

# Social Determinants of Health

## Concepts and Methods Relevant to Air Pollution

Sam Harper



**McGill**

Department of  
**Epidemiology, Biostatistics  
and Occupational Health**

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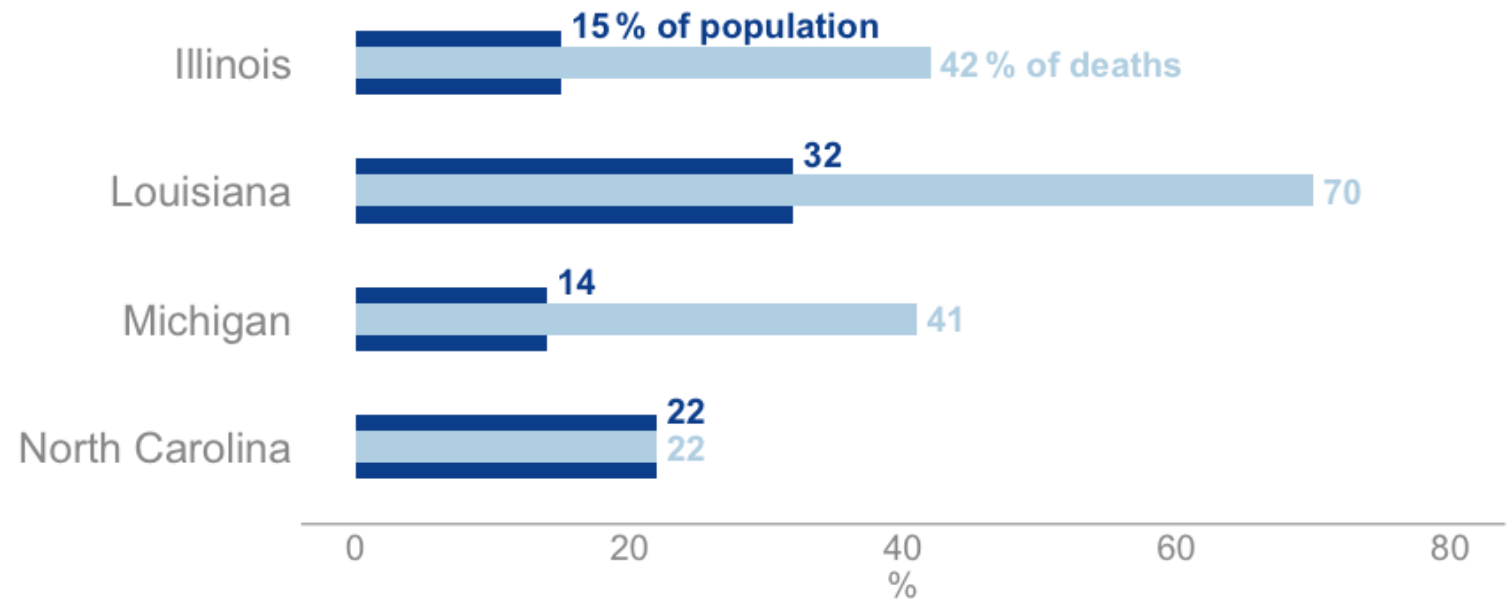


# 'A Terrible Price': The Deadly Racial Disparities of Covid-19 in America

For the Zulu club, a black social organization in New Orleans, Mardi Gras was a joy. The coronavirus made it a tragedy.

# Disproportionate racial impact of COVID-19 on deaths

Pandemic exposure reveals underlying inequalities in social conditions.





“We have long known that emissions coming from these facilities are very dangerous to the health of people who live nearby, and it is black people who live the closest. So I’m getting tired of being told our Covid death rates are only because we’re obese or have diabetes or are eating badly, without any regard to the **systematic harm pollution has caused us.**”

-Beverly Wright  
*Deep South Center for Environmental Justice*



A photograph of Terry Sharpe Sr., 49, held by his widow, Debra Sharpe, and his children, Terry Sharpe Jr. and Emily Sharpe. A truck driver and a Zulu member since 2017, Sharpe died of Covid-19.

"The conditions in the social and physical environment where people live, work, attend school, play and pray have an outsized influence on health outcomes."

"Those in the public-health field call these conditions **social determinants of health**".

# What are Social Determinants of Health?

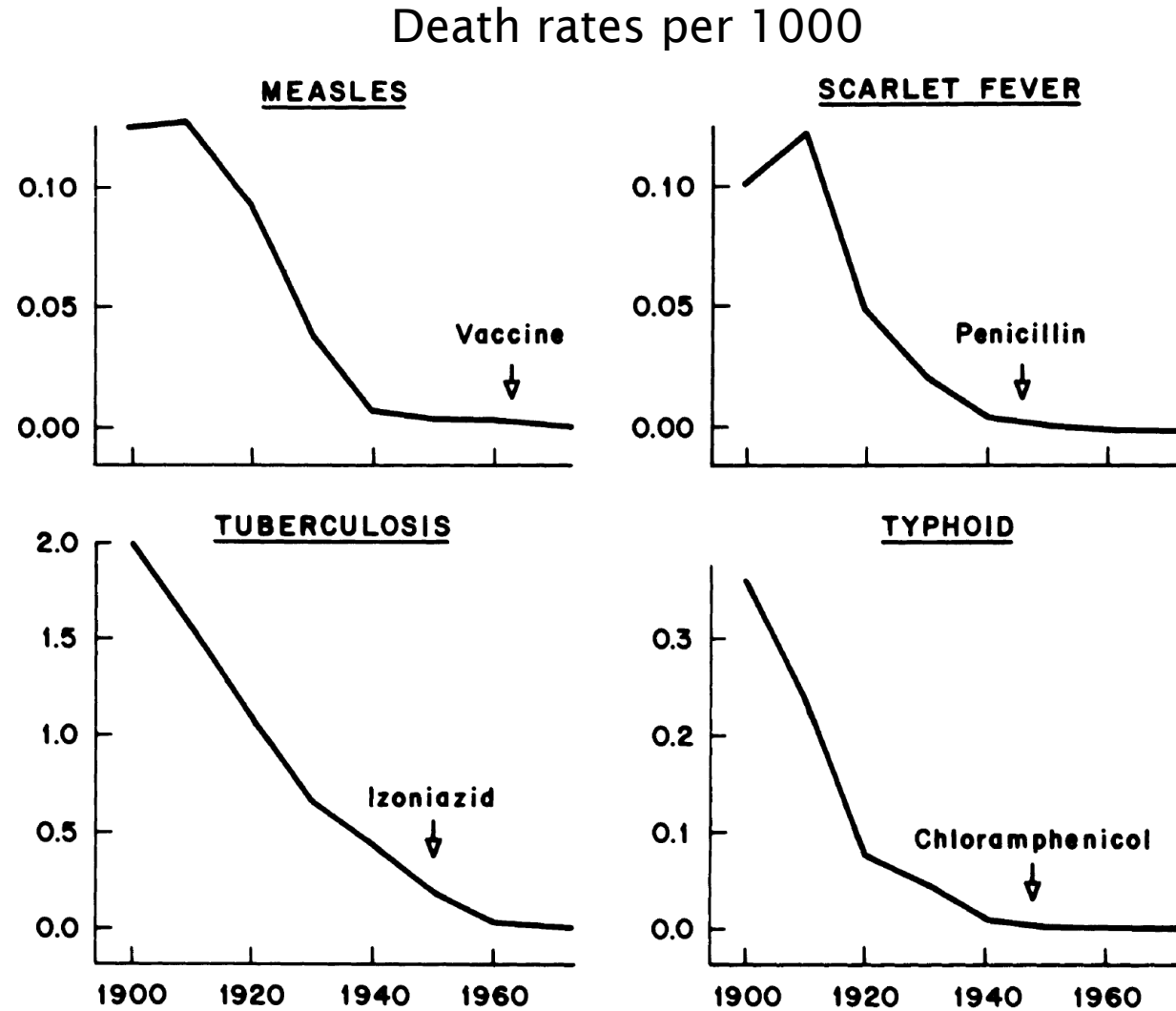
# The social determinants of health are the conditions in which people are born, grow, live, work and age.

- Availability of resources(e.g., safe housing and local food - markets)
- Access to educational, economic, and job opportunities
- Access to health care services
- Quality of education and job training
- Availability of community-based resources in support of community living and - opportunities for recreational and leisure-time activities
- Transportation options
- Public safety
- Social support
- Social norms and attitudes (e.g., discrimination, racism, and distrust of government)
- Exposure to crime, violence, and social disorder
- Socioeconomic conditions (e.g., concentrated poverty)
- Residential segregation
- Language/Literacy
- Access to mass media and emerging technologies
- Culture

# Concepts



Medical care matters, but not much

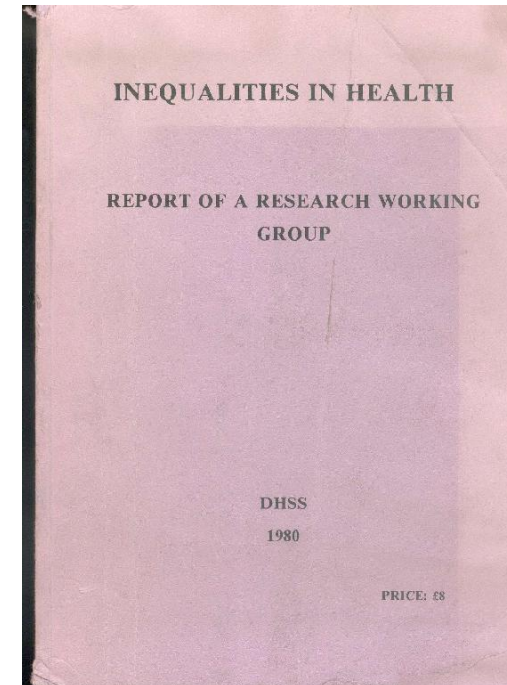


McKinlay & McKinlay (1977); McKeown (1979)

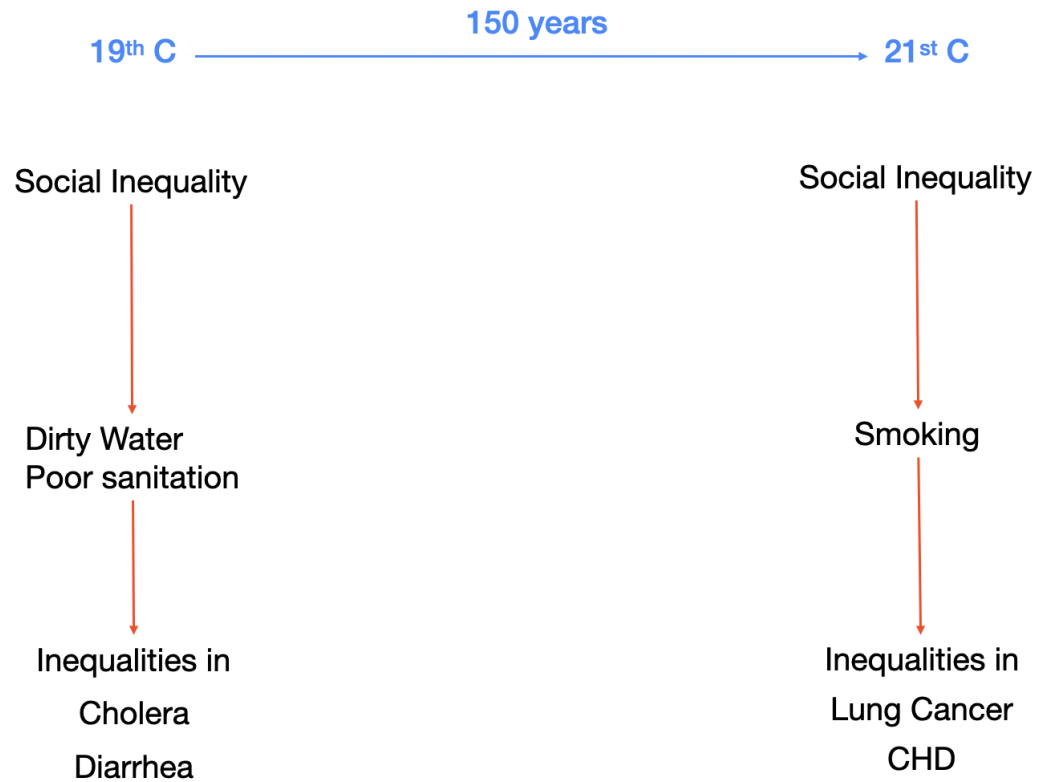
# The UK Black Report (1981) cemented the idea of **persistent** health inequalities

Universal health insurance did not reduce inequalities.

**More ambitious interventions needed** in education, housing and social welfare, in addition to improved clinical care.



Mechanisms may change, but social inequalities continue to reproduce health inequalities.



## Risk factors are insufficient

*"The social class difference was partly explained by known coronary risk factors: men in the lower grades smoked more and exercised less, they were shorter and more overweight, and they had higher blood pressures and lower levels of glucose tolerance.*

*Most of the difference, however, remains unexplained. It seems that there are major risk factors yet to be identified"*

-Rose and Marmot, 1981

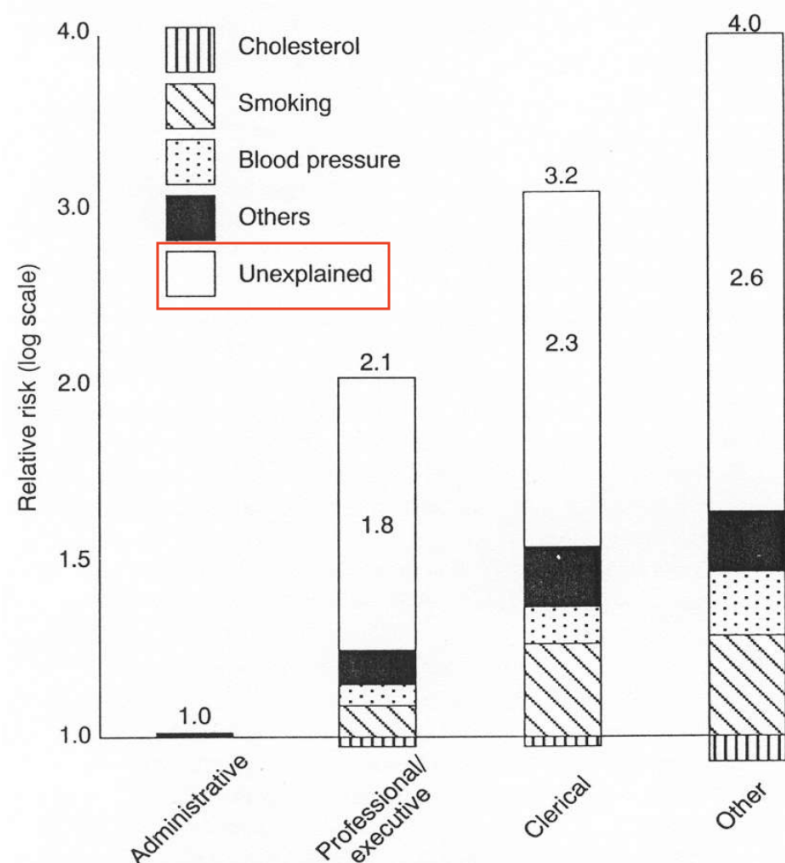


Figure 4.1: Relative risk of death from coronary heart disease according to employment grade, and proportions of differences that can be explained statistically by various risk factors  
Note: 'Others' = height, body mass, exercise, glucose tolerance  
Source: G. Rose and M. Marmot, Social class and coronary heart disease. *British Heart Journal* 1981: 13-19

## Interventions need to be social

*"...the primary determinants of disease are mainly economic and social, and therefore its remedies must also be economic and social."*

-Geoffrey Rose

Note 📌 y-axis difference!

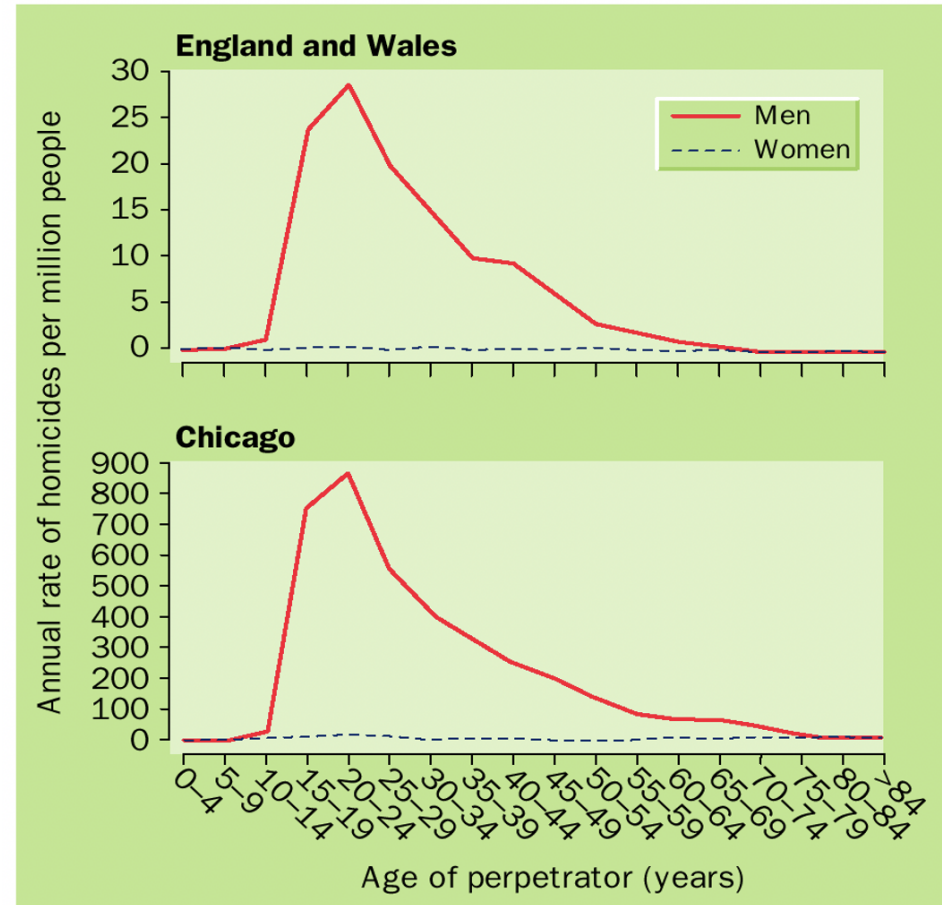


Figure 1: Rates of homicide in Chicago and England and Wales by age and sex of perpetrator



World Health  
Organization



Commission on  
Social Determinants of Health

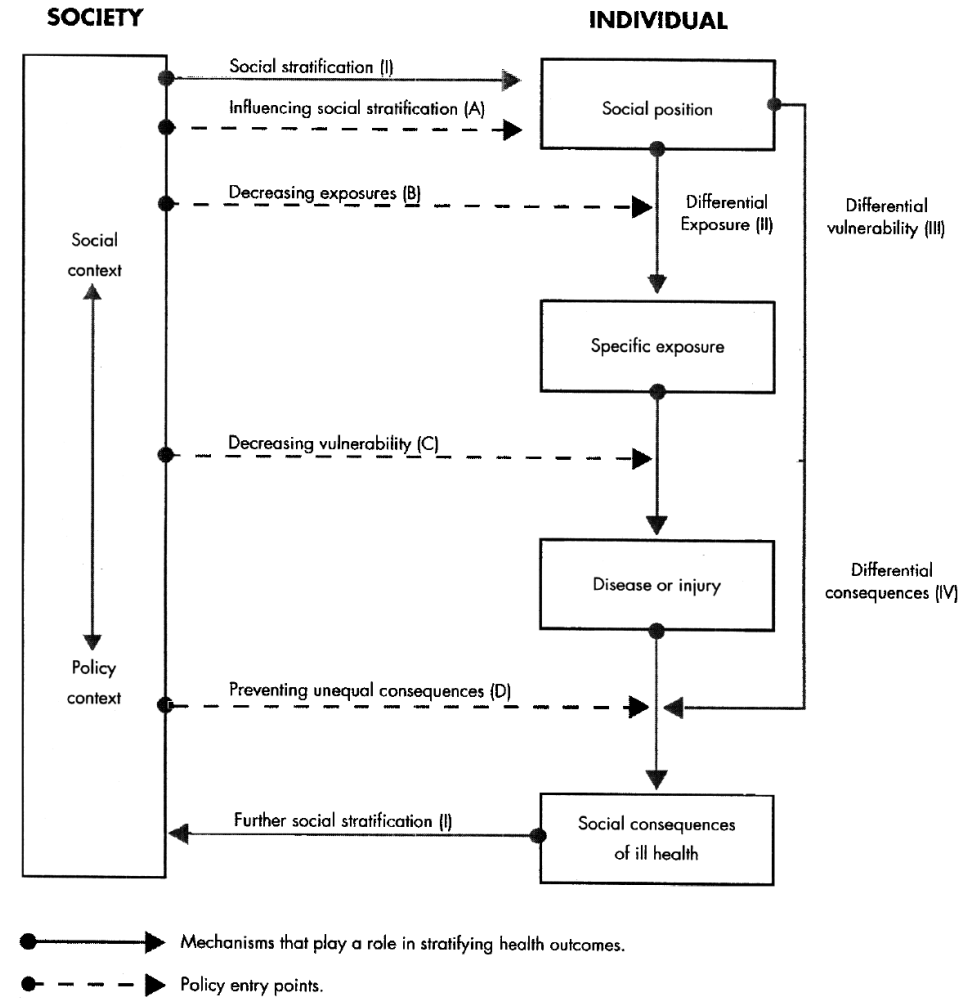
# Closing the gap in a generation

"Social injustice is  
killing people on a  
grand scale."

Health equity through action on  
the social determinants of health

# Conceptual model of SDOH (will redraw for legibility)

- Explicit links between social exposures
- Differential exposure and susceptibility
- Key leverage points for policy intervention



# Early evidence of disproportionate impact of environmental hazards

## TOXIC WASTES AND RACE In The United States

A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites

A20

THE NEW YORK TIMES

### Race Bias Found in Location of Toxic Dumps

By LENA WILLIAMS

Special to The New York Times

WASHINGTON, April 15 — Communities with large concentrations of black and Hispanic people have more hazardous waste facilities than other populated areas, a study released today concluded.

The study, prepared by the United Church of Christ's Commission on Racial Justice, asserted that the possibility that the placement of these dumps resulted by chance was "virtually impossible." It found that depressed economic conditions and a lack of education had made minorities especially vulnerable.

"Many predominantly minority communities are beset with a number of problems, ranging from poverty to unemployment," said the Rev. Benjamin F. Chavis Jr., executive director of the commission. "These communities cannot afford the luxury of being primarily concerned about the quality of their environment when confronted by a plethora of pressing problems related to their day-to-day survival."

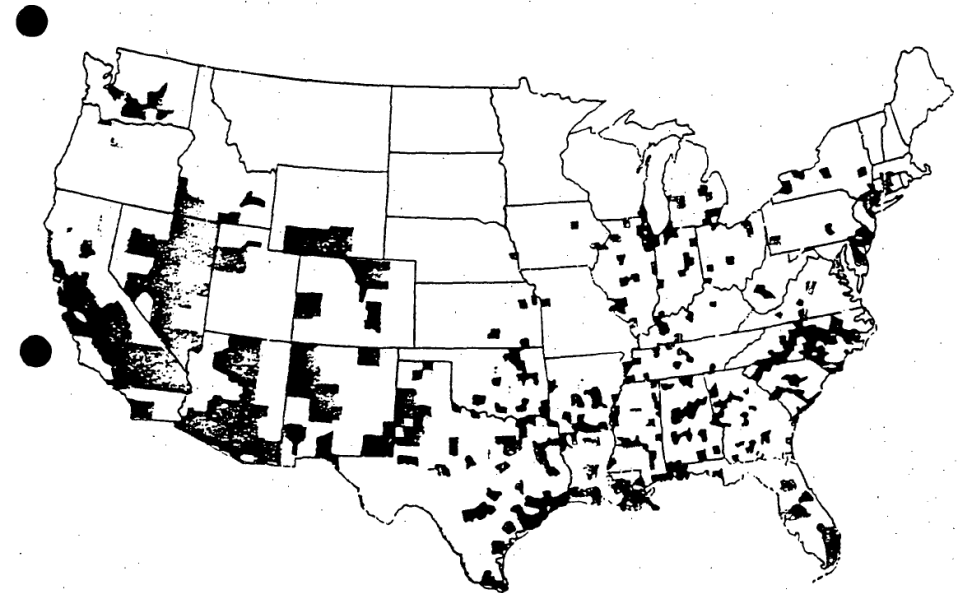
#### Economic Incentives Offered

Although 53 percent of white Americans live in areas with waste sites, the commission found that communities with the greatest numbers of dump-

shad the highest concentration of non-white residents. In addition, the study said that income and home values were substantially lower in communities with such facilities than in communities in the surrounding counties without them.

The group said that in many cases the location of the waste sites seemed to hinge on economic incentives. Residents in communities that agreed to be host to such facilities were often promised jobs and contracts to minority-owned firms, the study found.

Mr. Chavis said the commission was particularly concerned about the health risks posed by these facilities,





**Persistent** racial and socioeconomic inequalities in exposure

"...findings raise serious questions about the ability of current policies and institutions to adequately protect people of color and the poor from toxic threats."



**THE LONG-TERM DYNAMICS OF RACIAL/ETHNIC INEQUALITY IN NEIGHBORHOOD AIR POLLUTION EXPOSURE, 1990-2009**

**Nicole Kravitz-Wirtz**

*Population Studies Center, University of Michigan*

**Kyle Crowder**

*Department of Sociology, University of Washington*

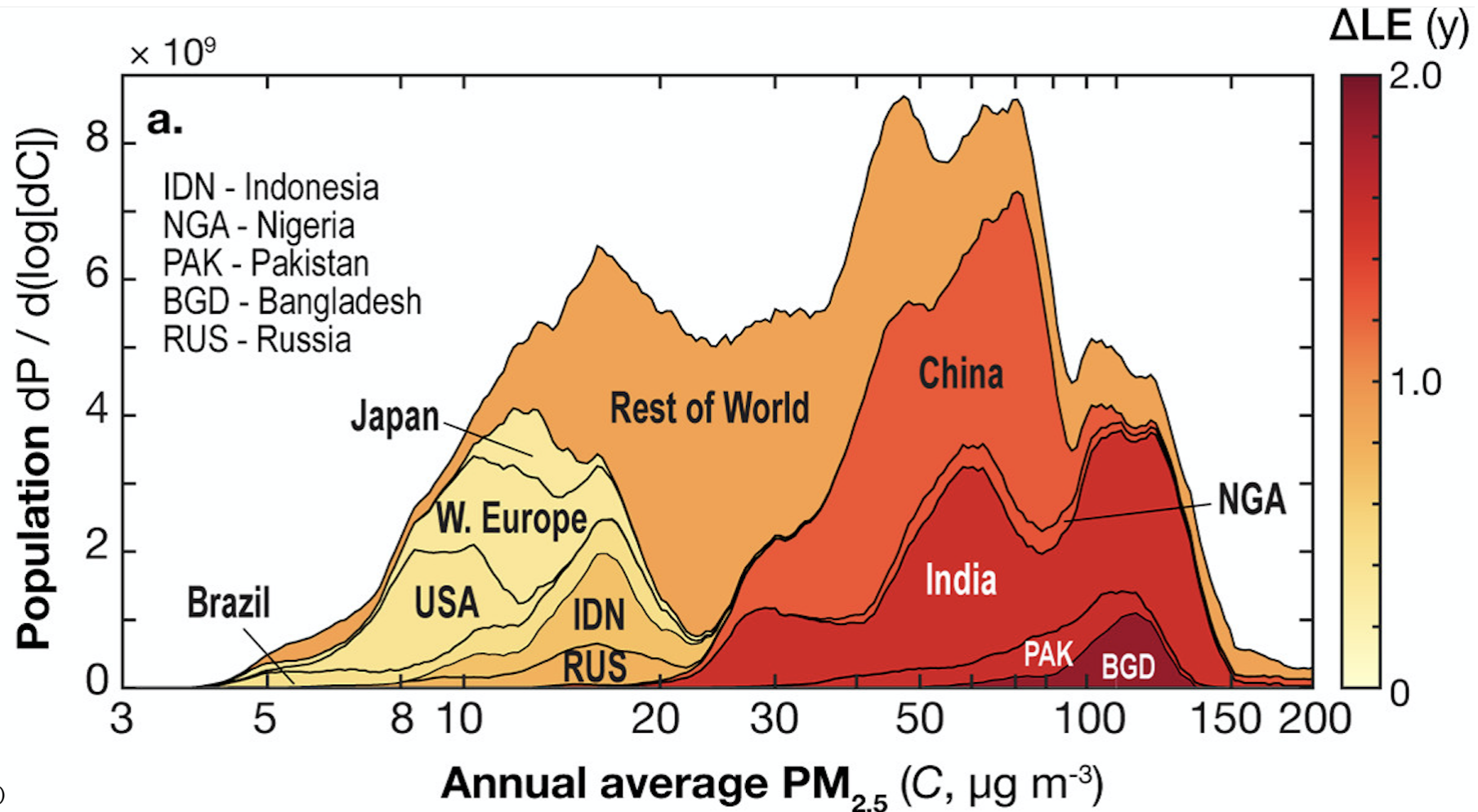
**Anjum Hajat**

*Department of Epidemiology, School of Public Health, University of Washington*

**Victoria Sass**

*Department of Sociology, University of Washington*

# Individual vs. population determinants



# Reviews of evidence on pollution and SDOH

Important heterogeneity

Most find that risks are more concentrated among disadvantaged social groups.

Plea for better methods

Research | Review

## Health, Wealth, and Air Pollution: Advancing Theory and Methods

Marie S. O'Neill,<sup>1</sup> Michael Jerrett,<sup>2</sup> Ichiro Kawachi,<sup>1</sup> Jonathan I. Levy,<sup>1</sup> Aaron J. Cohen,<sup>3</sup> Nelson Gouveia,<sup>4</sup> Paul Wilkinson,<sup>5</sup> Tony Fletcher,<sup>5</sup> Luis Cifuentes,<sup>6</sup> and Joel Schwartz,<sup>1</sup> with input from participants of the Workshop on Air Pollution and Socioeconomic Conditions\*

DOI 10.1007/s00038-014-0608-0

REVIEW

## Addressing equity in interventions to reduce air pollution in urban areas: a systematic review

Tarik Benmarhnia · Lynda Rey · Yuri Cartier ·  
Christelle M. Clary · Séverine Deguen · Astrid Brousselle

Cur Environ Health Rpt (2015) 2:440–450  
DOI 10.1007/s40572-015-0069-5

AIR POLLUTION AND HEALTH (JD KAUFMAN AND SD ADAR, SECTION EDITORS)

Cur Environ Health Rpt (2016) 3:287–301  
DOI 10.1007/s40572-016-0099-7

EARLY LIFE ENVIRONMENTAL HEALTH (J SUNYER, SECTION EDITOR)

## Socioeconomic Disparities and Air Pollution Exposure: a Global Review

Anjum Hajat<sup>1</sup> · Charlene Hsia<sup>2</sup> · Marie S. O'Neill<sup>3</sup>

## A Systematic Review of the Interplay Between Social Determinants and Environmental Exposures for Early-Life Outcomes

Allison A. Appleton<sup>1</sup> · Elizabeth A. Holdsworth<sup>2</sup> · Laura D. Kubzansky<sup>3</sup>

International Journal of  
Environmental Research  
and Public Health



Review

## Social Inequalities in Exposure to Ambient Air Pollution: A Systematic Review in the WHO European Region

Jonathan Fairburn<sup>1,\*</sup>, Steffen Andreas Schüle<sup>2,3</sup>, Stefanie Dreger<sup>2,3</sup>, Lisa Karla Hilz<sup>2,3</sup> and Gabriele Bolte<sup>2,3</sup>

# Methodological Issues

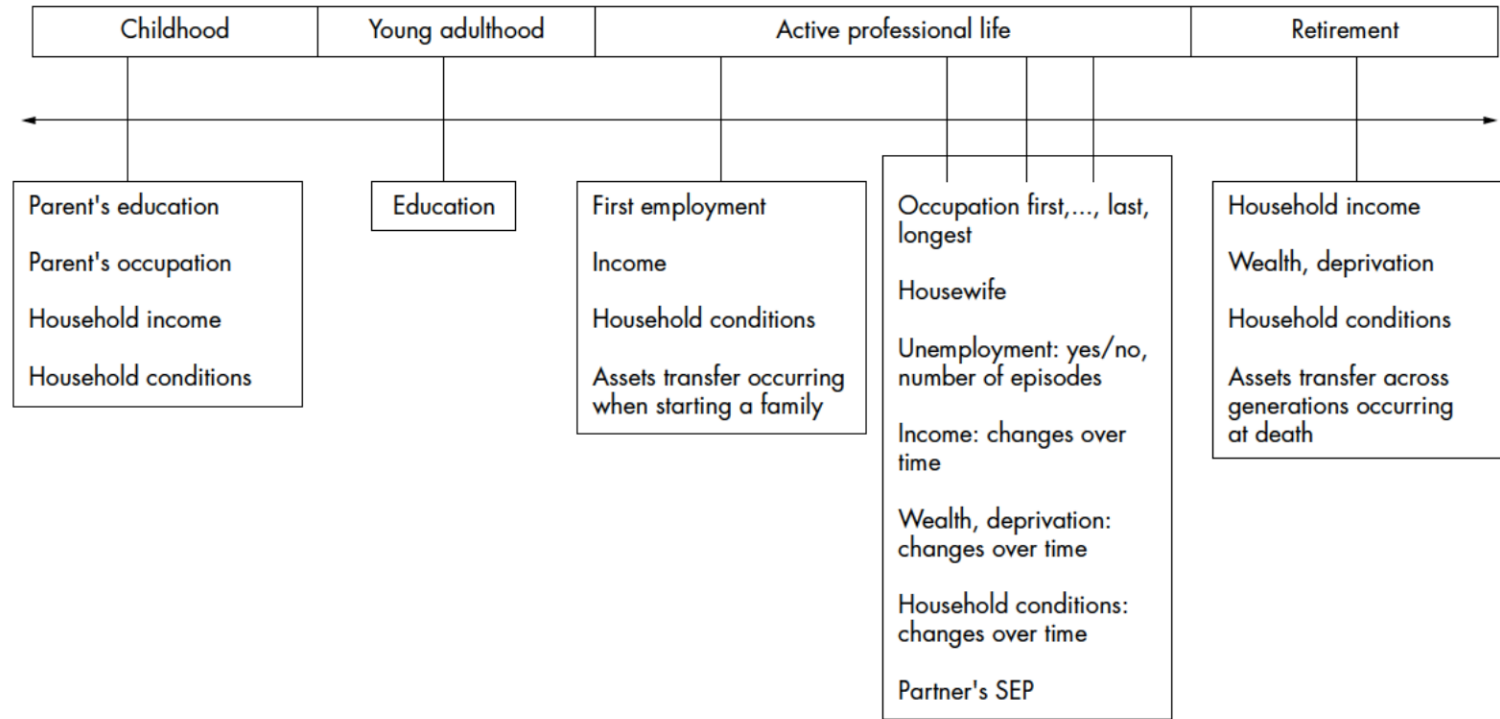
# 1. Clarity about the study goal

Descriptive aims

require attention to relevant units and measures.

Measures of the "social" are context dependent.

Need to fit for purpose.



What is the relevant risk for a particular pollutant?

# Earnings of teachers vs. non-teachers

Social position isn't static

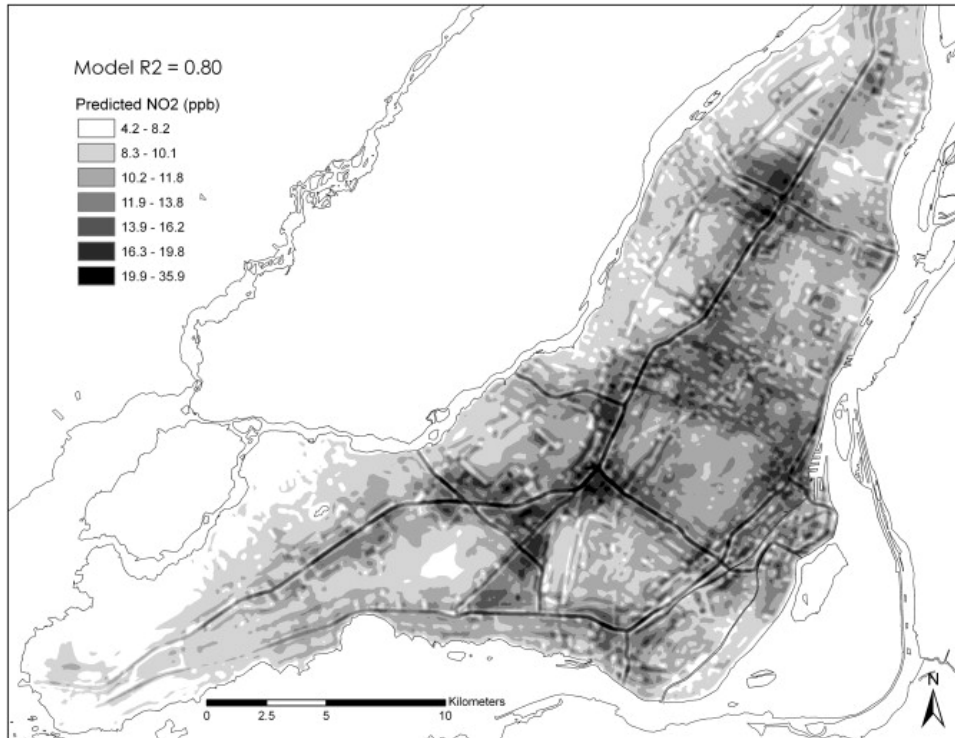
"Status" takes place in the context of an overarching structure.



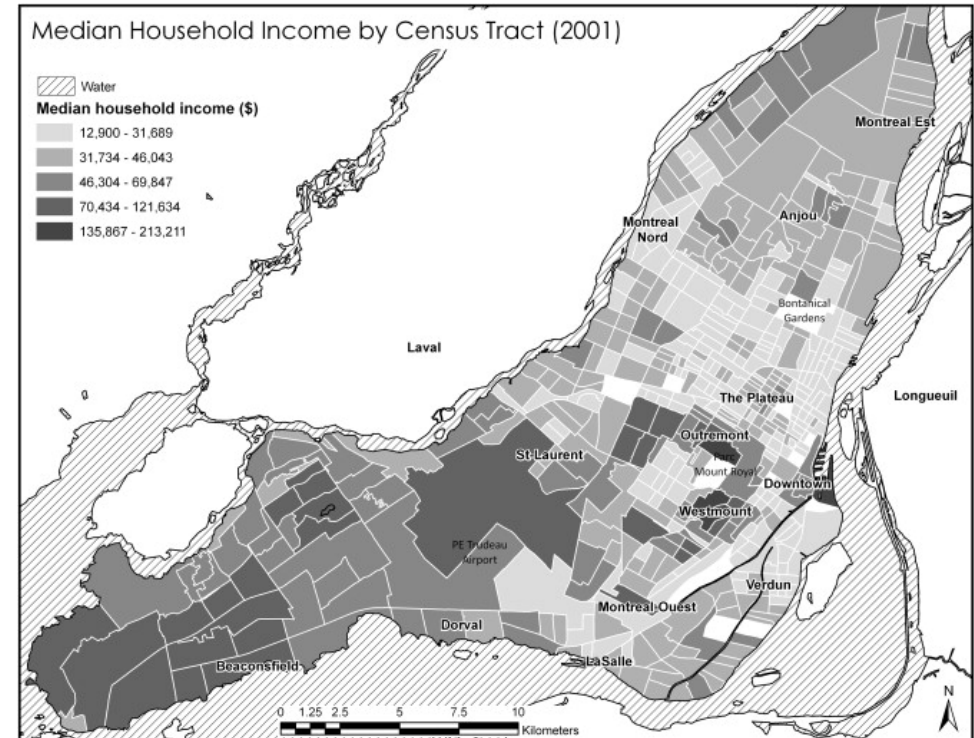
Source: [https://www.hamiltonproject.org/charts/annual\\_earnings\\_of\\_teachers\\_and\\_non-teachers](https://www.hamiltonproject.org/charts/annual_earnings_of_teachers_and_non-teachers)

# Context also matters for impacts

Higher income downtown core more exposed to  $NO_2$



Crouse et al. (2009)





# 1. Clarity about the study goal

Descriptive aims

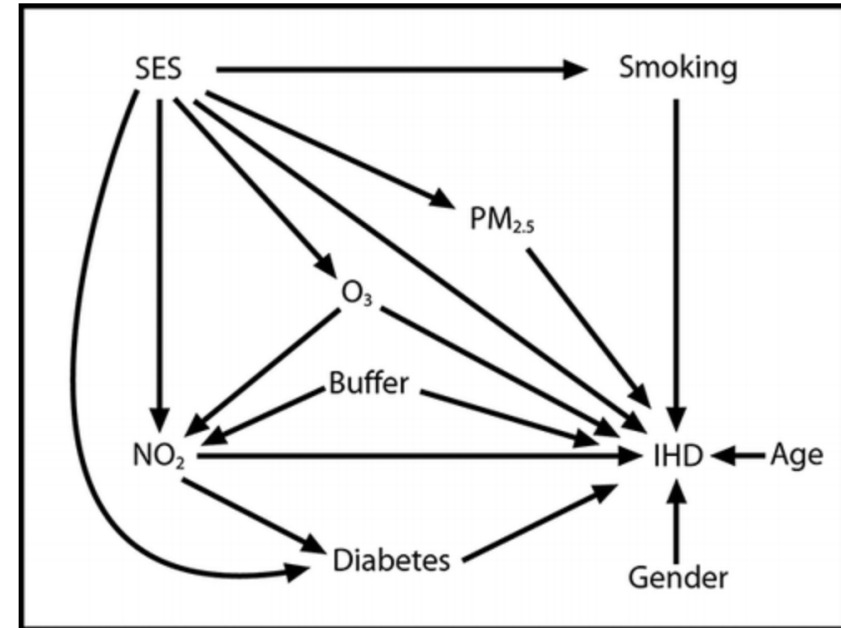
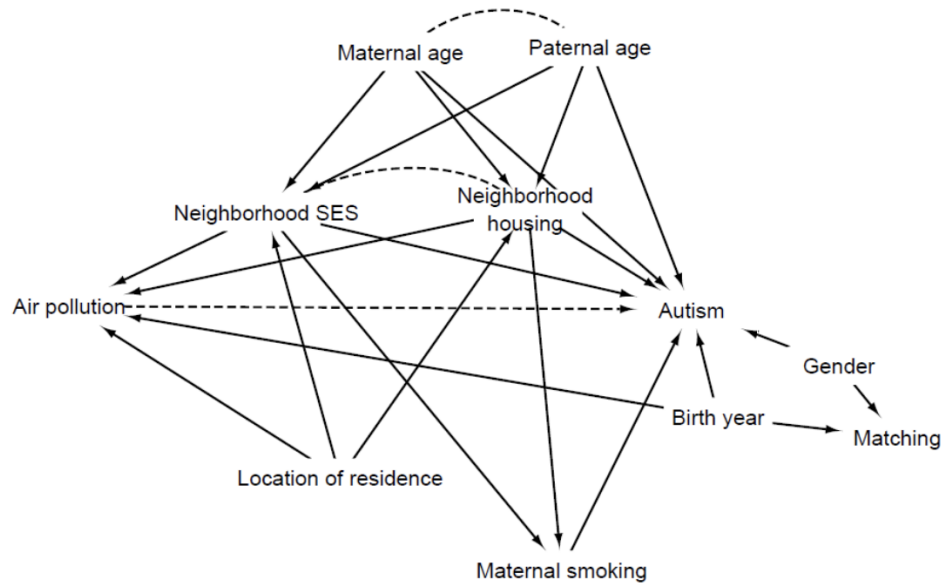
require attention to relevant units and measures.

Interventions

need all of the above 🙌 plus causal evidence.

Causal inference is **hard**.

Causal models have implications for analysis.



# Integrating multiple causes to explain inequalities.

the individual contribution of PM2.5 is comparable in magnitude to any single individual- or neighborhood-level factor.

## 2. Multi-level, multi-causal

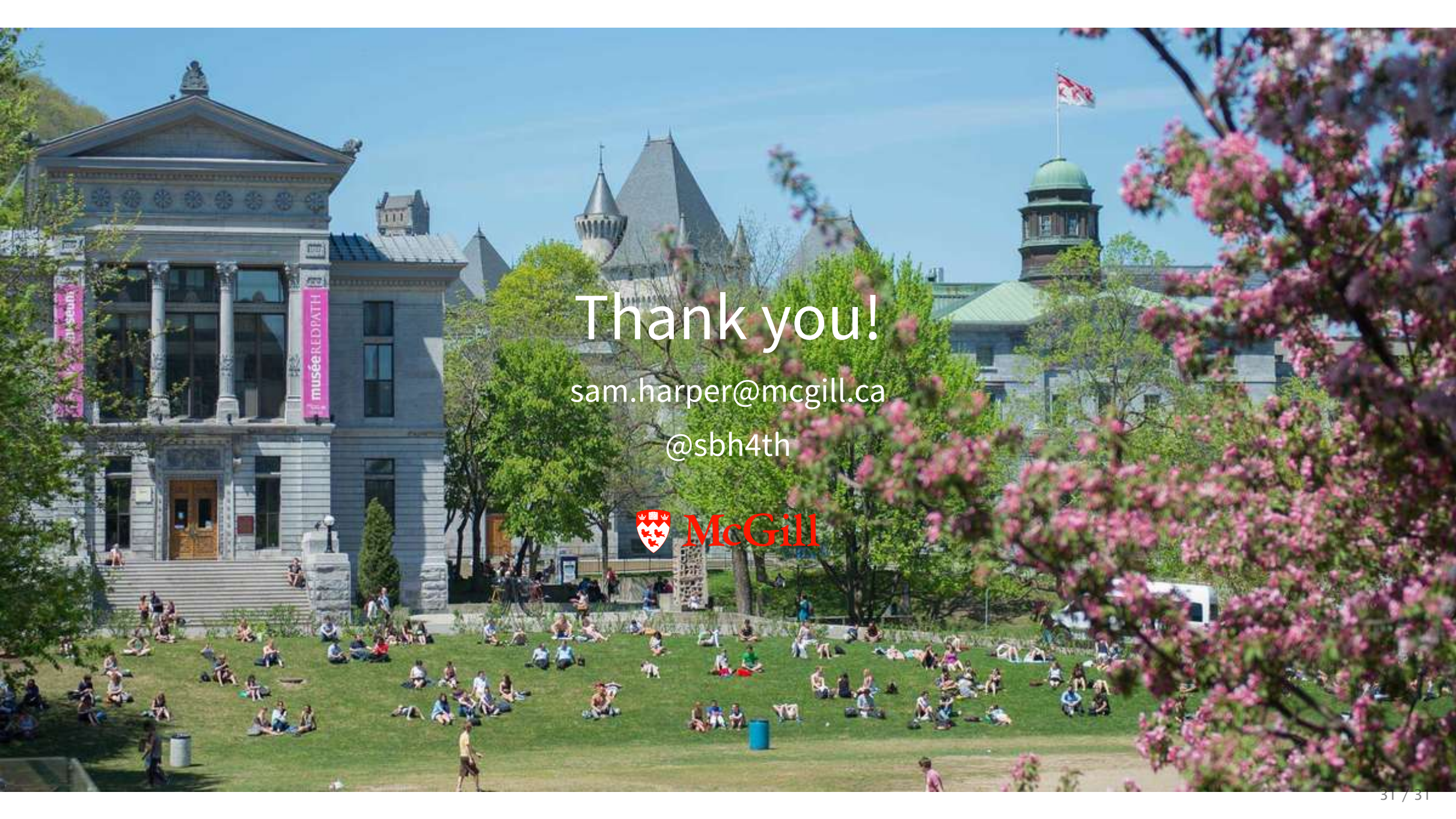
Incorporating social determinants  
means incorporating the

## 2. Which "social" exposures matter?

# Setting the stage

Social hierarchies affect the conditions into which people are born, grow, live, work, and age.

Greater attention to social determinants will enrich explanations and improve science and policy.



Thank you!

[sam.harper@mcgill.ca](mailto:sam.harper@mcgill.ca)

@sbh4th

