

Human Health Concerns from Grain Dusts & Molds During Harvest



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If you produce corn, soybeans, or other crops in Wisconsin or elsewhere in the Midwest, dust exposure while working is inevitable. Breathing in grain dust can affect the health and overall comfort for grain producers and others who work in the grain industry. Exposures can occur:

- In the combine
- While unloading
- During drying or processing
- In bins
- In any area near any of the above situations
- While grinding/mixing grain and other feed products

Grain dust is a complex soup that is made up of both organic and inorganic particles. Some of these can be inhaled easily, and depending on their size, can find their way deep into various parts of the respiratory system causing a range of adverse health effects. Grain dust is biologically active and is made up of a combination of:

- Plant material
- Mold and mold spores
- Insect parts and excreta
- Bacteria
- Endotoxins (toxins contained in the cell walls of some bacteria)
- Soil

Exposure to Small Concentrations During Normal Work

Most people will have some reaction to dusty conditions during grain harvest. Often, this will be a nuisance reaction or irritation, but in some cases, more problematic health problems are possible. Even in the cab of a combine, there is some level of dust (1 to 15 mg per cubic meter), and endotoxins (even with a sealed cab and proper air filtration) can reach limits that cause health issues and symptoms for some. At low levels that a healthy person might encounter during the harvest season, developing a cough might be common (intermittent with more phlegm when actual work exposure is happening). Other symptoms can include:

- chest tightness and/or wheezing
- slightly sore/irritated throat
- nasal and eye irritation
- a feeling of being stuffed up and congested all the time

Both chronic and acute bronchitis can also be common among those who handle lots of grain throughout the day as the main passages in the lungs get inflamed. Grain dust can also be a significant problem for those with asthma.

Exposure to Higher Concentrations of Grain Dust

Higher concentrations of dust exposure like you might encounter behind a combine, in a bin, or while unloading or processing grain are a concern especially this year with moldy and low test weight grain that might be more dusty and prone to damage. Moldy, damaged, dusty grain can cause significant issues for people. For many individuals, a heavy dose of dust even for a short time period can result in symptoms that occur a few (two to six) hours after exposure and may particularly noticeable after they've gone home at night. These symptoms can include:

- Cough
- Chest tightness
- Malaise - a general feeling of discomfort, illness, or feeling "ill-at-ease"
- Headache
- Muscle Aches
- Fever

Specific Reactions Caused by a "Massive" Exposure to Moldy Grain

Most people who have worked around grain will occasionally find themselves in a situation that is obviously very dusty. This “massive” exposure to a cloud of dust is something that should be avoided, though that is not always possible or practical. A massive exposure to moldy, dusty grain as well as other agricultural products (hay and silage in particular), even for a short period of time can result in two distinct medical conditions that look VERY similar and have the same cluster of symptoms outlined above (cough, chest tightness, etc.). The first condition is often referred to as “Farmer’s Lung” or *Hypersensitivity Pneumonitis*. (FHP) Many complaints by farmers to their health provider get mislabeled as FHP, but the condition is fairly uncommon and generally affects about 1 in 20 farmers. FHP is a delayed allergic reaction that is caused when highly sensitive people breathe in grain dusts and their bodies produce “antibodies” as a reaction to the dust. Since FHP is an allergic reaction and involves the body’s immune system, repeated exposures and bouts with FHP can get worse with each exposure, and some individuals may become physically unable to work in dusty areas and can develop permanent lung damage. FHP is most often brought on or made worse by molds and bacteria that grew under warm/high heat conditions. These heat-loving organisms are more likely to grow in stored hay or sometimes in the top layers of stored silage as compared to grain that has been standing out in the field, though exposures that lead to FHP can occur from grain. If you’ve been diagnosed with FHP before, and get sick this year while working around grain, it is a good idea to see your family doctor.

The second, and more common problem that results from massive dust exposures, is called “Organic Dust Toxic Syndrome” or ODTS. ODTS, as the name suggests, is a “toxic” reaction as compared to the allergic reaction that causes Farmer’s Lung. The respiratory system can get inflamed from the dust, molds, bacteria, and endotoxins in grain dust. With ODTS, people develop a general reaction that looks very similar to FHP even though the actual reaction by the body that causes the symptoms is quite different. People who develop ODTS will usually recover in a few days and permanent lung damage is not likely to occur with a single exposure, but they may feel fairly sick (fever, fatigue, cough, chest tightness, etc.) for a few days after exposure. Again, your family doctor should be consulted if you develop this type of reaction. It is possible that repeated occurrences of ODTS can lead to FHP in some people, so prevention is important.

A difficult problem is that since *Farmer’s Lung* and *Organic Dust Toxic Syndrome* have such similar symptoms, it is hard for health professionals to always recognize and know the difference and it will take additional medical testing to tell the two apart. Medical treatment is also different. References cited at the end of this article might be helpful for your physician if you visit your doctor’s office with serious problems that you think might be connected to harvesting or handling dusty and moldy grain. Another concern in late 2009 is that the respiratory symptoms that result from heavy grain dust exposure can look much like *influenza* (seasonal flu or H1N1). If you’ve been working in dusty conditions and end up with a “flu-like illness,” make sure you let your healthcare provider know you’ve had significant dust exposures.

Grain dust exposure and the associated problems and health symptoms are complex. Here are some specific things you can do to control your risk:

- While combining, make sure you have the correct and clean air filter in place. Use the appropriate setting on the blower in the cab whether you are using the heater or A/C. This will minimize dust concentrations in the cab. When replacing filters, make sure all gaskets are intact and that the air is being well-filtered.
- Regardless of your level of sensitivity, avoid direct exposures to dust whenever possible. Stay in the cab when unloading. Use the wind to your advantage rather than standing directly in a cloud of dust any time grain is being moved.
- Make sure your combine is properly adjusted to minimize grain damage. This will help to also minimize the amount of dust being generated.
- If you do find yourself working in a very dusty situation that cannot be avoided, consider using a NIOSH-approved and certified “N-95” dust mask (respirator) that fits you properly. BUT, only do so if you are free of health problems, particularly with your heart and lungs. Respirators are only effective if you are cleanly shaven. Local health professionals can be a great source of information and can recommend the type of respirator that can be safely worn. If you work in a facility where worker safety regulations for respiratory protection apply (such as a grain elevator or feed mill), there are other regulatory requirements before a dust mask can be worn by workers.

- People with asthma, previous experience with Farmer's Lung, existing respiratory infections or conditions, or who have experienced other chronic respiratory health issues should try to do everything possible to avoid dust exposure. Individuals who have these conditions should be alert for symptoms, even when working in a relatively clean environment like the cab of a combine, and should minimize their exposure to dust.
- If you find yourself working in a very dusty situation (like loading or cleaning out a bin or getting a heavy, prolonged exposure near a combine in the field) and end up feeling sick a few hours later, it is a good idea to give your family doctor a call, especially if symptoms continue to get worse. Again, your problem may be a condition like ODTS or FHP, but you may also have influenza or another illness.
- Realize that smoking tends to make any type of symptoms or reaction caused by dust exposure much worse. Smoking increases compounds the risk of developing respiratory diseases such as emphysema and chronic bronchitis.

References:

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Donham, K. J. and A. Thelin. 2006. Agricultural Medicine: Occupational and Environmental Health for the Health Professions. Ames, Iowa: Blackwell Publishing. (Chapter 3 contains information that can help a doctor in the process of differentiating between Farmer's Lung and ODTS).

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