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Research on short-term effects of air pollution on the health of airways of children with chronic respiratory complaints

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Starting in 2017, researchers will commence their study in Eindhoven on the effects of days with high air pollution on respiratory complaints, medication use and lung function of children suffering from chronic respiratory complaints such as wheezing or asthma.

Vera van Zoest, doctoral candidate at the Faculty of Geo-Information Science and Earth Observation (ITC) at the University of Twente is one of the researchers in the project. "We use the information of a high resolution network of air quality sensors in order to map air quality in space and time. By linking this information to the daily variation of asthma symptoms and lung function of children, we gain insight into the effect of air quality on the health of children suffering from asthma."

The study employs the Innovative Air Measurement System (Innovatief Lucht Meetsysteem, ILM), a sensor network that has been used to measure the air quality in Eindhoven since 2013 on a much more detailed level than currently possible in other cities. The ILM allows for much more accurate recording of the health impacts of air pollution in Eindhoven specifically. The ILM was created by AiREAS, a unique civil initiative in which the local citizens, the municipality of Eindhoven, the province of Noord-Brabant and scientific institutions, including the University of Twente and Utrecht University, all collaborate. Scientists of these universities will conduct the study under the supervision of Professor Alfred Stein.

Reason for the study

Previous studies have shown us that children with chronic respiratory complaints experience more severe complaints on days with increased air pollution. The extent of this effect, as well as the substances that cause these health effects, are not very well known. Research in various countries has demonstrated that the actual effects are not the same everywhere. This is why it is important for a Dutch city like Eindhoven to establish the nature of the health effects, and which substances are most influential. The ILM provides us with accurate information about air quality, which allows us to estimate the level of air pollution exposure for every child much better than we could previously.

Research method

For this particular study, children between the ages of 7 and 11 suffering from chronic respiratory complaints like asthma, frequent wheezing and/or using respiratory medicines (bronchodilators) are asked to answer questions about their medication use and their respiratory complaints daily for a period of four months. They will keep a digital journal to document this. For two months, their lung function is measured twice a day by breathing onto a device as hard as they can.

The air quality sensor network in Eindhoven consists of 35 sensor boxes which give a good overview of the air quality on a daily basis. By using the information of the sensor box closest to the child's home or school, we know the quality of the air children are breathing in on any given day. This allows us to study whether children experience more severe respiratory complaints, use more medication, or have reduced lung function on days with increased air pollution.

Provided by University of Twente