Agricultural Respiratory Diseases

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Agricultural areas have potentially significant sources of exposure to respiratory irritants and allergens associated with respiratory diseases. From an occupational and environmental perspective on a global scale, exposures to organic and inorganic dusts, biological material such as endotoxin and mold, pesticides, and chemicals are prevalent in agriculture and associated with a wide variety of respiratory symptoms and diseases. Agricultural activities such as fieldwork, planting and harvesting, grain handling, and work in silos, animal stalls, and dairy barns can generate significant amounts of respirable dust. Many respiratory exposures, like total dust concentration in fields, can be higher in agriculture than in other industries, and exposure levels may often exceed general industry standards for nuisance dusts. Despite generally lower rates of cigarette smoking in agriculture and farm workers, they have an increased prevalence of respiratory illnesses compared to the general population (Table 19.1) (1–10).

In developed countries, recent technological advances in agriculture have improved working conditions, yet paradoxically have increased other exposures such as concentrated indoor exposures to organic dust in confined animal feeding operations. In addition, engineering controls are often insufficient, and respiratory protection is needed but often underutilized by agricultural workers. In developing countries, significant overall exposures remain more widespread as agricultural practices and regulations are not standardized, although the majority of the working population participates in some type of agricultural work. Information regarding disease burden and prevalence is not easily available; statistics may underestimate disease prevalence because of underreporting or unavailability of reliable data. This chapter reviews respiratory illnesses associated with specific agricultural exposures, outlines the medical evaluation for respiratory diseases, highlights evolving research areas, and discusses strategies for prevention (1–3,7,8).

Several specific respiratory illnesses and syndromes are related to occupational and environmental exposures to agricultural areas. For those uninitiated in farm medicine, the atypical sources of toxic gas inhalation may come
as a surprise. Even grain storage and manure can produce toxic substances in the right circumstances.

**Toxic Gas Inhalation**

**Silo Filler’s Disease**

Farms with large numbers of livestock typically rely on a large storage container called a silo to store animal feed. A variety of relatively airtight structures can serve for animal feed storage, including upright metal tower silos, in-ground pits, and even huge plastic bags. In the silo, recently harvested grains are tightly compressed to squeeze out most of the air. The remaining oxygen is consumed rapidly by actively metabolizing plant cells. As the silo becomes anaerobic, rising amounts of organic acids are formed, resulting in

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1. HP, hypersensitivity pneumonitis; 2. ODTS, organic dust toxic syndrome.

*Source:* From Kirkhorn and Garry (7), with permission from Environmental Health Perspectives.