HEALTHY AND LOW CARBON URBAN AND TRANSPORT PLANNING

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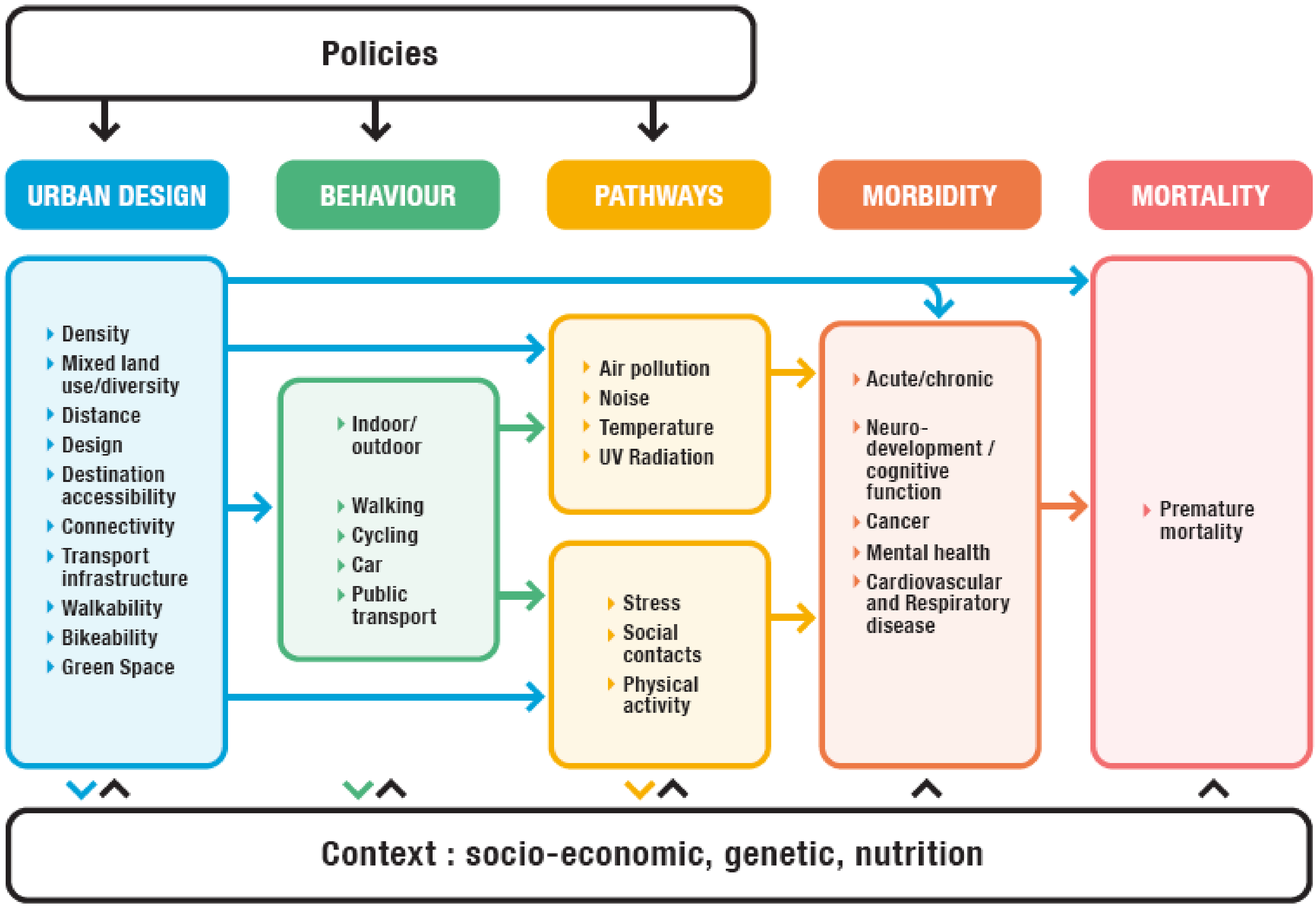
UBD
THE URBAN BURDEN
OF DISEASE ESTIMATION
FOR POLICY MAKING
POLICY

CRISIS

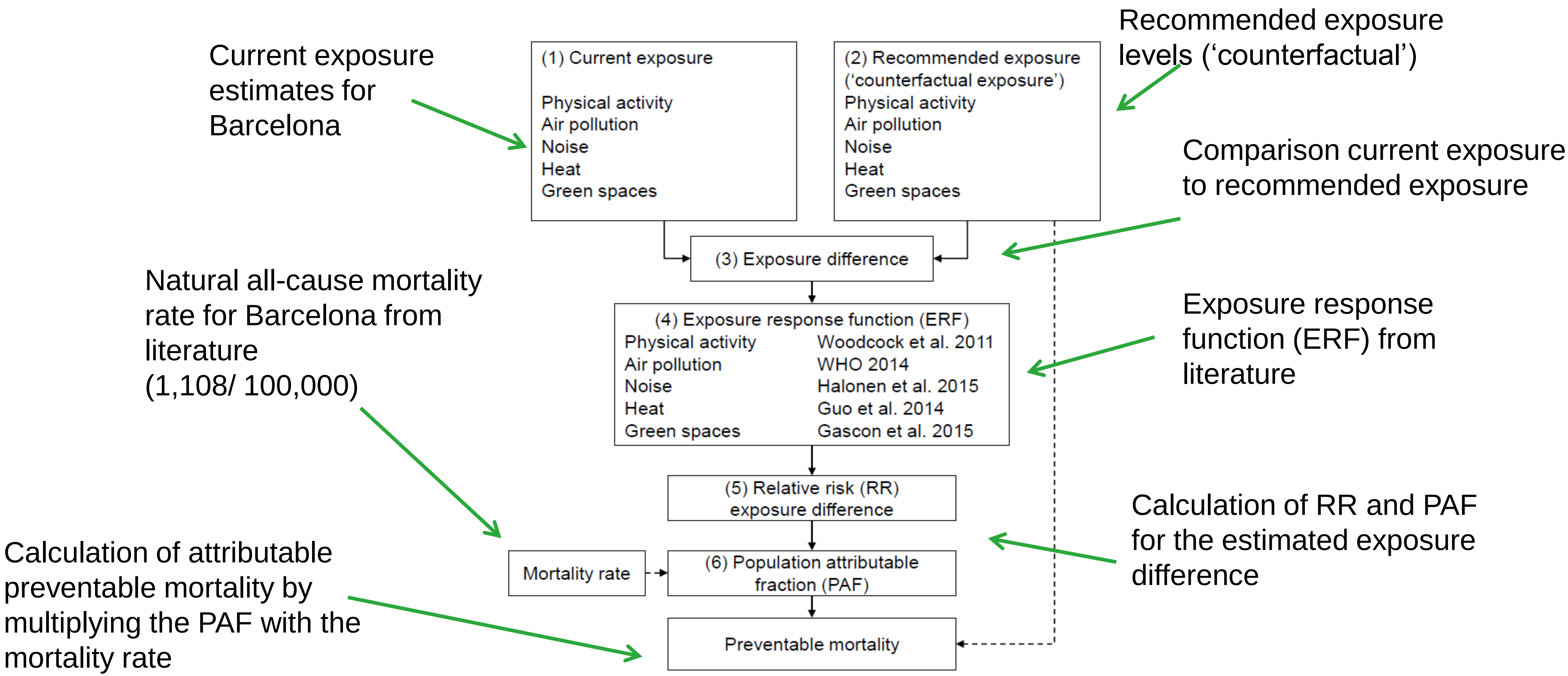
- CLIMATE CRISIS
- BIODIVERSITY
- OBESITY/DEMENTIA/HEALTH CRISIS
- COST OF LIVING
- ENERGY SECURITY



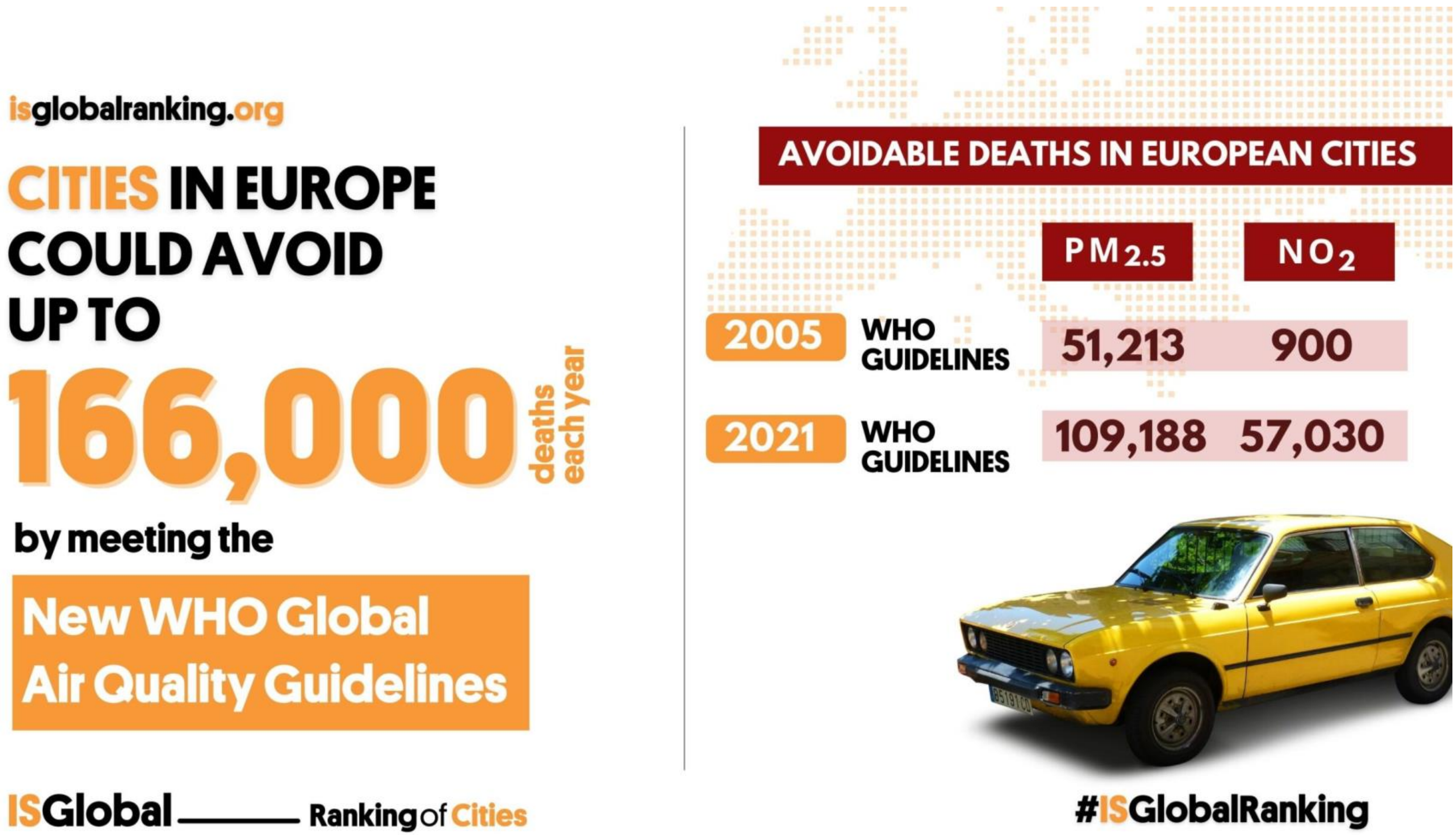
Nieuwenhuijsen 2016 and 2018
2020, 2021

Holistic and systematic approach . Induced demand
.Self fullfilling prophecies

Urban and TranspOrt Planning Health Impact Assessment tool (UTOPHIA)



Mueller et al EHP 2017; 125: 89-96



Khomenko et al 2021

ISGlobal

https://isglobalranking.org/

Pereira Barboza et al 2021

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NOISE FROM ROAD TRAFFIC

isglobalranking.org

60 MILLION PEOPLE ARE EXPOSED TO **NOISE** LEVELS HARFMUL FOR HEALTH IN EUROPEAN CITIES

Compliance with WHO guidelines on noise cities could prevent more than **3,600 annual deaths** from **ischaemic heart disease** alone.

#ISGlobalRanking

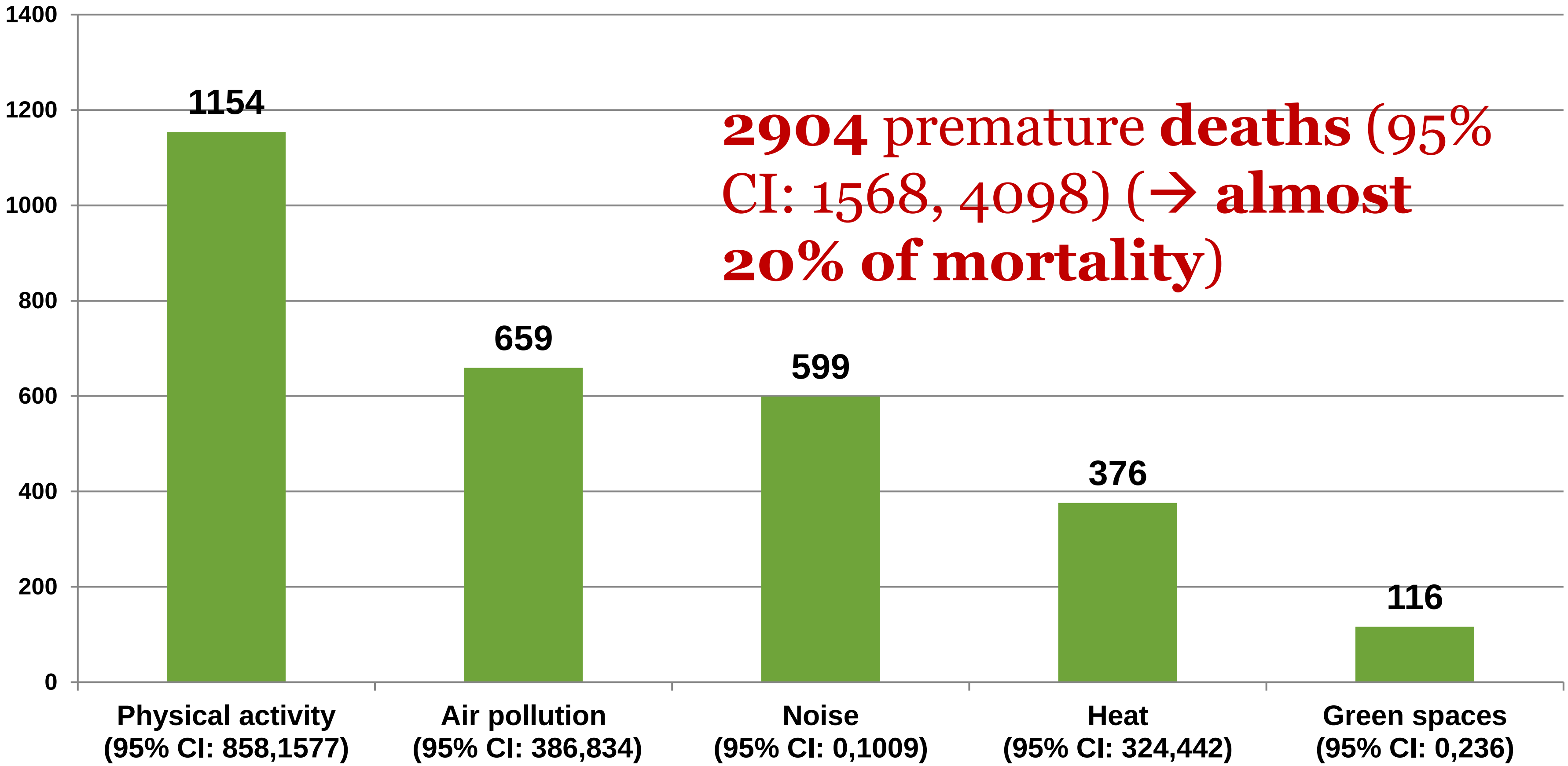
https://isglobalranking.org/

ISGlobal

2904 premature deaths (20%) annually in Barcelona due to suboptimal urban and transport planning

Mueller et al EHP 2017; 125: 89-96

DEATHS DUE TO POOR URBAN AND TRANSPORT PLANNING BARCELONA



2904 premature **deaths** (95% CI: 1568, 4098) (→ **almost 20% of mortality**)

Traffic injury deaths 30

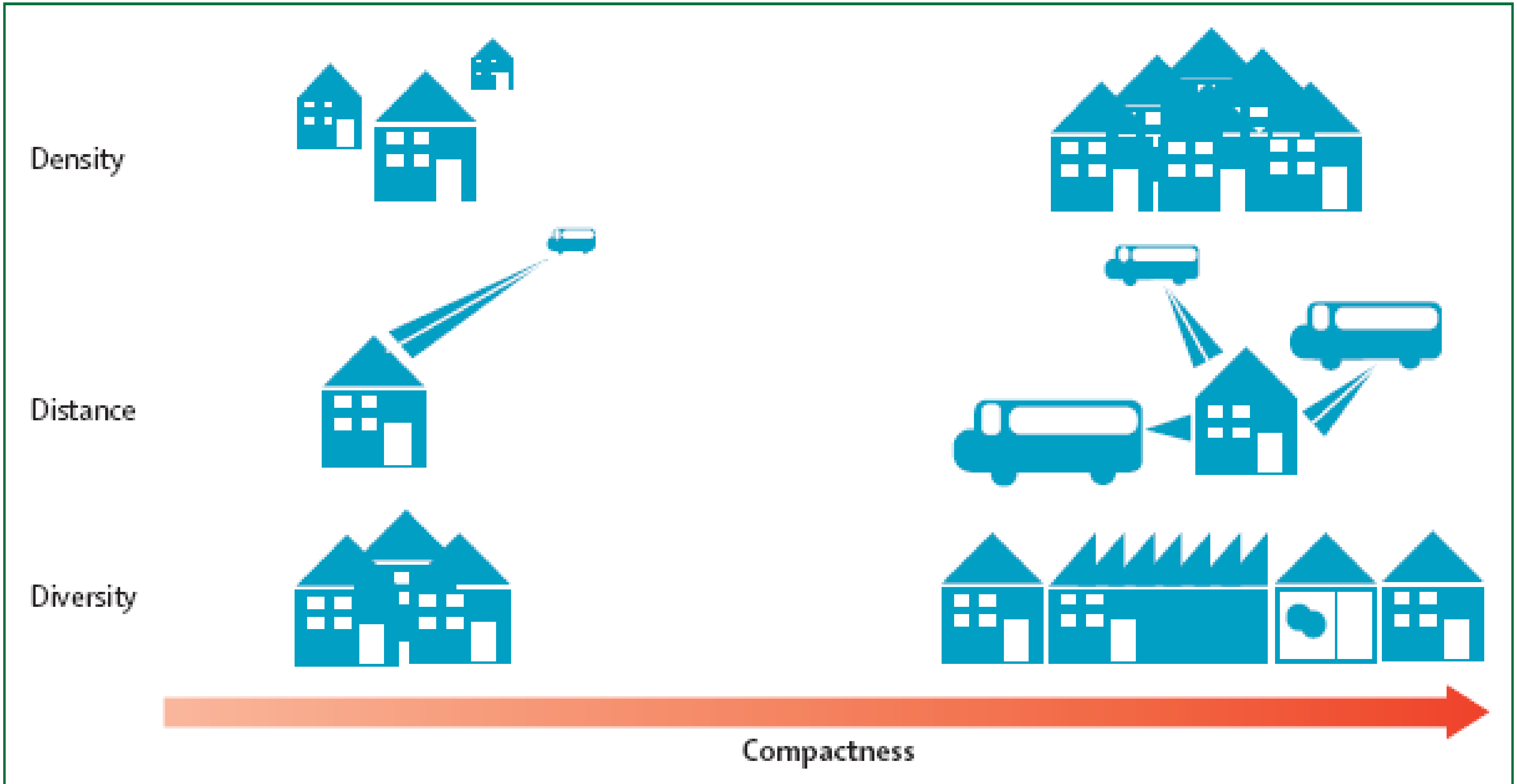
Mueller et al EHP 2017; 125: 89-96

https://redrawingbarcelona.isglobal.org/

SOLUTIONS

- **Land use changes**
- **Reduce car dependency**
- **Move towards public and active transportation**
- **Greening cities**

COMPACTNESS INSTEAD OF SPRAWL



393 (Copenhagen) to 826 (Boston) DALYs saved per 100.000 people annually

Stevenson et al 2016

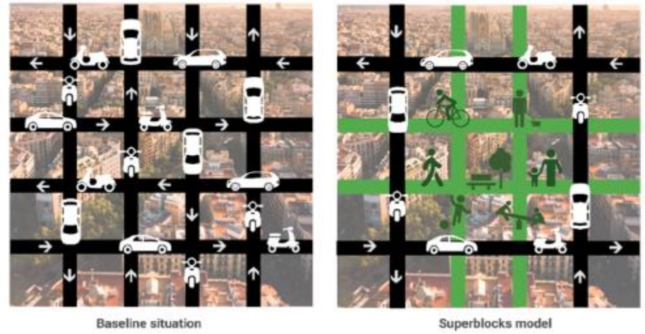
Paris Mayor: It's Time for a '15-Minute City'

In her re-election campaign, Mayor Anne Hidalgo says that every Paris resident should be able to meet their essential needs within a short walk or bike ride.

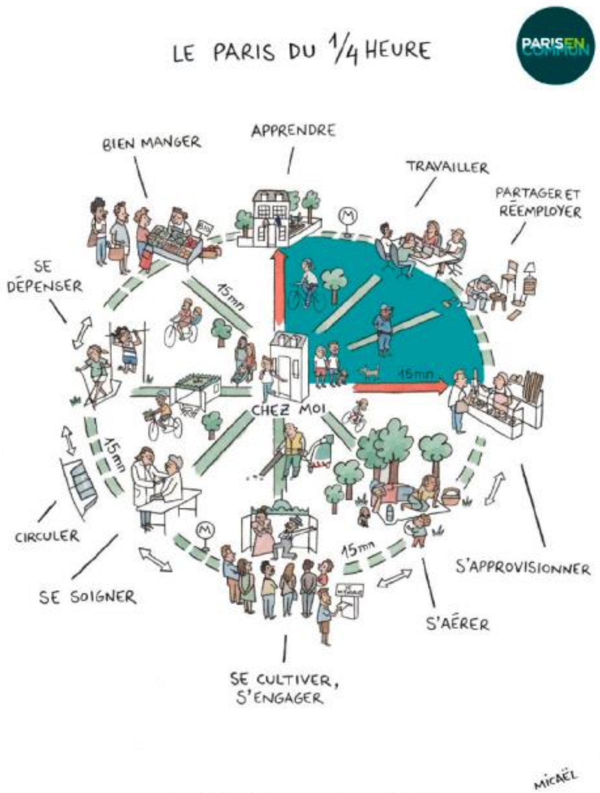
By Feargus O'Sullivan
18 de febrero de 2020 14:40 CET

NEW URBAN MODELS

a) low traffic neighbourhood, London



b) Superblock, Barcelona

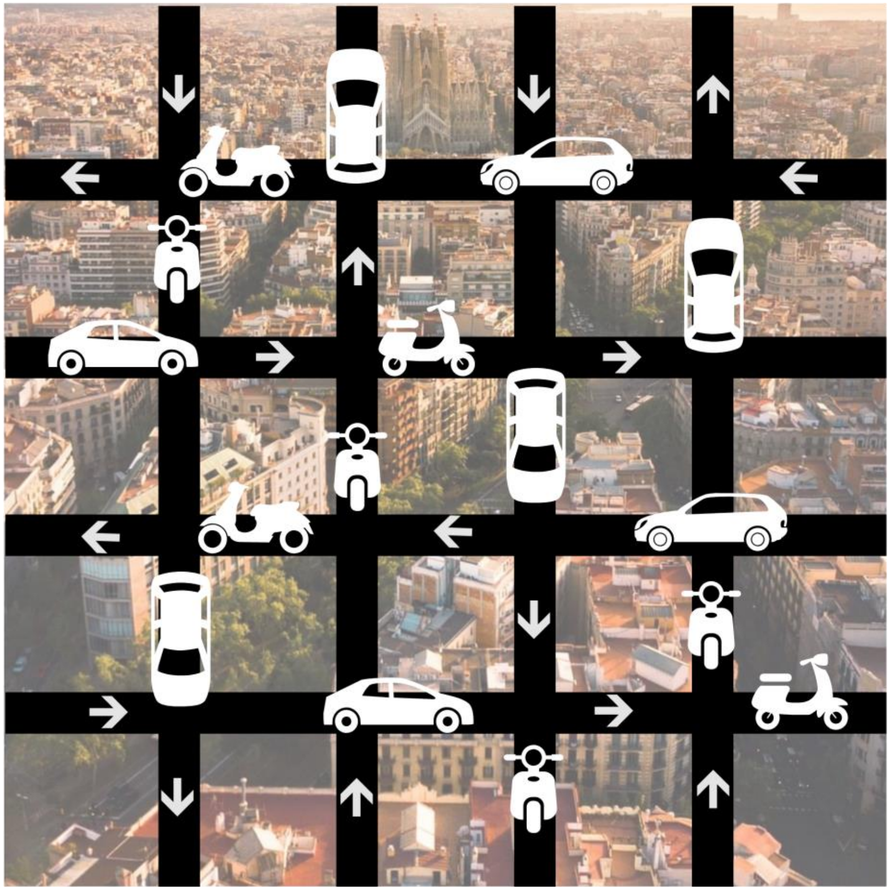


c) 15-minute city, Paris

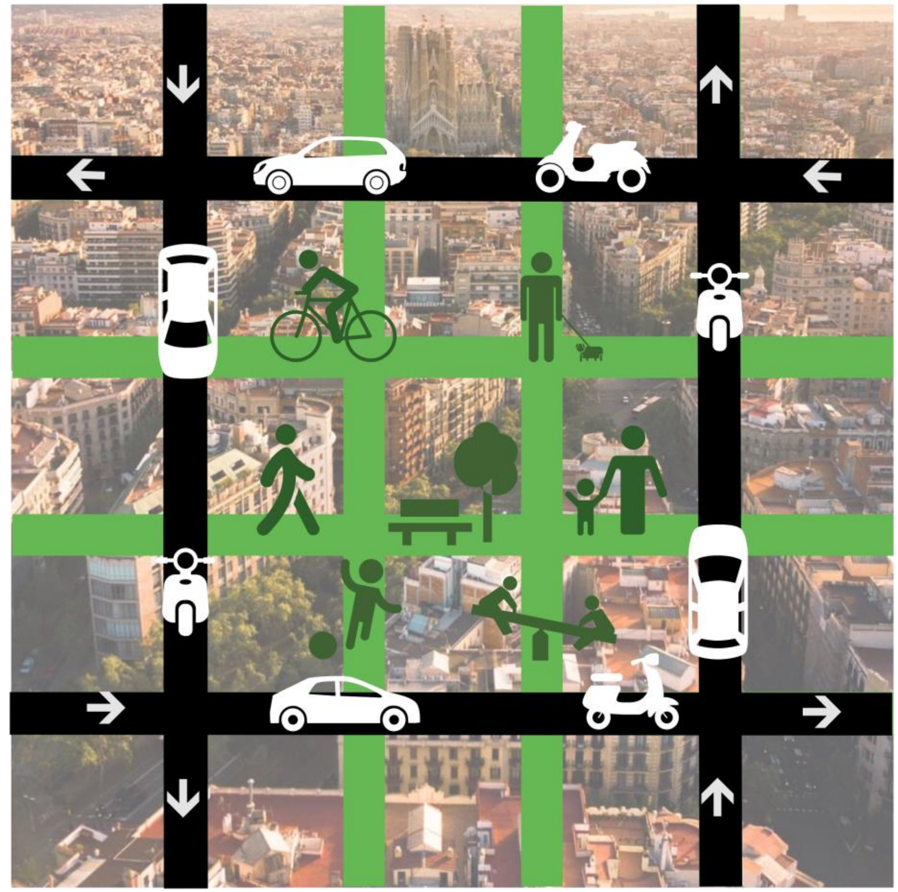
d) Car free Vauban, Freiburg, Germany

Nieuwenhuijsen 2021

BARCELONA SUPER BLOCK MODEL



Baseline situation



Superblocks model

Mueller et al 2019, Env Int

Barcelona Superblock San Antoni

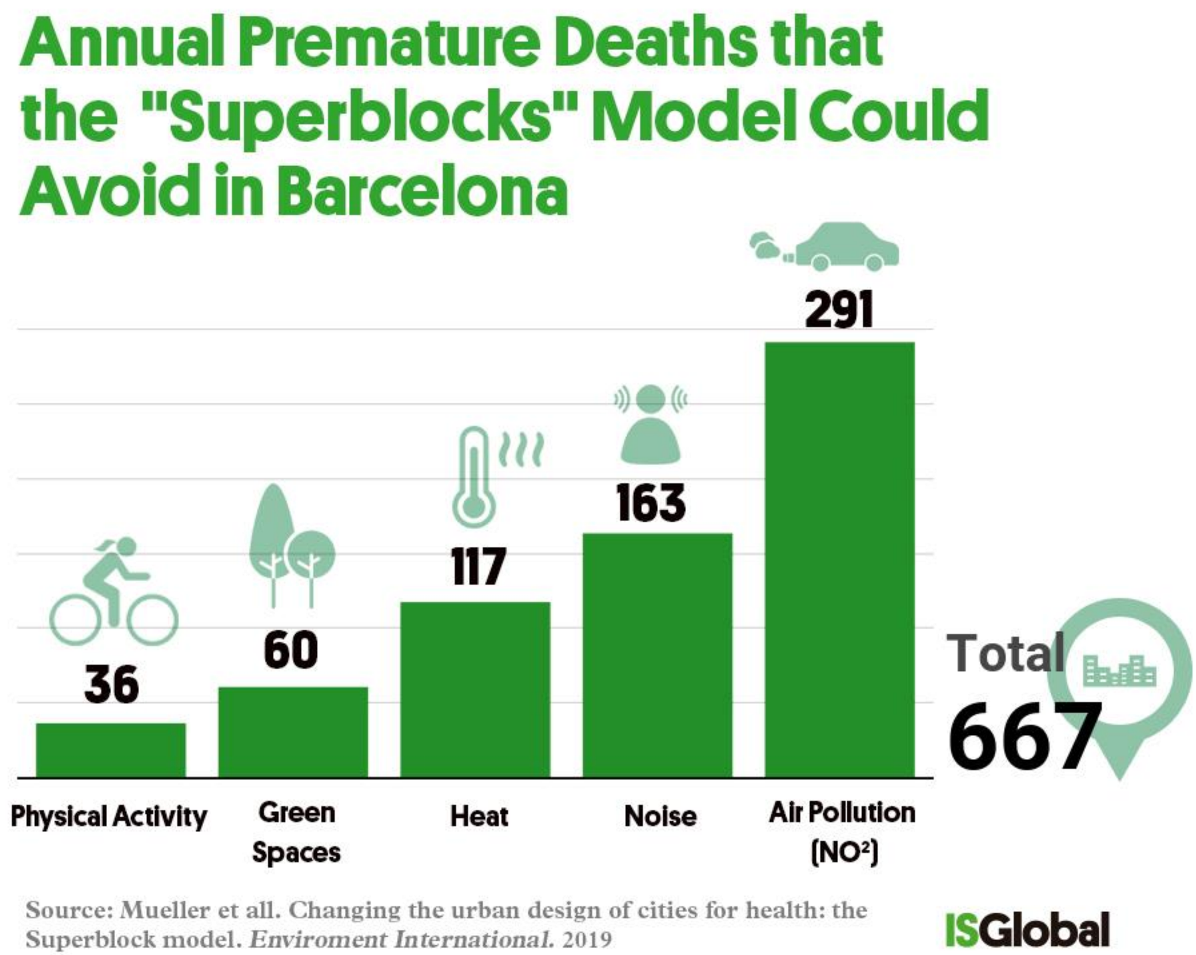
Before

After

BARCELONA SUPER BLOCKS

- **19.2% car reduction**
- **11.5 ug/m3 (24.3%) NO2 reduction**
- **2.9 dB noise reduction**
- **3 fold increase green space (6.5% to 19.6%)**
- **20% Surface temperature reduction**

Mueller et al 2019, Env Int



Mueller et al 2019, Env Int

LOW TRAFFIC NEIGHBOURHOODS

Table 3
Changes in average traffic volume for each LTN situation pre and post LTN.

LTN (number of observations)		Average Traffic Volume		Change (%)
		Pre LTN	Post LTN	
St Peter's (42)	External	5573	5769	+196 (3.5 %)
	Boundary	8703	8344	−359 (−4.1 %)
	Internal	2175	868	−1307 (−60.1 %)
Canonbury East (38)	External	5735	5762	+27 (0.5 %)
	Boundary	11,931	9357	−2574 (−21.6 %)
	Internal	2317	606	−1711 (−73.8 %)
Clerkenwell (28)	External	6249	5748	−501 (−8.0 %)
	Boundary	4988	4104	−884 (−17.7 %)
	Internal	473	250	−223 (−47.1 %)

Yang et al 2022

LOW TRAFFIC NEIGHBOURHOODS

Table 2
Changes in average NO_2 for each LTN situation pre and post LTN.

LTN (number of observations)		Average NO_2		Change (%)
		Pre LTN	Post LTN	
St Peter's (129)	External	25.13	25.60	+0.47 (1.9 %)
	Boundary	27.60	26.80	−0.80 (−2.9 %)
	Internal	23.81	20.23	−3.58 (−15 %)
Canonbury East (59)	External	24.52	27.22	+2.70 (11 %)
	Boundary	34.06	35.11	+1.05 (3.1 %)
	Internal	24.25	23.03	−1.22 (−5%)
Clerkenwell (122)	External	24.41	28.20	+3.79 (15.5 %)
	Boundary	28.33	29.07	+0.74 (2.6 %)
	Internal	27.16	25.91	−1.25 (−5%)

Yang et al 2022

LOW TRAFFIC NEIGHBOURHOODS

Table 3
Mean and median internal and boundary road traffic changes.

Internal Roads	Medians (middle values)	Means (average of all values)
Baseline	1220	1780
After Observed	662	930
Difference from Baseline	−363	−850
% difference from Baseline	−33.3%	−47.8%
After Predicted	1199	1745
Difference from Predicted	−321	−815
% difference from Predicted	−31.9%	−45.8

Boundary Roads	Medians (middle values)	Means (average of all values)
Baseline	11,034	11,706
After Observed	11,074	11,505
Difference from Baseline	106	−201
% difference from Baseline	1.2%	−1.7%
After Predicted	10,526	11,429
Difference from Predicted	242	77
% difference from Predicted	4.2%	0.7

Thomas and Aldred 2024

Journal of Transport & Health 35 (2024) 101771

Contents lists available at ScienceDirect

Journal of Transport & Health

journal homepage: www.elsevier.com/locate/jth

Impacts of active travel interventions on travel behaviour and health: Results from a five-year longitudinal travel survey in Outer London

Rachel Aldred[a,*], Anna Goodman[b], James Woodcock[c]

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[b] London School of Hygiene and Tropical Medicine, UK
[c] University of Cambridge, UK

Conclusions: Active travel interventions provided high value for money when comparing health economic benefits from physical activity to costs of scheme implementation, particularly low traffic neighbourhoods.

hood areas. The 20-year health economic benefit from the mini-Holland areas was calculated at £1,056 m, from a programme cost of around £100 m. The most effective interventions (low traffic neighbourhoods) provide a twenty-year per-person physical-activity related benefit of £4800 compared to a per-person cost of £28–35 (LTNs implemented during 2020 as Covid-19 emergency interventions) or £112 (higher-cost LTNs with more features like greening and crossing improvements).

Table 5
Findings in relation to key hypotheses.

H1a: Living in an intervention area is associated with an increased amount of walking and/or cycling.
Consistent evidence of a substantial amount of active travel especially in high-dose LTN areas, and some evidence of increases in high-dose non-LTN areas. Little or no evidence of change in low-dose areas.
H1b: Living in an intervention area is associated with an increased likelihood of walking and/or cycling.
Consistent evidence of increased participation in cycling in high-dose LTN areas (Waves 1–5), and to a lesser extent in high-dose non-LTN areas (Waves 3–5). Little or no evidence of change in low-dose areas.
H2a: Living in an intervention area is associated with decreased amount of time spent travelling by car or van.
Limited evidence of decreased amount of *time spent travelling* by car or van in high-dose LTN areas. Weak, non-significant trends to reductions in high-dose non-LTN areas. No evidence of any change in low-dose areas.
H2b: Living in an intervention area is associated with a decreased likelihood of travelling by car or van.
Some evidence of decreased *likelihood of travelling* by car or van in high-dose LTN areas. Weak, non-significant trends to reductions in high-dose non-LTN areas. No evidence of any change in low-dose areas.
H2c: Living in an intervention area is associated with a decreased likelihood of car or van ownership.
Some evidence of decreased car ownership in high-dose LTN areas in Waves 2–4. Weak, non-significant trends to reductions in high-dose non-LTN areas. No evidence of any change in low-dose areas.

Aldred et al 2024

Opinion
Transport policy

The Guardian view on low-traffic neighbourhoods: spread the word – these schemes work

Editorial

Sun 10 Mar 2024 19.25 CET

Share 350

Rejecting green transport policies was a backwards step by Rishi Sunak. New research proves it

30
km/hr
city

Grote steden willen wegen snel naar 30 km/uur: ‘Veel minder verkeersdoden’
https://www.ad.nl/auto/grote-steden-willen-wegen-snel-naar-30-km-uur-veel-minder-verkeersdoden~aa76773e/
AD dec 1, 2021

Health effects of low emission and congestion charging zones: a systematic review

Rosemary C Chamberlain, Daniela Fecht, Bethan Davies, Anthony A Laverty

Low emission zones (LEZs) and congestion charging zones (CCZs) have been implemented in several cities globally. We systematically reviewed the evidence on the effects of these air pollution and congestion reduction schemes on a range of physical health outcomes. We searched MEDLINE, Embase, Web of Science, IDEAS, Greenfile, and Transport Research International Documentation databases from database inception to Jan 4, 2023. We included studies that evaluated the effect of implementation of a LEZ or CCZ on air pollution-related health outcomes (cardiovascular and respiratory diseases, birth outcomes, dementia, lung cancer, diabetes, and all-cause) or road traffic injuries (RTIs) using longitudinal study designs and empirical health data. Two authors independently assessed papers for inclusion. Results were narratively synthesised and visualised using harvest plots. Risk of bias was assessed using the Graphic Appraisal Tool for Epidemiological studies. The protocol was registered with PROSPERO (CRD42022311453). Of 2279 studies screened, 16 were included, of which eight assessed LEZs and eight assessed CCZs. Several LEZ studies identified positive effects on air pollution-related outcomes, with reductions in some cardiovascular disease subcategories found in five of six studies investigating this outcome, although results for other health outcomes were less consistent. Six of seven studies on the London CCZ reported reductions in total or car RTIs, although one study reported an increase in cyclist and motorcyclist injuries and one reported an increase in serious or fatal injuries. Current evidence suggests LEZs can reduce air pollution-related health outcomes, with the most consistent effect on cardiovascular disease. Evidence on CCZs is mainly limited to London but suggests that they reduce overall RTIs. Ongoing evaluation of these interventions is necessary to understand longer term health effects.

Lancet Public Health 2023; 8: e559–74

MRC Centre for Environment and Health (R C Chamberlain MPH, D Fecht PhD, B Davies PhD), **Small Area Health Statistics Unit** (R C Chamberlain, D Fecht, B Davies), **NIHR Health Protection Research Unit in Chemical Radiation Threats and Hazards** (D Fecht), and **Public Health Policy Evaluation Unit** (A A Laverty PhD), **School of Public Health, Imperial College London, London, UK**

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Case Studies on Transport Policy 10 (2022) 1494–1513

Contents lists available at ScienceDirect

Case Studies on Transport Policy

journal homepage: www.elsevier.com/locate/cstp

A dozen effective interventions to reduce car use in European cities: Lessons learned from a meta-analysis and transition management

Paula Kuss *, Kimberly A. Nicholas

Lund University Centre for Sustainability Studies (LUCSUS), Box 170, 22100 Lund, Sweden

A R T I C L E I N F O

Keywords:
Transport transition
Car use reduction
Transport intervention
Urban mobility
Urban transition experiments
Climate mitigation

A B S T R A C T

Transitioning to fossil-free transport and reducing car use are necessary to meet European and national climate goals. Cities are promising leverage points to facilitate system transitions by promoting local innovation and policy experimentation. Building on transition management, we developed a knowledge base for the implementation of transition experiments to reduce city-level car use. From screening nearly 800 peer-reviewed studies and case studies, including in-depth analysis of 24 documents that met quality criteria and quantitatively estimated car use reduction, we identify 12 intervention types combining different measures and policy instruments that were effective in reducing car use in European cities. The most effective at reducing overall car use were the Congestion Charge, Parking & Traffic Congrol, and Limited Traffic Zone. Most interventions were led by local government, planned and decided in collaboration with different urban stakeholders. We evaluated the potential of the identified intervention types to be implemented in a pilot study of Lund, Sweden, using three criteria from Transition Management of novelty, feasibility, and suitability, as assessed by interviews with local experts. We recommend three transition experiments to reduce local car use in Lund: Parking and Traffic Control, Workplace Parking Charge, and Mobility Services for Commuters. We suggest practitioners follow our method to identify effective and locally suitable interventions to reduce car use, and future research quantify the effectiveness of interventions to reduce car use using the standardised outcome measure of daily passenger kilometres travelled by car.

Shifting towards healthier transport: carrots or sticks? Systematic review and meta-analysis of population-level interventions

Christina Xiao, Esther van Sluijs, David Ogilvie, Richard Patterson, Jenna Panter

Summary

Background Promoting active travel can be beneficial for both health and the environment. However, evidence about the most effective strategies is inconsistent. We aimed to compare the effectiveness of interventions with positive (ie, carrot), negative (ie, stick), or a combination of strategies on changing population-level travel behaviour. We also aimed to identify which intervention functions, or mechanisms of how interventions seek to alter behaviour (eg, by addressing safety or accessibility), affect transport outcomes.

Methods For this systematic review and meta-analysis, we searched eight online databases for studies published before March 28, 2022: Web of Science, MEDLINE, Scopus, Applied Social Sciences Index and Abstracts, Global Health, PsycINFO, CINAHL, and Transport Research International Documentation. We did not restrict searches by language or publication date. We included controlled before-and-after studies of population-level interventions and travel behaviours (ie, driving, public transport, walking, and cycling) from adults in the general population. We categorised interventions according to their function. Depending on whether gains or losses due to intervention function could occur, we classified interventions as carrot (eg, new bike-share programmes), stick (eg, congestion charging), or combined carrot-and-stick interventions (eg, pedestrianising areas by use of reallocated parking space). We used harvest plots to summarise the findings and guide narrative synthesis. Where possible, we converted outcomes into standardised mean differences and did random-effects meta-analyses.

Interpretation This Article found that, although transport interventions with only positive strategies are more commonly evaluated, interventions that combine both positive and negative strategies might be more effective at encouraging alternatives to driving at the population level. Further research is needed for interventions involving a stick strategy, which remain less widely implemented or well studied than those with only carrot strategies.

Lancet Planet Health 2022; 6: e858–69

MRC Epidemiology Unit, School of Clinical Medicine, University of Cambridge, Cambridge, UK (C Xiao MPH, E van Sluijs PhD, D Ogilvie PhD, R Patterson PhD, J Panter PhD)

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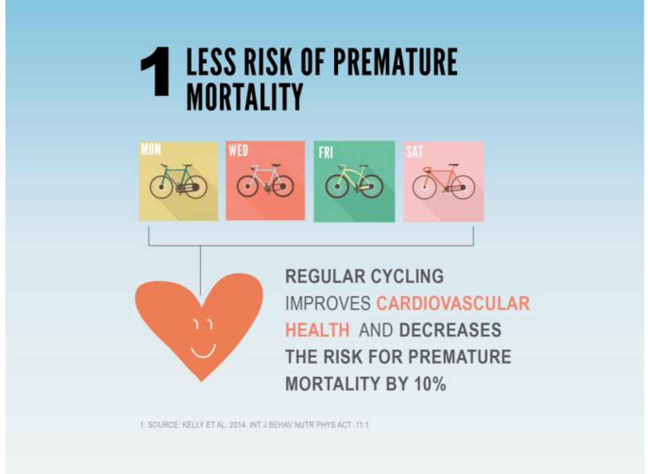
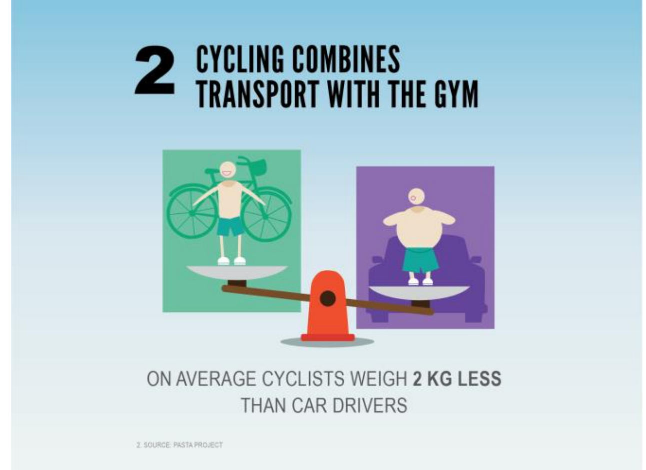
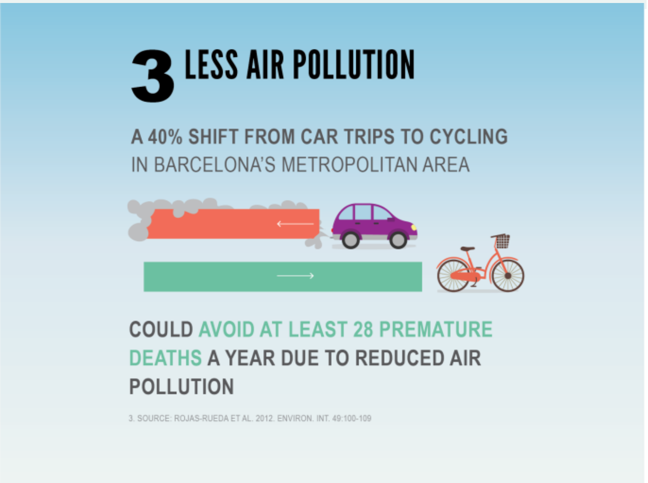
christina.xiao@mrc-epid.cam.ac.uk

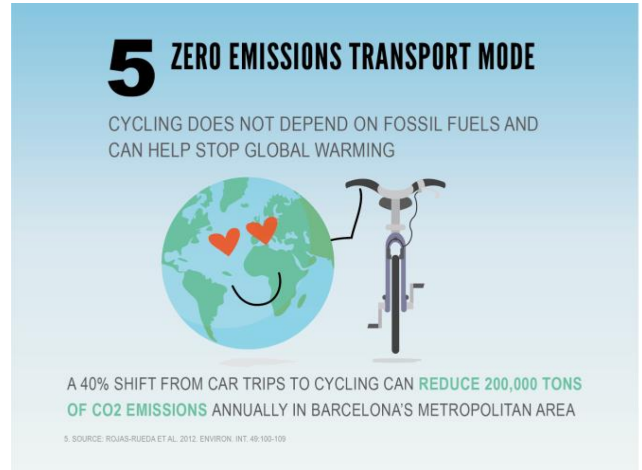
ELECTRIC CARS

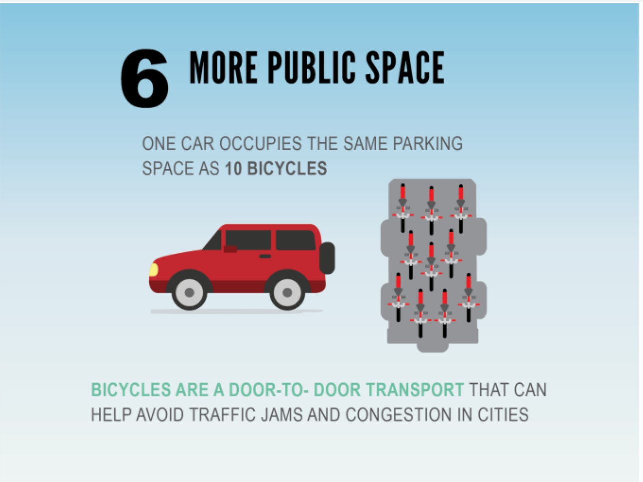
50% of car trips < 5 km





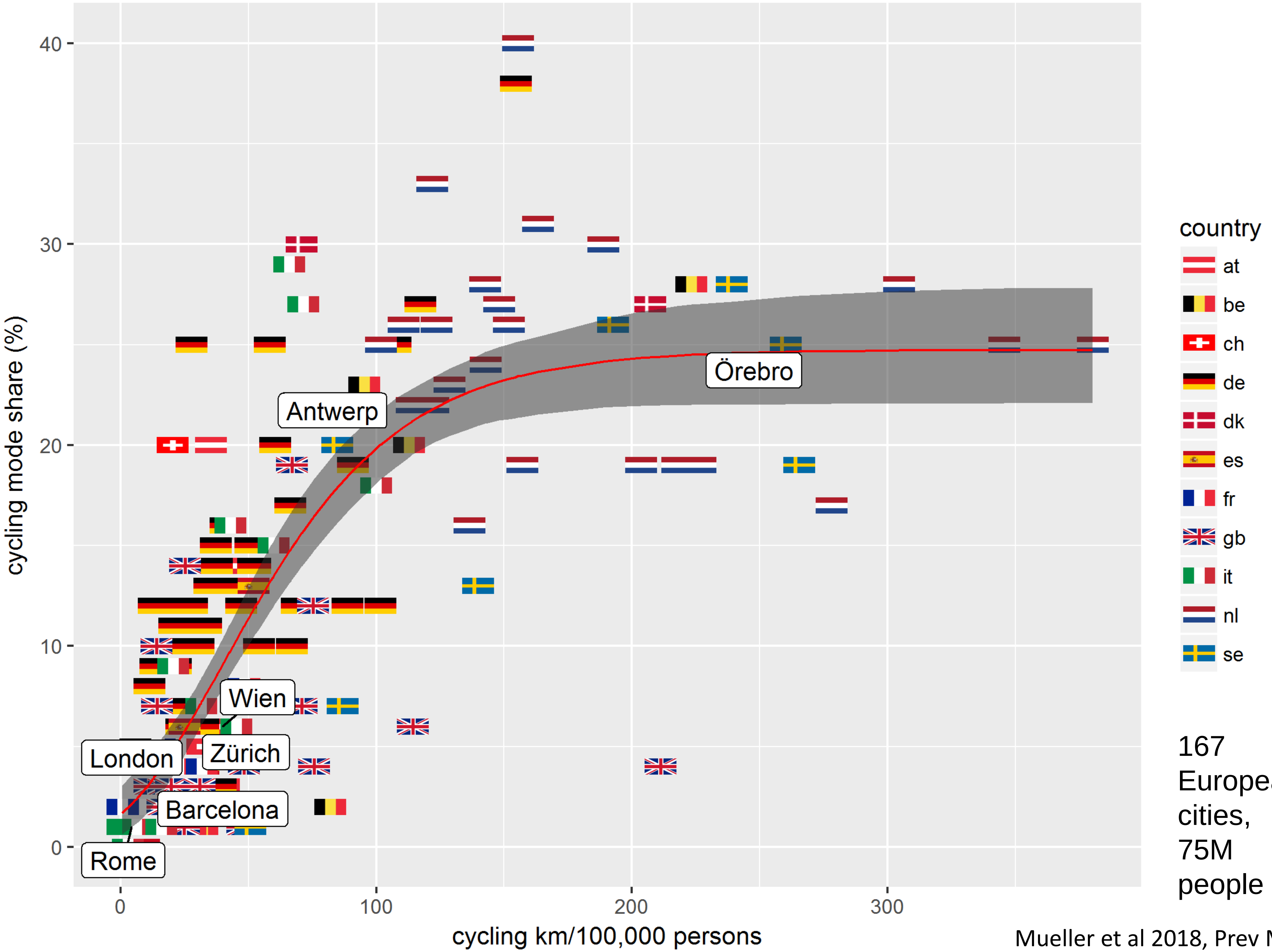






Benefits of physical activity well outweight the risks of air pollution and accidents for cyclists

Utrecht, NL



167 European cities, 75M people

Mueller et al 2018, Prev Med

PREMATURE DEATHS PREVENTED

- **10,091 premature deaths prevented annually in 167 European cities (75M people) if the mode share of cycling went up to 24.7%**

Mueller et al 2018, Prev Med

Transportation Research Part D 93 (2021) 102764

Contents lists available at ScienceDirect

Transportation Research Part D

journal homepage: www.elsevier.com/locate/trd

The climate change mitigation effects of daily active travel in cities

Christian Brand[a,b,*], Evi Dons[c,d], Esther Anaya-Boig[e], Ione Avila-Palencia[f,g], Anna Clark[h], Audrey de Nazelle[e], Mireia Gascon[f,i,j], Mailin Gaupp-Berghausen[k], Regine Gerike[l], Thomas Götschi[m], Francesco Iacorossi[n], Sonja Kahlmeier[o,p], Michelle Laeremans[c,t], Mark J Nieuwenhuijsen[f,i,j], Juan Pablo Orjuela[a,e], Francesca Racioppi[q], Elisabeth Raser[u], David Rojas-Rueda[f,s], Arnout Standaert[c], Erik Stigell[h], Simona Sulikova[a], Sandra Wegener[r], Luc Int Panis[c,d,t]

Daily mobility-related life cycle CO_2 emissions were 3.2 kg CO_2 per person, with car travel contributing 70% and cycling 1%. Cyclists had 84% lower life cycle CO_2 emissions than non-cyclists. Life cycle CO_2 emissions decreased by -14% per *additional* cycling trip and decreased by -62% for each *avoided* car trip. An average person who 'shifted travel modes' from car to bike decreased life cycle CO_2 emissions by 3.2 kgCO_2/day.

Global Environmental Change 67 (2021) 102224

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

The climate change mitigation impacts of active travel: Evidence from a longitudinal panel study in seven European cities

Christian Brand[a,*], Thomas Götschi[b], Evi Dons[c,d], Regine Gerike[e], Esther Anaya-Boig[f], Ione Avila-Palencia[g,h], Audrey de Nazelle[f], Mireia Gascon[g,i,j], Mailin Gaupp-Berghausen[k], Francesco Iacorossi[l], Sonja Kahlmeier[m,n], Luc Int Panis[c,d,s], Francesca Racioppi[o], David Rojas-Rueda[g,q], Arnout Standaert[c], Erik Stigell[r], Simona Sulikova[a], Sandra Wegener[p], Mark J. Nieuwenhuijsen[g,i,j]

We found that changes in active travel have significant lifecycle carbon emissions benefits, even in European urban contexts with already high walking and cycling shares. An increase in cycling or walking consistently and independently decreased mobility-related lifecycle CO_2 emissions, suggesting that active travel substituted for motorized travel – i.e. the increase was not just additional (induced) travel over and above motorized travel. To illustrate this, an average person cycling 1 trip/day more and driving 1 trip/day less for 200 days a year would decrease mobility-related lifecycle CO_2 emissions by about 0.5 tonnes over a year, representing a substantial share of average per capita CO_2 emissions from transport. The largest benefits from shifts from car to active travel were for business purposes, followed by social and recreational trips, and commuting to work or place of edu-cation. Changes to commuting emissions were more pronounced for those who were younger, lived closer to work and further to a public transport station.

PLOS SUSTAINABILITY AND TRANSFORMATION

This study presents the degree of urban sprawl on the planet at multiple spatial scales (continents, UN regions, countries, subnational units, and a regular grid) for the period 1990–2014. Urban sprawl increased by 95% in 24 years, almost 4% per year, with built-up areas growing by almost 28 km2 per day, or 1.16 km2 per hour.

Check for updates

RESEARCH ARTICLE

Rapid rise in urban sprawl: Global hotspots and trends since 1990

Martin Behnisch[1☯*], **Tobias Krüger**[1☯], **Jochen A. G. Jaeger**[2☯]

1 Leibniz Institute of Ecological Urban and Regional Development (IOER), Dresden, Germany,
2 Department of Geography, Planning and Environment, Concordia University Montreal, Montréal, Québec, Canada

☯ These authors contributed equally to this work.
* m.behnisch@ioer.de

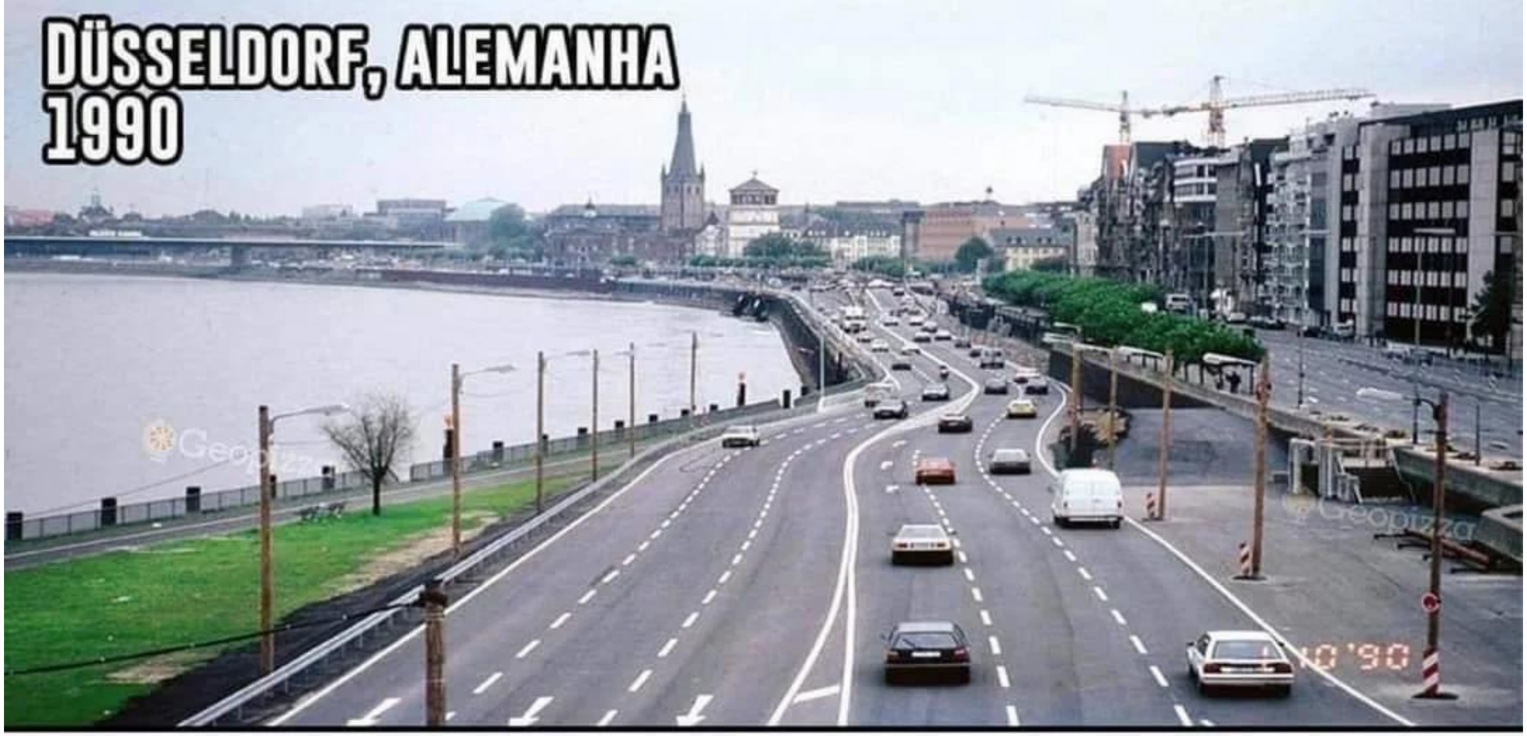
Abstract

Dispersed low-density development–"urban sprawl"–has many detrimental environmental, economic, and social consequences. Sprawl leads to higher greenhouse-gas emissions

The results demonstrate that Europe has been the most sprawled and also the most rapidly sprawling continent, by 51% since 1990. At the scale of UN regions, the highest relative increases in urban sprawl were observed in East Asia, Western Africa, and Southeast Asia. Urban sprawl per capita has been highest in Oceania and North America, exhibiting a minor decline since 1990, while it has been increasing rapidly in Europe, by almost 47% since 1990.

Seoul, Korea

Greening cities


DÜSSELDORF, ALEMANHA
1990


2019


1971
Amsterdam
Archives


2020
schlijper.nl
today

Vauban, Freiburg

Poblenou, Barcelona

Environment International 157 (2021) 106850

Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

Review article

New urban models for more sustainable, liveable and healthier cities post covid19; reducing air pollution, noise and heat island effects and increasing green space and physical activity

Mark J. Nieuwenhuijsen *

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CIBER Epidemiología y Salud Pública (CIBERESP), Madrid, Spain
Mary MacKillop Institute for Health Research, Melbourne, Australia

Environment International 140 (2020) 105661

Contents lists available at ScienceDirect

Environment International

journal homepage: www.elsevier.com/locate/envint

Urban and transport planning pathways to carbon neutral, liveable and healthy cities; A review of the current evidence

Mark J. Nieuwenhuijsen*

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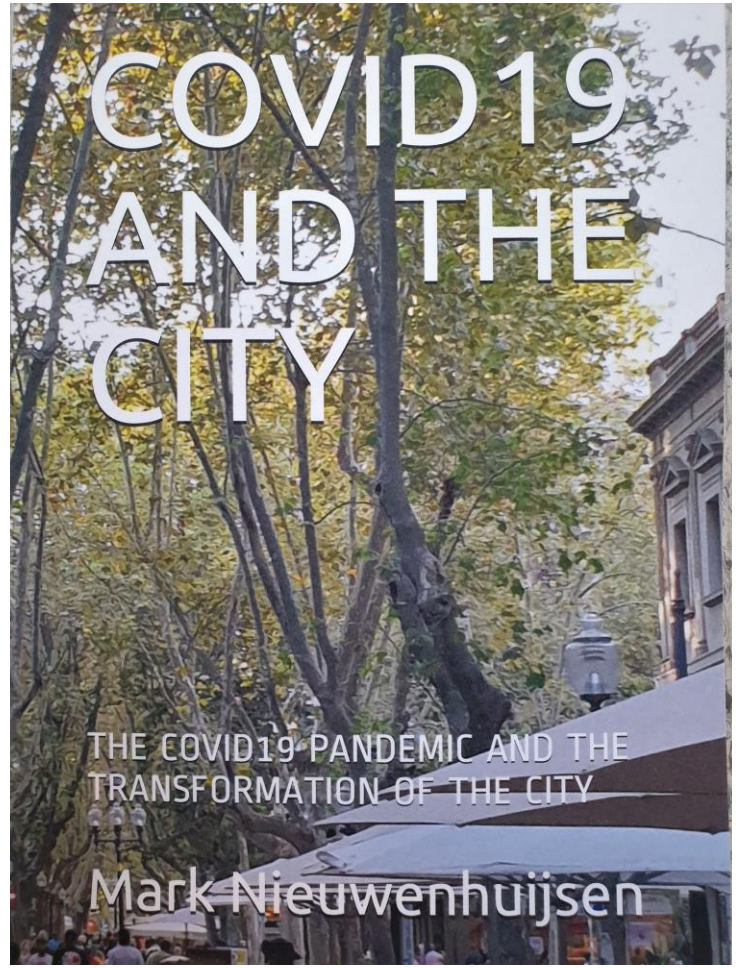
Mary MacKillop Institute for Health Research, Melbourne, Australia



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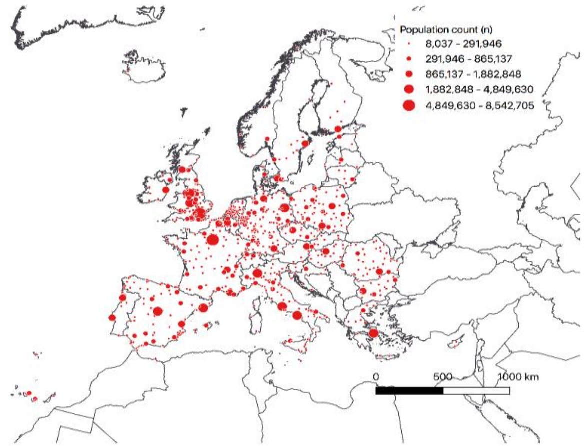

- **Title: THE URBAN BURDEN OF DISEASE ESTIMATION FOR POLICY MAKING (UBDPOLICY)**
- **Main objective**: to improve the estimation of health and well-being impacts and socio-economic costs and/or benefits of major urban environmental stressors, advance methodological approaches and foster their acceptance as common good practice for urban areas in Europe, for strengthened evidence-based policy-making. The work is conducted in nearly 1000 European cities and involves multiple stakeholders.
- **Role of ISGlobal**: Coordinators
- **Overall PI**: Mark Nieuwenhuijsen
- **Funding**: 4.3 Meuros
- **Funder**: Europe Horizon program (grant no 101094639) and Swiss and UK Governments
- **Start date**: 01 January 2023; **End Date**: 31 December 2026
- **Partners**: University of Utrecht (NL), SwissTPH (CH), Lund University (SE), HEAL (BE), Cambridge University (UK)

https://ubdpolicy.eu/

ISGlobal

POLICY

Thank you!

This project has received funding from the European Union's, Horizon Europe Framework Programme (HORIZON) under GA No 101094639 - THE URBAN BURDEN OF DISEASE ESTIMATION FOR POLICY MAKING (UBDPolicy)

ISGlobal

mark.nieuwenhuijsen@isglobal.org

Indicator checklist for **healthy urban and transport planning**

PLANNING PRINCIPLE	✓	INDICATOR
1. LAND USE MIX		
Is there sufficient public open/green space?	☐	≥ 25% of total surface
Is the allocation of the built environment appropriate?	☐	≤ 75% of total surface
• Is the proportion of the built environment allocated to roadways appropriate?	☐	≤ 25 % of total surface for roadways
• Is the proportion of built environment allocated to buildings appropriate?	☐	≤ 50% of total surface for buildings
• Is there a balance between residential and non-residential building function?	☐	75% of buildings with residential function 25% of buildings with non-residential function
Are there diverse destinations in direct proximity? Note: 'Walkable' destinations are those within a ≤ 300 m street network distance 'Cyclable' destinations are those within a ≤ 5 km street network distance	☐	↑ Number and diversity of local destinations (food, retail, general services, healthcare, community services, eating and drinking, recreation, entertainment, etc.) ≤ 300 m street network distance ≤ 5 km street network distance
2. STREET CONNECTIVITY		
Are streets well-connected and provide direct and short routes to destinations?	☐	↑ Number of street junctions
• Is active and public transport prioritized in providing short and direct routes to destinations?	☐	Yes
• Is private motorized transport diverted and re-directed to discourage use?	☐	Yes
Are over-and underpasses and other physical barriers that force pedestrians/ cyclists to change levels avoided?	☐	↓ Number of pedestrian/ cyclist over- and underpasses and other physical barriers
Are block sizes kept relatively small?	☐	≤ 120 m (i.e. Eixample blocks)
Are cul-de-sacs avoided?	☐	↓ Number of cul-de-sacs

PLANNING PRINCIPLE	✓	INDICATOR
3. DENSITY		
Is a medium to high dwelling density provided in the area?	☐	100 dwellings/ ha (Range: 50-150 dwellings/ ha)
Is a low to mid-rise building form provided?	☐	≤ 5-6 storey buildings that can be 'walked-up'
Is a human scale with sky visibility within normal sight lines retained?	☐	50° above horizontal is normal angle of sight
Is horizontal sprawl (i.e. low density development) avoided?	☐	↓ Low density development
Is vertical sprawl (i.e. high-rise building development) avoided?	☐	↓ High-rise building development
Is the housing surface/ capita appropriate?	☐	Optimum 30 m^2/ capita
4. TRAFFIC CALMING		
Is space for circulating and parked private motorized transport minimized?	☐	≤ 25 % of total surface for roadways and parking
Are the number of road lanes kept at a functional minimum?	☐	↓ Number of road lanes
Are road lane widths kept to functional minimum?	☐	≤ 3 m width each road lane
Are traffic calming and speed reductions features incorporated?	☐	↑ Number of traffic calming and speed reduction features (e.g. speed bumps, curb extensions, vertical deflections such as raised intersections or crossings, etc.)
Is on-road parking space minimized?	☐	↓ On-road parking Optimum ≥ 90% of parking is off-road parking
5. WALKING		
Is segregated, non-shared pedestrian infrastructure provided?	☐	≥ 75 % of total space accessible to pedestrians
Is sidewalk width consistent with its use?	☐	≥ 1.5 m sidewalk width
Are different pedestrian needs and abilities considered?	☐	↑ Barrier-free pedestrian infrastructure
Are street side changes and over- and underpasses avoided?	☐	Yes
Are conflicts with other transport modes at intersections and street form changes avoided?	☐	Yes
Does the walking infrastructure contain continuous greenery?	☐	Yes
Is a pedestrian network created that interconnects with other active and public transport modes (i.e. multi-modality)?	☐	Yes

NOTES

6. CYCLING

Is segregated, non-shared cycling infrastructure provided?	☐	≤ 400 m street network distance from residences
Is a homogenous, continuous and intuitive cycling network provided?	☐	Yes
Are conflicts with other transport modes at intersections and street form changes avoided?	☐	Yes
Are changes in street side and over- and underpasses avoided?	☐	Yes
Is the cycling infrastructure located on the curbside of the road instead of in the center?	☐	Yes
Is a cycling network created that interconnects with other active and public transport modes (i.e. multi-modality)?	☐	Yes
Does the cycling infrastructure contain continuous greenery?	☐	Yes

7. PUBLIC TRANSPORT

Is universal access (i.e. 100% of population) to public transport provided?	☐	≤ 300 m street network distance to bus stop ≤ 600 m street network distance to metro/ tram stop ≤ 800 m street network distance to train stop
Are conflicts with other transport modes at intersections and street form changes avoided?	☐	Yes
Are highly-connected public transport networks within and between municipalities developed?	☐	Yes
Is a public transport network created that interconnects with other active and public transport modes (i.e. multi-modality)?	☐	Yes

8. MULTI-MODALITY

Are pedestrian, cycling and public transport infrastructures well connected?	☐	Yes
Are multi-modality nodes that prioritize the switch between walking, cycling and public transport established and well distributed across the city?	☐	Yes
Is there space allocated for the necessary multi-modal infrastructures (e.g. park-and-ride parking, car-sharing spaces, bike and pedestrian infrastructures near public transport stops, etc.)?	☐	Yes

9. PUBLIC OPEN/ GREEN SPACE

Is universal access (100% of population) to public open/ green space provided?	☐	≤ 300 m street network distance
Is there sufficient public open/ green space?	☐	≥ 20 m²/ capita of public open space of which ≥ 10 m²/ capita should be green space
Is a major local green space provided?	☐	≥ 0.5 ha, best if within ≤ 300 m street network distance
Is a district green space provided?	☐	≥ 5 ha, best if within ≤ 2 km street network distance
Is a regional green space provided?	☐	≥ 20 ha, best if within cities catchment area
Is continuous surrounding greenness provided? (e.g. green corridors, street trees, green patches, pocket parks, etc.)	☐	100% of streets with vegetation ≥ 10 trees/ city block
Are walking and cycling infrastructures integrated into the local green space system?	☐	Yes

10. INTEGRATION OF ALL PLANNING PRINCIPLES

Are the land use mix, connectivity, density, traffic calming, walking, cycling, public transport, multi-modality and public open/ green space objectives developed simultaneously and integrated?	☐	Yes

NOTES

Big thanks to the whole team!

Questions?

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