



# The grandkids aren't alright: The intergenerational effects of air pollution

By Jonathan Colmer

When the National Ambient Air Quality Standards were introduced in the United States 50 years ago as part of the 1970 Clean Air Act Amendments, concerns about air pollution were largely focused on respiratory health and visible air quality. In the decades since, academics and policymakers alike have learnt that the impacts of air pollution are more far-reaching, affecting many dimensions of health, economic productivity, and overall economic and social wellbeing.

Children are especially vulnerable to the effects of air pollution. Exposure to pollution and other environmental risks in early childhood can play a critical role in shaping economic opportunity, through persistent effects on health and wellbeing. Fortunately, improvements in air



quality delivered by the Clean Air Act have been shown to bring significant benefits to those directly affected, reducing infant mortality, and increasing wealth, productivity and later-life earnings.

Investments in clean air could have even broader and more systematic effects on economic opportunity and inequality if these benefits propagate across generations. Over time we have learnt that disadvantaged communities are disproportionately exposed to pollution, indicating that differences in environmental quality may play an important role in driving and proliferating economic disparities. Poor environmental quality leads to worse economic outcomes for individuals, which directly shapes the economic opportunities of their children, as well as their children's exposure to environmental risks through the neighbourhoods that they can afford to live in. Investments to improve environmental quality and reduce environmental disparities could break the cycle, bringing economic benefits and reducing environmental, health and economic disparities both within and across generations.

We measure the intergenerational benefits of investments in environmental quality. Using newly available administrative and survey data from the US Census Bureau, which allowed us to construct more than 150 million parent-child links, we find that the introduction of the 1970 Clean Air Act not only benefitted those who directly experienced regulatory reductions in prenatal exposure to air pollution, but also shaped the educational outcomes of their children 40–50 years later. We estimate that a 10% reduction in prenatal exposure to particulate matter for individuals born around 1970 is associated with a 2.5 percentage point increase in the likelihood that the second-generation attends college 40–50 years later.

How do the effects of prenatal exposure cross from one generation to the next? In addition to measuring the intergenerational effects of air pollution, we also explore the mechanisms through which intergenerational transmission arises.

On the one hand, the health improvements associated with lower prenatal pollution exposure may have been inherited from one generation to the next – a biological transmission pathway. On the other hand, improvements in health may have translated into increased productivity and earnings as adults, providing a household environment that offered greater resources and opportunities. Using information on whether children are biological, adopted or stepchildren, we find little evidence that the effects are likely to have been driven by any inherited benefits. Instead, supporting evidence suggests that the intergenerational transmission mechanism appears to be driven by increased parental resources and investments.

Our findings have several important policy implications. First, in considering the efficacy of current and future environmental regulations, it is important to account for broader economic considerations, such as effects on education, productivity and earnings. To date, environmental agencies almost exclusively focus on direct health effects. Doing so misses important dimensions through which pollution affects society. Cost-benefit analyses of environmental regulations should incorporate these benefits for a more complete accounting of how reducing air pollution will affect society.

Second, our findings point to the importance of environmental quality in shaping economic opportunity. Our results underline the importance of ensuring that disadvantaged communities benefit from improvements in environmental quality. Not only do reductions in air pollution reduce disparities today, but these benefits are propagated from one generation to the next. Further examination of the links between environmental quality, economic mobility, and inequality should be explored. Investments in environmental quality should be included alongside traditional economic-mobility mechanisms such as investments in education, transportation and labour market opportunities. ◀

#### About the author

**Jonathan Colmer** is Assistant Professor of Economics at the University of Virginia, Director of the Environmental Inequality Lab, and a CAGE Associate.

#### Publication details

This article is based on the paper: Colmer, J., and Voorheis, J. (2020). The grandkids aren't alright: The intergenerational effects of prenatal pollution exposure, CEP discussion paper (no. 1733).