FORMALDEHYDE AWARENESS

VAAAHS Research Service

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- This training will cover OSHA's regulation, Formaldehyde, 29 CFR 1910.1048, and the VAAAHS's Formaldehyde Program, Policy Memo # S-2, Attach. J.
- Only exposure monitoring & PPE is applicable to research labs (Per OSHA letter of interpretation dated 3/23/17).
  - ORO mandates this awareness training though since it is an OSHA regulated substance (Per VHA Directive 1200.08,10.a.(1)).

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OBJECTIVES:

- To become familiar with the requirements of OSHA's Formaldehyde Standard and VAAAHS written policies concerning formaldehyde
- To become familiar with sources of information concerning formaldehyde and how to protect oneself from exposure
- To become familiar with emergency procedures involving formaldehyde

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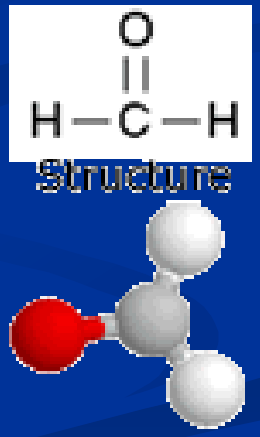
WHAT IS FORMALDEHYDE?

- Formaldehyde is a flammable, colorless gas with a pungent odor.
- Formalin describes aqueous solutions, particularly those containing 10% to 50% formaldehyde and 6% to 15% alcohol stabilizer.



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Formaldehyde can be present in several forms:

- Gas (natural state)
- Solid:
  - **Paraformaldehyde: waxy solid polymer (HCHO)n**
- Aqueous solutions:
  - **Formalin (formaldehyde in solution with methanol or water)**
  - **Paraformaldehyde solution in water**
- Within materials that can release formaldehyde gas:
  - **Insulation, carpeting, plywood, etc.**
  - **Also as by-product of some combustion processes**

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FORMALDEHYDE USES

Formaldehyde can be found in both laboratory and non-laboratory settings.

- Preserving and fixing tissues
- Biocide
- Fertilizer
- Plywood and particle board
- Embalming fluid
- Textiles
- Disinfectant

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Formaldehyde Odor Properties

- The odor threshold for formaldehyde is listed at 0.8 ppm
- Olfactory fatigue causes personnel with exposures to become less sensitive with time, so that levels might be much higher than 0.8 ppm before you can smell it.
- For this reason, ability to smell should not be used as a method to determine whether you are being exposed.

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FORMALDEHYDE USE

Become aware of products that you use that may contain formaldehyde and know how to protect yourself against the hazards.

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- The OSHA Formaldehyde Standard protects workers exposed to formaldehyde gas, its solutions, and materials that release formaldehyde.

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- OSHA Standard, 29 CFR 1910.1048
  - States the amount of formaldehyde gas that can be safely inhaled for specific lengths of time.
  - Includes requirements for exposure monitoring, regulated areas, methods of compliance, respiratory protection, PPE, hygiene protection, housekeeping, emergencies, medical surveillance, employee information and training, and recordkeeping when used in industry-----not research labs!

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INFORMATION

- A Safety Data Sheet (SDS) on formaldehyde must be available in the area where formaldehyde is present. It contains information on how to protect yourself from the hazards and what steps to take in an emergency.

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Symptoms of Exposure:

- Formaldehyde is an irritant and may cause allergic symptoms at very low levels.
- Symptoms of formaldehyde exposure can be acute, especially eye, nose, and throat irritation. These health effects will occur in most individuals when formaldehyde levels reach 0.1 parts per million (ppm).

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The following levels of ambient exposure have been associated with the listed symptoms:

- 0.5-2.0 ppm – May cause irritation to eyes, nose, and throat
- 3-5 ppm – Tearing of the eyes; may be intolerable to some personnel
- 5-10 ppm – Cough; tightness of chest; possible ocular damage
- 10-20 ppm – Difficulty in breathing; burning of nose and throat; heavy tearing of eyes
- 25-30 ppm – Severe injury to respiratory tract (pulmonary edema, pneumonitis)
- 100 ppm – Immediately dangerous to life and health

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Exposure to Formaldehyde

- Usually, removing an individual from the exposure will allow for recovery of symptoms with no persistent effects.
- Acute exposure can be fatal. However, the odor threshold is low enough that irritation of the eyes and mucous membranes will occur before fatal levels are achieved.

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Symptoms of Exposure to <u>Formaldehyde - Acute</u>

- Eye, nose, throat irritation
- Insomnia
- Headaches, Dizziness
- Depression, Memory loss
- Fatigue
- Nausea, Diarrhea
- Chest Pain
- Rashes
- Asthma

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Symptoms of Exposure to Formaldehyde - Chronic

- Formaldehyde exposure may also be chronic. A person may be exposed to formaldehyde day in and day out for many years before being diagnosed with cancer.
- The effects of exposure differ between individuals.

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Symptoms of Exposure to <u>Formaldehyde - Chronic</u>

- Respiratory difficulty
- Eczema
- Sensitization
- Suspect Human Carcinogen (lung, nasal, possibly brain cancer and leukemia)

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PERMISSIBLE EXPOSURE LIMIT (PEL)

PELs are the levels OSHA has set to ensure worker safety:

- Time Weighted Average (TWA) –

  0.75 ppm for an 8 hour work period
- Short Term Exposure Level (STEL) –

  2 ppm over any 15 minute period
- Action Level – 0.5 ppm over an 8 hour work period

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Initial Exposure Monitoring:

- Required for all work operations and/or job classifications where exposure to formaldehyde above the STEL or AL might occur.
- **Reminder:** STEL (Short-Term Exposure Limit) = 2 ppm as 15-minute average, and AL (Action Level) = 0.5 ppm as 8-hour average.
- Contact IH, ext. 55417, if you would like to know whether your work operation requires monitoring, or to request monitoring.

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DESIGNATED AREAS (Production Labs Only)

- Formaldehyde may cause cancer and must be used in a designated area when exceeding the PEL or STEL.
- All entrances to designated areas must be posted with the following:

  DANGER

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  IRRITANT and POTENTIAL CANCER HAZARD

  AUTHORIZED PERSONNEL ONLY

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DESIGNATED AREAS (Production Labs Only)

- Only persons trained in the hazards of formaldehyde who are familiar with how to protect themselves shall be allowed access to the designated areas
- All contract labor must be informed about access restrictions and the hazards present

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LABELING

The OSHA Formaldehyde Standard has specific labeling requirements:

- Products releasing 0.1-0.5 ppm must state "CONTAINS FORMALDEHYDE"
- Products releasing >0.5 ppm must state "POTENTIAL CANCER HAZARD" and must contain information on respiratory sensitization
- Contaminated laundry must state "DANGER, FORMALDEHYDE CONTAMINATED CLOTHING, AVOID INHALATION AND SKIN CONTACT"

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Protecting Yourself From Formaldehyde

There are three main ways **to** protect yourself from exposure to formaldehyde:

- **Engineering controls**
- **Safe work practices**
- **Personal protective equipment (PPE)**

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Engineering Controls for Use with Formaldehyde

- Fume hoods
- Local exhaust ventilation
- Slot ventilation
- Emergency Drench hose if greater than or equal to 1% Formaldehyde
- Emergency Eyewash if greater than or equal to 0.1% Formaldehyde

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- Engineering Controls are only effective if they are used!
- If at all possible, work in a vented chemical hood when preparing, using, or disposing of formaldehyde solutions.
- Paraformaldehyde solid (powder, granular, pill form) should also be weighed and dissolved in a chemical fume hood.

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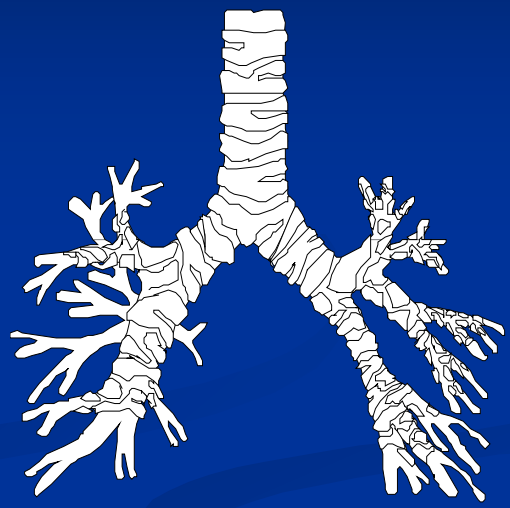
Safe Work Practices for Using Formaldehyde

- Schedule activities to minimize exposure
- Rotate employees so no employee is exposed for long periods of time
- Leave the work area after tasks are completed to allow formaldehyde to be exhausted from that area
- Avoid close contact (especially in the breathing zone)



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Additional Work Practices that can reduce airborne formaldehyde gas levels and potential exposures include:

- Keep solution containers of formaldehyde closed when not in use.
- Perform tasks involving formaldehyde in well-ventilated areas.
- **DO NOT** autoclave or microwave formaldehyde solutions.
- Use formaldehyde preservative substitute whenever possible

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Personal Protective Equipment For Use With Formaldehyde

- PPE should be selected based on the form of formaldehyde used, the conditions of use, and the degree of hazard.
- Clothing and gloves used should be impervious to formaldehyde.
- Goggles and face shields should be used for solutions containing 1% or more of formaldehyde.

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Gloves

- In selecting the correct gloves, breakthrough times and permeation data should be used and is available from most manufacturers.

  Materials such as neoprene or nitrile are recommended due to favorable permeation and degradation ratings.

  All gloves must be impervious.

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Respirator Protection for Formaldehyde

- Respirator use is required:
  - During the interval necessary to install or implement feasible engineering and work practice controls
  - Where engineering and work practice controls are not feasible
  - Where feasible engineering and work practice controls are not yet sufficient to reduce exposures below PELs
  - In emergencies

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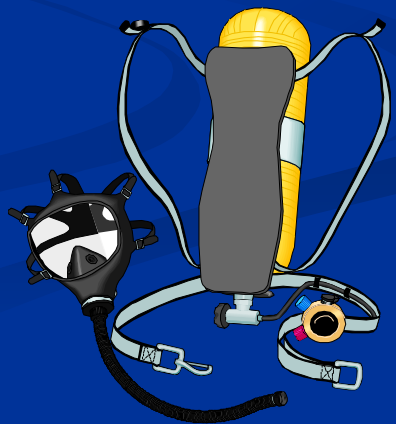
Respirator Protection for Formaldehyde

- Fit testing, training, and a medical evaluation are required in order to wear a respirator for formaldehyde
- Depending on exposure, OSHA is very specific concerning the type of respirator to use and how often cartridges or canisters must be replaced
- Contact IH for more details



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TRAINING

- Initial training must be provided upon assignment to a job with the potential for formaldehyde exposure
- Training is required whenever new conditions or hazards are introduced

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Medical surveillance

- Must be implemented for all employees exposed to formaldehyde at concentrations that equal or exceed the AL or STEL.
- Occupational medical services shall also be available for employees who develop signs and symptoms of overexposure to formaldehyde, and for employees exposed to formaldehyde in emergencies.

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Reporting Signs or Symptoms of Exposure

- If you develop signs or symptoms that you suspect are due to formaldehyde exposure, notify your PI/Supervisor immediately.

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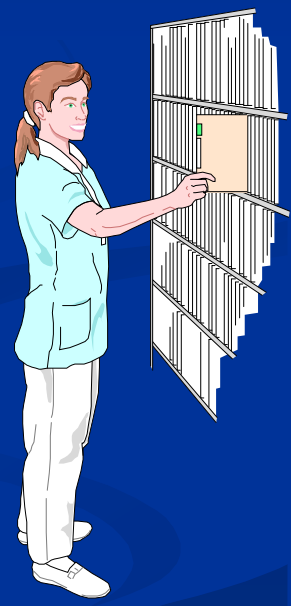
- **RECORDKEEPING**
  These are the employer recordkeeping requirements of OSHA's Formaldehyde Standard:
  - Exposure Records – keep 30 years
  - Medical Records – keep for employment + 30 years
  - Fit Testing Records – keep at least annually if respirator required
  - Training Records – keep



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Waste disposal

- Formaldehyde-contaminated waste and debris resulting from clean-up of leaks or spills shall be placed into sealed containers bearing a label warning of formaldehyde presence and hazards and disposed of as hazardous waste.
- Use spill kits located in the hallway.

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Employee Responsibilities

- Become familiar with Policy Memo #S-2, Attachment J, Formaldehyde Policy
- Wear appropriate PPE, attend training, and follow safe work practices for handling Formaldehyde and Formaldehyde –containing products.
- Report unsafe condition or use to PI/supervisor and/or IH
- Promptly report accidents and spills involving Formaldehyde to PI/supervisor
- Participate in periodic monitoring to assess exposure levels

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Employee Responsibilities

- Dispose of formaldehyde used to soak specimens into the sanitary sewer (currently allowed by POTW).
- Or dispose of as hazardous waste. Contact the GEMS Coordinator, ext. 53803.

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SUMMARY

- Formaldehyde is an irritant and potential human carcinogen, yet it has many favorable uses
- OSHA has set permissible exposure limits (PELS) for formaldehyde to ensure worker safety
- Only the PPE & exposure monitoring elements of the standard are applicable in research labs

Certificate of Completion

Statement of Certification: I hereby certify that I have reviewed and completed the *Formalde-hyde* training module on the date stated below.

Printed Name _____ Date:_____

Signature _____