Microdevelopment research in the last 20 years: What have we learned?

Health

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- H Turns on the top and clean, treated water comes out 24 hours a day
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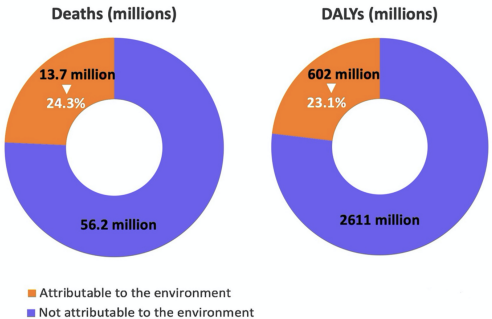
L Has to fetch water using valuable time, treat it at home, runs out without advanced planning

H Lives in a neighborhood/country with clean air, well enforced regulations, commutes in a well-sealed vehicle

L Lives in a polluted neighborhood, poorly sealed home, face tradeoffs between income and exposure

Environmental threats and the burden of disease



Source: WHO 2016

- Nearly a quarter of the disease burden globally from environmental threats
- Share is largest in LMICs
- Causal estimates of the magnitude and variety of impacts have emerged in the last two decades

Causal effect of environment on health

Data challenges: pollution data, health and mortality outcomes

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Water quality and quantity: Private good, rural populations most impacted

- Self protection: Ashraf et al. (2010), Kremer et al. (2011), Field et al. (2011), Bennear et al. (2013), Dupas et al. (2016), Brown et al. (2017), Berry et al. (2020)
- Self protection vs. public provision? Barriers to take up and service quality, mixed evidence on health impacts (Galiani et al. 2005, Devoto et al. 2012, Greenstone and Hanna 2014)

Ambient air quality: Public good, urban populations most impacted

- Recent improvements in pollution measurement, beginning with Jayachandran (2009) up to Heft-Neal et al. (2023)
- Large impacts, mostly infant and in utero exposure (Arceo-Gomez et al. 2014, Rangel and Vogl 2019, Adhvaryu et al. 2019) with some exceptions (Chen et al. 2013)

Causal effects of health on income

Environmental health threats likely to have impacts beyond direct effects on health

Contemporaneous exposure lowers cognition, labor supply and productivity

- Ebenstein et al. (2016), Hanna and Oliva (2015), Chang et al. (2019), Adhvaryu et al. (2022), Graff Zivin et al. (2021), Bedi et al. (2021)

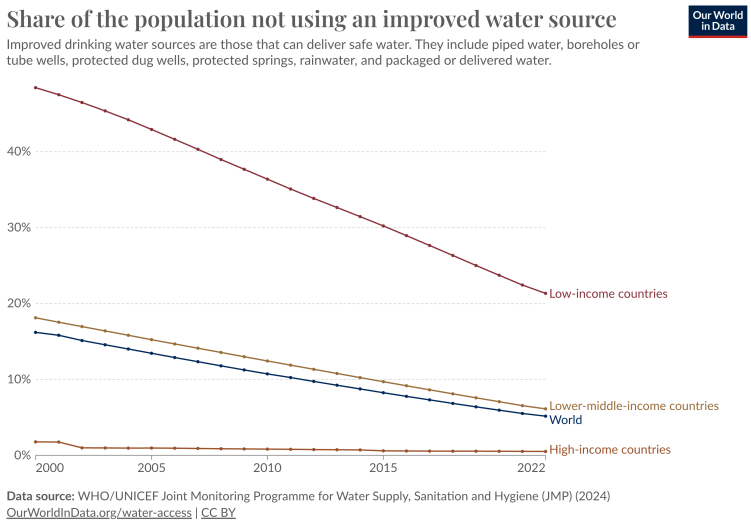
Improvements in health and life expectancy increase human capital investment, income

- Non-environmental health: Miguel and Kremer (2004), Currie (2009), Jayachandran and Lleras-Muney (2009), Lucas (2010), Baird et al. (2016)

"Fetal origins hypothesis": in utero exposure is particularly damaging for later life outcomes (Currie and Almond 2011)

- Currie and Vogl (2013), Bharadwaj (2017)

Income associated with *exposure* to environmental harms



Global trends: More households using improved water over time; steepest slope in LICs

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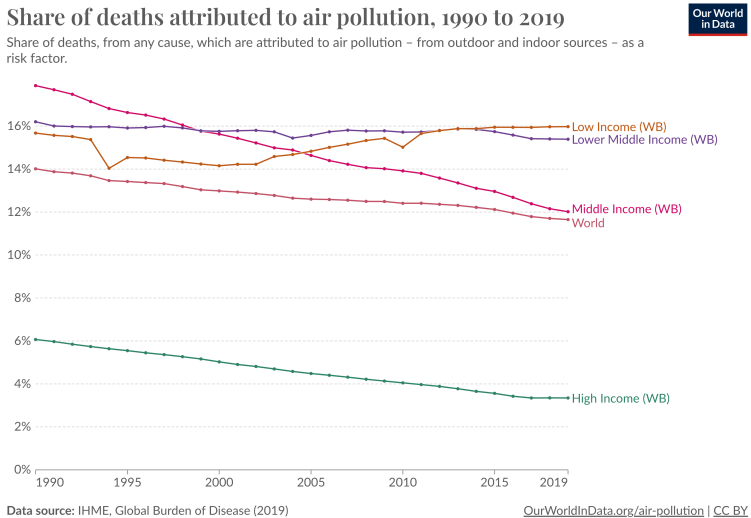

Global trends: Deaths from air pollution steady or slightly increasing in LICs

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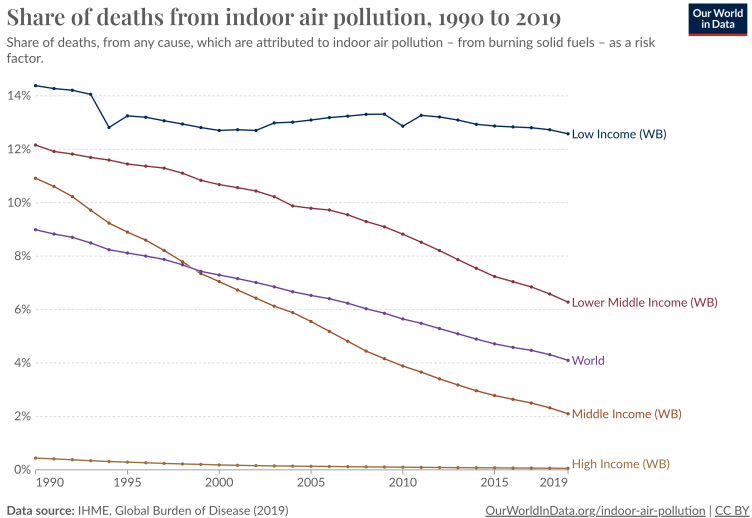

Global trends: Pollution deaths from indoor air pollution particularly divergent

Income impacts exposure to environmental harms

Holding fixed ambient environmental quality, does income affect exposure to environmental health threats?

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Still emerging literature suggests yes:

- Lower income households are more exposed where they live, work and commute (Li et al. 2020, Khanna et al. 2021, Chen et al. 2022, Bassi et al. 2022)
- Use of dirty fuels, household air pollution decreases with income, access to credit (Hanna and Oliva 2016, Berkouwer and Dean 2022, Asante et al. 2024)
- WTP for self protection is increasing in income, credit access and education (Ben Yishay 2017, Ito and Zhang 2020, Baylis 2024)
- Information increases WTP for self protection (Jalan and Somanathan 2008, Brown et al. 2017, Barwick et al. 2023, Baylis et al. 2024)

Looking backward, taking stock

Dramatic rise in research on the role of the environment in health and human capital

- Also within environmental economics, focused on HICs
- Field experiments unlocked work on constraints on and effects of self-protection
- Improvements in data sources unlocked work on ambient air quality
- Long run relationships are still poorly understood

Policy and enforcement needed to address inequality, counteract increasing exposure to air pollution through urbanization

- Economies of scale, public goods, poverty limit scope for self protection as a solution

Climate: The next big environmental health threat

Climate: Large negative effects on health (Anttila-Hughes and Hsiang 2013, Burgess et al. 2017, Carleton and Hsiang 2016, Carleton et al. 2022)

- Direct effects from heat- and disaster-related mortality and morbidity
- Indirect effects via income, human capital and conflict

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In perspective: Air pollution causes 6.7M premature deaths per year (IHME 2019)

- Climate change causes 250-400K premature deaths per year (WHO 2023)
- 3M by end of century (Lancet Countdown 2023)

Climate: The next big environmental health threat

The emerging threat: Climate exacerbates existing health threats

Scientific literature highlights concerning relationships between climate and

- water borne pathogens (Rodo et al. 2002)
- shifts in the distribution of malaria, dengue and other disease (Epstein 2001)
- wildfires as a source of particulate pollution (Liu et al. 2010, Chen et al. 2021)
- the formation of ozone (Larr and Neidell 2016)
- dust and dust-borne disease (Archibong and Annan 2023)

We have had decades to work on these problems, more pressing than ever

- Example: Health care system help smooth climate shocks (Cohen and Dechezlepretre 2022, Bjorkman et al. 2024)

Thank you

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