

1.0 Overview

Environmental Health and Safety (EHS) at Weill Cornell Medicine (WCM) has developed this Formaldehyde Exposure Prevention Plan to outline and promote a safe work environment for employees who handle or are exposed to all forms of formaldehyde. This Plan complies with the Occupational Safety and Health Administration (OSHA) Toxic and Hazardous Substances Standard 29 Code of Federal Regulations 1910.1048, Formaldehyde.

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3.0 Objectives

The Formaldehyde Exposure Prevention Plan (“Plan”) aims to:

- Ensure the risks of exposure to formaldehyde are properly evaluated.
- Safeguard the health and safety of employees and students.
- Identify formaldehyde hazards and control measures.
- Confirm compliance with local, state, and federal standards.
- Create guidelines for the implementation and maintenance of this Plan.

4.0 Applicability

This Plan applies to all students, faculty, and staff who handle or come in contact with all forms of formaldehyde including gas, aqueous solutions, solids, and materials which can release it.

See [Section 8](#) for a list of activities that have been evaluated for potential exposures, as well as procedures for identifying areas of concern, and implementing controls where exposures are found.

5.0 Responsibilities

5.1 ENVIRONMENTAL HEALTH AND SAFETY (EHS)

EHS duties include:

- Conduct exposure monitoring for formaldehyde, and provide written reports of results to users.
- Provide recommendations for methods to reduce exposure levels where applicable; including appropriate work procedures, engineering controls, and personal protective equipment (PPE).
- Review engineering controls and work practices in areas with formaldehyde use every year.
- Conduct training for all users with exposures to formaldehyde above 0.1 ppm.

5.2 WORKFORCE HEALTH AND SAFETY (WHS) AND STUDENT HEALTH SERVICES (SHS)

WHS and SHS responsibilities include:

- Provide medical screenings and surveillance as indicated in this Plan.
- Maintain medical records of individuals with formaldehyde exposure per this Plan.

5.3 PRINCIPAL INVESTIGATORS (PIS), FORMALDEHYDE OWNERS, AND LAB MANAGERS

Principal Investigators, formaldehyde owners, and lab managers are required to:

- Identify areas that utilize formaldehyde and notify EHS for a review of potential exposures.
- Confirm that individuals who handle or are exposed to formaldehyde are aware of the hazards and utilize appropriate work practices or controls.

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- Notify EHS of all changes in formaldehyde use, work practices, or controls that may impact formaldehyde exposures.
- Ensure compliance with either the [Laboratory Chemical Hygiene Plan](#) or [Chemical Hazard Communication Program for Non-Laboratories](#) regarding storage and labeling of formaldehyde-containing materials.

5.4 USERS

Formaldehyde users must:

- Follow the procedures outlined in this Plan.
- Use assigned Personal Protective Equipment (PPE) when needed.
- Attend appropriate safety training.

6.0 Formaldehyde Health Hazards

- **Formaldehyde is classified as a known cancer hazard (IARC Group 1 and NTP Known Human Carcinogen).**
- Short-term exposure to high levels of formaldehyde is highly irritating to the eyes, nose, and throat. It is also a sensitizing agent, and subsequent exposure may cause severe allergic reactions of the skin, eyes and respiratory tract.
- **Ingestion of formaldehyde can be fatal, and long-term exposure to low levels in the air or on the skin can cause asthma-like respiratory problems and skin irritation such as dermatitis and itching.**
- Concentrations of 100 parts per million (PPM) are immediately dangerous to life and health (IDLH). Note: The National Institute for Occupational Safety and Health (NIOSH) considers 20 ppm of formaldehyde to be IDLH.

7.0 Exposure Limits

The exposure limits established by the Occupational Safety and Health Administration (OSHA) standard 1910.1048 for formaldehyde are based on the measured concentration of formaldehyde gas in the air and the time of exposure, and include:

- Permissible Exposure Limit (PEL) is 0.75 parts per million (ppm) for an 8-hour Time-Weighted-Average (TWA).
- Short-Term Exposure Limit (STEL) is 2 ppm averaged over a 15-minute period.
- Action Level (AL) is 0.5 ppm for an 8-hour TWA.

If exposures are at or above the PEL, all provisions of this plan must be implemented in the work area.

If the AL is exceeded, EHS will set up a monitoring program and exposure control methods to ensure that subsequent levels remain below the PEL and AL.

8.0 WCM Formaldehyde Operations and Exposure Assessments

All processes, tasks, or work locations with potential for formaldehyde exposure must be assessed. The responsibility of the Manager/Principal Investigator needs to notify Environmental Health and Safety of activities that may result in formaldehyde exposures not included in this section; as well as of any changes in work practices or procedures, which may affect exposures for those processes listed.

8.1 GENERAL OPERATIONS

Formaldehyde should be handled in a working chemical fume hood. Variations in environmental conditions when performing tasks such as preparing solutions or cleaning spills of formaldehyde outside of the hood may result in elevated exposures.

Before using formaldehyde outside of a chemical hood, contact EHS to assess the environmental conditions of the workspace and to perform exposure monitoring.

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EHS has conducted exposure assessments of routine operations that utilize formaldehyde. The following tables show the activities monitored and whether results exceeded the exposure limits or the 0.1-ppm training threshold.

8.1.1 Laboratory Operations

Task Description	Location	Engineering Controls Utilized / Required	Exposure Levels Exceeded			
			AL	STEL	PEL	Level Required for Training
Intracardial Perfusion of Mice with 4% PFA	Lab	Fume Hood	No	No	No	No
Perfusion and Removal of Organs of Rats with 4% PFA	Sturgis	Downdraft Table	No	No	No	No
Skull Lab – Surgical Procedures on a fixed specimen	Skull Base Lab	General Room Exhaust	No	No	No	No
Skull Lab – Specimen Cleaning / Preparation	Skull Base Lab	Wash Station with Local Exhaust	No	No	No	No

8.1.2 Clinical Operation

Task Description	Location	Engineering Controls Utilized / Required	Exposure Levels Exceeded			
			AL	STEL	PEL	Level Required for Training
Grossing of Tissue	Department of Pathology Bio-Bank	General Room Exhaust	No	No	No	No

8.1.3 Gross Anatomy

Task Description	Location	Engineering Controls Utilized / Required	Exposure Levels Exceeded			
			AL	STEL	PEL	Level Required for Training
Head-Neck Lab	Anatomy Lab	General Room Exhaust	No	No	No	Yes
Embalming of Cadaver	Anatomy Prep Lab	Downdraft Table	No	No	No	Yes
Thoracic Wall and Lungs	Anatomy Lab	General Room Exhaust	No	No	No	Yes

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8.1.4 Autopsy

Task Description	Location	Engineering Controls Utilized / Required	Exposure Levels Exceeded			
			AL	STEL	PEL	Level Required for Training
Disposal/Replacement of Formaldehyde Solution	Autopsy Suite	Drum Hood	No	No	No	No
Conference Set-Up	Autopsy Suite	Downdraft Table, Drum Hood	No	No	No	No
Autopsy PEL	Autopsy Suite	Local & General Exhaust Systems	No	No	No	No
Sectioning of Fixed Lungs	Autopsy Suite	Downdraft Table	No	No	No	No
Fixing of the Lungs	Autopsy Suite	Drum Hood	No	No	No	No
Tissue Preparation for Slides	Autopsy Suite	Downdraft Table	No	No	No	No
Autopsy Conference	Autopsy Suite	Downdraft Table	No	No	No	No

9.0 Exposure Monitoring

EHS will conduct air monitoring in the user's breathing zone to determine the 8-hour and/or 15-minute exposure levels. After the initial evaluation, exposures will be reassessed according to the guidelines detailed below.

9.1 REPEATED MONITORING WHEN INITIAL RESULTS ARE BELOW THE ACTION LEVEL

If the initial monitoring results are below the Action Level (AL), monitoring must be repeated whenever there are changes to the work that may increase exposure levels, including:

- Change in Use.** Monitoring will be repeated when there are changes to the length of exposure, or the concentration or volumes of formaldehyde used.
- Operational Change.** Monitoring will be repeated when there are changes to the equipment, process, personnel, control measures, or Personal Protection Equipment (PPE) utilized.
- User Request.** Monitoring will be repeated at the request of a user, or when a user reports signs or symptoms associated with formaldehyde exposure.

9.2 REPEATED MONITORING WHEN INITIAL RESULTS ARE ABOVE THE ACTION LEVEL

If initial monitoring results show exposure at or above the action level, appropriate engineering controls must be implemented.

If exposure remains at or above the action level or STEL after implementation, EHS will conduct additional monitoring as follows:

- Levels above the AL** require follow-up monitoring every six months if the employee's previous exposure was at or above the action level.

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2. **Levels above the STEL** require follow-up monitoring annually if the employee's previous exposure was at or above the STEL.

9.3 TERMINATION OF MONITORING

Exposure monitoring may be terminated if results from two consecutive sampling periods, taken at least seven days apart, show that employee exposure is below the action level and the STEL.

9.4 NOTIFICATION OF MONITORING RESULTS

EHS will provide written notice of all results of exposure monitoring to employees and supervisors within 15 days of receiving the final monitoring results.

10.0 Regulated Areas

Work areas where monitoring results show the concentration of formaldehyde is above the PEL and/or STEL will be designated as a "regulated area".

10.1 POSTING

Regulated areas must have signs posted at all entrances and access ways, reading as follows:

DANGER
FORMALDEHYDE
MAY CAUSE CANCER
CAUSES SKIN, EYE, AND
RESPIRATORY IRRITATION
AUTHORIZED PERSONNEL ONLY

10.2 ACCESS

Access to regulated areas shall be limited to authorized persons who have been trained to recognize the hazards of formaldehyde.

11.0 Exposure Controls

In areas with exposure levels above limits, exposure to formaldehyde must be controlled to below the PEL and/or the STEL by the use of the following controls, or a combination of controls.

11.1 ENGINEERING CONTROLS

Wherever feasible, formaldehyde exposure must be controlled by implementing or utilizing engineering controls. Such controls include ventilation to reduce formaldehyde gas concentrations, or physical barriers to prevent splashes of liquid solutions from contacting the skin.

Where engineering controls are not yet in place or are not feasible, administrative controls or Personal Protective Equipment (PPE) must be utilized.

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11.2 ADMINISTRATIVE CONTROLS

Administrative controls include measures that limit user exposure, such as limiting the amounts used or time spent working with formaldehyde, or by restricting access to areas of potential exposure.

11.3 PERSONAL PROTECTIVE EQUIPMENT (PPE)

11.3.1 Respiratory Protection

- Respirator use is allowed under the following circumstances:
 - During the interval necessary to install or implement feasible engineering and administrative controls.
 - In work situations where feasible engineering or work practice controls are not yet sufficient to reduce exposure below PEL/STEL.
 - In work situations where engineering controls and work practice controls are not feasible.
 - In emergencies where exposure could exceed PEL/STEL.
- Whenever respirator use is required, the employee shall receive an appropriate respirator approved by the National Institute for Occupational Safety and Health (NIOSH) at no cost, and use it properly.
- The respirator selected shall reduce the airborne concentration of formaldehyde inhaled by the employee to at or below TWA or STEL.
- EHS maintains a written [Respiratory Protection Program](#), as required by the OSHA Respiratory Protection Standard (29CFR1910.134) and provides training and fit testing.
- Employees must obtain medical clearance from WHS or a healthcare provider for fit-testing and respirator use.
- A powered air-purifying respirator will be available to any employee who experiences difficulty wearing a negative pressure respirator.

11.3.2 Protective Equipment and Clothing

Personal protective equipment (PPE) such as lab coats, gloves, goggles, face shields must be provided at no cost to the employees.

Users must:

- Use appropriate PPE when working with formaldehyde.
- Avoid contact of the eyes and skin with liquids containing one (1%) percent or greater formaldehyde, by using chemical-protective clothing made of material impervious to formaldehyde.
- Have access to working eyewash and emergency showers, and be trained to use them in case of emergency.

11.4 HOUSEKEEPING AND SPILLS

The workplace will be maintained clean and free from formaldehyde-contaminated debris.

Spills of formaldehyde must be handled as outlined in the [Chemical Spill Planning and Response Manual](#).

11.5 LABELING

All chemical containers must be appropriately labeled as outlined in either the [Laboratory Chemical Hygiene Plan](#) or [Chemical Hazard Communication Program for Non-Laboratories](#).

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12.0 Medical Surveillance

12.1 REQUIREMENT FOR MEDICAL SCREENINGS

Medical Screenings or surveillance is required whenever:

- Employees are exposed to concentrations at or above the action level (AL) and/or STEL.
- Employees develop signs and symptoms of potential exposure.
- Employees are exposed to formaldehyde during emergencies.

12.2 MEDICAL SURVEILLANCE PROGRAM

Medical surveillance will be conducted as mandated by OSHA regulations, including:

- Employees covered under the medical surveillance program must complete a medical disease questionnaire.
- Employees required to wear a respirator are required to undergo an annual medical evaluation.
- When an employee is removed/transferred or restricted to work due to significant symptoms or medical condition from exposure, the supervisor shall assure that the exposure to formaldehyde at the new location is not at/or above the action level (AL) and/or STEL.
- Any employee not working because of a medical condition due to formaldehyde exposure must arrange for a follow-up medical examination within six months of removal, to determine if they can return to the original job status, or if the removal of formaldehyde-related job functions is permanent.
- Employees have the right to seek a second medical opinion regarding medical removal or restrictions.
- Employees exposed in an emergency will receive a medical evaluation as soon as possible. If there is a life-threatening condition as a result of exposure, they are to seek immediate attention at the nearest emergency room, then follow up the next business day at WHS

13.0 Training

Individuals assigned to a workplace where formaldehyde exposures are at or above 0.1 ppm must receive training when introduced into such an environment and annually thereafter.

EHS will impart the training, which includes:

- Discussion of the regulation, Safety Data Sheets, and labels.
- The purpose for and a description of the medical surveillance program; as well as signs and symptoms of exposure.
- Discussion of health hazards, such as cancer, irritation, and sensitization of the skin and respiratory system, eye and throat irritation, and acute toxicity.
- Instructions to report to the Supervisor the development of any adverse signs or symptoms suspected to be attributable to formaldehyde exposure.
- Description of operations in the work area where formaldehyde is present and safe work practices appropriate for limiting exposure.
- The purpose of proper use and limitations of PPE.
- Instructions for the handling of spills, emergencies, and clean-up procedures.
- The importance of engineering controls and safe work practices in reducing formaldehyde exposure.

Training is available upon request for groups by contacting EHS. Individuals may also attend the [WCM Laboratory Safety Training](#).

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14.0 Record Retention, Availability, and Revisions

14.1 RECORDKEEPING

EHS maintains copies of Exposure Monitoring, Training Attendance, and Respirator Fit Test records for at least 30 years. WHS maintains copies of employee medical surveillance records for the length of employment, plus 30 years.

14.2 AVAILABILITY OF RECORDS

Exposure monitoring or medical records will be provided to an employee, a former employee or their representative upon written request.

14.3 PROGRAM REVIEW AND UPDATE

This plan shall be reviewed annually, and updated as necessary.

15.0 Definitions

- **Action level** means a concentration of 0.5 parts formaldehyde per million parts of air (0.5 ppm); calculated as an 8-hour time-weighted average (TWA) concentration.
- **Exposure** means the contact with airborne formaldehyde without corrections for protection provided by the use of a respirator.
- **Formaldehyde** means the chemical substance, HCHO, Chemical Abstracts Service Registry No. 50-00-0.

16.0 References

- OSHA Regulations (Standards – 29 CFR), Toxic and Hazardous Substances – [1910.1048, Formaldehyde](#)
- OSHA Fact Sheet Formaldehyde https://www.osha.gov/OshDoc/data_General_Facts/formaldehyde-factsheet.pdf.
- [EHS Chemical Spill Planning and Response Manual](#)
- [EHS Laboratory Chemical Hygiene Plan](#)
- [EHS Chemical Hazard Communication Program for Non-Laboratories](#)
- [EHS Respiratory Protection Program](#)

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