

Deploying a Smart Exposure Information System:
*A Longitudinal Analysis of Air Quality, Children's Health, and School Absenteeism in
Spokane, Washington*

The purpose of this project is twofold: to assess among elementary school students in Spokane, WA a) the association between absenteeism triggered by respiratory events as related to school air quality, and b) the relationship between incidence of respiratory events occurring during the school hours as related to school air quality. Air quality sensors will be placed on rooftops and inside Spokane schools selected for their susceptibility to poor, moderate, or good air quality (GIS based). Student absenteeism from school and school-tracked incidents of air quality related respiratory illness will be correlated with air quality in and around schools. We expect to demonstrate that the deployment of sensors on rooftops and inside of schools provides a more accurate measure of a school's air quality than simply using local nearby sensors. This approach enhances the assessment of the effects of air quality on children's health and well-being by providing finer temporal and spatial detail of air quality within urban environments.

We define a smart city as one in which the deployment of a wide variety of sensors are integrated with high resolution models of the urban infrastructure to provide feedback and control that improve air quality among many other aspects of community well-being. This infrastructure, if properly designed and deployed, has the potential to provide a significant advancement in our understanding of the relationship between air quality and health in the presence of other confounding or modifying factors such as individual- and community-level characteristics. Ramboll is an internationally recognized environmental and health consultant, entrusted to find solutions for environmental, health, and social challenges. Obtaining a more accurate measure of air quality near schools will enable us to better explore the health effects of air quality on children. Poor air quality has been shown to increase absenteeism, decrease student's achievement, and affect health outcomes such as headaches, respiratory infections, asthma, allergies, fatigue, and depression. Air quality degrades closer to major roadways, and approximately 14% of schools in the US are located within 250m of a major transportation corridor. As such, our project directly aligns with Ramboll's definition of a smart society, where technology has added-value for the betterment of people and society, and in our case, children.