BEYOND ALLERGENS

Kids who live in low-income neighborhoods suffer higher than expected rates of asthma-related hospitalization and emergency care. Conventional wisdom blames the disparity on issues of healthcare access and utilization. Mounting evidence compiled by Matthew Perzanowski, MPH, PhD, supports an alternative hypothesis: “Asthma is not one disease.”

“There are common symptoms and outcomes,” he explains, “but different causes.”

It turns out that kids who live in low-income neighborhoods are at higher risk for an asthmatic phenotype known as exercise-induced wheeze (EIW), which is also associated with increased rates of hospitalization. “It could be because their respiratory systems are more responsive to triggers,” says Perzanowski, “and this leads them to get into trouble more quickly.”

Perzanowski—an associate professor of Environmental Health Sciences—and his colleagues were analyzing exposure to dust mites, cockroaches, and the like for insights into the precursors to allergies and asthma when they found that EIW rates seemed to be independent of any of the allergens they were tracking. “We started thinking maybe this isn’t an immunological pathway,” he says. “Maybe there’s a nervous system component.”

To find out, Perzanowski has zeroed in on the parasympathetic nervous system, which regulates digestion and resting heart rate and has also been implicated in the airway tightening associated with EIW. With funding from the Columbia Mailman School’s Dean’s Pilot program, he teamed up with pediatric pulmonologists and developmental neuroscientists at Columbia’s medical school, as well as Qixuan Chen, PhD, associate professor of Biostatistics, Julie Herbstman, PhD, associate professor of Environmental Health Sciences, and Virginia Rauh, ScD, professor of Population and Family Health. Already, they’ve begun collecting pilot data in partnership with the New York City Department of Health and Mental Hygiene and recruiting participants in a study to follow youngsters from infancy through school age. In June, the team included their preliminary analyses in an application for additional research support from the National Institutes of Health. “The goal,” says Perzanowski, “is to understand the mechanisms of EIW and intervene early in life.”