

Section 5 - Occupational Exposure Assessment and Medical Services

Exposure Assessment Overview

It is University of California policy to comply with all applicable health, safety and environmental protection laws, regulations and requirements. Cal/OSHA requires that all employers “measure an employee’s exposure to any substance regulated by a standard which requires monitoring if there is reason to believe that exposure levels for that substance exceed the action level (or in the absence of an action level, the exposure limit).” Repeated monitoring may be required if initial monitoring identifies employee exposure over the action level or exposure limit.

Minimizing an exposure may be accomplished using a combination of engineering controls, administrative controls and personal protective equipment, listed in order of priority. Assessing exposure to hazardous chemicals may be accomplished through a number of methods performed by EH&S, including employee interviews, visual observation of chemical use, evaluation of engineering controls, use of direct reading instrumentation, or the collection of analytical samples from the employee’s breathing zone. Personal exposure assessment will be performed under either of the following situations:

- When EH&S determines an exposure assessment is warranted based on chemical inventories, review of standard operating procedures (SOPs), types of engineering controls present, laboratory inspection results and/or review of the annual Laboratory Hazard Assessment Tool, or;
- When a user of a hazardous chemical has concern or reason to believe their exposure is not minimized or eliminated through use of engineering controls or administrative practices and the potential for exposure exists. In this case, the user should inform his or her PI, who will in turn contact the EH&S at 530-750-1264. EH&S will then determine the best course of action in assessing employee exposure, including visual assessment, air monitoring, medical evaluation, examination, or medical surveillance.

In event of any serious injury or exposure, including chemical splash involving dermal or eye contact, immediately call 911 and obtain medical treatment immediately. Do not wait for an exposure assessment to be performed before seeking medical care.

Biological exposure assessment

In keeping with requirements of CCR Title 8 Section 5199, UC ANR EH&S is responsible for providing biosafety expertise to perform and document biological risk assessments when required under code to mitigate the hazards of aerosol-transmissible diseases. Biological exposure assessments are based upon case-by-case review of lab procedures and practices; such exposure assessments must be conducted by an individual with the knowledge and ability to identify and recommend effective biological safety controls. A biological safety professional or biosafety officer is the title of EHS specialists with specific expertise in biological risk assessment. If such expertise is not available in UC ANR EH&S, UC campus Biological Safety Officers (or their delegates) may perform this function at the behest of UC ANR EH&S department.

Unlike chemical hazards, exposure limits do not exist for most biological agents. In many cases, protective equipment or practices may be required as precautionary measures. Whenever possible, prioritization and implementation of safety controls should be a collaborative effort between EH&S and research staff. In the event that a pathogen may be present. Unless prescriptive requirements apply to the work, performance-based criteria will be favored in establishing biosafety controls. Principal investigators proposing to deviate from standard biosafety practices may be required to provide evidence or data to support deviations from standard practices.

Chemical exposure assessment

All University employees require protection from exposure to hazardous chemicals above established exposure limits. The profession with expertise in chemical exposure assessment monitoring is industrial hygiene. At UC ANR, the person supervising, directing or evaluating the exposure assessment monitoring must be competent in the practice of industrial hygiene. UC ANR EH&S employs personnel with this expertise and relies on UC Davis, UC Riverside, and UC Berkeley EH&S departments for additional industrial hygiene program support. General questions regarding exposure assessment or the industrial hygiene program can be directed to the UC ANR EHS at ehs@ucanr.edu or (530)750-1264.

Cal/OSHA regulates Permissible Exposure Limits (PELs) for airborne contaminants to which “nearly all workers may be exposed daily during a 40-hour workweek for a working lifetime (of 40 years) without adverse effect”, are based upon an 8-hour Time-Weighted Average (TWA) exposure. Thus, the PELs are the maximum permitted 8-hour TWA concentration of an airborne contaminant without the use of respiratory protection. Cal/OSHA has also defined Short Term Exposure Limits (STELs) as the maximum TWA exposure during any 15 minute period, provided the daily PEL is not exceeded and Ceiling (C) exposures that shall not be exceeded at any time.

Cal/OSHA has listed established PELs, STELs and Ceiling exposures for chemical contaminants identified in [CCR Title 8 Section 5155](#) (Airborne Contaminants) Table AC-1 (www.dir.ca.gov/Title8/ac1.pdf). In the absence of a published Ceiling limit, Cal/OSHA requires employee exposure to concentrations above the PEL be controlled to prevent harmful effects. Further, Cal/OSHA has promulgated specific standards covering several regulated carcinogens, which may include an Action Level (AL), triggering medical surveillance requirements or the imposition of a specific Excursion Limit (such as for asbestos) with a unique measurement of the duration of an exposure.

Other hazardous exposures

Cal/OSHA has established exposure limits for numerous physical hazards including radiation, noise, vibration, dust (not otherwise specified), and heat. Similar to chemical exposure monitoring, someone skilled in the practice of industrial hygiene should direct and supervise any exposure monitoring activities to assure that the exposure monitoring activities are conducted and documented according to established procedures. Concerns for hazardous exposures in labs should be raised to the lab supervisor or location safety coordinator for communication to EH&S and initiation of a hard assessment.

Exposure Assessment Protocol

Assessment

UC ANR EH&S conducts exposure assessments for UC employees who work in UC ANR facilities and who conduct UC ANR business or research outside of UC facilities. Exposure assessments for projects occurring at UC campuses are conducted by the respective campus EH&S department. Employees have a right to observe testing, sampling, monitoring or measuring of employee exposure. They are also allowed access to the records and reports related to the exposure assessment. Exposure assessments may be performed for hazardous chemicals, as well as for physical hazards including noise and heat stress to determine if exposures are within PELs or other appropriate exposure limits that are considered safe for routine occupational exposure. The costs of exposure monitoring are the responsibility of the lab, department, and organization in which the personnel is employed. General protocol in conducting an exposure assessment may include any of the following:

- Employee interviews;
- Visual observation of chemical usage and/or laboratory operations;
- Evaluation of simultaneous exposure to multiple chemicals;
- Evaluation of potential for absorption through the skin, mucus membranes or eyes;
- Evaluating existing engineering controls (such as measuring face velocity of a fume hood);
- Use of direct reading instrumentation; and
- Collection of analytical samples of concentrations of hazardous chemicals taken from the employees breathing zone, or noise dosimetry collected from an employee's shirt collar or various forms of radiation dosimetry.

If exposure monitoring determines an employee exposure to be over the action level (or the PEL) for a hazard for which OSHA has developed a specific standard (e.g., lead), the medical surveillance provisions of that standard shall be followed. It is the responsibility of the PI to ensure that any necessary medical surveillance requirements are met. When necessary, EH&S will make recommendations regarding adjustments to engineering controls or administrative procedures to maintain exposure below any applicable PEL. Where the use of respirators is necessary to maintain exposure below permissible exposure limits, UC ANR will provide, at no cost to the employee, the proper respiratory equipment and training. Respirators will be selected and used in accordance with the requirements of CCR Title 8 Section 5144 (www.dir.ca.gov/Title8/5144.html) and the UC ANR's Respiratory Protection Program.

In assessing exposure to hazardous chemicals for which Cal/OSHA has not published a PEL, STEL or Ceiling exposure, EH&S defers to the Threshold Limit Values (TLVs) established by the American Conference of Governmental Industrial Hygienists (ACGIH) or the Recommended Exposure Limits (RELs) established by the National Institute of Occupational Safety & Health (NIOSH). Please contact EH&S at 530-750-1264 for more information regarding these chemicals.

Notification

UC ANR EH&S will promptly notify the employee and his/her PI of the results in writing) after the receipt of any monitoring results. EH&S will establish and maintain an accurate record of any measurements taken to monitor exposures for each employee. Records, including monitoring provided by qualified vendors, will be managed in accordance with CCR Title 8 Section 3204 "Access to Employee Exposure and Medical Records" (www.dir.ca.gov/Title8/3204.html).

Determine and implement controls

EH&S will use any of the following criteria to determine required control measures to reduce employee's occupational exposure:

- Verbal information obtained from employees regarding chemical usage;
- Visual observations of chemical use or laboratory operations;
- Evaluation of existing engineering control measures or administrative practices;
- Recommendations expressed in Safety Data Sheets;
- Regulatory requirements of Cal/OSHA;
- Recommendations from professional industrial hygiene organizations;
- Direct reading instrumentation results;
- Employee exposure monitoring results; and/or
- Medical evaluation, examination and/or surveillance findings.

Particular attention shall be given to the selection of safety control measures for chemicals that are known to be extremely hazardous. Per Cal/OSHA CCR Title 8 Section 5141 "Control of Harmful Exposure to Employees" (www.dir.ca.gov/Title8/5141.html), the control of harmful exposures shall be prevented by implementation of control measures in the following order:

- Engineering controls, whenever feasible;
- Administrative controls whenever engineering controls are not feasible or do not achieve full compliance and administrative controls are practical; and
- Personal protective equipment, including respiratory protection, during:
 1. The time period necessary to install or implement feasible engineering controls
 2. When engineering and administrative controls fail to achieve full compliance in emergencies.

Medical Evaluation

All employees, student workers, medical health services volunteers, or laboratory personnel who work with hazardous chemicals or biological agents shall have an opportunity and may be required by regulations to receive a free medical evaluation, including supplemental examinations which the evaluating physician determines necessary, under the following circumstances:

1. When an employee is required to use a respirator for their work (evaluation required prior to use of respirator);
2. Whenever an employee develops signs or symptoms associated with a hazardous chemical or biological agent to which an employee may have been exposed in a laboratory;
3. Where personal monitoring indicates exposure to a hazardous chemical is above a Cal/OSHA Action Level (AL) or Permissible Exposure Limit (PEL) or recommended exposure levels established by the National Institute for Occupational Safety & Health (NIOSH) or the American Conference of Governmental Industrial Hygienists (ACGIH) in the event Cal/OSHA has not established an AL or PEL for a particular hazardous chemical;
4. Whenever an uncontrolled event takes place in the work area such as a spill, leak, explosion, fire, etc., resulting in the likelihood of exposure to a hazardous chemical; or
5. Upon reasonable request of the employee to discuss medical issues and health concerns regarding work-related exposure to hazardous chemicals.

All work-related medical evaluations and examinations will be performed by a medical facility. Evaluations and examinations will be provided without cost to the employee, without loss of pay, and at a reasonable time and place.

Any laboratory employee or student worker who exhibits signs and symptoms of adverse health effects from work-related exposure should report the incident following UC ANR injury reporting procedures (http://safety.ucanr.edu/Guidelines/Reporting_an_Injury/). Safety Note # 123 describes procedures for reporting employee injuries or illnesses (<http://safety.ucanr.edu/files/1369.pdf>) and Safety Note #76 describes procedures for reporting a serious work-related injury (<http://safety.ucanr.edu/files/1472.pdf>).

Serious injury or illness is defined as any injury or illness occurring in a place of employment which requires inpatient hospitalization for a period in excess of 24 hours for other than medical observation or in which an employee suffers a loss of any member of the body or suffers any serious degree of permanent disfigurement, but does not include any injury or illness or death caused by the commission of a Penal Code violation, or an accident on a public road or highway (CCR Title 8, Section 330 [h]).

Information to provide to the clinician

At the time of the medical evaluation, the following information shall be provided:

1. Personal information such as age, weight and University employee ID number;
2. Common and/or IUPAC name of the hazardous chemicals to which the individual may have been exposed;
3. A description of the conditions under which the exposure occurred;
4. Quantitative exposure data, if available;
5. A description of the signs and symptoms of exposure that the employee is experiencing, if any;
6. A copy of the Safety Data Sheet (SDS) of the hazardous chemical in question;
7. History of exposure including previous employment and non-occupational (recreational) hobbies;
8. Any additional information helpful in assessing or treating an exposure or injury such as a biological component of exposure or existence of an antitoxin; and
9. Employment/pay status at time of exposure/injury.

Physician's written opinion

For evaluation or examinations required by Cal/OSHA, the employer shall receive a written opinion from the examining physician which shall include the following:

1. Recommendation for further medical follow-up;
2. Results of the medical examination and any associated tests, if requested by the employee;
3. Any medical condition which may be revealed in the course of the examination which may place the employee at increased risk as a result of exposure to a hazardous chemical found in the workplace; and
4. A statement that the employee has been informed by the physician of the results of the consultation or medical examination and any medical condition that may require further examination or treatment.

Medical Surveillance

Medical surveillance is the process of using medical examinations, questionnaires and/or biological monitoring to determine potential changes in health as a result of exposure to a hazardous chemical or other hazards. Certain Cal/OSHA standards require clinical examination as part of medical surveillance when exposure monitoring exceeds an established Action Level or PEL.

UC ANR medical surveillance and services are provided by the UC Davis Occupational Medical Clinic in coordination with designated local medical providers. Medical surveillance is required of employees who are routinely exposed to certain hazards as part of their job description (such as asbestos) and may be offered to other employees based upon quantifiable or measured exposure. Examples of hazards that are monitored through the medical surveillance program may include: Asbestos, Beryllium, Formaldehyde, Lead, Methylene Chloride, Cholinesterase-inhibiting Pesticides, Noise (Hearing Conservation Program), Radioactive Chemicals (Bioassay Program), Respirator Use (Respirator Protection Program), and other particularly hazardous substances. Individuals with questions regarding work-related medical surveillance are encouraged to contact EH&S at 530-750-1264 for more information.

Confidentiality & Individual's Access to Personal Medical Records

All patient medical information is protected by California and federal law and is considered strictly confidential. The medical facility is prohibited from disclosing any patient medical information that is not directly related to the work-related exposure under evaluation and should not reveal any diagnosis unrelated to exposure. Any patient information disclosed by the medical facility to the employee's supervisor will be limited to information necessary in assessing an employee's return to work, including recommended restrictions in work activities, if any. Any patient information disclosed by the medical facility to EH&S will be limited to information necessary to develop a course of exposure monitoring, or perform hazard assessments and incident investigations, if appropriate, the medical facility will otherwise disclose patient medical information only as required by California and Federal law, such as for Worker's Compensation Insurance claims. Each employee has the right to access his/her own personal medical and exposure records. The medical facility will provide an employee with a copy of his/her medical records upon written request.

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Appendices and SOPs

Appendices

Appendix 5a - List of Occupational Health Providers

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