



Environmental Health and Safety

Laboratory Use of Chemicals that Require Occupational Medical Services (OSHA 1910)

The Occupational Safety and Health Administration has identified 13 carcinogens and 12 toxic chemicals that require preventive occupational medical services including preplacement exams, annual exams, work and medical history and some medical tests.

The **13 suspect carcinogens** require all persons handling these chemicals to be in a medical surveillance program.

The **12 toxic substances** require all persons handling the substances if they exceed the airborne chemical Action Level specified for each chemical. NOTE: These chemicals should always be handled in fume hoods or glove boxes hence no laboratory staff is expected to exceed the Action Level for any of these chemicals.

There are many more, 100 or more, additional chemicals identified as Select Carcinogens, Mutagens and Teratogens that require medical attention following contact with the chemical by skin, ingestion or inhalation or if an individual experiences signs and symptoms of exposure to the chemicals. Preventive medical services are not required for these chemicals.

Carcinogens: chemicals known to cause cancer in exposed persons

For laboratories, OSHA has two different definitions of chemicals that are known to cause cancer in exposed persons:

Suspect carcinogens (1910.1003-1016) 13 OSHA carcinogens

Select carcinogens (1910.1450 Chemical Hygiene regulations) are defined as:

1. OSHA suspect carcinogens or
2. Listed as “known to be carcinogen” list, National Toxicology Program (most current list) or
3. Listed as Group 1 “carcinogenic to humans” International Agency for Research on Cancer (IARC) or
4. It is listed in Group 2A and 2B by IARC or
5. listed as “reasonably anticipated to be a carcinogen” and causes a statistically significant tumor incidence in experimental animals
 - a. after inhalation exposure of 6-7 hours per day, 5 days per week for a significant portion of animal lifetime of dosages less than 10 mg/M3;

- b. after repeated skin exposure to 300 mg/kg of body weight per week or
- c. after oral dosages of less than 50 mg/kg of body weight per day

Medical surveillance requirements for chemical carcinogens:

13 OSHA suspect carcinogens

A regulated area is an area where exit and entry is controlled to control exposure to the chemical carcinogen and in which the carcinogen is used: this may be a laboratory hood, glove box or some other physically defined space.

A person entering the regulated area must have:

- a. preplacement medical exam
- b. annual periodic medical exam
- c. provide medical and work history
- d. additional medical tests as specified by physician
- e. emergency medical services following exposure to the chemical
- f. all medical exams and reports in writing to employer

1003 4-nitrobiphenyl

1004 alpha naphthylamine

1006 methylchloromethylether

1007 3 dichlorobenzidine

1008 bischloromethylether

1009 beta naphthylamine

1010 benzidine

1011 4 aminodiphenyl

1012 ethyleneimine

1013 betapropriolactone

1014 2 acetylaminofluorene

1015 dimethylaminoazobenzene

1016 p nitrosodimethylamine

Select carcinogens have fewer medical requirements:

Subpart (g)

1. a medical examination will be provided if an employee develops signs and symptoms of overexposure to the chemical
2. as required by substance specific regulations (1910 subpart Z)
3. medical consultation following a spill, leak ,explosion or other source of possible exposure

These requirements apply to 2 additional categories of high hazard chemicals:

Reproductive Toxins: chemicals (mutagens) that cause chromosomal damage or fetal damage (teratogens) in pregnant women

Substance specific regulations

OSHA has written several regulations for 12 specific chemicals that specify occupational medical services prior to exposure, during potential exposure and following an exposure incident:

Acrylonitrile 1910.1045 if exposed to 1 ppm for 8 hr TWA

Preplacement exam, periodic exam, post exposure exam, medical and work history

Arsenic compounds 1910.1018 if exposed to 10 ug/M3 for 8hr TWA for all inorganic arsenic compounds except arsine

Preplacement exam, periodic exam, post exposure exam, medical and work history

Benzene 1910.1028 if exposed above 0.5 ppm for 8 hr TWA

Preplacement exam, periodic exam, post exposure exam, medical and work history; blood tests

1,3-butadiene 1910.1051 if exposed above 0.5 ppm for 8 hr TWA

Preplacement exam, periodic exam, post exposure exam, medical and work history and blood tests;

Cadmium 1910.1027 if exposed above the action level of 2.5 ug/M3 over 8 hr TWA exposure

NOTE: cadmium metal and compounds in all forms

Preplacement exam, periodic exam, post exposure exam, medical and work history and blood / urine tests

Chromium+6 compounds 1910.1026 if exposed above 2.5 ug/M3 for 8 hr TWA NOTE : chromium +6 valence in any chemical compound

Preplacement exam, periodic exam, post exposure exam, medical and work history

1,2-dibromo-3-chloropropane 1910.1044 if exposed above 1 ppb for 8 hr TWA

Preplacement exam, periodic exam, post exposure exam, medical and work history

Ethylene oxide 1910.1047 if exposed to 0.5 ppm for an 8 hr TWA exposure

Preplacement exam, periodic exam, post exposure exam, medical and work history and blood tests

Formaldehyde 1910.1048

Lead and inorganic lead compounds 1910.1025 if exposed above 30 ug/M3 8hr TWA for 30 days per year or more

Preplacement exam, periodic exam, post exposure exam, medical and work history and blood tests

Methylene chloride 1910.1052 if exposed to 12.5 ppm 8hr TWA any time

Preplacement exam, periodic exam, post exposure exam, medical and work history and blood tests

Methylenediamine 1910.1050 if exposed to .005ppm (5 ppb) 8hr TWA

Preplacement exam, periodic exam, post exposure exam, medical and work history and blood tests

Vinyl chloride 1910.95 if exposed above 0.5 ppm TWA 8hr requires

Preplacement exam, periodic, post exposure, work and medical history, blood tests