

Occupationally Related Asthma, Bronchitis or Respiratory Hypersensitivity Reaction

(Occupationally related respiratory conditions due to inhalation of chemicals, gases, fumes, and vapors; Occupationally Related Asthma)

Other Names/Conditions: Work-related chemical pneumonitis, chemical bronchitis, or toxic pneumonitis. Work-related asthma, work-aggravated asthma, and reactive airways dysfunction syndrome are conditions that will also be described in this reference.

Responsibilities:

Hospital: Report by phone, fax, or mail

Lab: Report by phone, fax, or mail

Physician/Health care providers: Report by phone, fax, or mail

Medical Examiners: Report by phone, fax, or mail

Poison Control Centers: Report by phone, fax, or mail

Occupational Nurses: Report by phone, fax, or mail

Local Public Health Agency (LPHA): No follow-up required, unless outbreak occurrence

Report to the IDPH Bureau of Environmental Health Services:

Iowa Department of Public Health

Bureau of Environmental Health Services

Lucas State Office Building

321 E. 12th Street

Des Moines, Iowa 50319-0075

Phone (Mon-Fri 8 am - 4:30 pm): 800-972-2026

Fax: 515-281-4529

24-hour Disease Reporting Hotline: (For use outside of EHS office hours) 800-362-2736

Web: <https://idph.iowa.gov/ehs/reportable-diseases>

Report Form: Environmental & Occupational Report Form on web

Note: This revised document reflects provisional language in reference to the current Iowa Administrative Code [641] Chapter 1: "Occupationally related asthma, bronchitis or respiratory hypersensitivity reaction" means any extrinsic asthma or acute chemical pneumonitis due to exposure to toxic agents in the workplace. (ICD-10 codes J67.0 to J67.9)."

The diagnostic coding currently listed is inappropriate for the narrative of the condition described. ICD-10 codes J67.0-J67.9 refer to hypersensitivity pneumonitis due to organic dust, and exclude pneumonitis due to inhalation of chemicals, gases, fumes or vapors (J68.0). The condition described would more appropriately be designated as chemical pneumonitis, chemical bronchitis, or toxic pneumonitis, or a broad category of respiratory conditions due to inhalation of chemicals, gases, fumes, and vapors, with an assigned ICD-10 diagnosis codes of J68 (respiratory conditions due to inhalation of chemicals, gases, fumes, and vapors) after first using an appropriate T59.0-T59.9 code (toxic effects of other gases, fumes, and vapors). Reportable cases are those related to occupational or work exposures.

Hypersensitivity pneumonitis (J67.0 to J37.9) is described elsewhere in related Iowa Department of Public Health reference materials.

In an effort to improve the accuracy of this reference, respiratory conditions due to inhalation of chemicals, gases, fumes, and vapors (chemical pneumonitis) and work-related asthma, work-aggravated asthma, or reactive airways dysfunction syndrome will be referenced separately. A recommendation to update the current Iowa Administrative Code [641] Chapter 1 is being considered.

Occupationally related chemical pneumonitis.

1. The Disease Definition

Occupationally related respiratory conditions due to inhalation of chemicals, gases, fumes, and vapors (chemical pneumonitis) is currently defined in the Iowa Administrative Code as occupationally related asthma, bronchitis or respiratory hypersensitivity reaction, or any extrinsic asthma or acute chemical pneumonitis due to exposure to toxic agents in the workplace. (ICD-10 codes J67.0 to J67.9). However, the currently listed condition name and diagnostic coding is inappropriate for the narrative of the condition described. The current definition mixes two separate but related conditions. The condition described would more appropriately be designated as respiratory conditions due to inhalation of chemicals, gases, fumes, and vapors, with an ICD-10 diagnosis codes of J68 which would be assigned after using an appropriate T59.0-T59.9 code (toxic effects of other gases, fumes, and vapors). Other names would include chemical pneumonitis, chemical bronchitis, or toxic pneumonitis. Reportable cases are those related to occupational or work exposures.

A. Clinical Description

Acute chemical pneumonitis causes swelling of the lung tissue, movement of fluid into the air spaces in the lung, and less ability to absorb oxygen and get rid of carbon dioxide. In severe cases, death may result from lack of oxygen reaching the tissues (hypoxia). Chronic chemical pneumonitis can follow low levels of exposure to the lung irritant over extended periods. This causes inflammation and may provoke fibrosis (scarring) with decreased oxygen exchange and stiffening of the lung. Unchecked, this condition may ultimately lead to respiratory failure and death.

Symptoms of acute exposure include air hunger (feeling that you cannot get enough air), abnormal lung sounds (wet or gurgling), cough, difficulty breathing, and an unusual sensation or possibly a feeling of burning in the chest. Symptoms of chronic exposure include cough (not always present), progressive disability related to shortness of breath, rapid breathing, and shortness of breath with only mild exercise.

B. Sources of Exposure

Many household and industrial chemicals can produce both an acute and a chronic form of inflammation in the lung. Chlorine is one of the most irritating of commonly inhaled substances. Exposure to dangerous levels may occur at home (during use of cleaning materials containing bleach), during industrial use or unplanned events such as spills, or near swimming pools. Inhalation of other dangerous substances can occur in many different settings, including factories (especially during smelting, welding, or other metal work), the production or use of solvents or pesticides, fires (house fires, wildfires), and from grain and fertilizer dust.

C. Population at Risk

Anyone can be exposed to chemical fumes. The primary population at risk for reportable cases are those who work with chemicals in an occupational setting.

D. Diagnosis, Treatment, and Prognosis

Prompt consultation with a poison control center (1-800-222-1222) is recommended for acute exposures. It is important to provide the full name and chemical information for the correct treatment protocols to be determined. Safety Data Sheets (SDS), which were formerly called material safety data sheets (MSDS) contain the information needed, and should be available from the employer.

Diagnosis and a determination of severity are made by taking an occupational exposure history and using various laboratory and imaging tests, which may include a CT or x-ray of the chest, lung function studies, and blood-gas analysis.

The most important treatment is to stop the exposure to the chemical that caused the symptoms. Further treatment is focused on reducing symptoms. Oxygen therapy may be helpful, and corticosteroids may be given to reduce inflammation. Antibiotics are usually not helpful or needed, unless there is a secondary infection.

The outcome depends on the chemical agent involved, the severity of exposure, and whether the problem is acute or chronic. Acute respiratory distress syndrome (ARDS), respiratory failure and death can occur.

E. Prevention of Exposure

In order to ensure chemical safety in the workplace, information about the identities and hazards of the chemicals being used must be available and understandable to workers.

If someone has a job in a high-risk profession, in the United States the company has legal responsibilities to help protect the worker from hazardous chemicals. Under guidelines established by the Occupational Safety and Health Administration (OSHA), an employer is required to do the following:

- **Inform the worker** if they will be working with any hazardous chemicals.
- **Train the worker how to safely handle** these chemicals.
- **Train the worker how to respond** to an emergency, such as a chemical spill.
- **Provide protective gear**, such as masks and respirators.
- **Offer additional training** if a new chemical is introduced to your workplace.

Under OSHA guidelines, an employer is required to keep a material safety data sheet (MSDS) for each hazardous chemical that's used in their workplace. This is a document that must be submitted by the chemical's manufacturer to the employer. Workers have a legal right to see and copy such documents. If a worker suspects that they are allergic to a certain substance, they should show the material safety data sheet to their medical provider.

Under the OSHA Hazard Communication Standard:

- Chemical manufacturers and importers are required to evaluate the hazards of the chemicals they produce or import, and prepare labels and safety data sheets to convey the hazard information to their downstream customers;
- All employers with hazardous chemicals in their workplaces must have labels and safety data sheets for their exposed workers, and train them to handle the chemicals appropriately. The training for employees must also include information on the hazards of the chemicals in their work area and the measures to be used to protect themselves.

Work rules regarding chemical handling and the appropriate use of respiratory personal protective equipment (PPE) should be followed. If respiratory PPE is used, it is important to use the appropriate breathing mask or respirator for the chemical or vapors involved. People who work near fires should take care to limit exposure to smoke or gases.

While at work, workers should be alert for unsafe and unhealthy working conditions and report them to their supervisor. An OSHA consultation is an option for employers and employees.

2. Reporting Criteria

A. Disease Reporting

All cases of occupationally related chemical pneumonitis, chemical bronchitis, or toxic pneumonitis are reportable in Iowa under the current definition found in the Iowa Administrative Code [641] Chapter 1: "Occupationally related asthma, bronchitis or respiratory hypersensitivity reaction" means any extrinsic asthma or acute chemical pneumonitis due to exposure to toxic agents in the workplace. (ICD-10 codes J67.0 to J67.9)." An update to the definition is being proposed to correct inaccuracies.

Mandatory reporting is required of health care providers, clinics, hospitals, clinical laboratories, and other health care facilities; school nurses or school officials; poison control and information centers; medical examiners; occupational nurses. Hospitals, health care providers, and clinical laboratories outside the state of Iowa for confirmed or suspect cases in an Iowa resident. Primary responsibility for reporting falls to the physician or other health practitioner attending the patient and to laboratories performing tests identifying the disease, including tissue biopsy testing that is diagnostic of the disease.

Additional information and reporting forms can be found in the Iowa Administrative Code [641] Chapter 1, which can be accessed through a link on the IDPH Bureau of Environmental Health Services web page at <https://idph.iowa.gov/ehs/reportable-diseases> . Call the IDPH EHS hotline at 800-972-2026 during regular business hours if you have questions.

B. Reference

MedlinePlus, Chemical pneumonitis: <https://medlineplus.gov/ency/article/000143.htm>

Occupational Safety and Health Administration, Chemical Hazards and Toxic Substances: <https://www.osha.gov/SLTC/hazardoustoxicsubstances/>

American Lung Association, Chemical Releases: <http://www.lung.org/our-initiatives/healthy-air/outdoor/emergencies-and-natural-disasters/chemical-releases.html?referrer=https://www.google.com/>

Mayo, ARDS: <https://www.mayoclinic.org/diseases-conditions/ards/symptoms-causes/syc-20355576>

Occupationally related asthma

1. The Disease Definition

Occupationally related asthma, bronchitis, or respiratory hypersensitivity reaction is not currently well-defined in the Iowa Administrative Code. Under the ICD-10 CM coding system, asthma is coded as J45.x, in addition to a code of Z56.9 to refer to occupational problems or work circumstances.

Occupational asthma is asthma caused by, or worsened by, exposure to substances in the workplace. These substances may cause asthma in one of 3 ways:

- An allergic reaction
- An irritant reaction
- A reaction which results in the buildup of naturally occurring chemicals such as histamines in the lungs resulting in an asthma attack.

Occupational asthma has been defined as a disease characterized by variable airflow limitation and/or airway hyperresponsiveness due to causes or conditions attributable to a particular occupational environment and not to stimuli encountered outside of the workplace.

Work-related asthma can be divided into two general groupings: Occupational asthma (OA) and work aggravated asthma (WAA). Occupational asthma is further subdivided into OA with latency and OA without latency. OA without latency is also termed Reactive Airways Dysfunction Syndrome or 'irritant-induced asthma.'

Work aggravated asthma (WAA) is an asthma exacerbation as a result of a workplace exposure in an individual with a prior history of asthma. If the worker is asymptomatic for a period of time and then experiences a recurrence of symptoms, careful consideration should be given as to whether this represents an aggravation of pre-existing asthma or a new sensitivity to a workplace exposure. Often asthma can 'light up' in the presence of workplace irritant exposures and this may reasonably be considered an increase in bronchial hyperresponsiveness and work-aggravated asthma. An assessment of workplace exposures to chemicals known to sensitize airways is appropriate.

A. Clinical Description

Symptoms of occupational asthma include general symptoms of an asthma attack, such as coughing, wheezing, chest tightness, shortness of breath, and breathing difficulty. Eye irritation, nasal congestion, and/or runny nose may also be present. This can be allergy-related or an irritant reaction from exposure to asthma triggers in the workplace.

Severe asthma attacks can be life-threatening. Signs of an asthma attack that needs emergency treatment include:

- Rapid worsening of shortness of breath or wheezing
- No improvement even after using short-acting bronchodilators
- Shortness of breath with minimal activity

B. Sources of Exposure

More than 300 workplace substances have been identified as possible causes of occupational asthma. These substances include:

- **Animal substances**, such as proteins found in dander, hair, scales, fur, saliva and body wastes.
- **Chemicals**, such as anhydrides, diisocyanates and acids used to make paints, varnishes, adhesives, laminates and soldering resin. Other examples include chemicals used to make insulation, packaging materials, and foam mattresses and upholstery.
- **Enzymes** used in detergents and flour conditioners.
- **Metals**, particularly platinum, chromium and nickel sulfate.
- **Plant substances**, including proteins found in natural rubber latex, flour, cereals, cotton, flax, hemp, rye, wheat and papain, a digestive enzyme derived from papaya.
- **Respiratory irritants**, such as chlorine gas, sulfur dioxide and smoke.

C. Population at Risk

Workers have an increased risk of developing occupational asthma if:

- **The worker has existing allergies or asthma.** Although this can increase the risk, many people who have allergies or asthma do jobs that expose them to lung irritants and never have symptoms.
- **Allergies or asthma runs in the worker's family.** A worker's parents may pass down a genetic predisposition to asthma.
- **The worker works around known asthma triggers.** Some substances are known to be lung irritants and asthma triggers.
- **The worker smokes.** Smoking increases the risk of developing asthma.

High-risk occupations

It's possible to develop occupational asthma in almost any workplace. But the risk is higher for those who work in certain occupations. Here are some of the riskiest jobs and the asthma-producing substances associated with them:

Jobs	Asthma-producing substances
Adhesive handlers	Chemicals such as acrylate
Animal handlers, veterinarians	Animal proteins
Bakers, millers	Cereal grains
Carpet makers	Gums
Metal workers	Cobalt, nickel
Forest workers, carpenters, cabinetmakers	Wood dust
Hairdressers	Chemicals such as persulfate
Health care workers	Latex and chemicals such as glutaraldehyde
Pharmaceutical workers	Drugs, enzymes
Seafood processors	Seafood

Jobs	Asthma-producing substances
Shellac handlers	Chemicals such as amines
Spray painters, insulation installers, plastics and foam industry workers	Chemicals such as diisocyanates
Textile workers	Dyes
Users of plastics, epoxy resins	Chemicals such as anhydrides

(Mayo Clinic, Occupational Asthma, <https://www.mayoclinic.org/diseases-conditions/occupational-asthma/symptoms-causes/syc-20375772>)

D. Diagnosis, Treatment, and Prognosis

Generally, if a person's asthma symptoms are worse on days when they work, improve when they are at home for any length of time (weekends, vacations) and then recur when they return to work, occupational asthma should be considered.

If someone is suspected of having occupational asthma, the health care provider may consider a referral to an asthma specialist. A medical history and physical examination, inclusive of an occupational and environmental exposure history, is required for the diagnosis of any adult with new onset asthma. The history and physical should address the following: (1) an initial assessment of asthma, (2) an assessment of the temporal association between symptoms and work, and (3) an assessment of workplace exposures.

If a diagnosis of asthma, occupational asthma, or work aggravated asthma is made, the medical provider or specialist will develop an asthma treatment plan, which will include asthma medications, such as bronchodilators, asthma inhalers, and inhaled steroids to control your asthma. It will also be important to avoid any asthma triggers at work and to work with the employer to control workplace exposures. Control of workplace exposures is the primary means of management of work aggravated asthma and RADS. Mitigation of exposures in the workplace can occur by institution of engineering, administrative and personal control measures. Engineering controls eliminate exposures by substituting non-irritant chemicals for irritant chemicals or designing work processes such that exposures do not occur the workplace, e.g. enclosing machinery. Administrative controls mitigate exposures by changing work patterns such that the asthmatic individual has significantly less exposure. Personal control measures such as respirators are the last line of defense and often the least effective in mitigating exposures. Consultation with a professional industrial hygienist is appropriate. The medical management of the patient does not significantly differ from that of a non-occupational asthmatic.

In some instances, asthma associated with sensitizers may require complete cessation of the exposure, and counseling regarding leaving the work environment. Attempting to transfer the worker to a work environment without the sensitizer present is optimal. If an appropriate evaluation has been performed for the diagnosis of work-related asthma, a specialist can have reasonable confidence in recommending removal from ongoing exposure. Some patients may need vocational training to learn new skills.

E. Prevention of Exposure

Although workers may rely on medications to relieve symptoms and control inflammation associated with occupational asthma, they can do several things on their own to maintain overall health and lessen the possibility of attacks:

- **If the worker smokes, quit.** In addition to all its other health benefits, being smoke-free may help prevent or lessen symptoms of occupational asthma.
- **Avoid irritating gases.** Occupational asthma may be worsened by exposure to industrial pollution, automobile emissions, natural gas stoves and chlorine used in swimming pools.
- **Minimize household allergens.** Common household substances — such as mold, pollen, dust mites and pet dander — can aggravate symptoms of occupational asthma. Air conditioners, dehumidifiers

and thorough cleaning practices, especially in the bedroom, can minimize the exposure to these substances and help a person breathe easier.

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B. Reference

WebMD: <https://www.webmd.com/asthma/guide/occupational-asthma-work-related-asthma#1>

Mayo Clinic: <https://www.mayoclinic.org/diseases-conditions/occupational-asthma/symptoms-causes/syc-20375772>

Diagnosing Work-Related Asthma. 2006 Washington State Department of Labor and Industries, Safety and Health Assessment & Research for Prevention (SHARP). PUBLICATION 64-1-2006
<http://www.lni.wa.gov/Safety/Research/files/AsthmaCme.pdf>

American Lung Association, Asthma in the Workplace. <http://www.lung.org/lung-health-and-diseases/lung-disease-lookup/asthma/living-with-asthma/creating-asthma-friendly-environments/asthma-in-the-workplace.html?referrer=https://www.google.com/>

Guidelines for the Diagnosis and Management of Asthma (EPR-3). 2007. <https://www.nhlbi.nih.gov/health-topics/guidelines-for-diagnosis-management-of-asthma> or summary report: <https://www.nhlbi.nih.gov/files/docs/guidelines/asthsumm.pdf>

All links were active as of February 2018.