

Air pollution and lack of physical activity pose competing threats to children in China

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Brad Cardinal is a kinesiology professor in the College of Public Health and Human Sciences at Oregon State University and a national expert on the benefits of physical activity. Credit: Oregon State University

Children and adolescents in mainland China are facing two serious and conflicting public health threats: ongoing exposure to air pollution and an

increasingly sedentary lifestyle with little regular physical activity outside school.

Health workers and policymakers need to find ways to address both of these issues so that [children](#) can be more physically active without suffering the health risks caused by exposure to [air pollution](#), an Oregon State University researcher suggests in a new commentary published this month in the *Journal of Pediatrics*.

"The question is how do we balance the virtues of physical activity with the hazards of air pollution?" said Brad Cardinal, a kinesiology professor in the College of Public Health and Human Sciences at Oregon State University and a national expert on the benefits of physical activity. "Ultimately, we have to find ways for people to stay active despite the air pollution."

Many cities and countries around the world grapple with air pollution issues, but there is particular concern for children growing up in China in part because they tend to commute more on foot or bike and their playgrounds and sports fields are often found near busy streets or highways, Cardinal said. The impacts of air pollution contributed to 1.2 million deaths in 2010.

At the same time, very few Chinese children today are participating in moderate or [vigorous physical activity](#) outside of school, and the number of overweight and obese children in China has more than doubled in the last 25 years.

Children are particularly susceptible to adverse health impacts from both short- and long-term exposure to air pollution, in part because they have higher rates of respiration and tend to take shallower breaths. Air pollution has been associated with increases in asthma, chronic cough and other respiratory problems in children that are likely to be

exacerbated by heavy breathing from vigorous exercise, Cardinal said.

So how do [public health](#) officials approach these competing challenges? Cardinal and his co-author, Qi Si of Zhejiang University in China and a former visiting scholar at OSU, suggest the two problems should be addressed together.

They recommend four urgent steps for health officials and policymakers who are grappling with these issues:

- * Increase awareness among parents, children, [health workers](#), educators, and policymakers on the causes and impacts of air pollution on children and adolescents, as well as the potential harm when coupled with outdoor physical activity
- * Add air quality systems at school sites, so pollution can be measured when and where children are engaging in physical activity
- * Adjust the intensity of outdoor physical activity during the school day on the basis of air pollution monitoring results
- * Educate children about exercising in polluted environments, including instruction to stop activity when they notice problems such as coughing, chest tightness or wheezing

Since schools are the base for much of the physical activity of today's children, they are a critical piece in addressing both issues, Cardinal said. Monitoring the micro-climate at a school would provide better, more localized information for school officials making decisions about whether children should be outside exercising or at what level of intensity.

"Doing some kind of physical activity, even if it is not as vigorous, is still

better than having no [physical activity](#) for the children," he said.

Clothing accessories or fitness equipment could also be designed to help protect children from pollution during outdoor play activities on days when air quality levels were low, he said.

"The goal is to get people thinking about these complex problems and real-world solutions," Cardinal said. "The hope is that someone will innovate appropriate solutions for addressing both of these problems."

More information: Qi Si et al, The Health Impact of Air Pollution and Outdoor Physical Activity on Children and Adolescents in Mainland China, *The Journal of Pediatrics* (2017). [DOI: 10.1016/j.jpeds.2016.10.016](#)

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