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Health, climate change and air quality-state of knowledge



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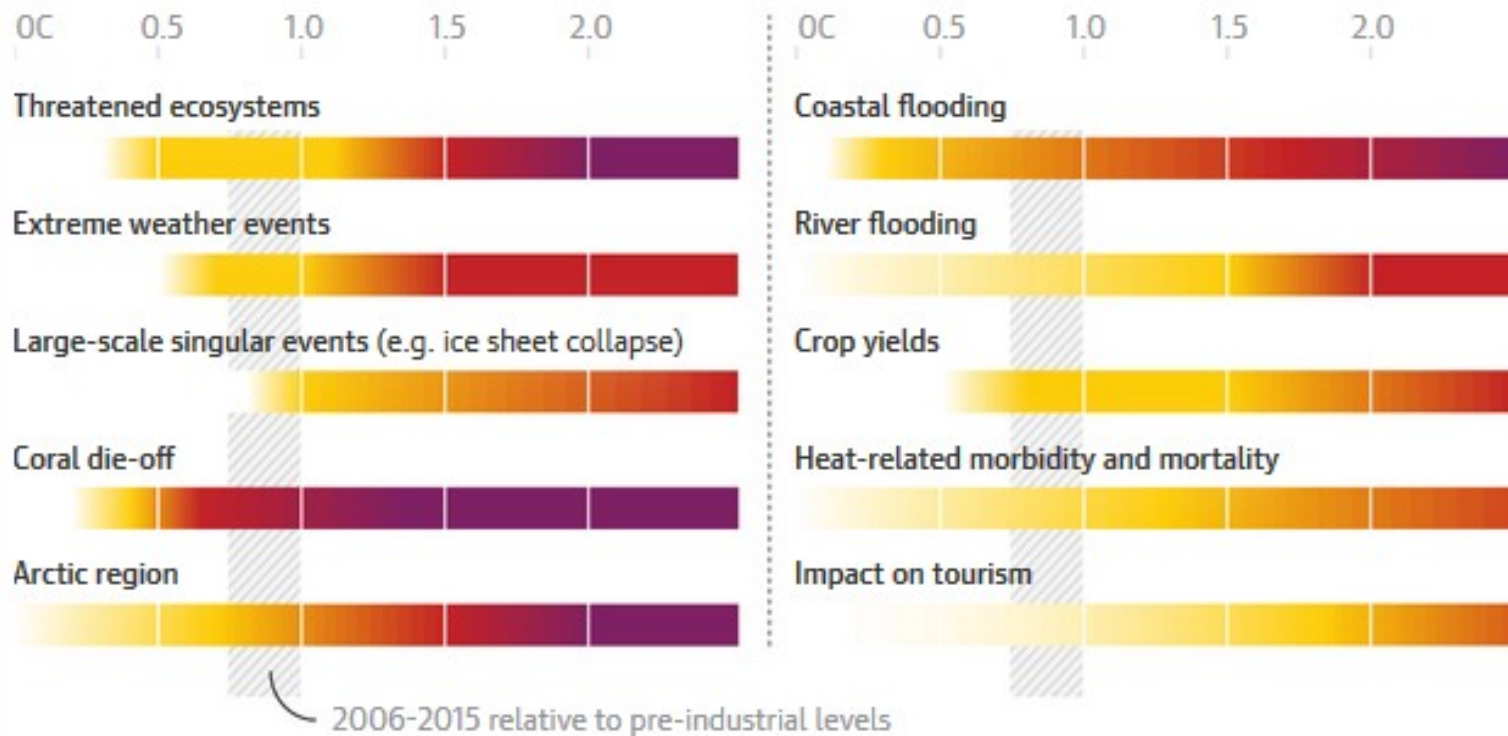
IPCC 1.5°C report 8 October 2018

Rising temperatures, rising risks

Key to impacts and risks

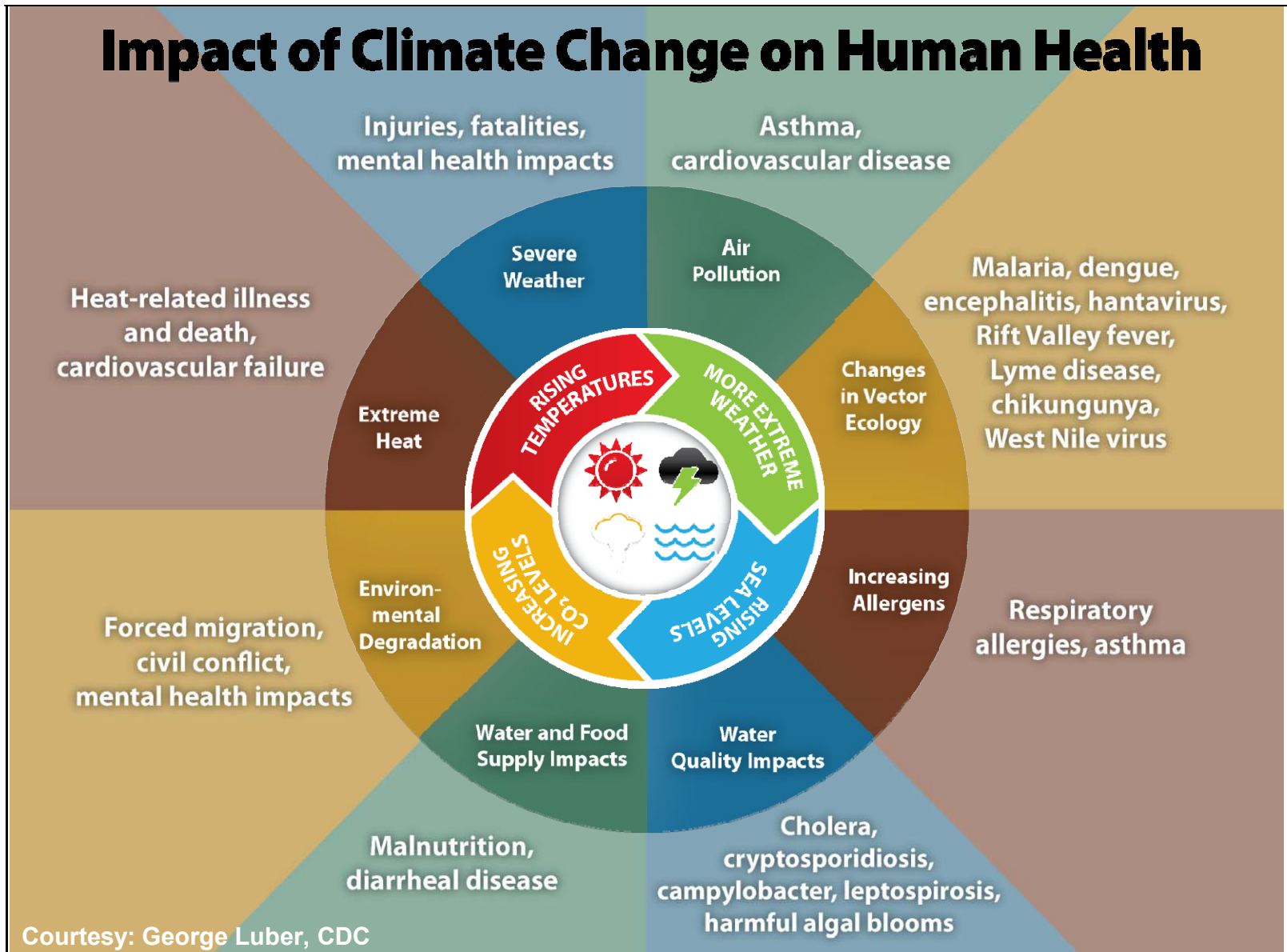


Global mean surface temperature change relative to pre-industrial levels, C



Guardian graphic. Source: IPCC Special Report on Global Warming of 1.5C

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The imperative of climate action to protect human health in Europe



EASAC policy report 38

June 2019

ISBN: 978-3-8047-4011-2















This report can be found at
www.easac.eu

- Climate change is adversely affecting human health
- Climate change can have effects on health within the boundaries of the EU and also by affecting the health of populations outside the EU.
- Rapid and decisive climate action could greatly reduce the risks to health
- Much can be done by acting on present knowledge, capitalising on the health co –benefits of decarbonisation
- The scientific community also has important roles in generating new knowledge and countering misinformation

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SHORT-LIVED CLIMATE POLUTANTS

Near term response to mitigation

SUBSTANCE	ANTHROPOGENIC SOURCES	LIFETIME IN ATMOSPHERE	LOCAL	REGIONAL	GLOBAL
BLACK CARBON (BC)		DAYS			
METHANE (CH ₄)		12 YEARS			
TROPOSPHERIC OZONE (O ₃)		WEEKS			
HYDROFLUORO-CARBONS (HFCs)		15 YEARS (WEIGHTED BY USAGE)			

Air Pollution & Climate Two Sides of Same Coin

The majority of air pollutants impact the climate (directly or indirectly)

The majority of GHG sources co-emit air pollutants (or contribute to their formation)

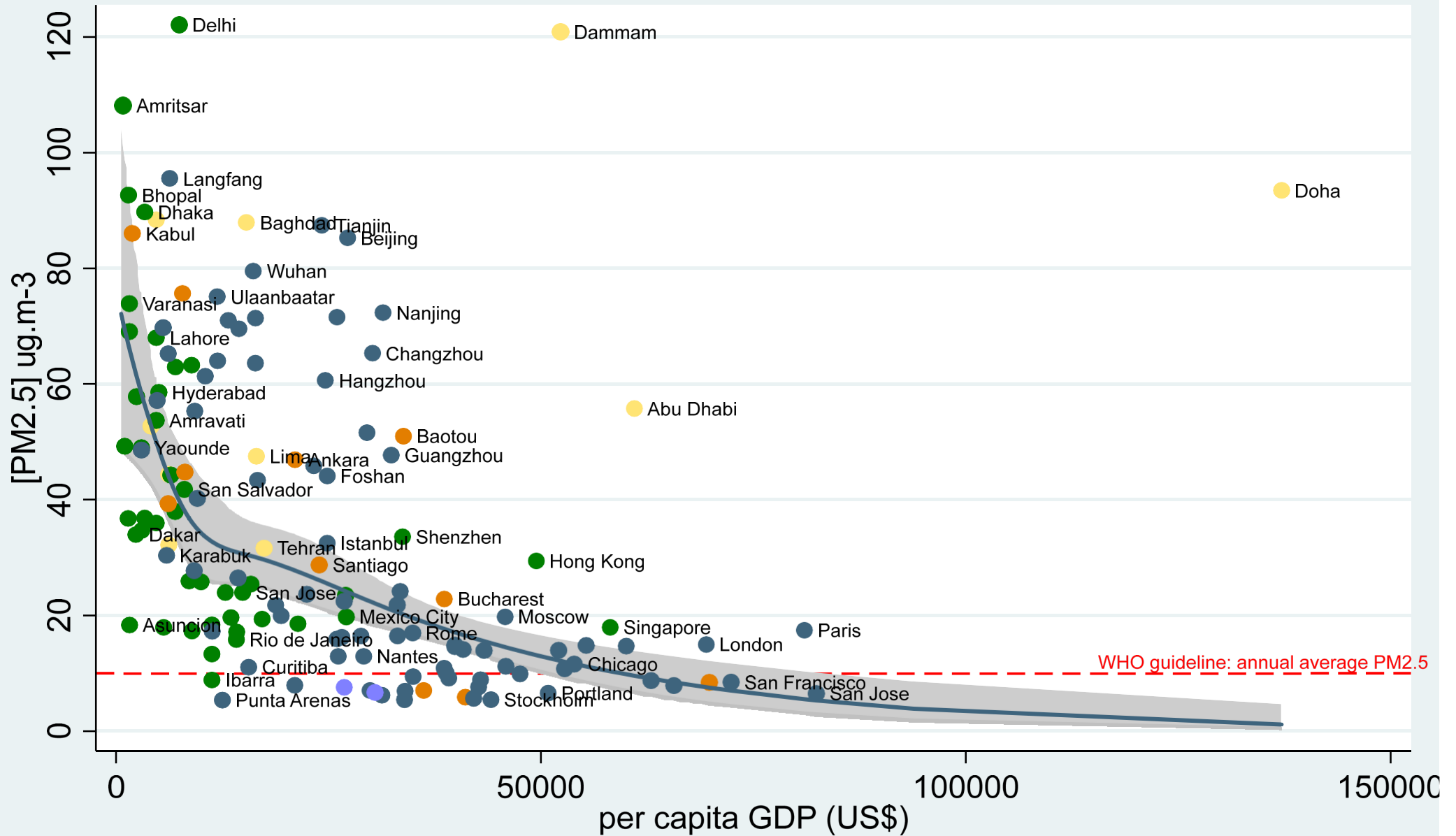
This interlinkage often multiplies the costs arising from our current dangerous pathway but is also an opportunity to amplify the benefits of our actions and catalyse even greater mitigation ambition




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Air pollution: annual average PM_{2.5}, SHUE database cities

(Milner, Wilkinson, Haines, Davies) (Wellcome Trust funded)





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LET'S CUT 7 MILLION DEATHS ANNUALLY IN HALF

BREATHELIFE.
Clean Air. Healthy Future.

 World Health Organization

 CLIMATE & CLEAN AIR COALITION

THE **INVISIBLE KILLER**

Air pollution may not always be visible, but it can be deadly.



36%
OF DEATHS FROM
LUNG CANCER



34%
OF DEATHS FROM
STROKE

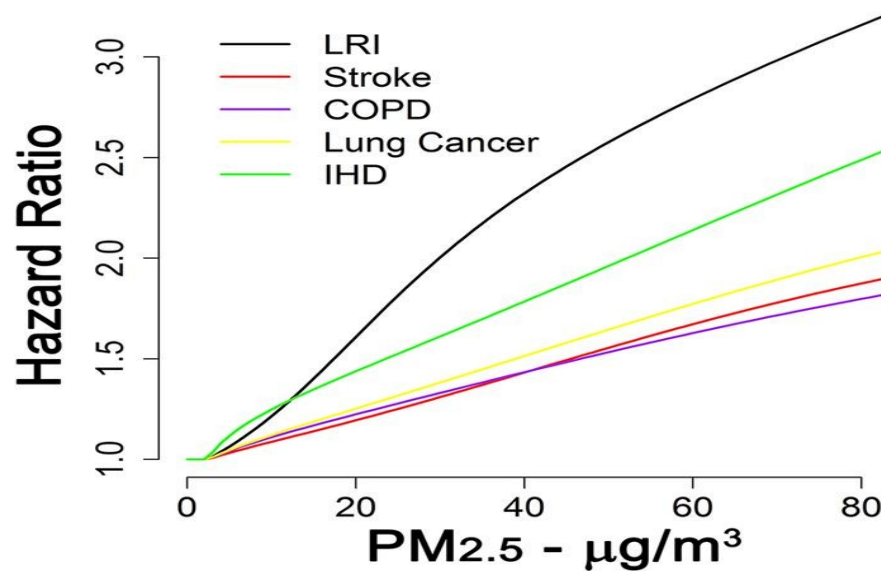
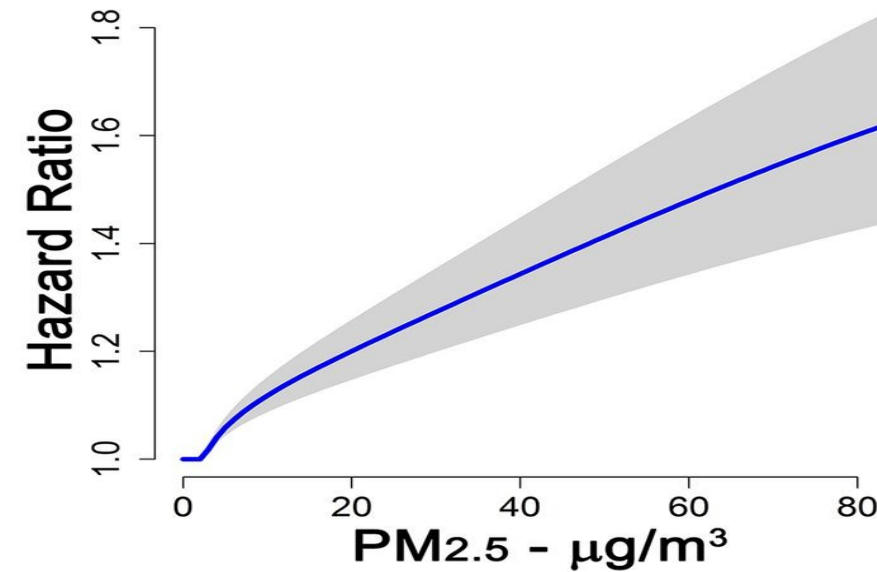


27%
OF DEATHS FROM
HEART DISEASE

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Recent (GEMM) hazard ratio predictions over PM_{2.5} exposure range for Non-communicable diseases plus Lower Respiratory Infections (NCD+LRI).

COPD = Chronic Obstructive Pulmonary Disease , IHD= Ischaemic Heart Disease



PNAS

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Air pollution risks to child and maternal health

AIR POLLUTION IS A GLOBAL CHILDREN'S HEALTH ISSUE

Globally **93%** of all children and **630 million** children under 5 years are exposed to air pollution levels* above the WHO air quality guidelines

*fine particulate matter 2.5 micrometers or less in diameter (PM2.5)



THE BURDEN OF DISEASE FROM POLLUTED AIR IS HEAVIEST IN LOW- AND MIDDLE-INCOME COUNTRIES

Percentage of children under 5 years exposed to PM2.5* levels higher than the WHO air quality guideline are:



100%
Africa & Eastern Mediterranean



99%
South-East Asia



98%
Western Pacific



87%
Americas

98% Low- and middle-income countries | **52%** High-income countries

CLEAN AIR FOR CHILDREN'S HEALTH

#AirPollution



Preterm birth



Low birth weight

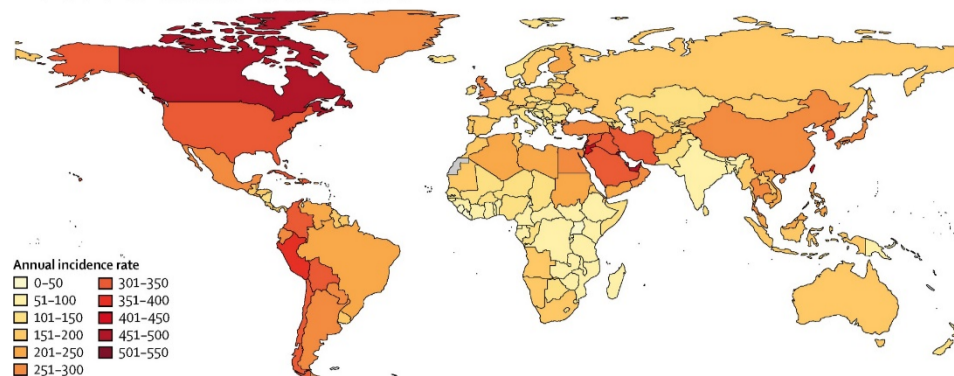
Global, national, and urban burdens of paediatric asthma incidence attributable to ambient NO₂ pollution: estimates from global datasets

Pattanun Achakulwisut, Michael Brauer, Perry Hystad, Susan C Anenberg, Lancet Planetary Health 2019

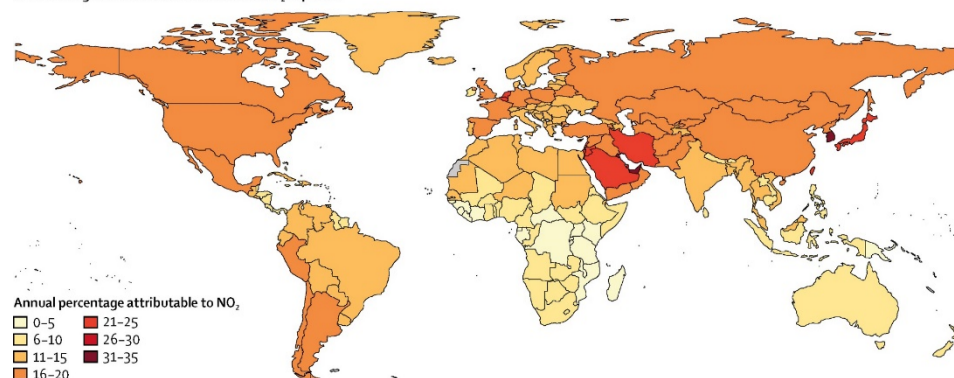
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B Number of new asthma cases due to NO₂ exposure (per 100 000)

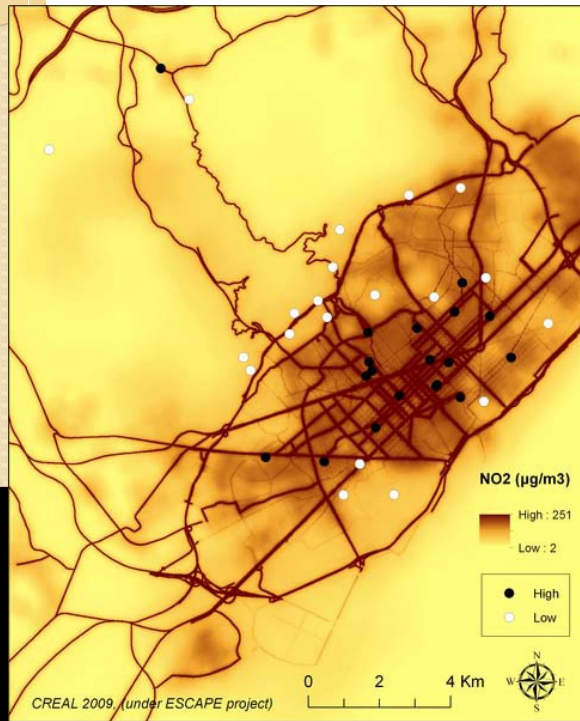


C Percentage of new asthma cases due to NO₂ exposure



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Transport –related air pollution and cognitive development in children



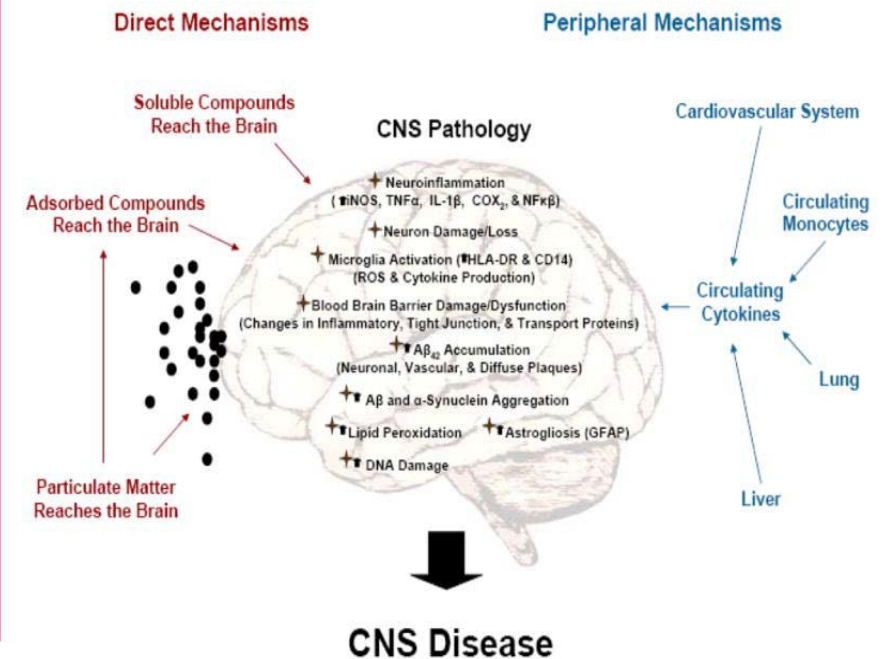
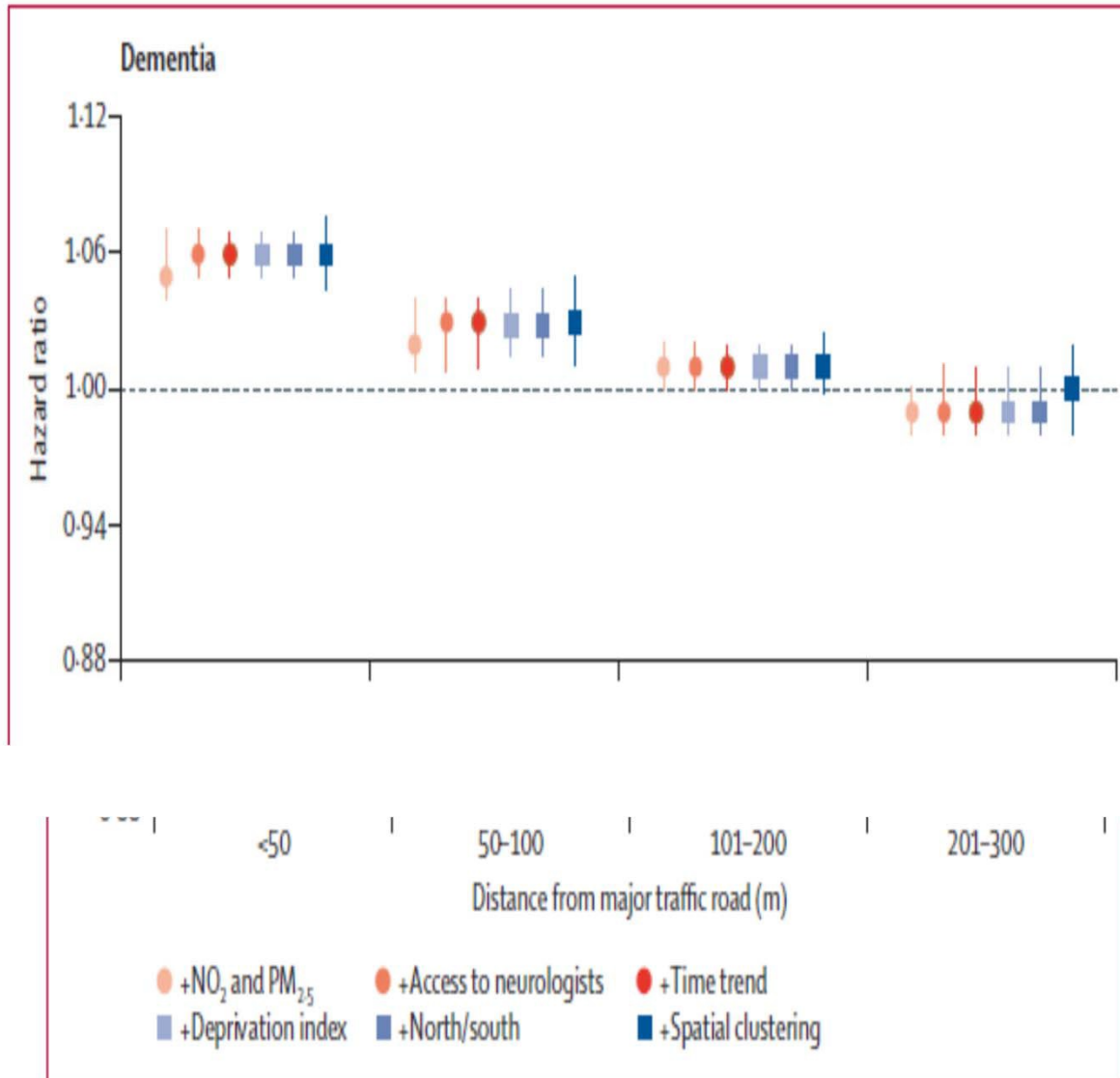
Children attending schools in Barcelona exposed to higher levels of Elemental Carbon, NO₂, and UFP experienced substantially smaller growth in all the cognitive measurements;

Jerrett J., et al. (2015) Association between Traffic-Related Air Pollution in Schools and Cognitive Development in Primary School Children: A Prospective Cohort Study. *PLoS Med*

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Possible increased risk of dementia – proximity to major road

(Chen et al Lancet 2017 :389; 718-26)



Block & Calderon-Garciduenas
2009

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THE ULTIMATE SOLUTION TO POLLUTION and to climate change

Energy switching to clean renewable sources

Transition to “circular economy”

New technologies have ‘leapfrog’ potential.



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Healthy sustainable cities



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Modelled dietary change and GHG emissions

(Milner et al 2015 BMJ Open)



- Average dietary CO₂e emissions per person in the UK are **~2050 kg/year** (or 5.6 kg/day)
- Following optimisation to **meet WHO nutritional guidelines**, CO₂e emissions per person reduced to **~1700 kg/year** (4.7 kg/day)
- **~17%** decrease in dietary GHG emissions
- The dietary changes would save **~7 million** life years over 30 years, mainly from reduced **coronary heart disease**.
- Projected increase in life expectancy of **~ 8 months**

Under 2 Degrees Celsius: Fast Action Policies to Protect People and the Planet from Extreme Climate Change

<http://ccacoalition.org/en/resources/summary-under-2-degrees-celsius-fast-action-policies-protect-people-and-planet-extreme>

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