Economic Benefits of Improving Air Quality and Protecting Children's Health

Narrator: Air pollution has been linked with several serious health problems including respiratory and cardiovascular diseases. Children can be particularly vulnerable to long term health effects that are associated with air pollution because their bodies are still developing. One in ten children suffer from asthma, the most common chronic disease of childhood, which can be both triggered by, and maybe even the result of, exposure to air pollution. This disease can have significant healthcare costs and other economic burdens for families, including doctor's visits and lost wages from parents staying home with sick kids.

Dr. Sylvia Brandt is an expert in economic modeling and a distinguished researcher in Econometrics and Environmental Economics at the University of Massachusetts. She has spent over 10 years examining the economic impacts of childhood diseases like asthma.

Dr. Brandt says that while air pollution across the country has decreased in recent decades, it still impacts children with asthma and even causes asthma for some children. For example, Dr. Brandt and her colleagues found that in Los Angeles, about 8% of childhood asthma cases could be directly attributed to traffic pollution.

Brandt: That's about 27,000 kids with asthma due to traffic pollution alone. We know that one out of six pediatric emergency room visits are asthma related, and we know that our children miss 10 million school days every year because of asthma.

Narrator: These hospital visits and missed school days add up. Other aspects of the disease also pose economic costs for parents, such as medical copays, filling prescriptions, specialists visits, and missed work resulting in lost wages. In fact, in one of Brandt's studies, 18% of the families interviewed had a caregiver who had to change employment in order to care for their child's asthma. According to Dr. Brandt, this economic burden impacts some populations more than others.

Brandt: Being low income or black or Hispanic is associated with having higher levels of pollution exposure, but there are factors that compound the effects of that exposure. If you're living in housing with asthma triggers such as mold or pests, then you may be even more sensitive to the effects of pollution. We know that poor housing is, again, associated with race, ethnicity and income.

Currently about 8.5% of children are documented as having asthma, but this proportion varies a lot over groups of children. For example, the proportion is lowest among white, non-Hispanic children, in which is about 7.8%, and the rate is highest among black, non-Hispanics, where it's about 13%. When we talk about these percentages, it's really important to think about the impact of asthma.

It takes time and money to manage asthma. If a family has less of those resources, it can be very difficult to complete the numerous tasks of managing asthma. For example, if you rent, you may not be able to remove the asthma triggers from your home. If you're already lower income, it means that managing asthma may take money away from other needs like housing and food. This is a real trade-off that the families we interviewed often brought up.

Narrator: Dr. Brandt uses economic models to explain the population-wide costs of air pollution on children's health. She says that traditional economic models include two parts. The first is risk assessment, which counts the number of asthma attacks that are directly caused by an incident of

increased pollution exposure. The second part is the economic analysis where costs, such as emergency room visits, or hospitals stays, are incorporated.

But traditional models have important limitations, according to Brandt, because they don't account for many of the diverse economic impacts associated with asthma.

Brandt uses a different framework that includes economic factors traditional economic models miss. Her framework accounts for the cost of medical care needed to treat an acute attack and the cost of managing asthma daily.

Importantly, Brandt's model rethinks how economic models value the time and effort of stay-at-home caregivers. She says that current models value full-time caretaking inside the home at $0.

Brandt: This assumption completely ignores the value of caregiving. It ignores that that mother or other caregiver, if she or he were not taking care of the child with asthma, would be doing things like shopping for the family, cleaning, tending to the young and old, volunteering in school and community groups.

But even worse is that this systematic undervaluing of time doesn't end there. For example, we had mothers talking about being fired because they had to miss work to care for their child's asthma. In the standard economic model, those mothers' time would be valued at zero from that point forward. It's more accurate to think about all the lost earnings of those mothers as a cost of asthma because it's the asthma itself that led to their lost employment.

Narrator: Another unique feature of Brandt's framework is that it also considers asthma's impact on quality of life. She says that often one of the biggest impacts on quality of life is the stress and uncertainty in between asthma attacks.

By leaving out the many ways asthma affects family life, Dr. Brandt says current models are underestimating the benefit that families and society at large would gain if air pollution were reduced. For example, she notes that standard models miss the cost of daily asthma treatment and other conditions that are related to asthma such as persistent coughing. Without including these important factors, Dr. Brandt says that the cost of asthma is significantly underestimated by these models, undervaluing the impact on the family by as much as 51%

Brandt: What the standard approach misses is the family's actual experience of living with asthma. In short, it's an outsider's view of asthma rather than a family's perspective, so we miss large impacts and costs.

We found that the total value of those impacts of asthma as a chronic condition -- the prices for goods, the lost wages, the quality of life impacts, that whole range of impacts -- that total package has a value to the family of $6600 a year for one child. Just to give you a sense of scale, that's about 12% of a typical annual household income.

We need to shift from thinking about treating a discrete asthma attack to managing asthma as a chronic condition and all that that entails. If we use the correct value of the impact of asthma, it would direct us to invest more in public health programs as well as pollution reduction.

Narrator: Brandt hopes her model, which improves how the economic impacts of air pollution are assessed, will help inform policy makers and protect children's health.

By now you may be wondering what parents can do to decrease their children's exposure to air pollution in their homes. Dr. Brandt says there are several things parents can think about in their home environment. For example, she suggests identifying asthma triggers that you may be able to control and using simple green cleaning products such as vinegar and baking soda. She also recommends being aware of air quality indicators, such as those found on the Environmental Protection Agency website and keeping your child indoors on days with particularly poor air quality. These steps may help to reduce asthma triggers, and the cost of managing them.

Thanks to today's guest Dr. Sylvia Brandt for joining us. You can learn more about air pollution, your health, and the economic impacts of pollution on our website at niehs.nih.gov/podcasts.

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