A Comprehensive Synthesis and Future Prospects of Environmental Health Literature
2010 – 2023

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In collaboration with Chuan Liao[1], Elizabeth Ludwig-Borycz[2], Seongmin Shin[1], Yujin Lee[1], Ziqing Wei[1], Jana Turner[2], Yulu Chen[1], Rodina Araia[2], Florence Cheung[1], and Arun Agrawal[2]

[1] Cornell University; [2] University of Michigan
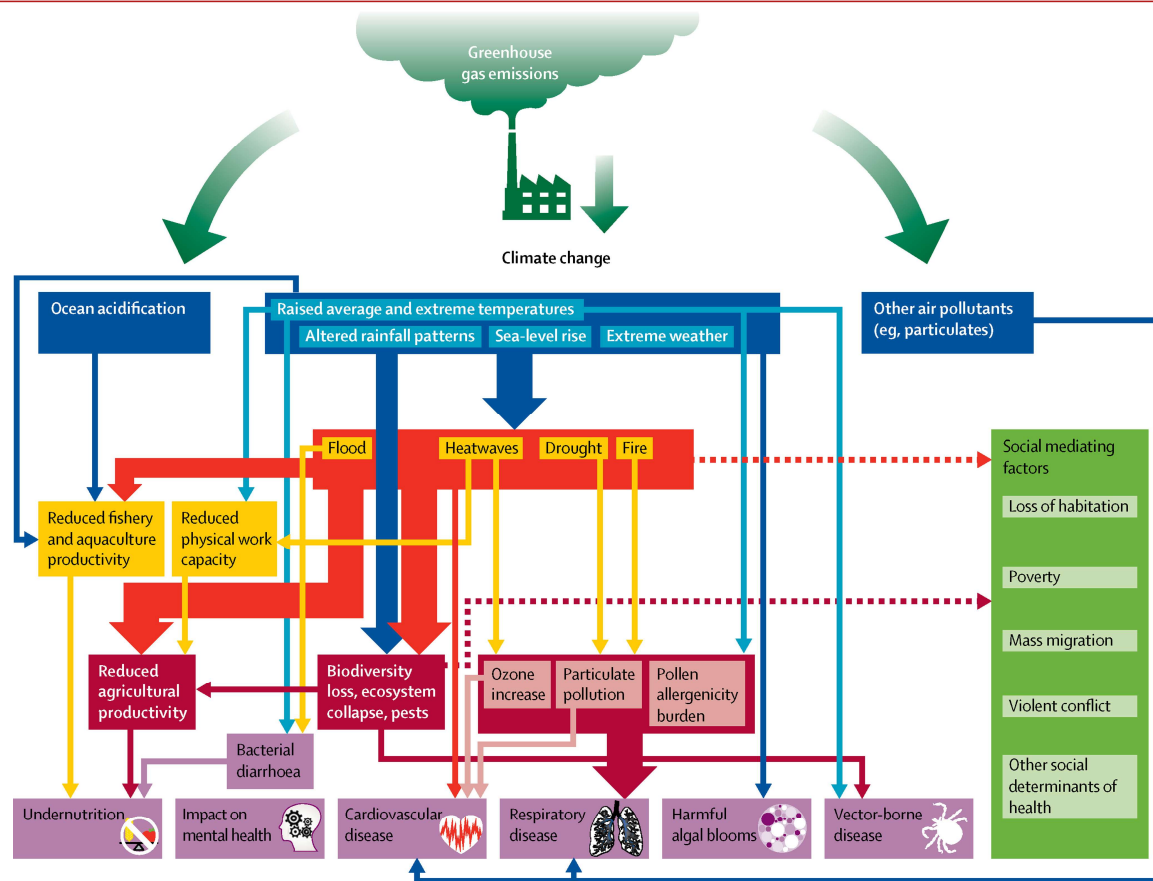
Annual Meeting of the Rural Sociological Society

July 25th, 2024

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Outline

1. Background

2. Introduction

3. Objectives

4. Methods

5. Results

6. Discussion

Environmental change and health

Source: The Lancet

Existing studies and research gaps

- Research on the social determinants of health has advanced significantly, while environmental health remains an emerging research topic

- Existing systematic reviews of environmental health literature focus on specific environmental factors (e.g., air quality) and their context-specific health impacts

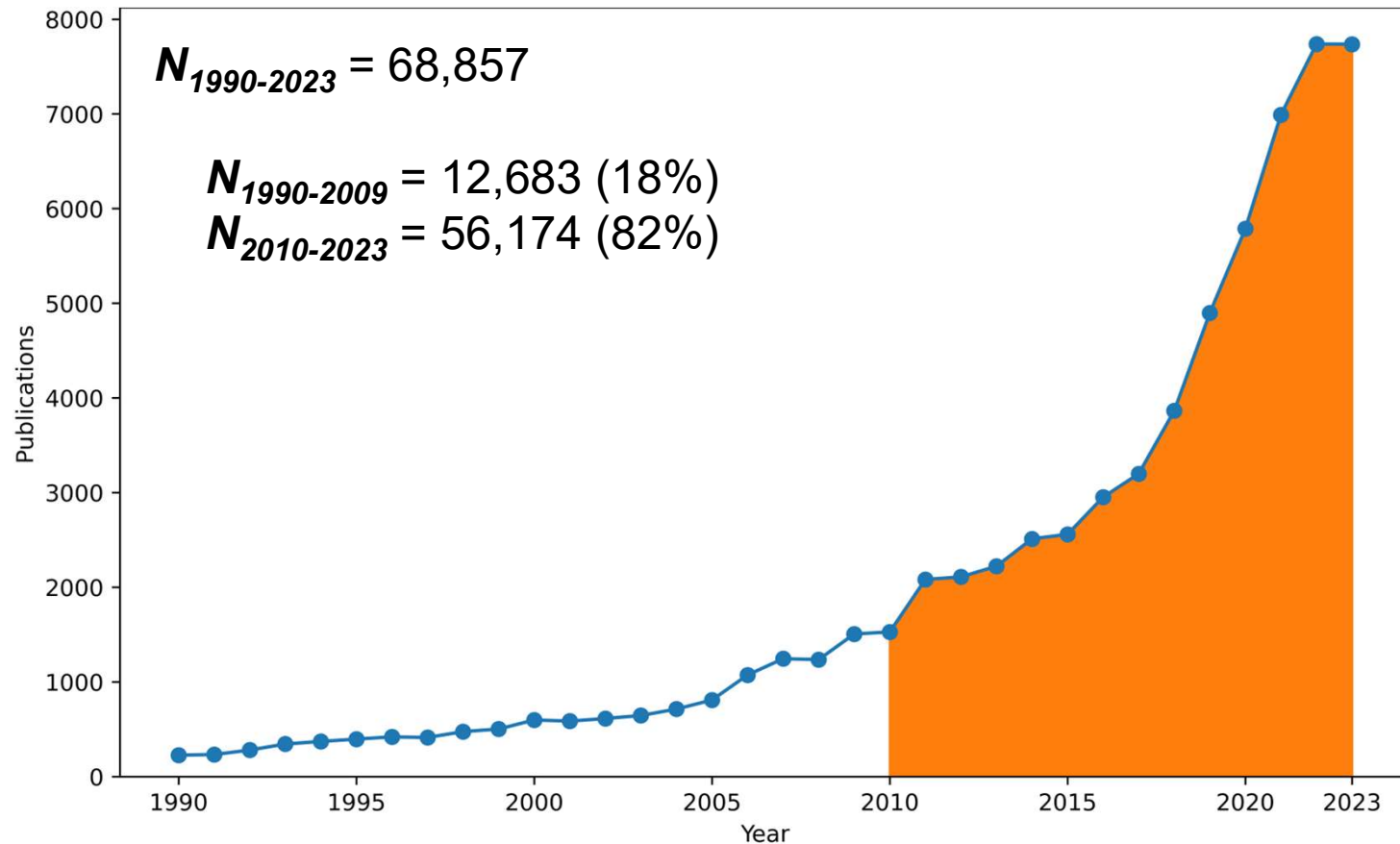- Such a narrow scope limits our understanding of the broader environmental health literature
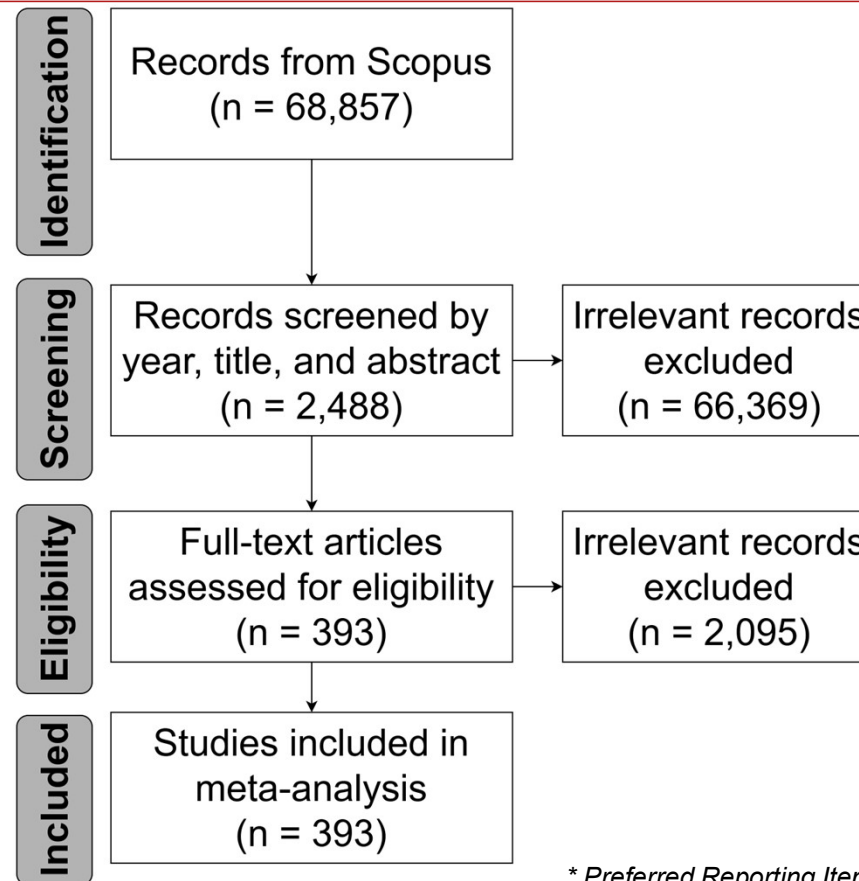
Research objectives

Through a systematic review of the environmental health literature between 2010 and 2023, this research aims to:

1. Demonstrate the research trend

2. Determine geographic hotspots of research efforts

3. Assess the environment-health relationship

4. Identify challenges and opportunities for future research
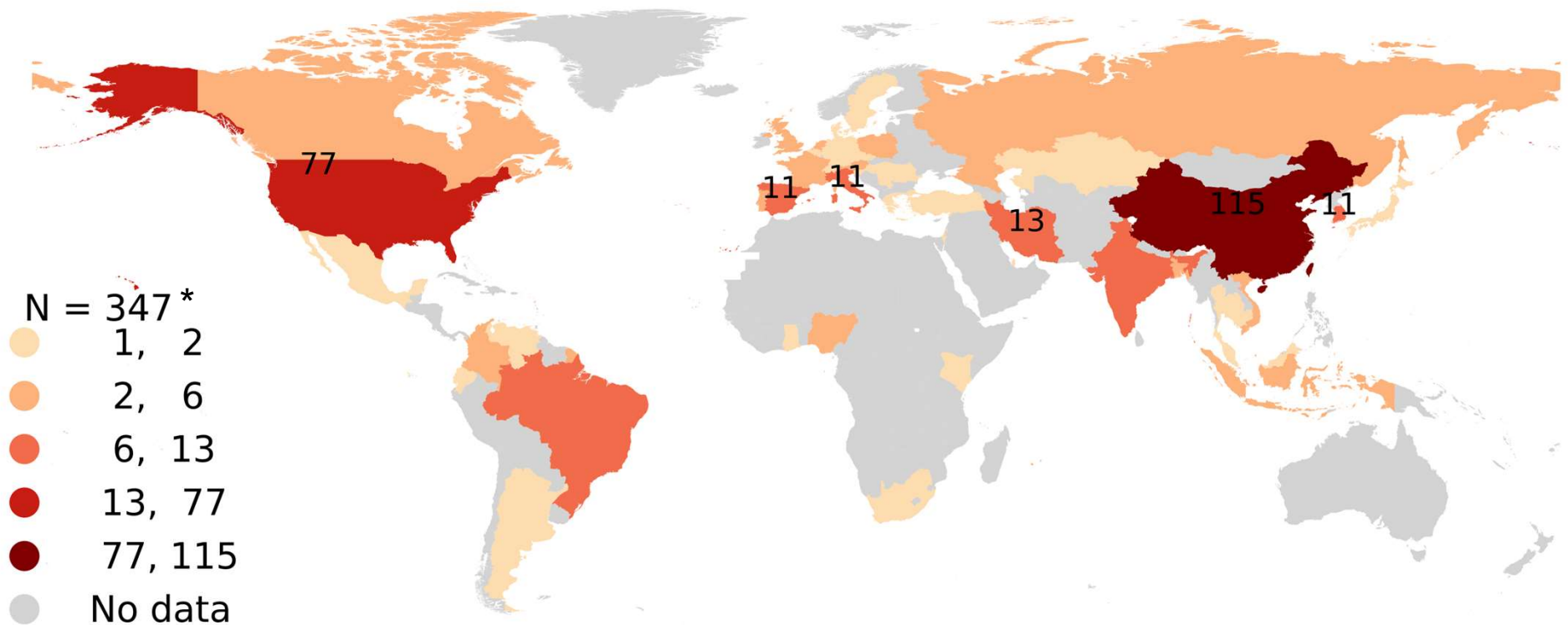
Publication trend

$N_{1990\text{-}2023}$ = 68,857

$N_{1990\text{-}2009}$ = 12,683 (18%)
$N_{2010\text{-}2023}$ = 56,174 (82%)

PRISM*

Identification	Records from Scopus (n = 68,857)	
Screening	Records screened by year, title, and abstract (n = 2,488)	Irrelevant records excluded (n = 66,369)
Eligibility	Full-text articles assessed for eligibility (n = 393)	Irrelevant records excluded (n = 2,095)
Included	Studies included in meta-analysis (n = 393)	

* Preferred Reporting Items for Systematic reviews and Meta-Analyses

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Hot spots of environmental health studies

N = 347 *
- 1, 2
- 2, 6
- 6, 13
- 13, 77
- 77, 115
- No data

77   11 11   13   115   11

Studies involving multiple countries are not included in this map

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Research methods

8.9%

1.8%

6.6%

82.7%

- Qualitative
- Quantitative
- Mixed
- Others

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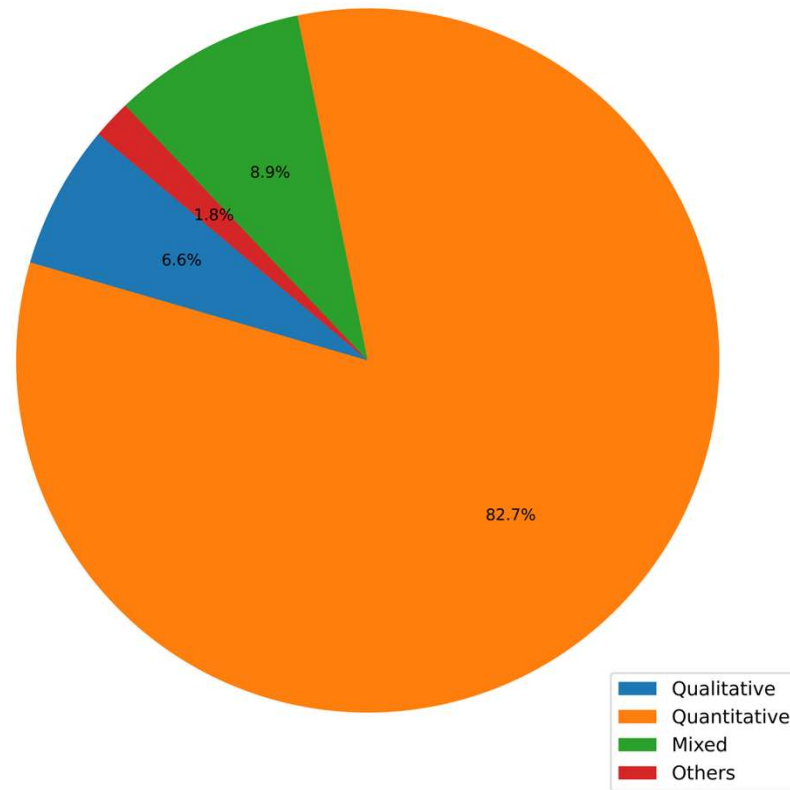
Environmental factors of interest

(A) All countries

(B) China

(C) USA

(D) Iran

(E) Italy

(F) Spain

(G) Korea
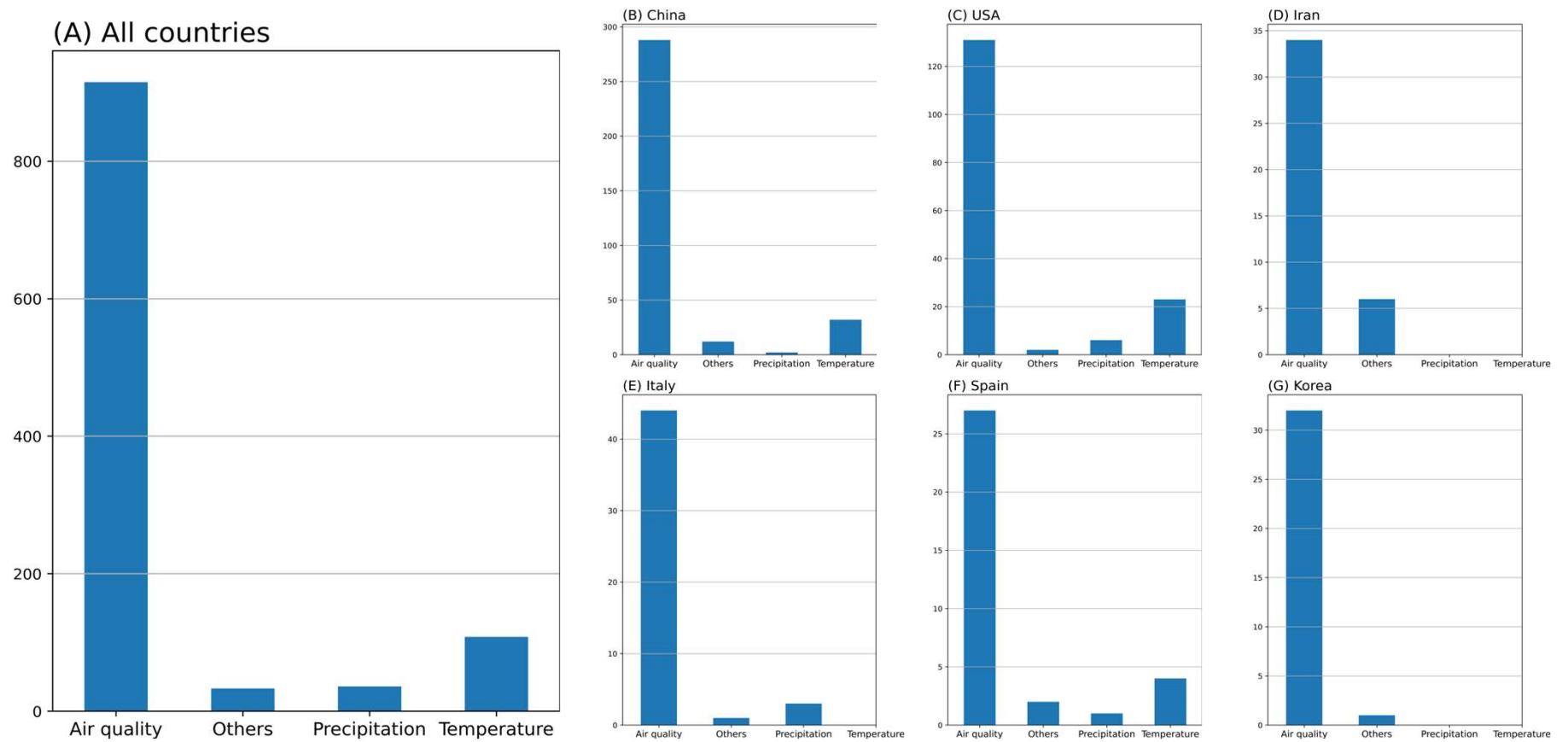
All-country environment-health relationship

Respiratory Diseases   Air quality: 87%

Mortality   Air quality: 83%

Mental Health   Air quality: 65%

General Health   Air quality: 85%

Chronic Diseases   Air quality: 91%

Cardiovascular Diseases Air quality: 87%

Cancer   Air quality: 92

Birth Outcomes   Air quality: 90%

Acute Conditions   Air quality: 47%

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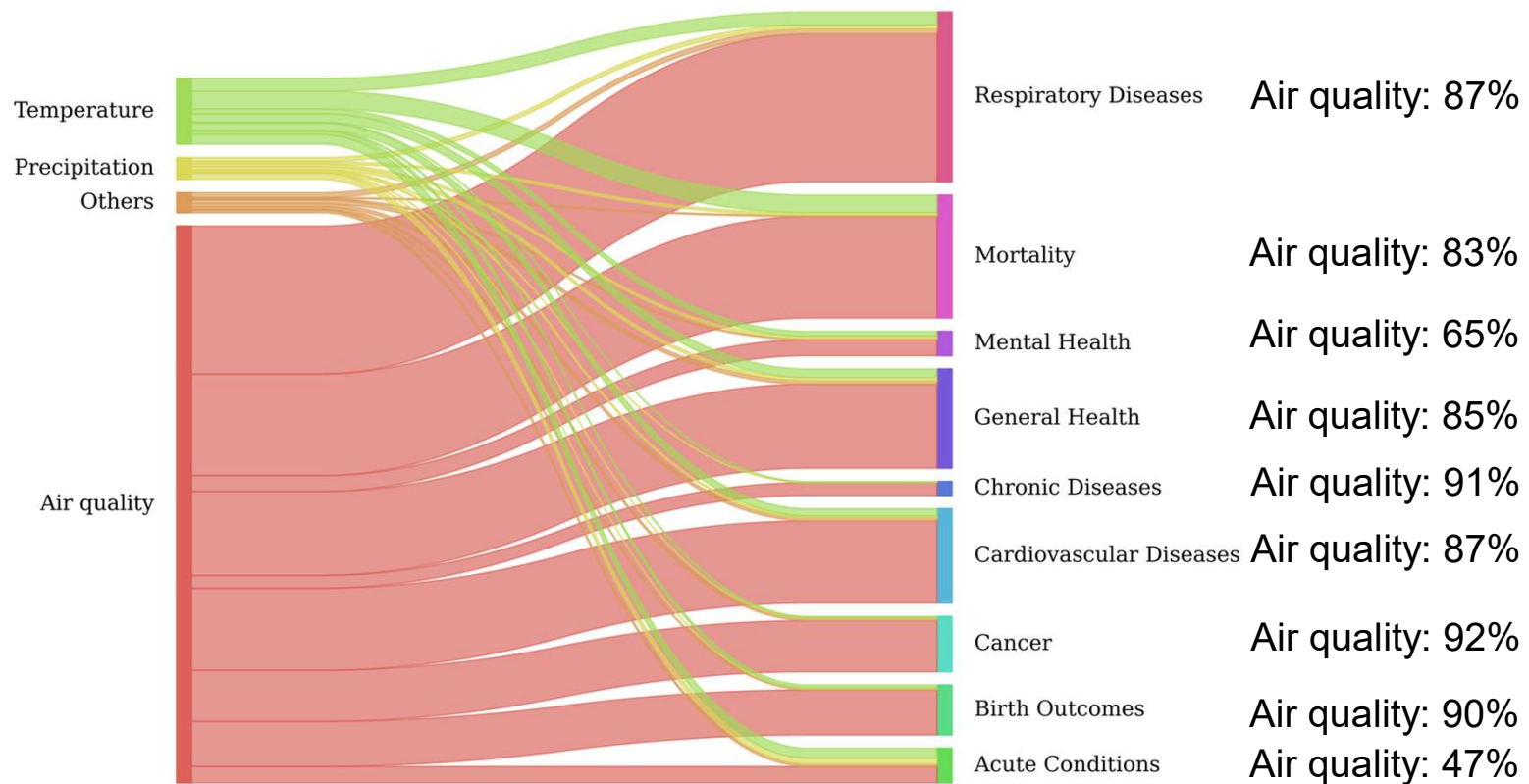
Takeaways

1. Environmental factors influence health outcomes

2. Quantitative research dominates in the literature

3. Existing research focuses on air quality in developed nations, overlooking the pressing issue of rising temperatures and areas such as the Middle East and Africa

Implications for research and policy-making

1. Research priorities should shift towards addressing global warming and population health

2. Qualitative research is essential for capturing experiences, resilience, and adaptation strategies

3. Efforts are needed to explore exposure-outcome mechanisms and develop targeted preventative policies
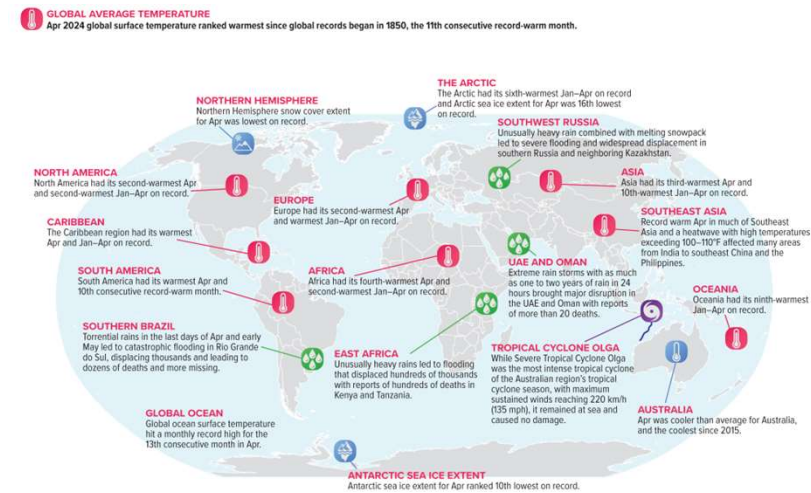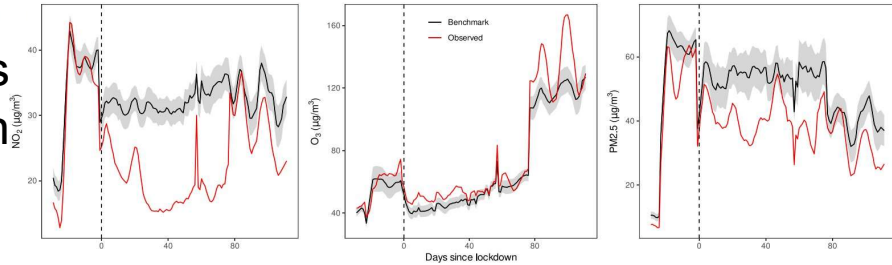
Source: PNAS; NOAA

Thank you

Questions?
Email Dr. Shuai Zhou at sz675@cornell.edu

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Appendix

Literature search strategy

Literature screening criteria

Inclusion of health outcomes
- infectious diseases
- respiratory, cardiovascular, neurological, and other diseases
- morbidity/mortality
- undernutrition
- mental health
- occupational health
- injuries
- pregnancy and birth outcomes (e.g., low-birth weight)
- allergies
- hospitalization
- public health issues
- height/weight (e.g., short, obese)

Inclusion of environmental factors
- sea-level rise
- temperature
- extreme weather events/natural disasters
- droughts
- flooding
- wildfire
- air quality
- hurricane/tsunami

Coding strategy for environmental factors

1. **Cardiovascular diseases:** Cardiovascular diseases
2. **Respiratory diseases:** Respiratory diseases; Asthma; COVID19
3. **Mortality:** Mortality
4. **Chronic diseases:** Diabetes; Kidney diseases, Obesity
5. **Acute conditions:** Diarrhea; Infectious diseases
6. **Mental health:** Cognitive impairment; Mental health
7. **Cancer:** Cancer
8. **General health:** Anemia; General health risks; Hospitalization; Longevity
9. **Birth outcomes:** Adverse birth outcomes
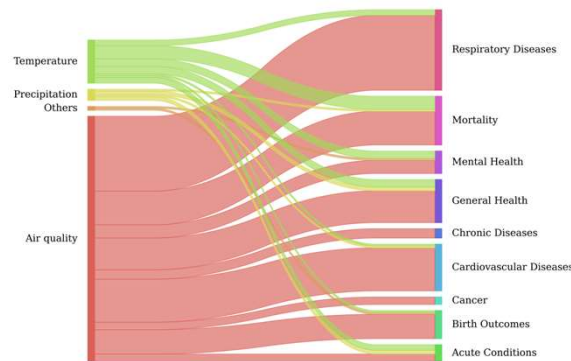
Coding strategy for health outcomes

1. **Air quality:** Air quality, SO2; CO; CO2; NH3; NO; NO2; NOx; O2; O3; PM; PM1; PM10; PM2.5; SO2; SO4; SOx
2. **Temperature:** Cold; Heat; Temperature; GHGs
3. **Precipitation:** Drought; Flood; Precipitation
4. **Others:** Deforestation; Humidity; Hurricane; NDVI; Storm
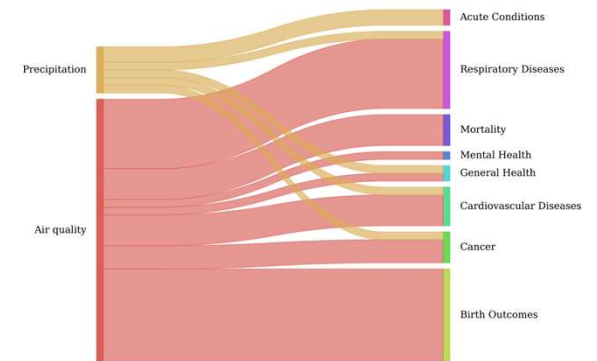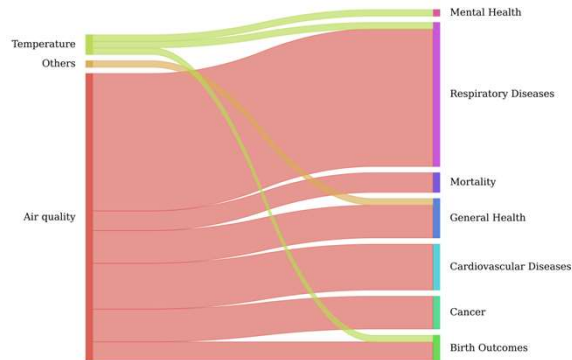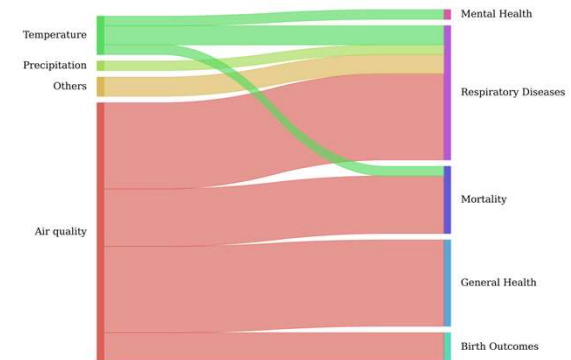
Country-specific environment-health relationship

(A) China
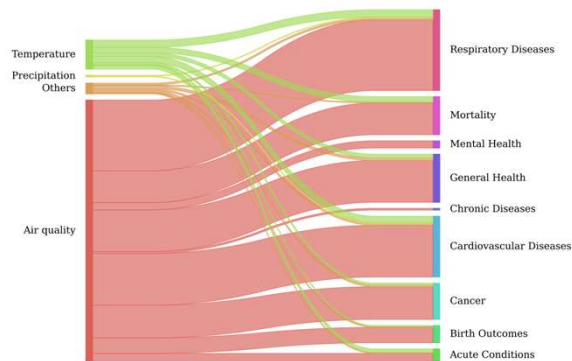
(B) USA

(C) Iran

(D) Italy

(E) Spain

(F) Korea

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