical vapors or dust, and when working with any appreciably volatile substance. Do microwave staining and coverslipping and open heated solutions inside the hood. Gross formalin fixed specimens in the hood, or on a ventilated table. Confirm and document adequate hood performance before use via a reading gauge. Keep materials stored in hoods to a minimum and do not allow them to block vents or air flow.

When working in the hood, move toward the center, avoiding use of the first 6 inches behind the opening. Suggested air velocity is 100 lfm (linear feet per minute).

4.1.9 Waste disposal

Do not discharge concentrated acids or bases, flammables, highly toxic substances, or heavy metals such as mercury (B-5 fixative) into the sewer. These substances must be recycled or reduced when possible, or placed in appropriate containers to be picked up by safety services. A Hazardous Waste Manifest must accompany waste material.

Formulations of 10% or less of formaldehyde may be discharged to the sewer, unless they exhibit other characteristics of hazardous waste or they are in a high enough volume to generate a problem.

4.1.10 Working alone

Avoid working alone in the laboratory if the procedures being conducted are hazardous or if you are not properly trained.

4.2 Chemical procurement, distribution, and storage

4.2.1 Procurement

Before a substance is received, information on proper handling, storage, and disposal should be known to those individuals involved. No container should be accepted without an adequate identifying label. Secondary and transfer containers must be identified with the appropriate label.

4.2.2 Stockrooms and storerooms

Substances should be segregated in a well identified area with local exhaust ventilation providing at least six air changes per hour. Stored chemicals should be examined periodically (at least annually) for replacement, deterioration, and container integrity. Acids, bases, and flammables require separate storage.

4.2.3 Distribution

When chemicals are hand carried, containers should be packed in an outside container or bucket. Freight-only elevators should be used if possible. Acid containers larger than 500 ml are to be carried in an acid carrier. When dispensing alcohol, the 55 gallon drum and the receiving can must be grounded.

4.2.4 Laboratory storage

Amounts permitted should be as small as practical. Storage on bench tops, open shelves, and in hoods is inadvisable. Exposure to heat or direct sunlight should be avoided. Periodic inventories should be conducted, with unneeded items being properly disposed of or returned to the storeroom. Upon receipt and the opening of a chemical, the container must be dated. Keep containers on caps and cabinet doors closed when they are not in use.

4.3 Environmental monitoring

Annual monitoring for formaldehyde and xylene fumes are conducted in both the grossing area and the histology laboratory. Employees are notified of the results.

Regular instrumental monitoring of airborne concentrations is not usually justified or practical in laboratories but may be appropriate when testing or redesigning hoods or other ventilation devices or when a highly toxic substance is stored or used regularly. Safety services has the ability to perform such monitoring and can be consulted regarding the need to monitor a particular area or operation.

4.4 Inspections

Formal housekeeping and chemical hygiene inspections are held semi-annually by safety services and the departmental safety officer. Informal inspections are performed by the histology supervisor monthly and documented in the quality assurance meeting minutes.

4.5 Medical program

Medical surveillance by a licensed physician is provided at no cost to the employee by the department when

- an employee exhibits signs or symptoms associated with exposure to a hazardous chemical utilized in the laboratory;
- a spill, leak, or explosion occurs resulting in the likelihood of a hazardous exposure;
- an employee is exposed routinely above the action level, or in the absence of an action level, above the permissible exposure limit of a substance for which there are exposure monitoring or medical surveillance requirements.

4.5.1 Medically relevant information

When an employee has been exposed to a hazardous chemical, the laboratory supervisor or their representative should provide the examining physician with the identity of the chemicals, a description of exposure conditions, and the employee's symptoms, if any. The physician's opinion must be written and indicate any need for follow-up, results, any

increased risk, and a statement that the employee has been notified of the these items.

4.5.2 First aid

The emergency room at the hospital is available at all times. Lab personnel should be trained in basic first aid procedures.

Basic first aid supplies are maintained in the laboratory.

4.6 Records

4.6.1 Accidents

Accidents and incidents are documented in the monthly quality assurance. report. Workman's Compensation forms must be filed in the event of an injury accident. A copy is retained in the employee's file.

4.6.2 Medical reports

Medical reports (correspondence and physician's employee health evaluations) are retained by the department for thirty years in accordance with state and federal regulations. Employee health documents are on file with safety services and employee health.

4.6.3 Training records

Training records are retained in departmental employee files.

4.6.4 Inventories

Inventory of chemicals including an inventory of carcinogenic and highly toxic chemicals is maintained and updated annually.

4.7 Signs and labels

Prominent signs and labels of the following types are posted:

4.7.1 Doors

- emergency telephone numbers of personnel

-
-
- hazards in the area
 - Safety precautions

4.7.2 Identity solution labels

- National Fire Protection Association label showing contents of containers (including waste receptacles)
- associated hazards

4.7.3 Location signs

- safety showers and eyewash stations
- safety and first aid equipment
- clean areas where food and beverage consumption and storage are permitted
- warning signs at areas or equipment where special or unusual hazards exist

4.8 Information and training programs

The supervisor is responsible for the employee training program in this work area. The laboratory supervisor is to ensure that all of the information specified below are provided to the employees in this work area who are subject to the Laboratory Safety Standards.

- methods and observations that may be used to detect the presence or release of a hazardous chemical
- the physical and health hazards of chemicals in the work area
- measures employees can take to protect themselves from chemical hazards.

5 References

National Research Council. 1988. *Prudent practices for handling Hazardous Chemicals in Laboratories*. Washington, D.C.: National Academy Press. 233-235.

University of Utah Public Safety. *Chemical Hygiene Training Packet*.