



Environmental and Occupational Disease Case Reporting and Investigation Protocol **OCCUPATIONAL LUNG DISEASES FROM BIODUSTS AND BIOAEROSOLS**

I. IDENTIFICATION AND DEFINITION OF CASES

- A. **Clinical Description:** Biodusts and bioaerosols can cause a variety of occupational lung conditions in workers. Bioaerosols are complex mixtures of particles comprised of living and dead microorganisms, cellular material from plants and animals, dispersal units (fungal spores and plant pollen), or allergenic proteins. Biodusts include similar organic components that can be projected into the air but which settle slowly under the influence of gravity. Agricultural workers, waste handlers, wood processors, and food processors can be at risk. Both biodusts and bioaerosols can produce a wide range of occupationally related lung conditions that are generally classified as follows:
- **Asthma and asthma-like syndromes:** Airway hyperreactivity and inflammation can occur with and without sensitization to biodusts and bioaerosols. Causes include vegetable dusts; plant fibers from processing of cotton, hemp, or flax; and wood dusts, particularly western red cedar.
 - **Hypersensitivity pneumonitis (HP):** Also referred to as extrinsic allergic alveolitis, HP is an immunologically mediated inflammatory disease of the lung caused by a variety of organic agents. Causes include bacteria or fungi (farmer's lung, cheese worker's lung, grain worker's lung), and animal proteins from urine or feces (bird breeder's lung, animal handler's lung). HP typically causes cough, headache, and shortness of breath; symptoms can be mistaken for viral infections or pneumonia. Prolonged symptoms can lead to irreversible lung fibrosis.
 - **Organic toxic dust syndrome (OTDS):** OTDS is a type of inhalation fever characterized by short-term but severe, flu-like symptoms. Unlike HP, sensitization or susceptibility is not required to develop OTDS. Causes include bioaerosols contaminated with fungi, bacteria, or endotoxin.
 - **Chronic bronchitis:** Chronic inflammation of the bronchial tree with cough and sputum production can be caused by biodusts of cotton, grain, and wood. Symptoms may be worsened by smoking.
- B. **Criteria for Diagnosis:**
Clinically compatible illness or physician diagnosis.
- C. **Case Definition:**
- **Confirmed:** History of exposure to biodust or bioaerosol and development of clinically compatible illness.
 - **Probable:**
 - Death certificate record listing lung disease linked to biodust or bioaerosol exposure as an underlying or contributing cause of death; **or**
 - Hospital discharge record listing lung disease linked to biodust or bioaerosol exposure as primary, secondary or other diagnosis; **or**
 - Workers compensation claim with a diagnosis of a lung disease linked to biodust or bioaerosol exposure; **or**
 - Health care professional's report of an individual diagnosed with a lung disease due to exposure to biodusts or bioaerosols.

II. REPORTING

- A. **Wisconsin Disease Surveillance Category II—Methods for Reporting:** This disease shall be reported to the patient's local health officer or to the local health officer's designee within 72 hours of recognition of a case or suspected case, per Wis. Admin. Code § [DHS 145.04 \(3\) \(b\)](#). Report electronically through the Wisconsin Electronic Disease Surveillance System (WEDSS), or mail or fax a completed Acute and Communicable Disease Case Report ([F-44151](#)) to the address on the form.
- B. **Responsibility for Reporting:** According to Wis. Admin. Code § [DHS 145.04\(1\)](#), persons licensed under Wis. Stat. ch. [441](#) or [448](#), laboratories, health care facilities, teachers, principals, or nurses serving a school or day care center, and any person who knows or suspects that a person has a communicable disease identified in [Appendix A](#).

C. **Criteria for Reporting:** Clinically compatible disease.

III. CASE INVESTIGATION

- A. **Responsibility for case investigation:** The Wisconsin Division of Public Health performs case investigations unless local health departments choose to conduct routine follow-up for all cases in their jurisdictions. A case investigation may include information collected by phone, in-person, in writing, or through review of medical records or disease report forms, as necessary and appropriate.
- B. **Required Documentation:** WEDSS disease incident investigation report, including appropriate, disease-specific tabs.

IV. PUBLIC HEALTH INTERVENTIONS AND PREVENTION MEASURES

- Routine education to patients on prevention of exposure to biodusts and bioaerosols.
- Workers at risk for exposures to biodusts and bioaerosols should use appropriate personal protective equipment (PPE) and respiratory protection in accordance with NIOSH and OSHA guidelines. In general, an N-95 respirator is recommended for bioaerosol exposures, but PPE and medical clearance recommendations for a specific agent should be confirmed.
- NIOSH's [website for respiratory exposures](#) has resource links for many respiratory agents.
- Specific guidance from NIOSH and OSHA are available for [post-disaster mold exposure](#), [agricultural dusts](#), and [sanitation work/sewage exposure](#).

V. CONTACTS FOR CONSULTATION

- A. Medical Management: Wisconsin Poison Center, 800-222-1222
- B. Case Reporting: Bureau of Environmental and Occupational Health, 608-266-1120

VI. RELATED REFERENCES

- A. Kilburn KH. Summary of the 5th International Conference on Bioaerosols, Fungi, Bacteria, Mycotoxins, and Human Health. Arch Environ Health. 2003; 58(8):538-42.
- B. Liebers V, Raulf-Heimsoth M, Bruning T. Health effects due to endotoxin inhalation (review). Arch Toxicol. 2008; 82(4):203-10.
- C. Pearson C, Littlewood E, Douglas P, Robertson S, Gant TW, Hansell AL. Exposures and health outcomes in relation to bioaerosol emissions from composting facilities: a systematic review of occupational and community studies. J Toxicol Environ Health B Crit Rev. 2015; 18(1):43-69.
- D. Reynolds SJ, Nonnenmann MW, Basinas I, Davidson M, Elfman L, Gordon J, et al. Systematic review of respiratory health among dairy workers. J Agromedicine. 2013; 18(3):219-43.
- E. Shiraiwa M, Ueda K, Pozzer A, Lammel G, Kampf CJ, Fushimi A, et al. Aerosol Health Effects from Molecular to Global Scales. Environ Sci Technol. 2017; 51(23):13545-67.
- F. Straumfors A, Heldal KK, Eduard W, Wouters IM, Ellingsen DG, Skogstad M. Cross-shift study of exposure-response relationships between bioaerosol exposure and respiratory effects in the Norwegian grain and animal feed production industry. Occup Environ Med. 2016; 73(10):685-93.