

Respiratory Disease Among Farmers

A recent consensus document on lung disease among farmers was published by the American Thoracic Society (Respiratory Health Hazards in Agriculture. American Journal Respiratory Critical Care Medicine 1998; 158:S1-S76). Table I summarizes respiratory diseases typically found in farmers. Hypersensitivity pneumonitis (Farmer's Lung) is the lung disease most commonly associated with farming, but airway diseases occur more frequently.

Table II summarizes known allergens that may be found on a farm. Farming

is an industry in which there are many allergens that can cause respiratory illness and affect large numbers of farmers. Finland, for example, has a comprehensive surveillance system for work-related disease, and the most common cause of work-related asthma among all industrial sectors is sensitization to cow dander among farmers. Additionally, there are a number of chemicals used on farms which have been associated with Reactive Airways Dysfunction Syndrome (RADS) after an acute spill or leak. These include anhydrous ammonia used as a fertilizer, the herbicide Metam, and disinfectants and cleaners containing acids, ammonia, chlorine, and glutaraldehyde.

**Table I. Agricultural Respiratory Disease
 Common Exposures and Effects**

<u>Respiratory Region</u>	<u>Principal Exposures</u>	<u>Diseases/Syndromes</u>
Nose and nasopharynx	Vegetable dusts Aeroallergens Mites Endotoxins Ammonia	Allergic and nonallergic rhinitis Organic dust toxic syndrome (ODTS)
Conducting airways	Vegetable dusts Endotoxins Mites Insect antigens Aeroallergens Ammonia Oxides of nitrogen Hydrogen sulfides	Bronchitis Asthma Asthma-like syndrome ODTS
Terminal Bronchioles and alveoli	Vegetable dusts Endotoxins Mycotoxins Bacteria and fungi Hydrogen sulfide Oxides of nitrogen Paraquat Inorganic dusts (silica, silicates)	ODTS Pulmonary edema/adult respiratory distress syndrome Bronchiolitis obliterans Hypersensitivity pneumonitis Interstitial fibrosis

(AJRCC 1998; 158:S56)

Table II. Known Allergens Related to Farming

Plant

Grain dust (all types of grain)

Animal

Grain mite	Poultry dander
Grain weevil	Poultry mites
Cow dander	Egg yolk proteins
Cow urine	Meal worm
Pig urine	Fungi
Pig dander	(Alternaria, Aspergillus, Cladosporium)

Chemicals

Antibiotics used in feed
(spiramycin, amprolium)
Formaldehyde
Glutaraldehyde

A particular difficulty in diagnosing work-related asthma among farmers is that they typically live and work in the same location. There may not be sufficient time away from the exposure to indicate a temporal association with work. Another possible problem is illustrated in Figure I. This shows peak flow monitoring performed by a farmer who had become sensitized to grain dust. On day 1 he was

Figure I. Recurrent Nocturnal Asthmatic Reactions in Farmer Exposure to Grain Dust

(See the last page of this document for Figure 1.)

exposed to grain dust. He stayed away from his farm for the next 5 days but had recurrent nocturnal reduction in his peak flow after a single exposure to grain dust on day 1.

To assist in assessing exposures on the farm there are a number of substances for which there are IgE antibody assays available (Table III).

The American Thoracic Society (ATS) consensus document distinguishes between work-related asthma caused by exposure to allergens or an acute overexposure to an irritant and an “Asthma-Like

Table III. Commercially Available RASTs for Farm Related Allergens

Plant

Grain dust
Specific types of grain (i.e. corn, rye, wheat)

Animal

Storage mites	Goose feathers
Molds	Horse Hair
Chicken feathers	Rabbit epithelium
Cow dander	Rabbit hair
Duck feathers	Sheep epithelium
Egg proteins	Swine epithelium
Goat epithelium	Turkey feathers

Syndrome”. The document defines this syndrome as “an acute non-allergic airway response . . . associated with airway inflammation . . . ” but that it “is a self-limited inflammatory event that does not involve persistent airway hyperreactivity”. The document states the “Asthma-Like Syndrome” may occur with exposure to grain dust, among pig confinement workers, and poultry workers. The clinical difference that distinguishes patients with work-related asthma is the occurrence of increasing symptoms throughout the workweek with ongoing exposure while patients with the “Asthma- Like Syndrome” have symptoms that lessen or cease later in the workweek. However, with repeated exposure the symptoms in the “Asthma-Like Syndrome” can become chronic. The ATS cites Byssinosis as the prototype disease for this condition. They ascribe the symptoms to exposure to endotoxins

in the organic matter without an allergic reaction.

The consensus document also discusses another lung condition for which we have a particular interest; the possibility of interstitial fibrosis from silica exposure in farming. The ATS cites case reports, environmental measurements and studies of animals from dusty environments (i.e. camels from the Somali Desert). They conclude, however, that the data is insufficient to reach a

conclusion on the degree of risk. We have never received a report of silicosis in a farmer in the ten years that the State of Michigan Silicosis Registry has been functioning.

As always, we are interested in receiving reports of work-related disease. If you have a farmer with possible work-related lung disease, please let us know at 1-800-446-7805, or fax 1-517-432-3606 or E-mail Rosenman@pilot.msu.edu.

Index of Previous *PS News* Issues

The Project SENSOR News has been published since 1989. Please contact us if you would like a copy of any of the previous issues listed below. Newsletters from Spring 1997 onward can be found on our web site: <http://www.chm.msu.edu/oem/index.htm>. Or, you may request a copy via phone 1-800-446-7805, fax (517)432-3606 or email Rosenman@pilot.msu.edu.

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