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Pediatric asthma is a growing problem in Milwaukee. Is 'indoor air' to blame?

Stephanie Blaszczyk, Milwaukee Journal Sentinel    Published 10:00 a.m. CT July 18, 2019
Year after year, the story remains the same.

The No. 1 reason for admission to Children's Hospital of Wisconsin: pediatric asthma. The No. 1 reason for assignment to the intensive care unit at Children's: pediatric asthma.

Although it's just a slice of the overall medical picture, the average in-patient hospitalization due to asthma costs $5,300 for a child on Medicaid in Wisconsin, and can range from half to three times that amount.

"Asthma can develop any time after 6 months to a year of age, but its onset is especially prevalent in kids ages 2 to 5," said Joshua Steinberg, a physician at Children's and professor at the Medical College of Wisconsin who specializes in asthma and allergy treatment.

It affects people of all ethnicities, all ages and both sexes. About 25 million people in the United States have asthma, and about a quarter of them are children.
The question is: Why?

Asthma causes the airways of the lungs to narrow because of inflammation, making breathing difficult. Attacks occur when something irritates their airways — incessant coughing, heavy wheezing, shortness of breath, chest tightness. Children are susceptible because their airways are smaller and more vulnerable.

Steinberg said it's not clear why that vulnerability is heightened, "but it's a thing in developed countries."

"Our genes haven't changed that quickly so there must be something besides genetics that explains the explosion in asthma prevalence," Steinberg said. "The prevailing theory is that it's something in our main environment, something we are exposing children or adults to that's causing this increased susceptibility."

The greater prevalence of asthma in younger generations compared with geriatric populations is echoed in other developed countries, which suggests that something in modern-day life is to blame.

Steinberg has a longstanding clinical interest in hard-to-treat asthma. During his training in West Philadelphia, it became obvious that urban asthma is a different beast compared with asthma in other places.

"Urban populations face socioeconomic disparities, increased pollution and other obstacles that are unique to cities," he said. "Doctors are interested in urban and underserved communities. It's a huge subset of asthma research right now."

The high level of pollution in outdoor air, especially in urban areas, has historically attracted public attention.

But what about indoor air pollution? And what about combining that concern with the issue of heightened asthma rates in children?

"Indoor air quality levels can be five times worse than outdoor air quality levels," said Erin Lee, a clinical research coordinator at the Medical College of Wisconsin and a board member of Fight Asthma Milwaukee Allies, a nonprofit coalition.

That's not encouraging news for Americans who, on average, spend 90% of their time indoors, according to the U.S. Environmental Protection Agency.

Home environments are hotbeds for asthma triggers. Building materials, gas stoves, cleaning products, home fragrance and personal care items can all release particulate matter — tiny particles a fraction of the width of a human hair — or volatile organic compounds into the air that can penetrate deep within the lungs and trigger an asthma attack.

**Air quality in day care centers**

The Medical College of Wisconsin, the University of Wisconsin-Milwaukee College of Nursing and Fight Asthma Milwaukee Allies recently joined forces to improve the indoor air quality conditions in an unexpected place — day care centers throughout the Milwaukee area.

According to a report from the Urban Institute, many children spend up to 10 hours per day in child care facilities—facilities where Lee said there are no indoor air quality standards.

The research, known as the Healthy Day Cares Indoor Air Quality study, is the first of its kind in Wisconsin and one of the first nationally as well.

Happy Faces child care center in Milwaukee has implemented environmentally friendly cleaning practices in favor of popular chemical products for the safety of the children. (Photo: Hannah Schroeder / Milwaukee Journal Sentinel)

The work applies concepts from the Healthy Homes program to day care facilities. Healthy Homes is a longstanding program through the U.S. Department of Housing and Urban Development. To date, content from the Healthy Homes program and Fight Asthma Milwaukee Allies has reached more than 10,000 people in the Milwaukee area through educational videos (https://www.youtube.com/watch?v=K3cELBHBIR4) and other means.

Steinberg, Lee and Anne Dressel, a professor at the University of Wisconsin-Milwaukee College of Nursing, sought to understand the condition of indoor air quality at 32 licensed day care centers in Milwaukee before and after educating day care staff about green cleaning and pest management practices.
Pediatric asthma is rampant in Milwaukee. Is ‘indoor air’ at fault?

Their goal: determine if teaching the staff would actually change their cleaning habits and affect indoor air quality.

Students from the University of Wisconsin-Milwaukee College of Nursing who participated in the Healthy Day Cares Indoor Air Quality study. (Photo: University of Wisconsin-Milwaukee)

The researchers used an air quality monitor to measure indoor air quality for a month to obtain baseline data. Then, nursing students from UWM, staff from the Medical College of Wisconsin and community workers from Fight Asthma Milwaukee Allies educated day care staff about green cleaning for asthma [https://www.famallies.org/resources].

Green cleaning includes using vinegar, hydrogen peroxide and baking soda in place of commonly used bleach solutions.

"Bleach is the cheapest and most readily used product, yet it's not good for the respiratory system, even if you don't have asthma," Lee said. "Our green cleaning education has a long history. We did green cleaning before it was hip and trendy."

Many participating day care centers eagerly adopted the green cleaning practices.

"We started using vinegar more than other products to clean and mop the floors," said Sue Sthokal, owner of First Class Child Care in West Allis. "We are also using essential oil diffusers as opposed to aerosol cans when spraying for odors, and changing our air filters more often."

Sthokal said that it was important for her employees to see what they could do for the environment and to see what soaps, cleaners or other products might cause issues for her day care children, about a dozen of whom have asthma.

"Normally, we just look to make sure things appear clean and are disinfected," Sthokal said. "But the training made you think about the things you use that could affect both kids and adults."

Happy Faces child care center on Milwaukee's south side also implemented sweeping changes in response to the educational intervention.

"Before when I would shop, I would buy Ajax, Fabuloso, Easy-Off, fabric softener, Clorox, Mister Clean Magic Erasers and Drano," said owner Maria Moreno. "I would use a different cleaning product for every surface — the sink, stove, floors, countertops, bathroom and laundry room. Now we use white vinegar and baking soda for all of our cleaning. ... The best thing about it — we can teach the kids to take care of the environment."

As an added benefit, Moreno said, her monthly shopping bill has been reduced by more than 75%.

Yolanda Cruz, a medical assistant at the Medical College of Wisconsin and a community health care worker, instructed many of the day care employees — including Moreno and her staff. She also has spent a significant amount of time providing one-on-one, in-home green cleaning education to families in the Milwaukee area.

In that time, she's observed a common misconception: In some cultures, particularly Hispanic and African American, the smell of chemicals — like bleach, Fabuloso or Pine-Sol — is associated with cleanliness. Cruz mentioned that people often don't believe that surfaces are clean without those familiar scents.

Although final results from the study have not been published, Steinberg said that in general, small home-based facilities had poorer air quality compared with larger centers. During hours of operation, adequate ventilation also was an issue. Volatile organic compounds and particulate matter levels didn't exceed dangerous limits, but they were found in increased amounts.

"This gave us a huge opportunity to address an area where kids are spending time," Dressel said.

A hometown problem

According to the Asthma and Allergy Foundation of America, Milwaukee has the sixth-highest number of asthma-related emergency department visits in the country.
The state Department of Health Services reported that during 2017 there were 6,640 asthma-related emergency department visits in Milwaukee alone, and 2,575 of these visits were for pediatric patients.

In Wisconsin, approximately 400,000 adults and 100,000 children have asthma, and as many as one in four kids in Milwaukee Public Schools have asthma. And while the burden of asthma is high all around, it is not equally shared.

"Certain sub-populations, including African Americans and Hispanics, have dramatically increased risks of hospitalizations and fatalities due to asthma," Steinberg said.

Asthma is most commonly treated with an inhaler. Unfortunately, inhalers can be expensive, used infrequently or used incorrectly. If the medicine within the inhaler doesn't get to the target organ — the lungs — then it's as good as useless.

Adherence to asthma treatments is an additional problem. Inhalers can easily be forgotten at home, which makes them useless in emergency situations. Or patients may not fully understand why consistent inhaler use is necessary. Additionally, patients may shy away from compliance for social reasons; they don't want to be viewed as "different."

There are no drugs that can cure asthma, only ones that can alleviate the symptoms.

"There's been no new drug for the masses, only incremental changes over the last 25 years," Steinberg said. "So now we look to the environment because it's one factor that's 'potentially modifiable.' Even if that only reduces the risk for 5 to 10% of people, for a huge population that adds up to a huge improvement."

**A pill for asthma**

A Wisconsin startup company is taking a different approach — it's developing a pill to treat asthma.

Pantherics Inc. wants to bring a pill from the lab of Alexander Arnold, a professor of chemistry and biochemistry at the UWM, to clinical trials.

The estimated cost of manufacturing the pills are on par with current inhaler prices, and the medication is shelf stable so it could be made and shipped all over the world.

"We are looking at a big disease with a big unmet need," Douglas Stafford, director of the Milwaukee Institute of Drug Discovery and president of Pantherics said. "We are not looking for new and fancy. We are looking for stuff to help everyone around the globe."

Steinburg reiterated that there's still much work to be done on the home front.
"Asthma is shockingly ignored in Milwaukee," Steinberg said. "And it's a much bigger problem than you might think. It's not just coughing and wheezing here and there. As evidenced by the number of hospitalizations, patients in the intensive care unit and death rates — it is not a minor problem."

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