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# MASK USE IN SWINE BARNs REDUCES HEALTH EFFECTS

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## Background

Swine producers are exposed to dusts and gases when working in barns. Studies have shown that these workers are at increased risk of developing respiratory symptoms, decreases in lung function levels and increases in airway reactions. Engineering controls are in development in an attempt to reduce the dust and gas levels in this work environment. One method for reducing worker exposure to dusts is by having workers wear a disposable respirator (mask) during barn work activities.

The objective of the study was to evaluate health effects related to wearing a disposable mask in a swine confinement unit.

## Study Design

Twenty-one subjects between the ages of 18 and 35 years old were recruited to participate in the study. These subjects were male, nonsmokers, with no asthma or allergies and had no previous exposure to a swine barn environment.

The study was conducted to assess subjects' health reactions after a four-hour exposure in a grower/finisher room while wearing a mask and not wearing a mask. Subject responses were measured at three separate occasions: after four hours in an office setting; after a four hour exposure wearing a disposable mask in a grower finisher room; and after a four hour exposure in a grower/finisher room without a mask.

The grower/finisher room measured 14.3 m X 11.0 m X 3.0 m. The pen floor was partially slatted (30% of the pen area). A total of 132 pigs were housed in the room with 95 kg being the average mass of the animals at the completion of the study. The management of the room and the production methods conformed to those commonly used in the swine industry in Saskatchewan. Over the course of the 2.5 week study, the alleyway of the room was not swept or cleaned.

Subjects' health response to the environment was measured by lung function tests, methacholine challenge tests, nasal lavage, blood tests and symptom scores. The personal exposure level to dusts and endotoxin were measured over the exposure period. Area samples for gases, temperature and humidity were also measured.



Without a mask, lung function is impaired by over 8%.

## Results

Self reported symptom scores of subjects are shown in Figure 1 and indicate that cough, phlegm and chest tightness were significantly greater when a mask was not worn compared to when a mask was worn. Lung function results indicate that during the office exposure day and the exposure day when a mask was worn, there was slight improvement in lung function over the exposure periods (Figure 2). On the exposure day when no mask was worn, an average reduction in lung function of 8.12% was observed over the four-hour exposure period (Figure 2). These

same trends were observed in other measures of health status of these subjects over the exposure period. Dust, gas and endotoxin results indicate that there was very little variation in the environmental levels over the study period.

## Conclusion

These results indicate that the use of a well-fit disposable mask over a four-hour exposure period by persons previously unexposed to a swine barn environment reduces respiratory symptoms and reductions in lung function.

While personal protection is useful to assist workers in short-term high-dose exposures, we believe that long-term prevention of dysfunction requires the development of production and engineering control technologies that allow workers to function within a healthful environment.

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*Dust masks help, but aren't a long term solution.*

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Figure 1: Comparison of respiratory symptoms while wearing a mask and not wearing a mask.

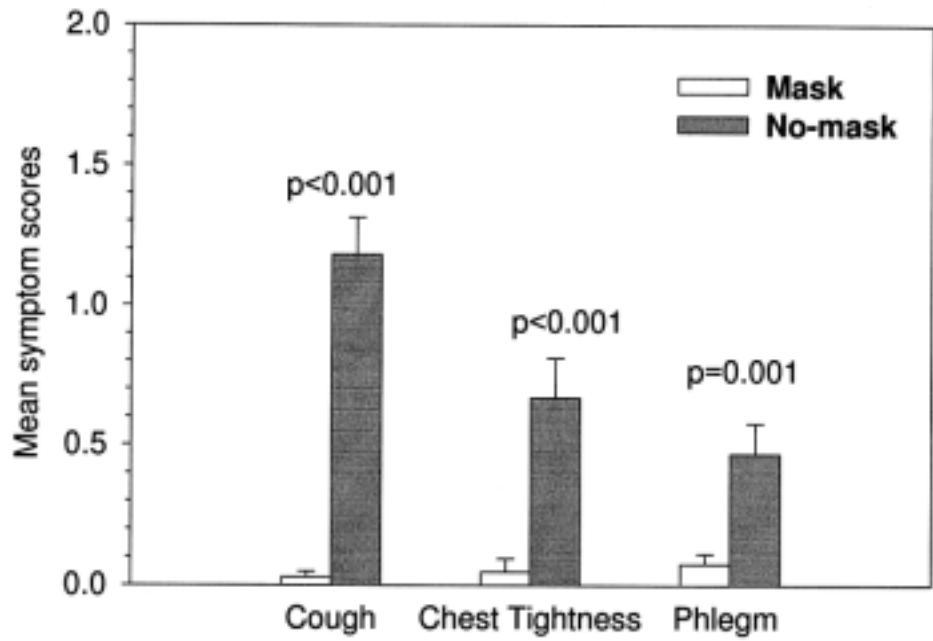


Figure 2: Comparison of changes in lung function for the three exposures.

