

# Study establishes lung health response to cement dust exposure

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Long-term exposure to cement dust at levels that are comparable to the present occupational exposure limits could cause a decline in lung volumes, according to a new study.

The research, published today (21 April, 2016) in the *European Respiratory Journal*, is the first study to assess whether differing levels of exposure have a different level of impact on lung health.

Over 61,000 workers in the EU are employed in the [cement production](#) industry. During the production of cement, workers may be exposed to airborne particulate matter (dust) generated from cement and raw materials. Previous studies have linked inhalation of dust among this group of workers to airway symptoms and changes in the airflow in the lungs, but this is the first to find that the risk of ill-health was increased when the level of exposure increased.

A total of 4,966 workers from eight different countries were included in the study in 2007 and 2009. Researchers analysed air samples from cement production plants, measured [lung function](#) of the workers and collected data from questionnaires taken at the start of the study and at the follow-up time in 2009 and 2011-2012.

The results showed that a decline in lung function over time was consistently associated with increasing exposure to dust from cement production.

Dr Karl-Christian Nordby, from the National Institute of Occupational Health in Norway and lead author of the study, commented: "Our results found that declines in lung volume are consistently associated with increases in exposure to cement dust. More than half of the study population was exposed to dust levels that induced statistically significant excess lung function decline. It is important that preventive measures beyond respiratory protection are implemented in order to reduce exposure and prevent lung function decline. The substantial differences between exposure levels in the plants suggest that this should be possible."

The workers were grouped into five categories based on their personal exposure to dust. Exposure measurements in this study focused on the inhaled particles that could reach the lower airways. This provided a more precise understanding of the harmful effects on the airways than the total dust exposure measurement, which is often used for [occupational exposure](#) limits.

The measurements used in the study cannot be compared directly to the levels of total dust exposure that are used in occupational exposure limits. However, the authors were able to analyse previous data for the participating plants that used the total [dust](#) exposure measurement to provide a comparison for their findings.

Lung function testing was used to measure forced expiratory volumes in order to assess decline in lung function. Forced expiratory volumes in one second (FEV1) is a measure of the volume of air that can be forcibly exhaled in one second after inhalation, and is the most important measure of obstructive lung changes. The results of the study predicted a yearly excess decline of 0.84 percentage points of the predicted value of FEV1, standardised for age, sex and standing height, in the highest exposure group compared to the lowest. Over a period of 20 years, this would lead to an added loss of more than 400 ml in lung capacity in the

highest [exposure](#) group. Although no consensus currently exists regarding reference values for normal lung volume changes, the decline would be clinically relevant.

**More information:** Thoracic dust exposure is associated with lung function decline in cement production workers, [DOI: 10.1183/13993003.02061-2015](#)

Provided by European Lung Foundation

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