

## Respiratory Health with Dusty and Moldy Grain

Wisconsin farmers working feverishly to get crops harvested before the snow flies may find themselves exposed to a variety of dust. Breathing grain dust can affect your comfort and is a health concern for all in the grain industry.

Grain dust is a complex soup of particles. The smallest dust particles are easily inhaled and find their way deep into the respiratory system. Grain dust is biologically active. It's made up of plant material, mold, insect parts and excreta (bug poop), bacteria, endotoxins (toxins contained in the cell walls of some bacteria) and soil particles including silica.

Most people will have some reaction to dusty harvest conditions. Often, this will be a nuisance reaction (like a runny nose) or throat irritation. In some cases, bigger health problems occur. Even inside a combine's cab, there is some dust. Endotoxins associated with some types of bacteria (even with a sealed cab and proper air filtration) can cause problems for some individuals. At low dust levels during prolonged and busy harvest operations, a cough is common. This might be an intermittent cough, producing more phlegm when you're working near dust. Other symptoms are chest tightness/wheezing, sore/irritated throat, nasal and eye irritation and feeling stuffed-up and congested.

Chronic and acute bronchitis is also common for those who handle grain. Bronchitis occurs as lung passages get inflamed. Grain dust can also be quite a debilitating concern for those with asthma.

A massive exposure to a thick cloud of dust is something to avoid. Though, total avoidance is not always possible. Massive exposures to moldy, dusty grain even for a short period of time can result in two distinct medical conditions having symptoms that include cough, chest tightness, malaise (a general feeling of discomfort, illness or feeling 'ill-at-ease'), headache, muscle aches and fever.

People exposed often begin to feel sick a few hours after their exposure, and may feel quite sick as they go to bed at night. The two conditions are 'Farmer's Lung' or Farmer's Hypersensitivity Pneumonitis and Organic Dust Toxic Syndrome.

'Farmer's Lung' or Farmer's Hypersensitivity Pneumonitis is less common and affects about 1 in 20 exposed individuals (5 percent or slightly more). Often, farmers get sick and tell their health provider about their symptoms and their illness sometimes gets misdiagnosed as FHP.

However, FHP is a delayed allergic reaction caused when sensitive people inhale dusts causing their bodies to produce antibodies. Since FHP is an allergic reaction and involves the immune system, each new FHP bout gets worse. With repeated exposure, some people become unable to work in dusty areas and can develop permanent lung damage.

FHP is caused by dust that contains mold, mold spores and bacteria that developed in warm storage conditions. Heat-loving

molds are more likely to grow in stored hay or top layers of silage. FHP molds can also occur in stored grain. If you've been diagnosed with FHP before, and get sick again while working around grain (or hay/silage), you should visit your local clinic.

Organic Dust Toxic Syndrome, the second type of illness is a toxic reaction. With ODTS, your respiratory system becomes inflamed from the dust, molds, bacteria and endotoxins in dust. Symptoms look like FHP. But, the body's reaction causing symptoms is different. People who develop ODTS usually recover in a few days. Permanent lung damage from ODTS is rare. Again, your local health professional should be consulted if you develop this type of reaction.

Agricultural health experts face a difficult problem, as Farmer's Lung and Organic Dust Toxic Syndrome look almost identical. At times, even rural health professionals can have a hard time recognizing these illnesses and knowing the difference. Medical testing is often needed to truly tell the two apart. Medical treatment is also different. References found on the website cited at the end of this article might be helpful if you visit a clinic.

Grain dust exposure and related health symptoms are complex. Here are specific things to reduce risk:

- **Have a clean air filter in place when operating a combine.** Use correct settings on the cab blower when the heater or air conditioner is being used to create a positive pressure. When replacing cab filters, ensure gaskets are installed and sealing correctly.
- **Avoid exposures to dust whenever possible,** regardless of your sensitivity. When combining, stay in the cab with the door closed when unloading.
- **Properly adjust your combine to minimize grain damage and dust generated.** Properly harvested grain will store better with fewer mold (and insect) issues.
- **Wear a NIOSH-approved 'N-95' dust mask that fits properly in conditions where dust is unavoidable.**

Caution: Wear a respirator only if you are free of health problems, particularly with your heart and lungs. If you need extra protection, a powered air purifying respirator (PAPR) or 'air helmet' can be used in these situations. There are other regulatory requirements in commercial grain storage facilities. Consult experts before requiring employees to use respirators.

- **If you feel sick, call your health care provider.** This is especially important if you know you are allergic to these dusts, or if your symptoms continue to get worse.
- **Smoking makes grain dust exposure symptoms much worse.** ■

*By John Shutske, Ph.D., agricultural engineering specialist for UW-Madison and UW-Extension.*