Urban Planning: A strategic opportunity for health and wellbeing

Carolyn Daher

WELLBASED February 20th, 2025

Urban Planning, Environment and Health Initiative

ISGlobal Barcelona Institute for Global Health

Institució CERCA Centres de Recerca de Catalunya

A partnership of:

"la Caixa" Foundation

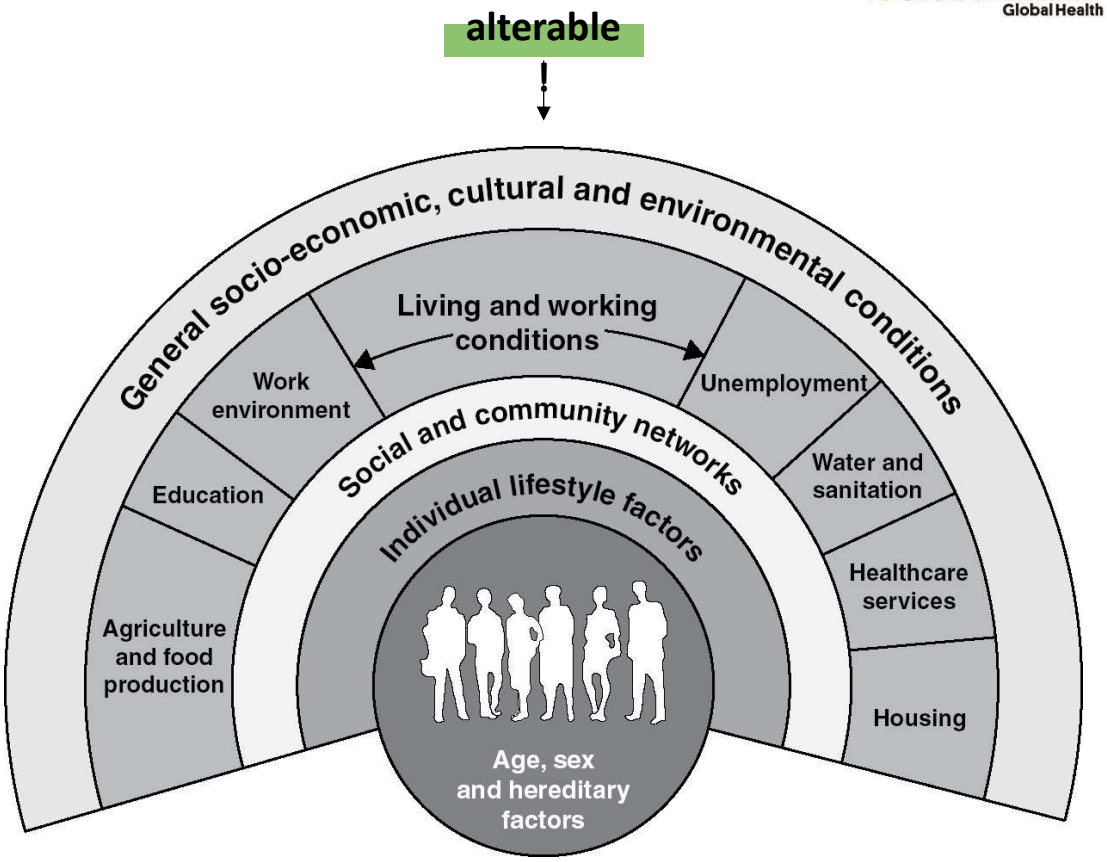
ISGlobal Barcelona Institute for Global Health

According to the WHO, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.”

Health and health determinants

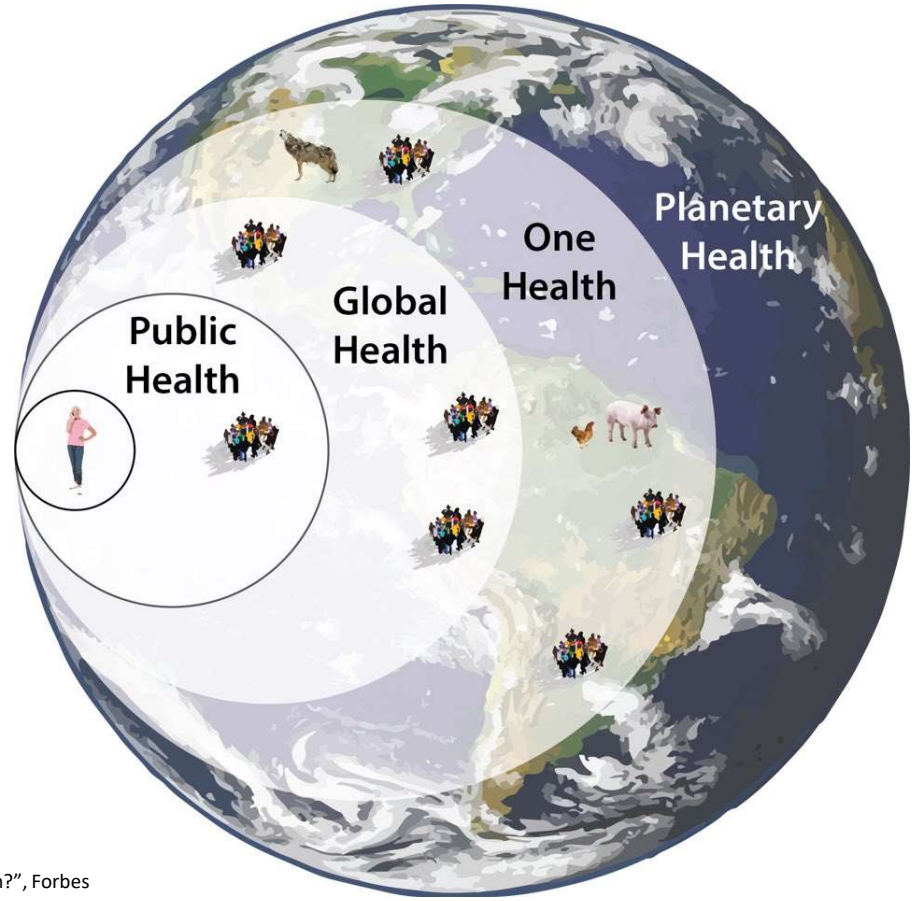
Our health is determined by socio-economic, cultural and environmental factors and public policies

According to the WHO, **23%** of global mortality is linked to environmental factors.



Dalghren and Whitehead, 1991

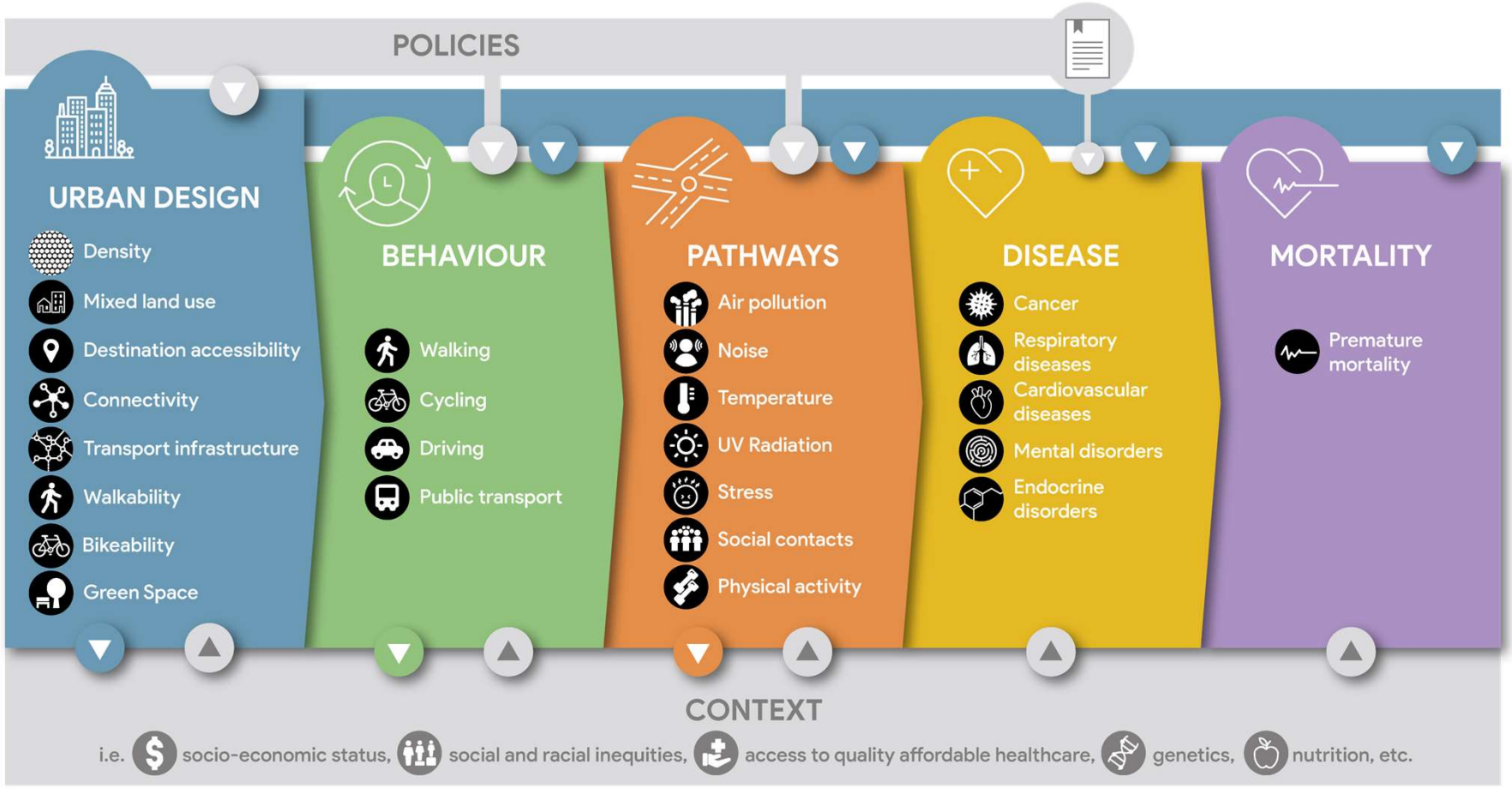
ISGlobal Barcelona Institute for Global Health



ERIC MARTY “What Is Planetary Health?”, Forbes
Apr 22, 2021

The drivers of health in cities come from outside the health sector.

Conceptual framework for the relationship between urban and transport planning, environmental exposures and human health



Nieuwenhuijsen 2016 and 2018

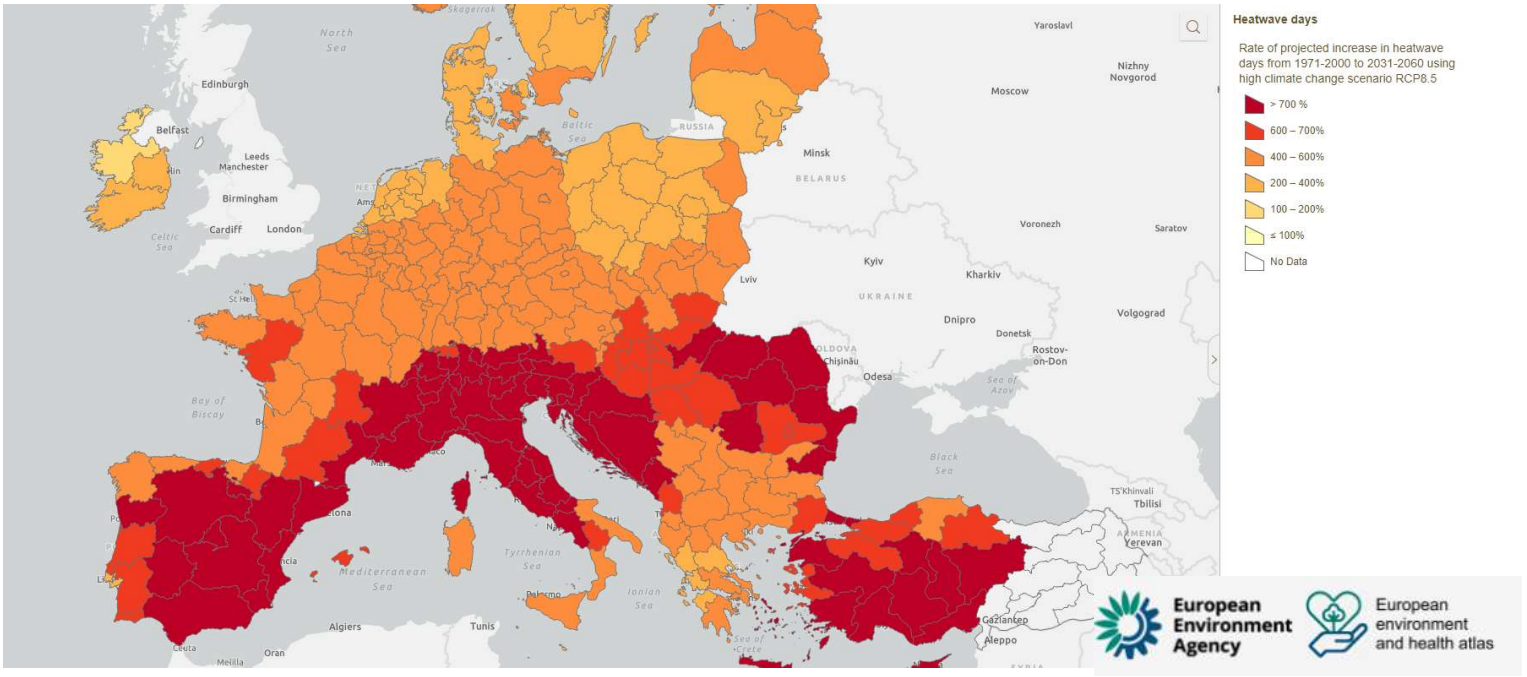
Cambio Climático

ISGlobal Barcelona Institute for Global Health

No continente, country or commuinty is immnute to the health impacts of climate change.

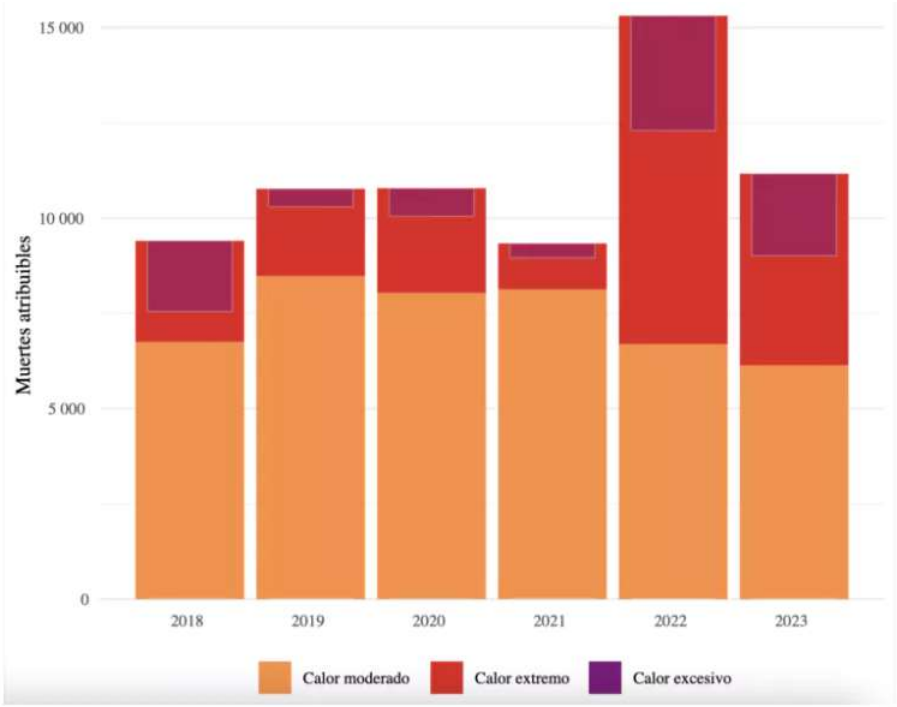
ISGlobal Barcelona Institute for Global Health

Projected increase in heat wave days 2031-2060

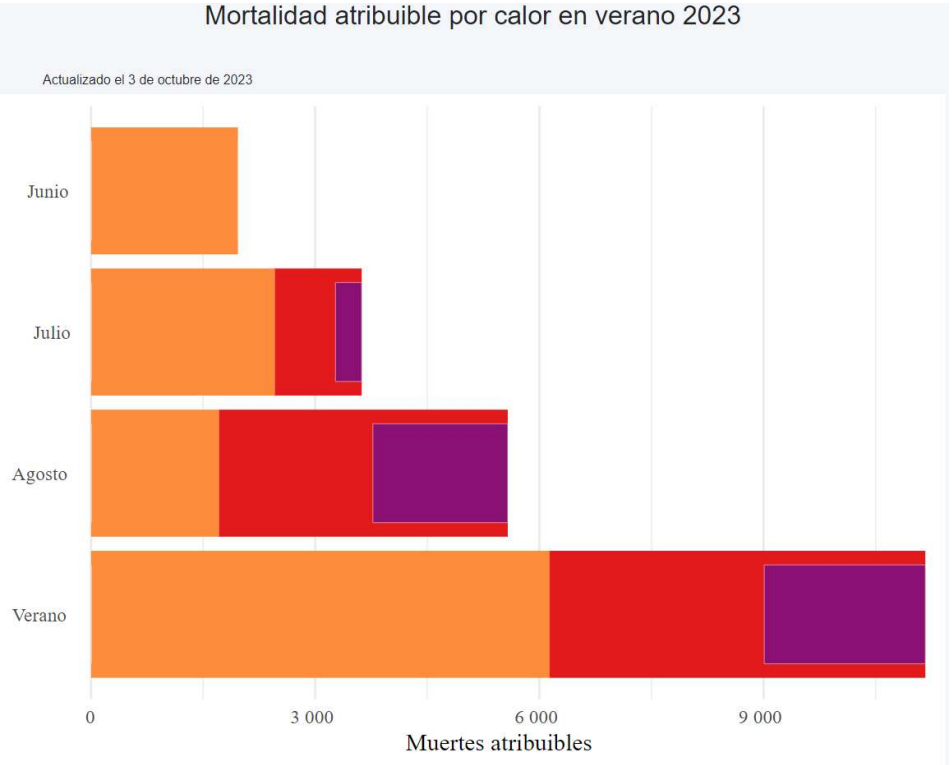


Mortalidad
Atribuible en
verano por
Calor en
España

ISGlobal Barcelona Institute for Global Health



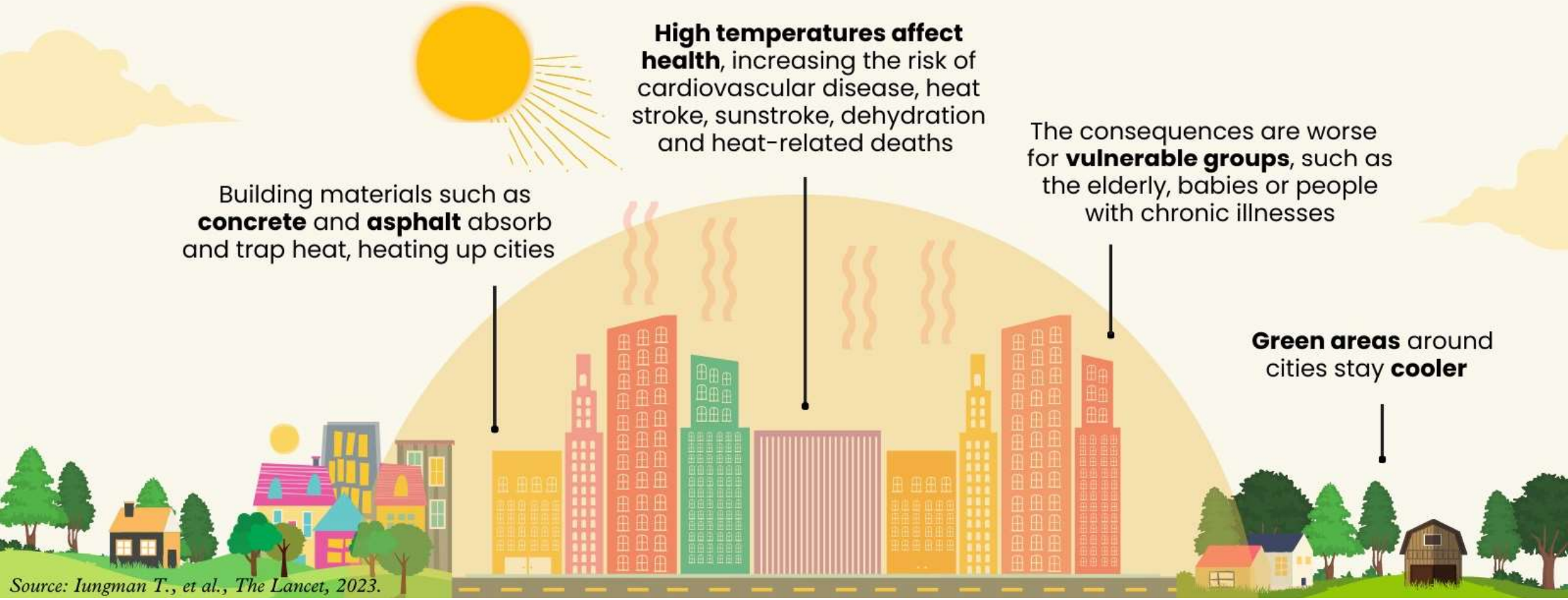
Mortalidad atribuible por calor en verano. MACE.



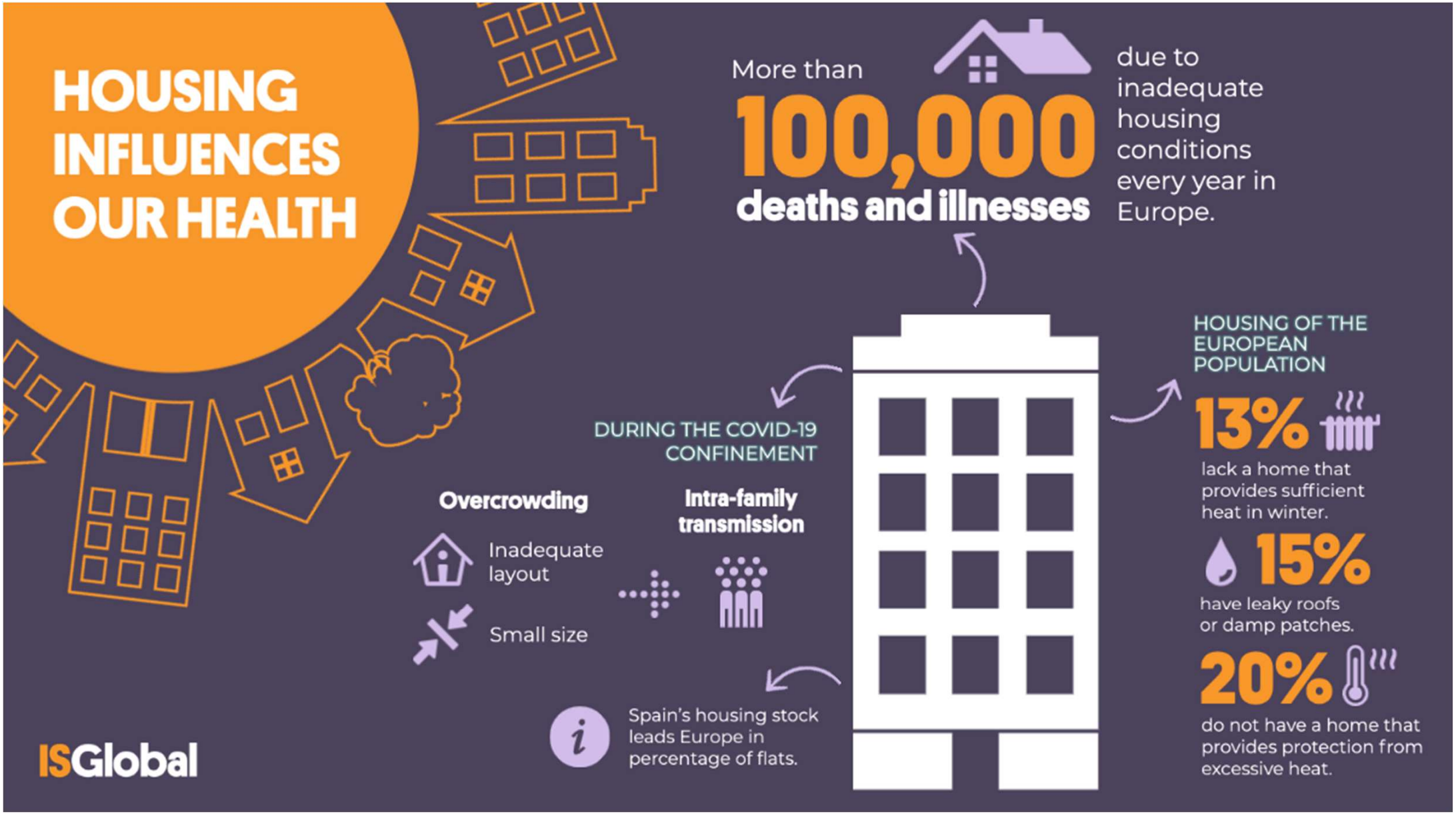
ISGlobal

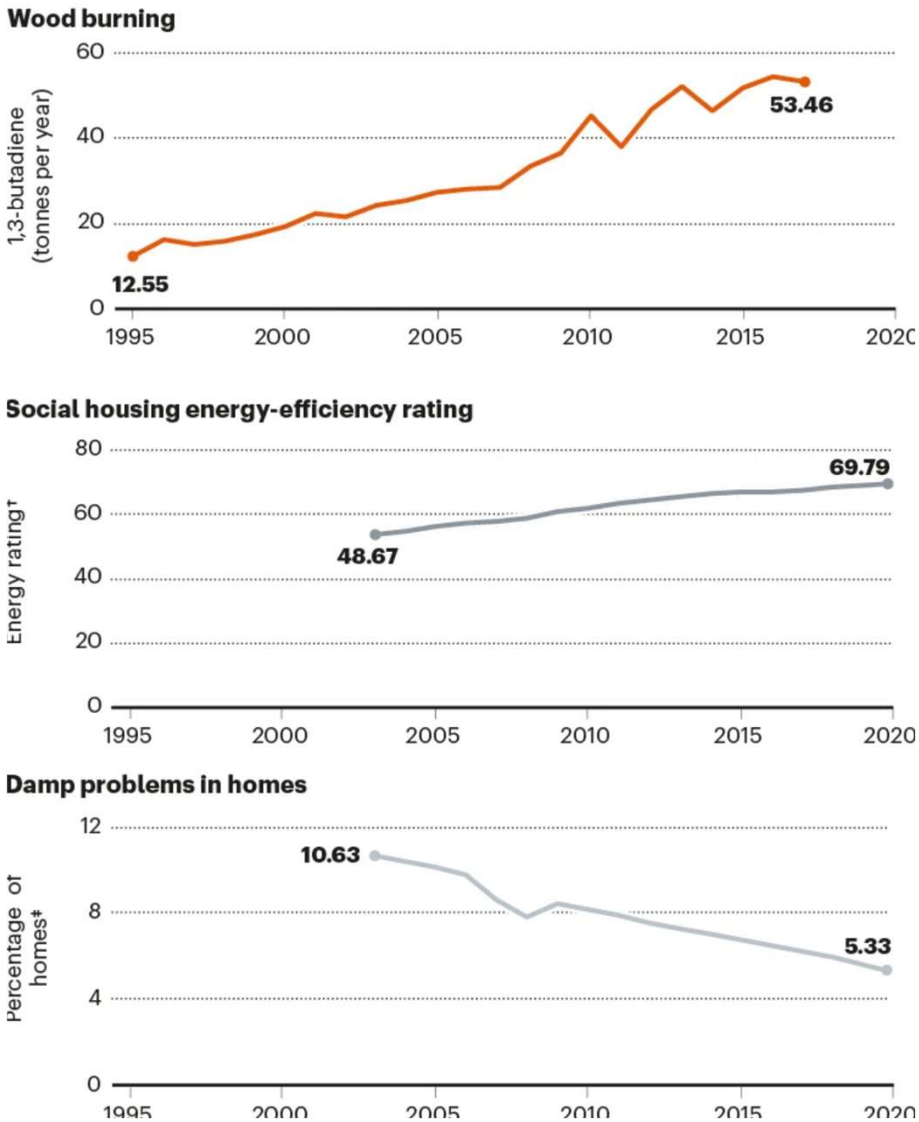
The urban heat island effect

Refers to the **increase in temperature** in **urban environments** compared to surrounding areas.



Source: Iungman T., et al., The Lancet, 2023.


HOUSING INFLUENCES OUR HEALTH
More than
100,000
deaths and illnesses
due to inadequate housing conditions every year in Europe.
DURING THE COVID-19 CONFINEMENT
Overcrowding
Inadequate layout
Small size
Intra-family transmission
Spain's housing stock leads Europe in percentage of flats.
HOUSING OF THE EUROPEAN POPULATION
13%
lack a home that provides sufficient heat in winter.
15%
have leaky roofs or damp patches.
20%
do not have a home that provides protection from excessive heat.
ISGlobal



Datos de viviendas en Inglaterra y Gales (*English Housing Survey 2020–2021*).
Fuente: [Hidden harms of indoor air pollution — five steps to expose them (nature.com)]

Connection between domestic energy insecurity and health

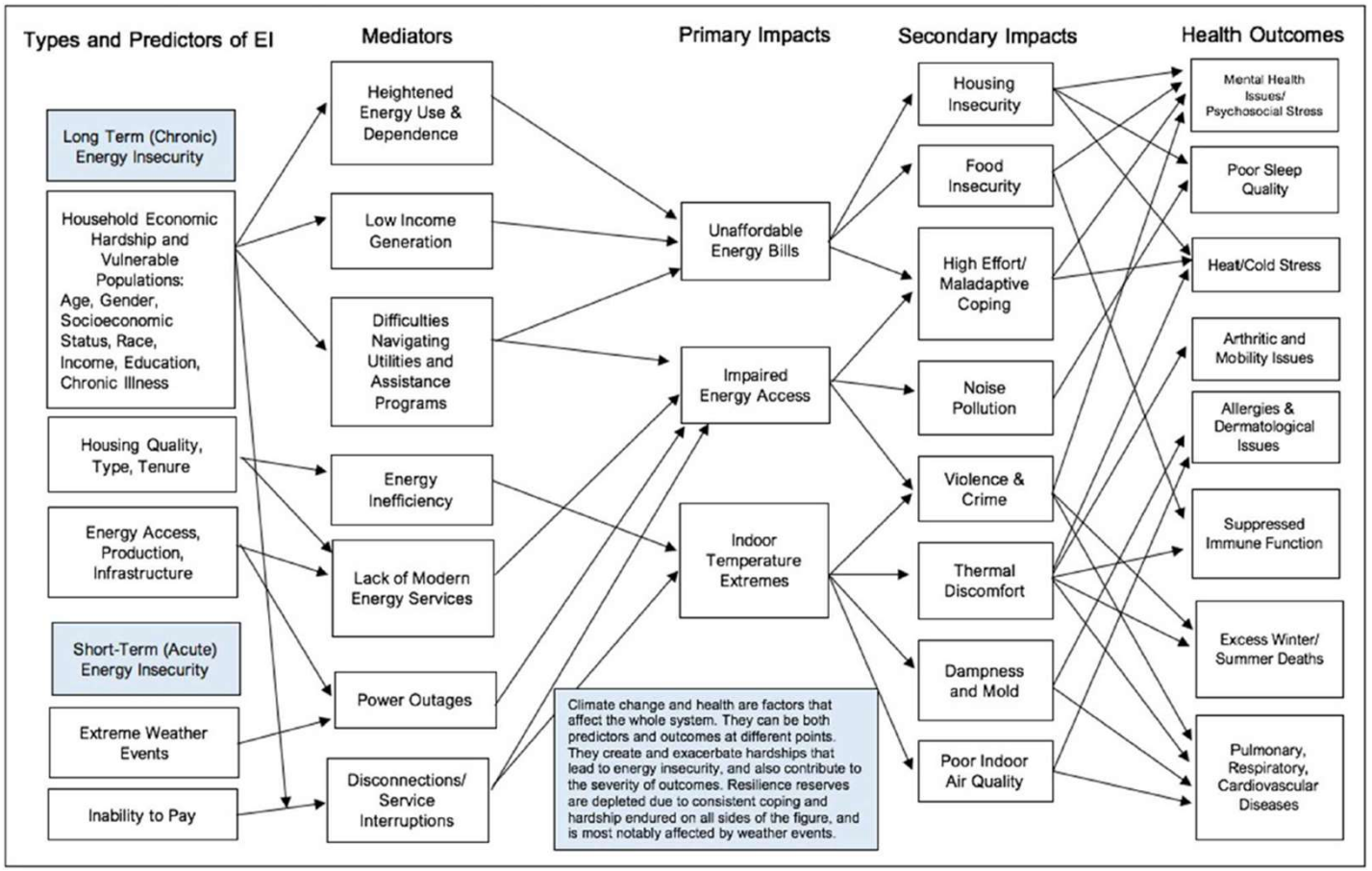


FIGURE 2 | Connection between household energy insecurity (EI) and health.

Source: Jessel, Sawyer and Hernandez (2019)
https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2019.00357/full

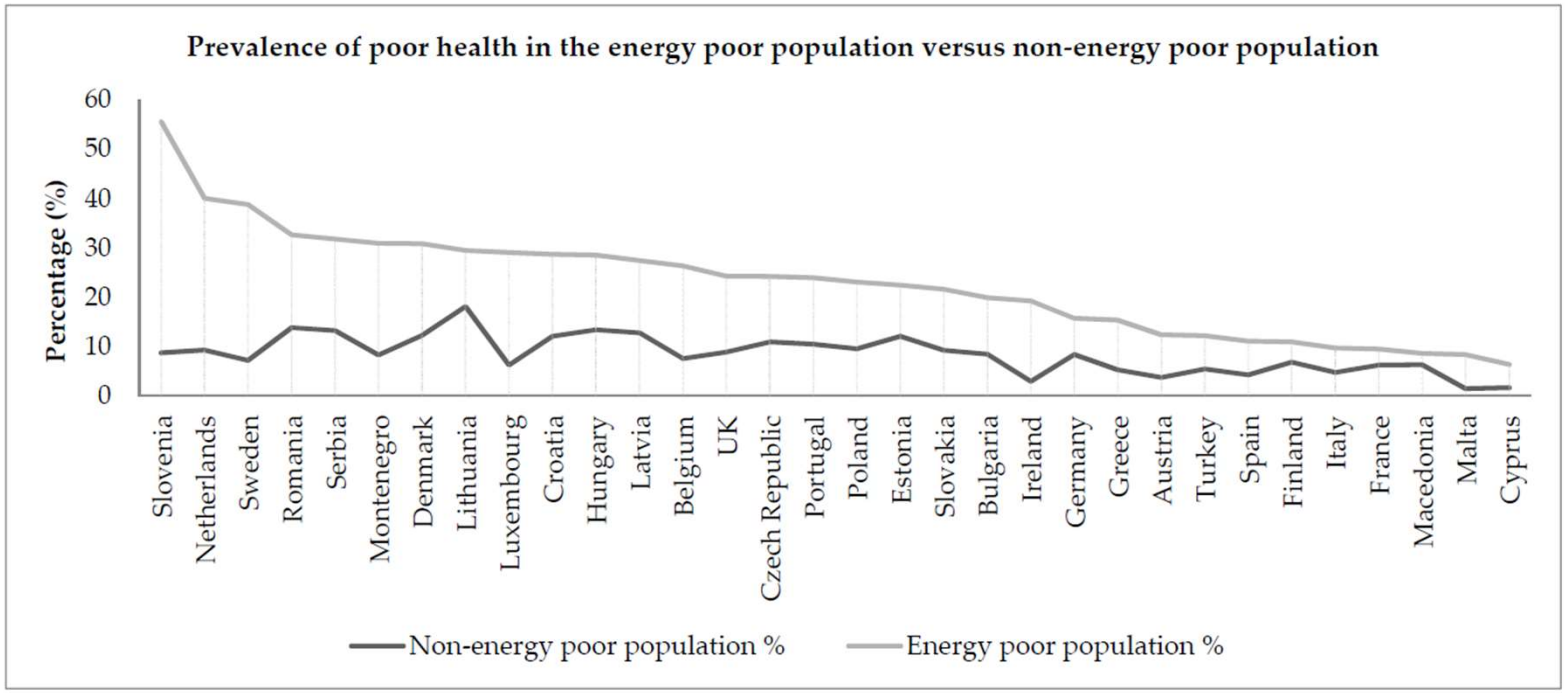


Figure 1. Line graph showing the prevalence of poor health among the energy poor and non-energy poor populations across 32 European countries.

Source: Thomson et al (2019)
https://www.mdpi.com/1660-4601/14/6/584

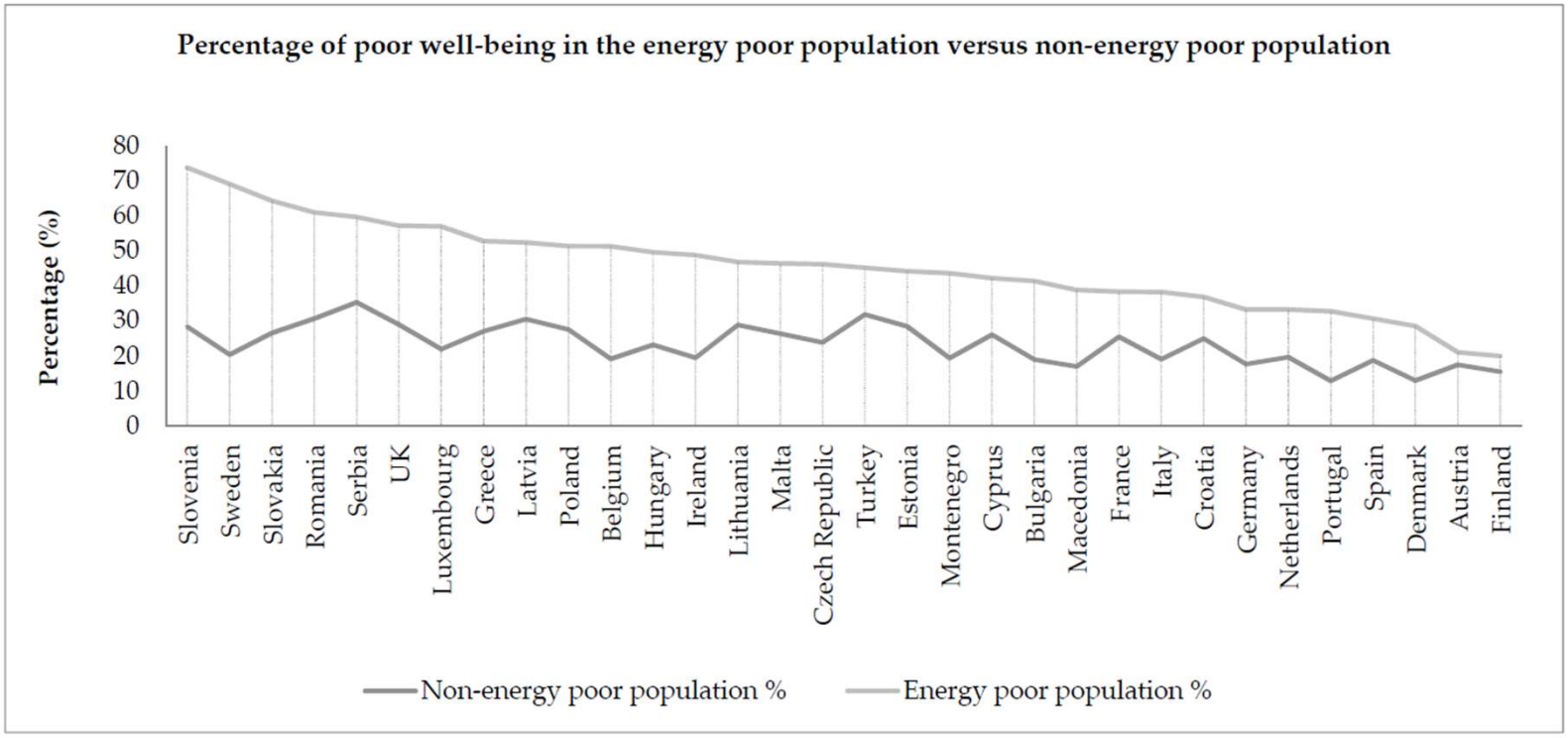


Figure 3. Line graph showing the prevalence of poor emotional well-being among the energy poor and non-energy poor populations across 32 European countries.

Source: Thomson et al (2019)
https://www.mdpi.com/1660-4601/14/6/584

Exposure to cold and heat could affect adolescents' mental health

Original Investigation | Environmental Health

January 28, 2025

Temperature Exposure and Psychiatric Symptoms in Adolescents From 2 European Birth Cohorts

Esmée Essers, MSc[1,2,3]; Michelle Kusters, MD[1,2,3]; Laura Granés, MD[1,2,4,5]; et al

» Author Affiliations | Article Information

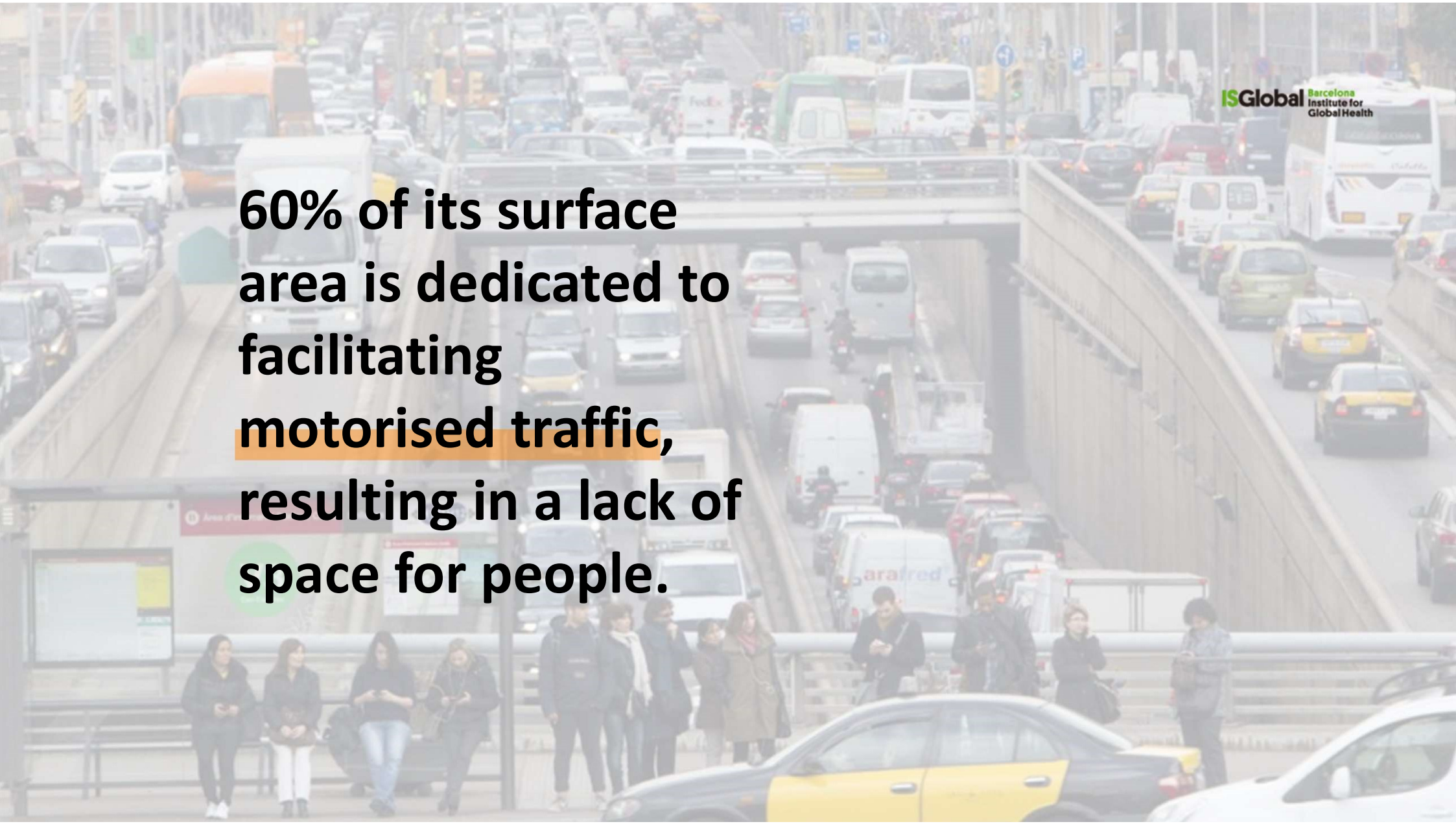
JAMA Netw Open. 2025;8(1):e2456898. doi:10.1001/jamanetworkopen.2024.56898

In this cohort study, exposure to cold in the Netherlands and heat in Spain was linked to more psychiatric symptoms.

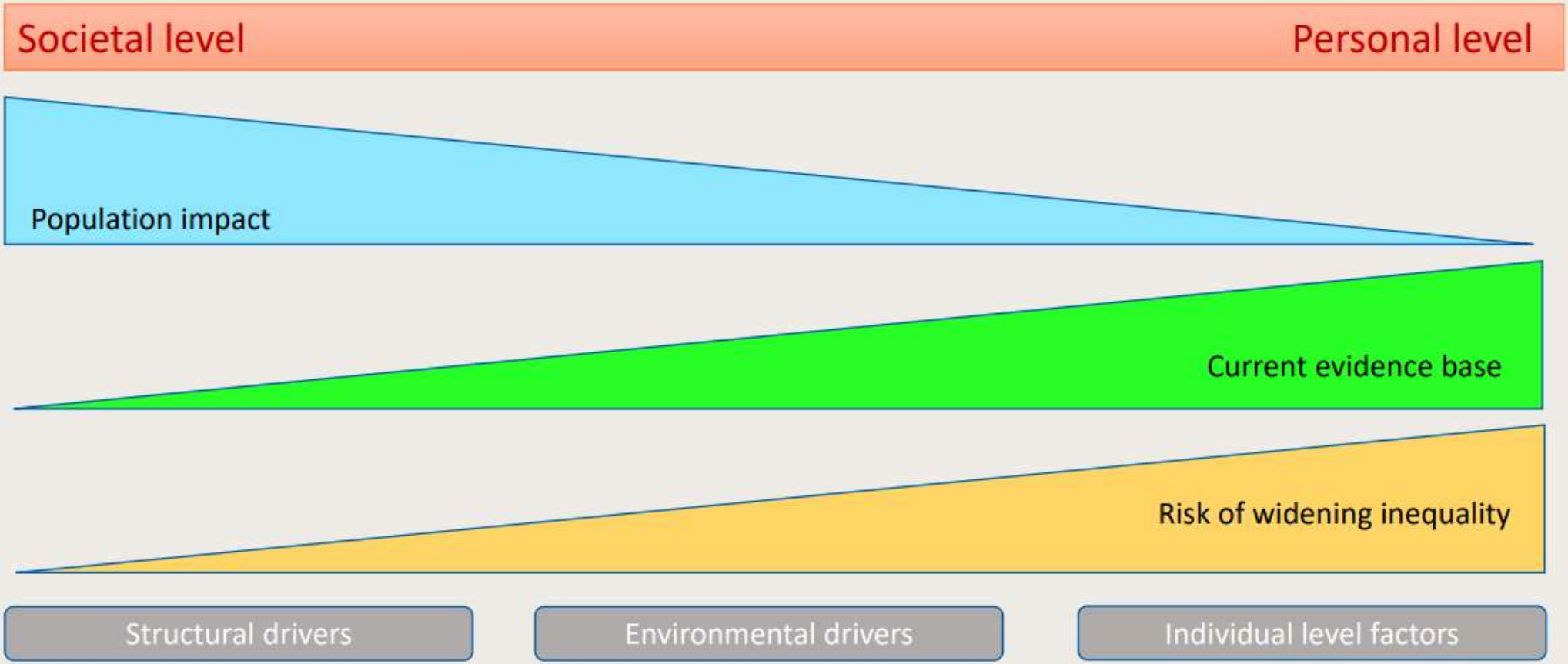
Health impacts related to the distribution and use of public space

Foto: Mediterráneo Press

Foto: Las Provincias


ISGlobal Barcelona Institute for Global Health
60% of its surface area is dedicated to facilitating motorised traffic, resulting in a lack of space for people.

Policies versus individual level interventions



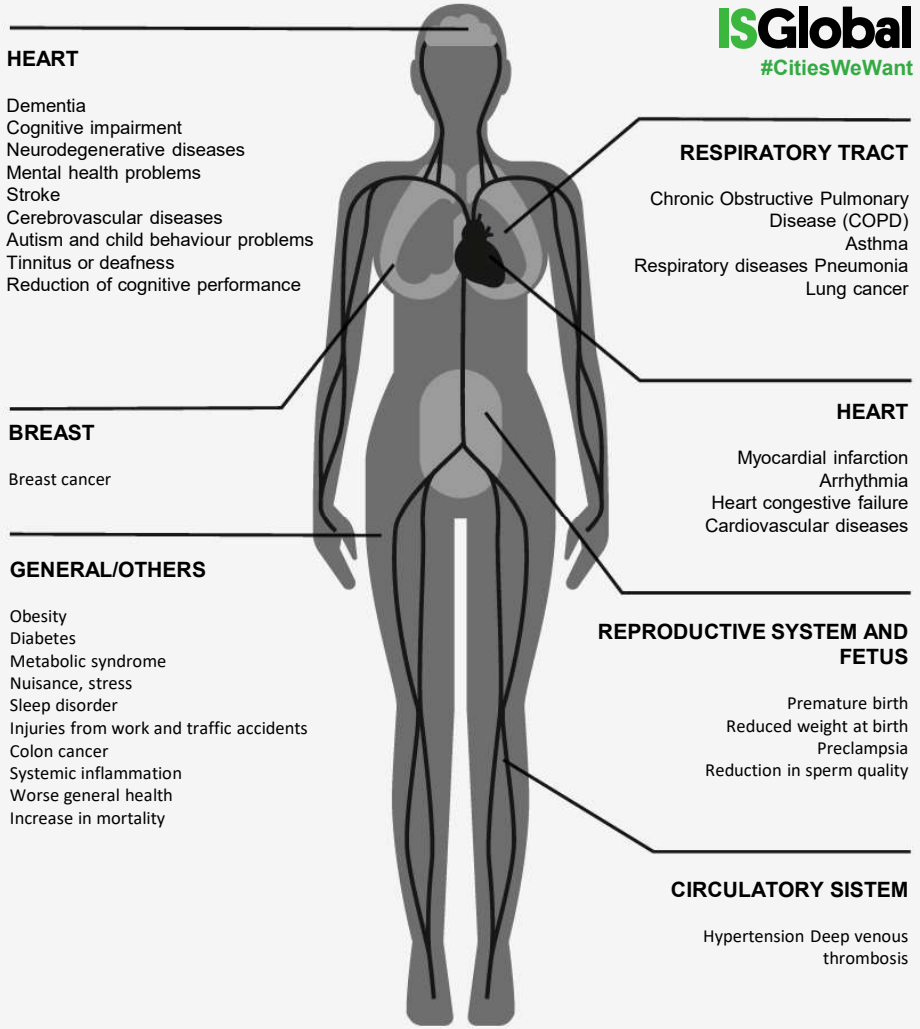
Co-funded by the European Union

How Urban Environment Impacts our Health

Health conditions associated with air pollution, noise and heat, and a lack of physical activity and naturals spaces

- Air pollution
- Noise
- Heat
- Lack of physical activity
- Lack of natural spaces

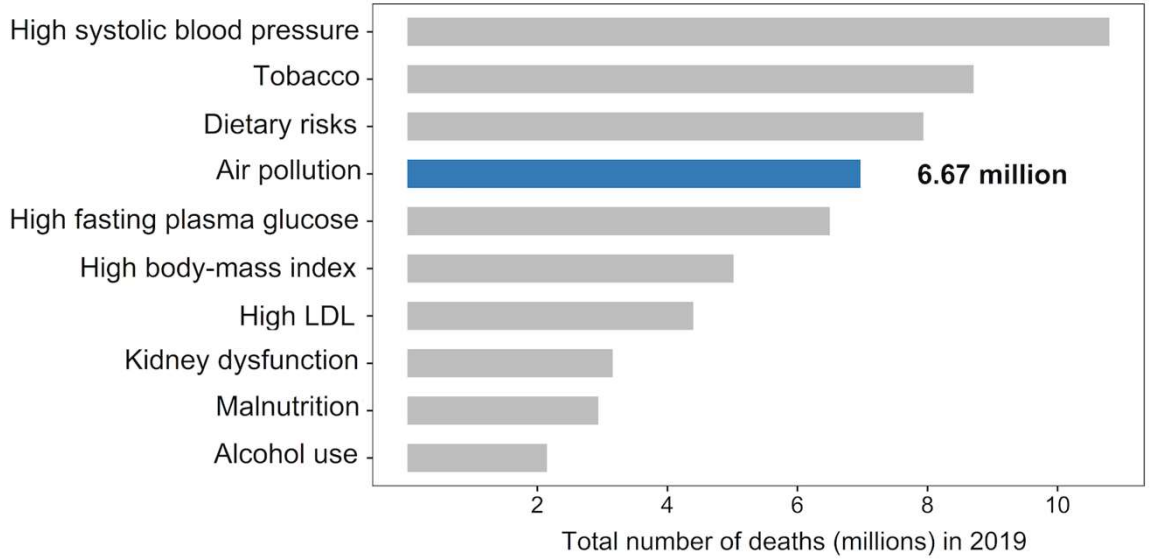
All



5 Keys to Healthier Cities

Burden of disease

Air pollutiion is the 4th **principal risk factor factor for premature mortality worldwide**



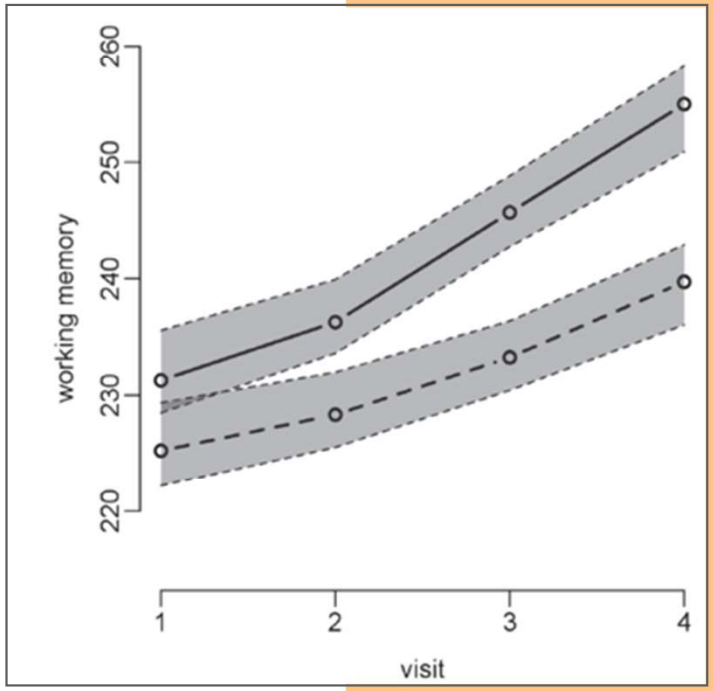
▶ Font: https://www.stateofglobalair.org/health

Figura N. Rànquing global de factors de risc per morts totals per totes les causes el 2019.

Health effects of air pollution

11,5%

In low-pollution schools, working memory increased by 11.5% in one year.



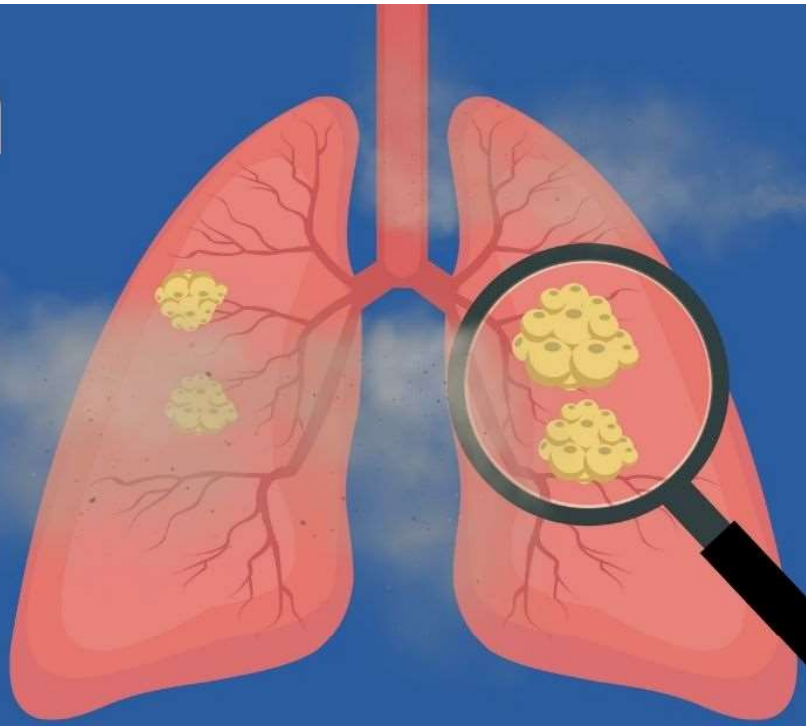
Sunyer PLOS Med 2015

7,4%

In the **most polluted schools** it increased by 7.4%.

Air Pollution and Lung Cancer

ISGlobal



Outdoor **air pollution** is **second** only to tobacco as the greatest cause of l**ung and respiratory cancers.**

Around **10-20%** of all lung cancer cases in the EU are related to air pollution.

The financial costs of lung cancer in the European Region are estimated to be over **€100 billion annually**.*

Cities are hotspots of air pollution. **Stricter ambient air quality limits** are needed to reduce air pollution related lung cancer.

*ERS 2013

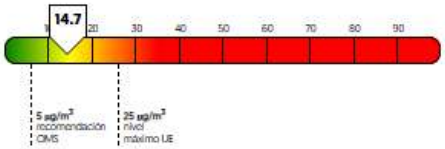
ISGlobal Barcelona Institute for Global Health

Valencia
(área metropolitana)
ESPAÑA

Contaminación | Espacios Verdes | Ruido

Contaminación atmosférica

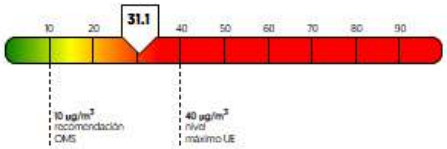
$PM_{2,5}$
(MEDIA ANUAL)



POSICIÓN EN EL RANKING

241/858

NO_2
(MEDIA ANUAL)



POSICIÓN EN EL RANKING

68/858

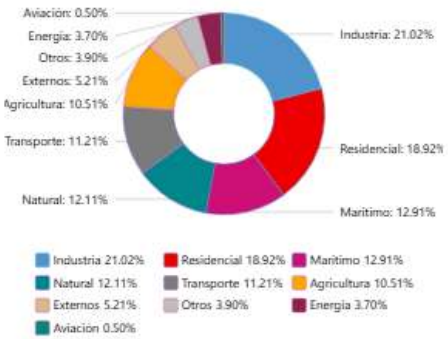
MUERTES EVITABLES

718
CUMPLIENDO CON LAS NUEVAS RECOMENDACIONES DE LA OMS (2021)

352
CUMPLIENDO CON LAS RECOMENDACIONES ANTERIORES DE LA OMS (2005)

811
IGUALANDO LOS NIVELES MÁS BAJOS DE CONTAMINACIÓN

CONTRIBUCIÓN SECTORIAL A LA MORTALIDAD ASOCIADA A $PM_{2,5}$ (EN %)



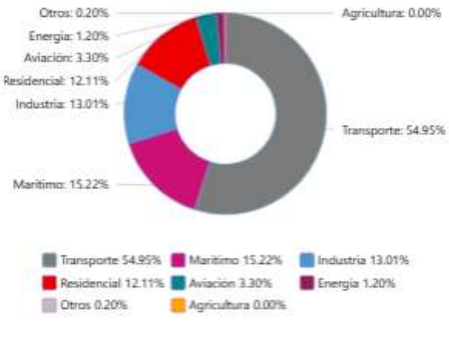
MUERTES EVITABLES

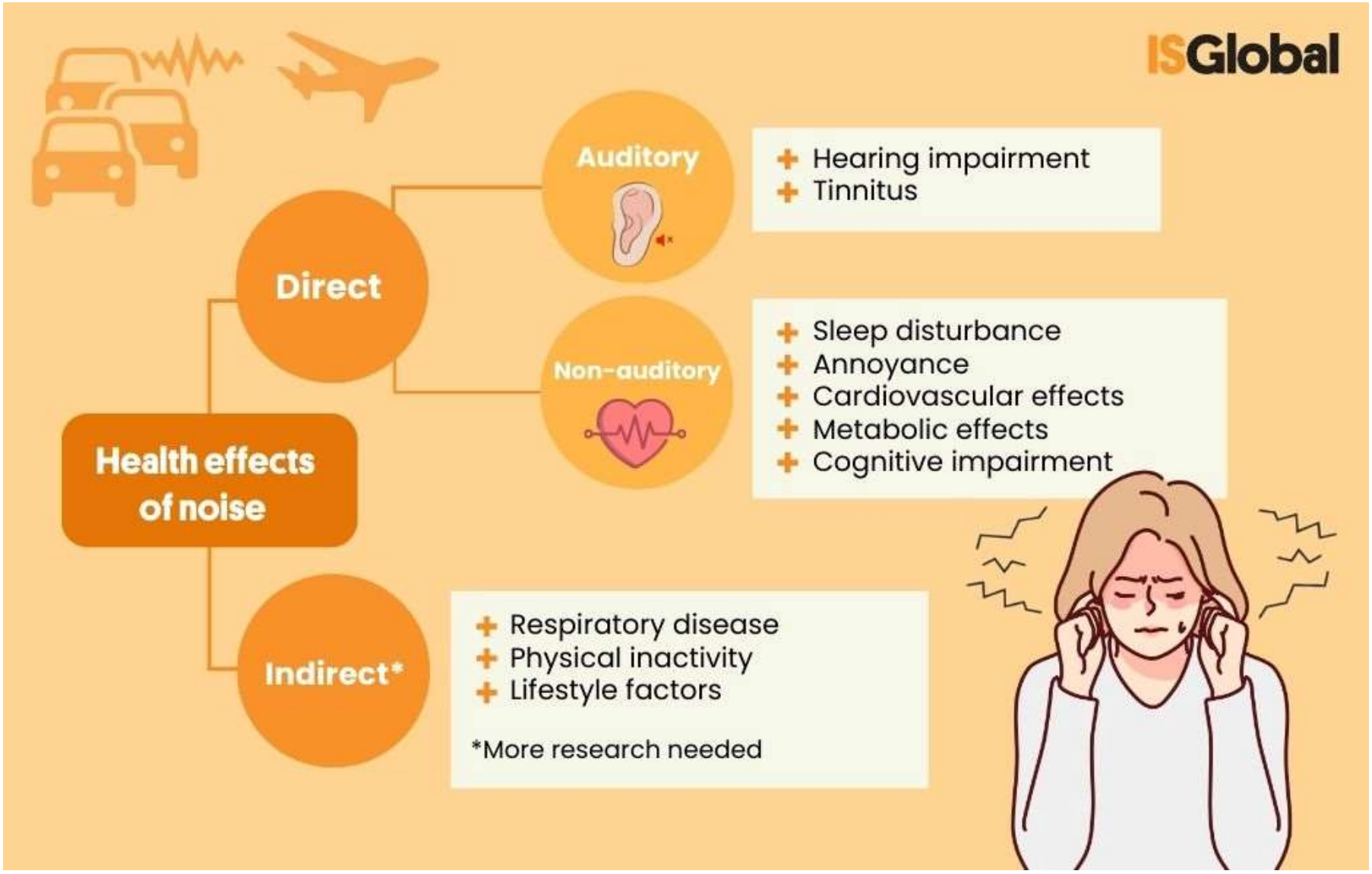
450
CUMPLIENDO CON LAS NUEVAS RECOMENDACIONES DE LA OMS (2021)

3
CUMPLIENDO CON LAS RECOMENDACIONES ANTERIORES DE LA OMS (2005)

582
IGUALANDO LOS NIVELES MÁS BAJOS DE CONTAMINACIÓN

CONTRIBUCIÓN SECTORIAL A LA MORTALIDAD ASOCIADA A NO_2 (EN %)




ISGlobal
Health effects of noise
Direct
Auditory
Hearing impairment
Tinnitus
Non-auditory
Sleep disturbance
Annoyance
Cardiovascular effects
Metabolic effects
Cognitive impairment
Indirect*
Respiratory disease
Physical inactivity
Lifestyle factors
*More research needed

Physical activity and sendentary behavior

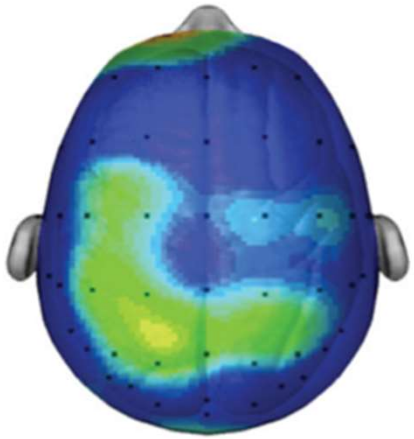
ISGlobal Barcelona Institute for Global Health

Paradigm Shift

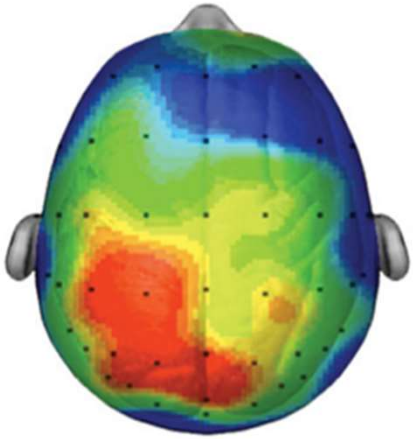
New WHO physical activity recommendations: **Every move counts.**

Effects of the lack of physical activity

ISGlobal Barcelona Institute for Global Health



After 20 minutes of sitting quietly



After 20 minutes walking

Research/scans kindly provided by Dr. Chuck Hillman, University of Illinois

1 of 4 adults in the world does not exert enough physical activity

31%

Reduction in all-cause mortality among people that exercised more.

Warburton et al.

Urban design is key in favouring physical activity in cities

"Walkable" environments + Cycle lanes + Public transport =

More physical activity in cities

ISGlobal

ISGlobal

Over 4% of summer mortality in European cities is attributable to urban heat islands

30%

Increasing **tree cover** in cities to **30%**

can reduce the **temperature** of urban environments by up to **1.3 °C**

and **prevent 1/3 of premature deaths** attributable to urban heat islands in summer

Source: Iungman T., et al., The Lancet, 2023.

ISGlobal

Benefits of urban green infrastructure

Reduces risk of **cardiovascular disease** and **cancer**

Reduces **air** and **noise pollution**

Promotes **physical activity**

Improves **mental health** and increases **life satisfaction**

Improves **memory** and **attention**

Decreases the **urban heat island** effect

Source: Lungman T., et al., The Lancet, 2023.

ISGlobal

Annual preventable mental health problems through Green Corridors in Barcelona

Mental health indicator	Preventable cases (total)	Preventable cases (%)
Perceived risk of poor mental health 	31,353	14.03%
Tranquilliser /sedative use 	9,476	8.11%
Antidepressant use 	13,375	13.37%
Visits to mental health specialists 	16,800	13.37%

Source: Vidal Yáñez et al, Environ Health Perspectives, 2023.

ISGlobal

GREEN SPACES AND MENTAL HEALTH

A study led by ISGlobal estimates that implementing **Green Corridors** throughout the city of **Barcelona**:

COULD REDUCE:

14% of cases of self-perceived mental ill health

13% of visits to mental health professionals

13% of antidepressant use

8% of the use of tranquillisers or anxiolytics

AND INCREASE:

5,7% of Barcelona's green surface

Estimated savings in direct and indirect mental health costs are:

45 million euros per year

Source: Vidal Yáñez et al, Environ Health Perspectives, 2023.

Blue Spaces & Health

What is the link between health and spaces with water?

What are blue spaces?

Natural spaces, like oceans or rivers

Artificial spaces, like ponds or fountains

Blue spaces & physical activity

People who live closer to a coast or a river were more likely to walk more than

300 minutes per week

(Wilson et al. 2011)

Limited scientific evidence

An ISGlobal review of

35 studies shows association with more physical activity and better mental health

Blue spaces & mental health

People who live within

5km of a coast report better mental health

(White et al. 2013)

ISGlobal

isglobalranking.org

CITIES IN EUROPE COULD PREVENT UP TO

43.000 deaths each year

if they achieved the WHO recommendations on access to

green space.

Over **60%** of population has insufficient access to green space.

#ISGlobalRanking

ISGlobal RankingOfCities

Espacios Verdes

ISGlobal Barcelona Institute for Global Health

Índice de vegetación (NDVI)

POSICIÓN EN EL RANKING

698/866

% DE POBLACIÓN POR DEBAJO DEL OBJETIVO DE NDVI

62,40%

MUERTES EVITABLES

138

CUMPLIENDO LAS RECOMENDACIONES DE LA OMS

Área Verde (GA)

POSICIÓN EN EL RANKING

528/866

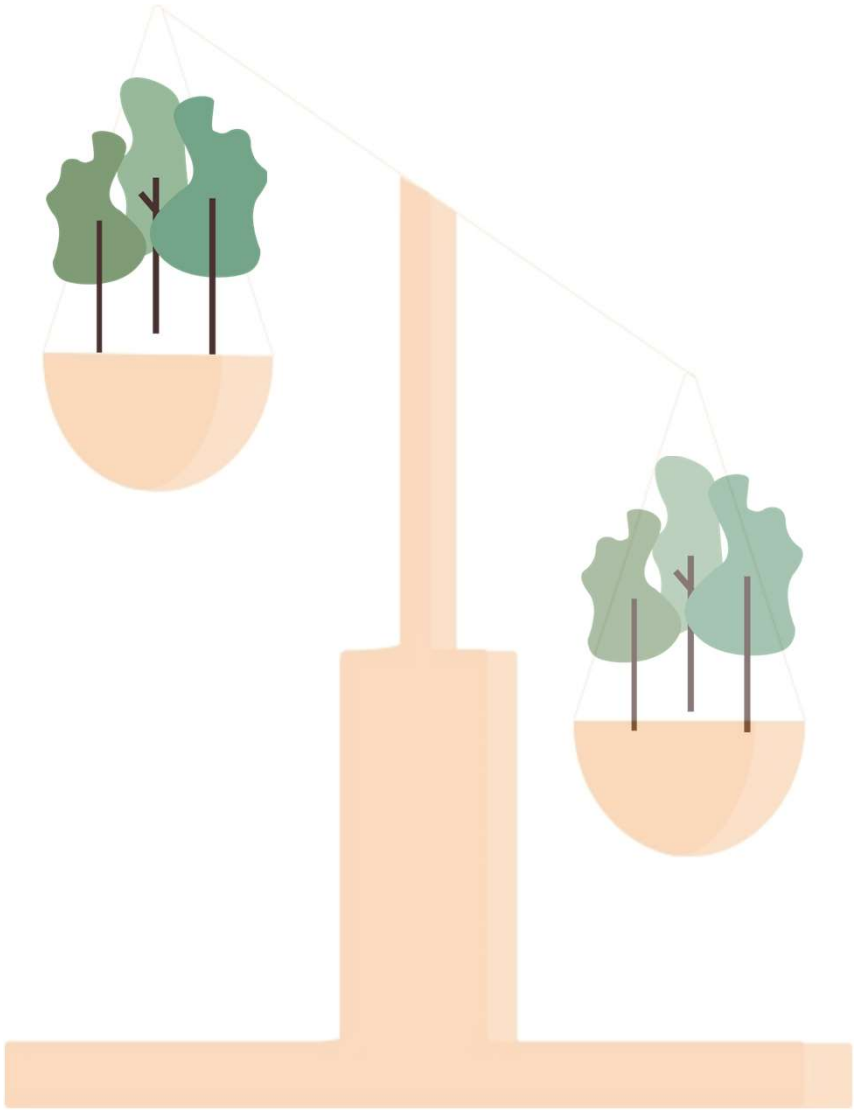
% DE POBLACIÓN POR DEBAJO DEL 25% DE GA

57,34%

MUERTES EVITABLES

87

CUMPLIENDO LAS RECOMENDACIONES DE LA OMS



The distribution of nature in cities is a key determinant of its health impact.

ISGlobal Barcelona Institute for Global Health

What can we do?

SDGs with connections to health

ISGlobal Barcelona Institute for Global Health

Multisectorial approach

Multi sectorial and systemic approaches are needed to address current problems and find solutions

Courtesy of Jo Ivey Boufford

Designers, architects and urban and transport planners have a critical opportunity to protect and promote health.

https://habitasventila.org/guia-ventilacion/

The 3-30-300 Rule

Fuente: Konijnendijk, C.C. Evidence-based guidelines for greener, healthier, more resilient neighbourhoods: Introducing the 3–30–300 rule. *J. For. Res.* (2022). https://doi.org/10.1007/s11676-022-01523-z

Health Impact Assessment:
A Scientific Tool to Build Healthy Cities

ISGlobal

Impacts on health

It estimates the potential effects of a particular intervention on the health of the population.

Reduction of Inequities

It assesses the distribution of these effects across the population, e.g. by socioeconomic vulnerability.

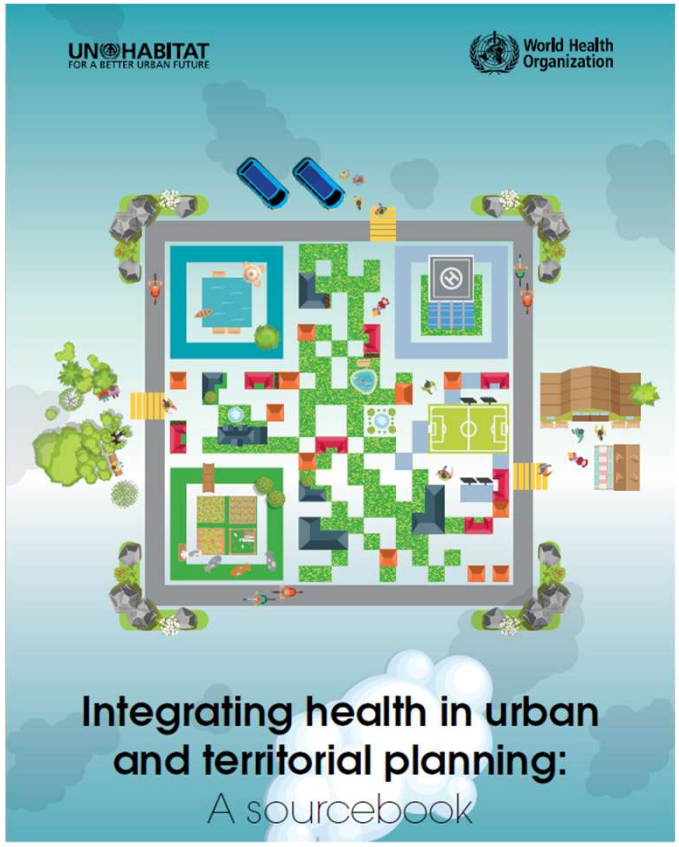
Decision making

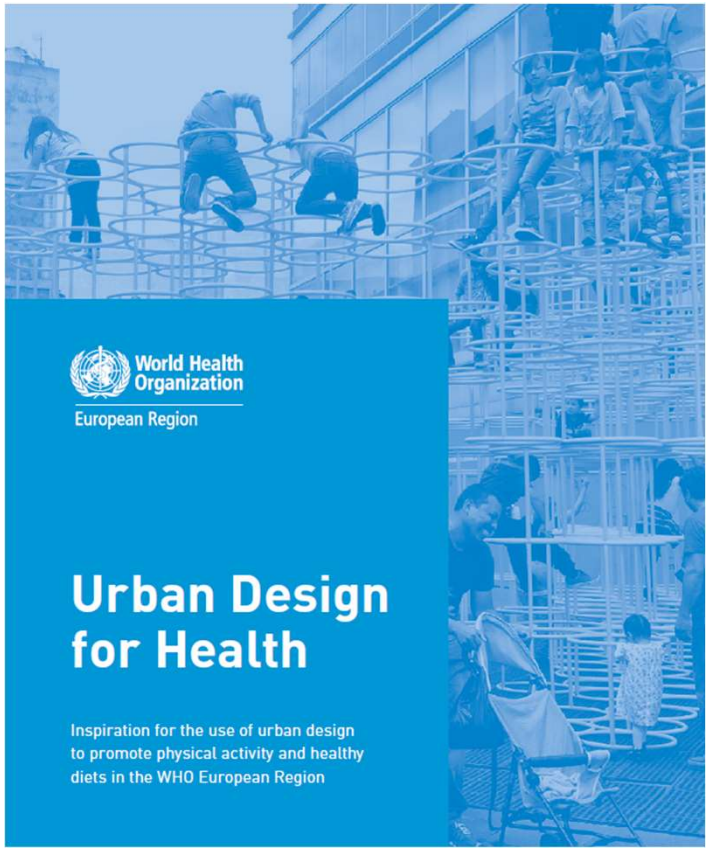
It helps stakeholders make informed decisions before, during and after the intervention.

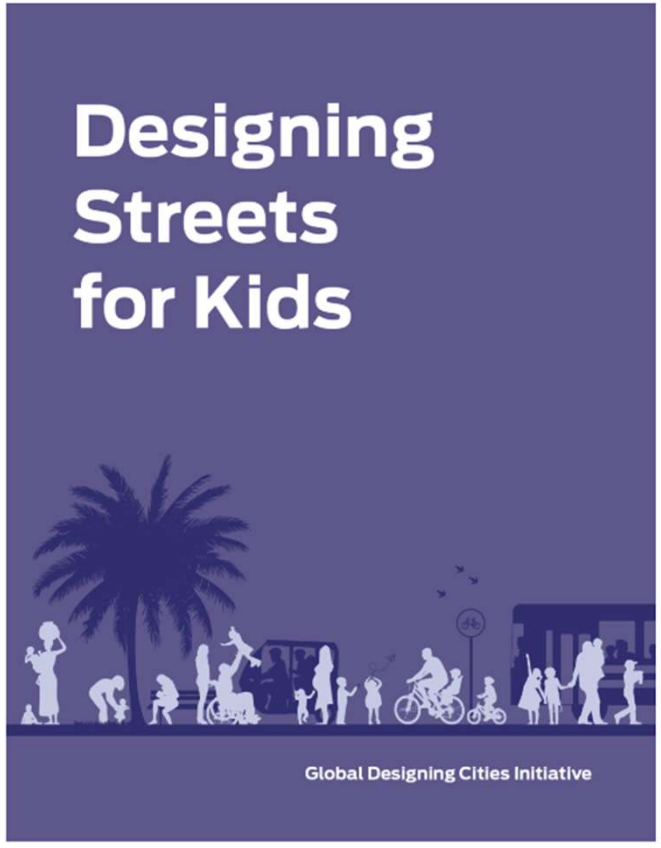
Increasing use

An assessment in Barcelona demonstrated that a better urban planning could prevent 3,000 deaths annually.

ISGlobal Barcelona Institute for Global Health







New online courses open to everyone

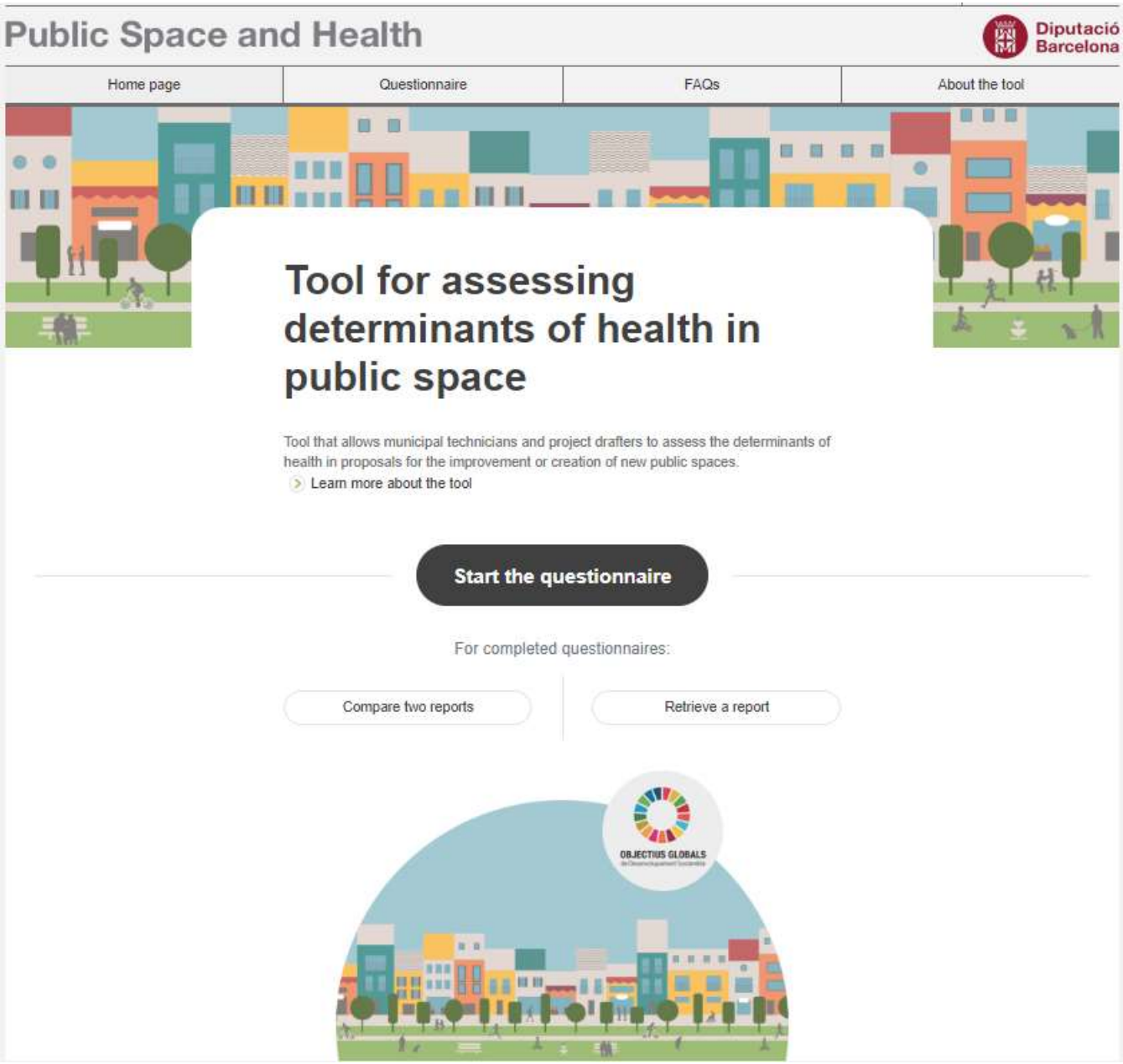
A collaboration between ISGlobal and EIT Urban Mobility.

Funded by the European Union

The Urban Heat Island effect: How to tackle excess heat in cities

Tackling noise pollution in cities

ISGlobal Instituto de Salud Global Barcelona



ISGlobal Barcelona Institute for Global Health

Citizen participation

ISGlobal Barcelona Institute for Global Health

Engage with communities to

empower and make change

Citizen Science

Tidy Street, Brighton, UK (2011)

Through a digital platform, Tidy Street residents could measure their energy consumption and the amount of their electricity bills. The average in the measurement was reduced by 15%, and in some cases up to 30% in the reduction of electricity costs. This has resulted in improvement in household economies, and great awareness of energy costs.

Fuente: https://nomadaq.blogspot.com/2011/11/tidy-street-project.html

Ventila por tu Salud

ISGlobal Barcelona Institute for Global Health

Herramienta asociada a la guía básica de criterios y recomendaciones para ventilar nuestro hogar mejor.

Completa este breve cuestionario de 10 preguntas sobre las características de tu vivienda y obtén algunas claves sobre cómo ventilar mejor.

Empezar

Más de la mitad del aire que respiramos a lo largo de nuestra vida es inhalado dentro de nuestro hogar (referencia)

El aire interior puede estar hasta cinco veces más contaminado que el aire exterior (referencia)

La calidad del aire interior en las viviendas empeora notablemente en invierno, ya que las personas suelen evitar ventilar cuando hace frío

Existen múltiples enfermedades (cardíacas, del sistema respiratorio o cardiovascular, así como reacciones alérgicas) atribuibles a una exposición a aire interior contaminado (referencia)

Costs?
vs
Investments!

Investing in home improvements makes sense from an economic point of view.

Housing deficiencies have negative impacts that can lead to poorer health or accidents, resulting in substantial health care costs. These costs must be integrated into housing policy planning.

When reductions in health/care expenditure and social improvements are considered, one study estimates that **for every €3 invested in home improvements, €2 would be amortised in just one year.**

Source: *Inadequate housing in Europe: Costs and consequences* (2016), pág.40.

Table 7: Summary of costs and benefits to society of the six inadequacies

Country	Dwelling stock	Proportion of dwellings with three or more inadequacies out of six	Average unit cost of repair (€)	Total cost of repair (€ thousands)	Annual direct medical savings (in terms of healthcare provision) (€ thousands)	Annual indirect medical savings (€ thousands)	Annual total societal medical savings (€ thousands)	Payback (years)
SE	4,633,678	4.7%	16,759	11,400,835	24,070	453,533	477,603	23.87
FI	2,906,000	4.0%	8,180	3,290,242	25,204	505,377	530,581	6.20
AT	4,441,000	4.2%	9,926	3,460,576	29,484	603,007	632,491	5.47
LU	208,000	5.4%	8,815	301,650	2,627	53,275	55,902	5.40
DK	2,762,444	2.3%	7,123	2,297,609	27,062	551,947	579,009	3.97
LV	1,018,000	30.1%	5,439	4,421,745	68,099	1,385,795	1,453,894	3.04
NL	7,200,000	5.5%	4,450	5,180,915	84,262	1,703,448	1,787,710	2.90
DE	40,545,300	6.6%	9,066	52,652,715	943,858	19,849,699	20,793,557	2.53
BE	5,203,400	11.3%	5,832	6,590,226	133,221	2,762,613	2,895,834	2.28
FR	28,077,000	12.0%	6,586	44,583,984	930,427	19,444,533	20,374,960	2.19
EE	649,700	21.2%	5,370	2,437,639	54,621	1,133,034	1,187,655	2.05
RO	8,329,000	19.8%	3,928	22,093,431	514,865	10,497,212	11,012,077	2.01
LT	1,389,000	15.4%	5,175	4,530,039	121,346	2,538,965	2,660,311	1.70
SI	857,000	4.7%	2,755	353,949	10,001	203,628	213,629	1.66
CZ	4,101,635	8.9%	4,344	2,824,092	82,114	1,699,237	1,781,351	1.59
UK	27,767,000	11.0%	5,567	38,793,613	1,209,984	25,444,741	26,654,725	1.46
SK	1,994,900	7.2%	4,977	1,926,007	69,339	1,460,844	1,530,183	1.26
IT	28,863,000	11.2%	3,640	20,446,841	793,741	16,709,084	17,502,825	1.17
BG	3,918,200	13.4%	3,795	6,462,532	254,676	5,323,439	5,578,115	1.16
PL	13,853,000	19.1%	4,883	29,441,165	1,208,896	25,548,628	26,757,524	1.10
HR	1,923,522	10.9%	2,565	1,192,817	51,090	1,059,377	1,110,467	1.07
IE	2,019,000	6.5%	4,710	1,244,640	55,843	1,179,260	1,235,103	1.01
HU	4,400,000	14.3%	3,035	4,806,011	228,544	4,798,360	5,026,904	0.96
EL	6,384,000	15.7%	2,875	5,727,292	402,415	8,542,901	8,945,316	0.64
ES	25,208,000	6.3%	4,116	13,890,859	1,004,494	21,345,457	22,349,951	0.62
MT	223,900	7.9%	2,816	172,310	13,555	287,431	300,986	0.57
PT	5,878,700	9.9%	3,236	4,648,127	437,337	9,289,699	9,727,036	0.48
CY	433,212	15.0%	3,348	303,174	30,579	650,227	680,806	0.45
EU28	**235,187,591**	**10.6%**	**5,127**	**295,475,035**	**8,811,754**	**185,024,751**	**193,836,505**	**1.52**

Note: The table is ordered by first year return on investment.

Table 7: Summary of costs and benefits to society of the six inadequacies

Country	Dwelling stock	Proportion of dwellings with three or more inadequacies out of six	Average unit cost of repair (€)	Total cost of repair (€ thousands)	Annual direct medical savings (in terms of healthcare provision) (€ thousands)	Annual indirect medical savings (€ thousands)	Annual total societal medical savings (€ thousands)	Payback (years)
SE	4,633,678	4.7%	16,759	11,400,835	24,070	453,533	477,603	23.87
FI	2,906,000	4.0%	8,180	3,290,242	25,204	505,377	530,581	6.20
AT	4,441,000	4.2%	9,926	3,460,576	29,484	603,007	632,491	5.47
LU	208,000	5.4%	8,815	301,650	2,627	53,275	55,902	5.40
DK	2,762,444	2.3%	7,123	2,297,609	27,062	551,947	579,009	3.97
LV	1,018,000	30.1%	5,439	4,421,745	68,099	1,385,795	1,453,894	3.04
NL	7,200,000	5.5%	4,450	5,180,915	84,262	1,703,448	1,787,710	2.90
DE	40,545,300	6.6%	9,066	52,652,715	943,858	19,849,699	20,793,557	2.53
BE	5,203,400	11.3%	5,832	6,590,226	133,221	2,762,613	2,895,834	2.28
FR	28,077,000	12.0%	6,586	44,583,984	930,427	19,444,533	20,374,960	2.19
EE	649,700	21.2%	5,370	2,437,639	54,621	1,133,034	1,187,655	2.05
RO	8,329,000	19.8%	3,928	22,093,431	514,865	10,497,212	11,012,077	2.01
LT	1,389,000	15.4%	5,175	4,530,039	121,346	2,538,965	2,660,311	1.70
SI	857,000	4.7%	2,755	353,949	10,001	203,628	213,629	1.66
CZ	4,101,635	8.9%	4,344	2,824,092	82,114	1,699,237	1,781,351	1.59
UK	27,767,000	11.0%	5,567	38,793,613	1,209,984	25,444,741	26,654,725	1.46
SK	1,994,900	7.2%	4,977	1,926,007	69,339	1,460,844	1,530,183	1.26
IT	28,863,000	11.2%	3,640	20,446,841	793,741	16,709,084	17,502,825	1.17
BG	3,918,200	13.4%	3,795	6,462,532	254,676	5,323,439	5,578,115	1.16
PL	13,853,000	19.1%	4,883	29,441,165	1,208,896	25,548,628	26,757,524	1.10
HR	1,923,522	10.9%	2,565	1,192,817	51,090	1,059,377	1,110,467	1.07
IE	2,019,000	6.5%	4,710	1,244,640	55,843	1,179,260	1,235,103	1.01
HU	4,400,000	14.3%	3,035	4,806,011	228,544	4,798,360	5,026,904	0.96
ES	25,208,000	6.3%	4,116	13,890,859	1,004,494	21,345,457	22,349,951	0.62
MT	223,900	7.9%	2,816	172,310	13,555	287,431	300,986	0.57
PT	5,878,700	9.9%	3,236	4,648,127	437,337	9,289,699	9,727,036	0.48
CY	433,212	15.0%	3,348	303,174	30,579	650,227	680,806	0.45
EU28	**235,187,591**	**10.6%**	**5,127**	**295,475,035**	**8,811,754**	**185,024,751**	**193,836,505**	**1.52**

Note: The table is ordered by first year return on investment.

Source: *Inadequate housing in Europe: Costs and consequences* (2016), pág.40.

Drought Flooding **Extreme heat** Climate-sensitive disease Data source

Select a metric

People affected | Total events | Damage caused | Average temperature anomalies | Contributing data stations

1901 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020

Damage from extreme heat events (USD) Data source

No event | No data | 0.1 to 116.9mn | 117 to 588.9mn | 589mn to 2.429bn | 2.43bn to 6.48bn | > 6.49bn

Adjusted for inflation

The Jenks natural breaks classification method has been used to provide a more meaningful visualisation of this map data. Countries with no recorded entry in this dataset show as 'No event'.

34,807 million tonnes CO_2

Spain

Select a country / territory: Spain

7 Total extreme heat events

183 Number of people affected by extreme heat

15,191 Deaths caused by extreme heat

$1.3 billion Damages caused by extreme heat

These statistics include all reported events since 1901

https://wellcome.org/news/tracking-health-effects-climate-change-around-world

ESTUDIO SOBRE LA POLUCIÓN

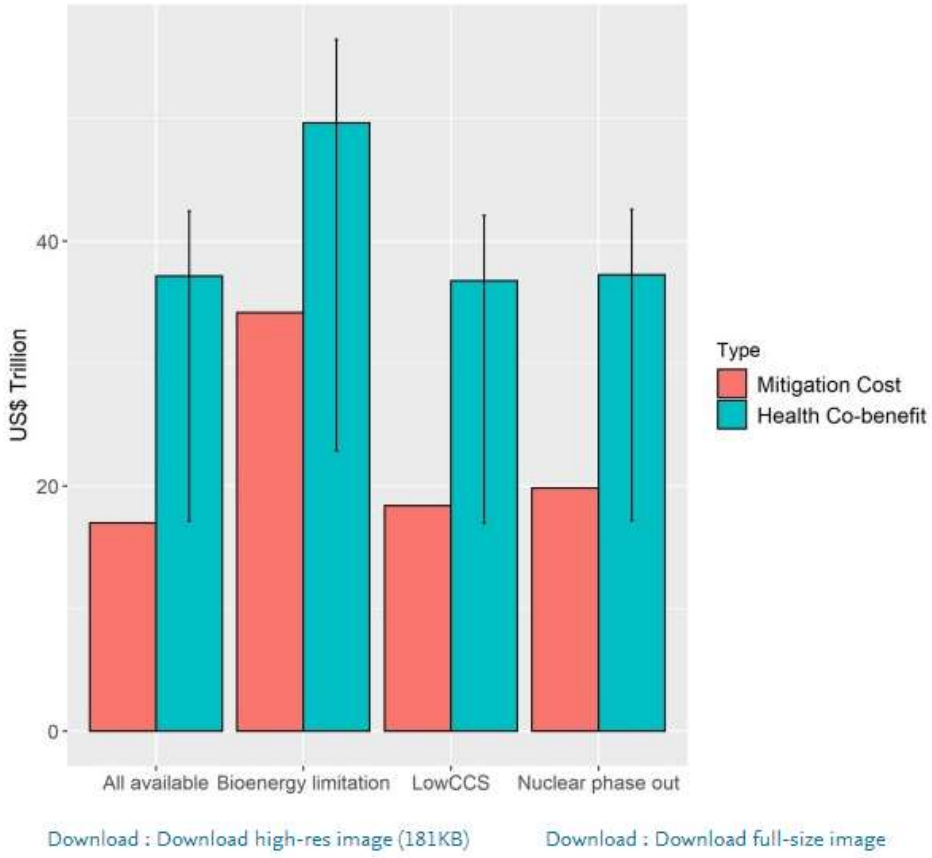
La contaminación del aire le cuesta a España 926 euros por habitante al año

Barcelona es el municipio con mayor coste por habitante (1.256 euros) y Madrid, el de mayor coste general (3.383 millones)

Un estudio europeo calcula el mayor coste por habitante corresponde a Barcelona, con 1.256 euros y seguida de Guadalajara (1.183), Madrid (1.169), Coslada (1.033), La Coruña (1.033), Palma de Mallorca (1.024), Toledo (970), Leganés (959), Talavera de la Reina (956) y Logroño (922).

https://www.elperiodico.com/es/medio-ambiente/20201021/estudio-coste-por-habitante-contaminacion-aire-espana-8166579

Co-benefits of health vs mitigation costs



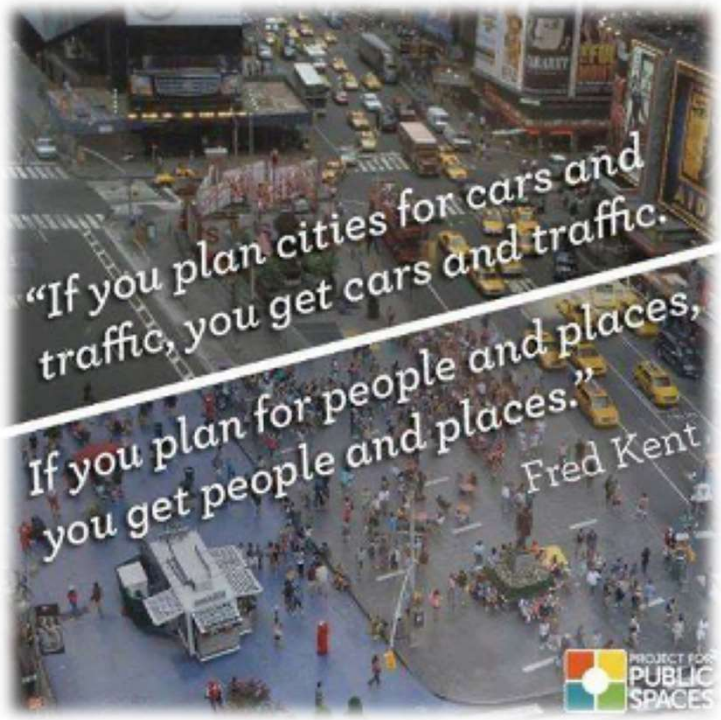
Download : Download high-res image (181KB) Download : Download full-size image

Fig. 7. Cumulative (2020–2050) health co-benefits and mitigation costs per scenario (US$ trillion). The uncertainty bars represent the consistent lower and upper bounds, combining the "theoretical minimum concentration below which there is considered to be no health impact" (Zcf) and VSL values. The discount rate used is 3%.

Source: **Sampedro J, Smith SJ, Arto I, González-Eguino** M, **Markandya A,** Mulvaney KM**, Pizarro-Irizar C,** Van Dingenen R. Health co-benefits and mitigation costs as per the Paris Agreement under different technological pathways for energy supply. Environ Int. 2020 Mar;136:105513. doi: 10.1016/j.envint.2020.105513. Epub 2020 Jan 29. PMID: 32006762.

ISGlobal Barcelona Institute for Global Health

In cities where people live well, health comes from the environment, people do not have to go in search of it.



Thank you!

Nuestro equipo:

- Xavier Basagaña
- Aleix Cabrera
- Glòria Carrasco
- Payam Dadvand
- Mireia Gascón
- Laura Hidalgo
- Tamara Iungman
- Sarah Koch
- Sasha Khomenko
- Natalie Mueller
- Mark Nieuwenhuijsen
- Evelise Pereira
- Anna Ramos
- Pau Rubio
- Celia Santos
- Carlota Sáenz
- Raul Toran
- Mònica Ubalde
- Inés Valls

carolyn.daher@isglobal.org

https://www.isglobal.org/urban-planning

www.isglobal.org/ca/ciudadesquequeremos