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# Nature as Urban Health Infrastructure: From Evidence to Action

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I Biocities webinar series: Healthy cities by Nature

03 June 2026

**ISGlobal**  
Barcelona  
Institute for  
Global Health

 EXCELENCIA  
SEVERO  
OCHOA

 Institutió  
**CERCA**  
Centres de Recerca  
de Catalunya



**According to the WHO,**

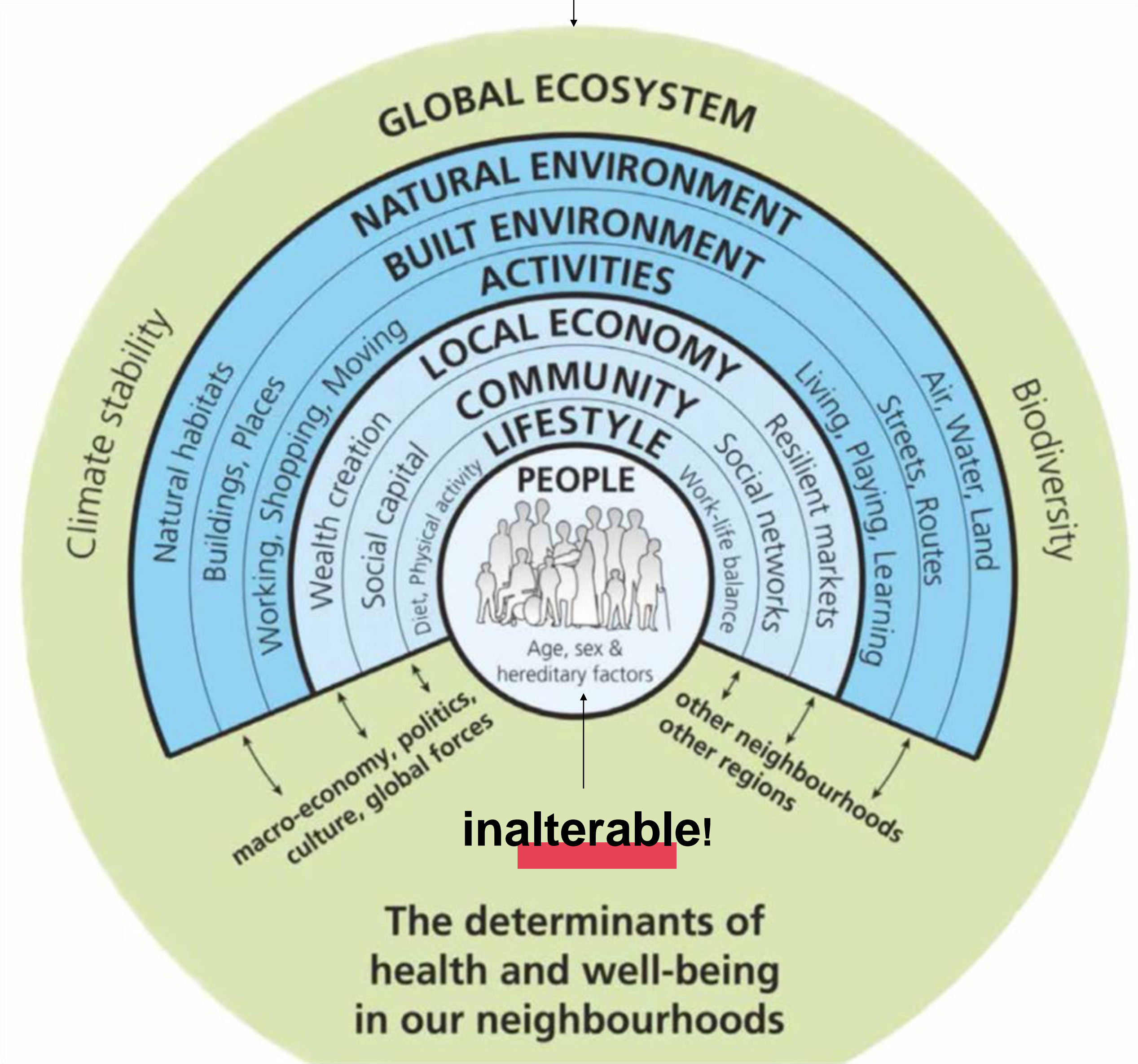
**"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"**

# 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**, and **disease burden** is linked to environmental factors.

Factors that are **alterable!**



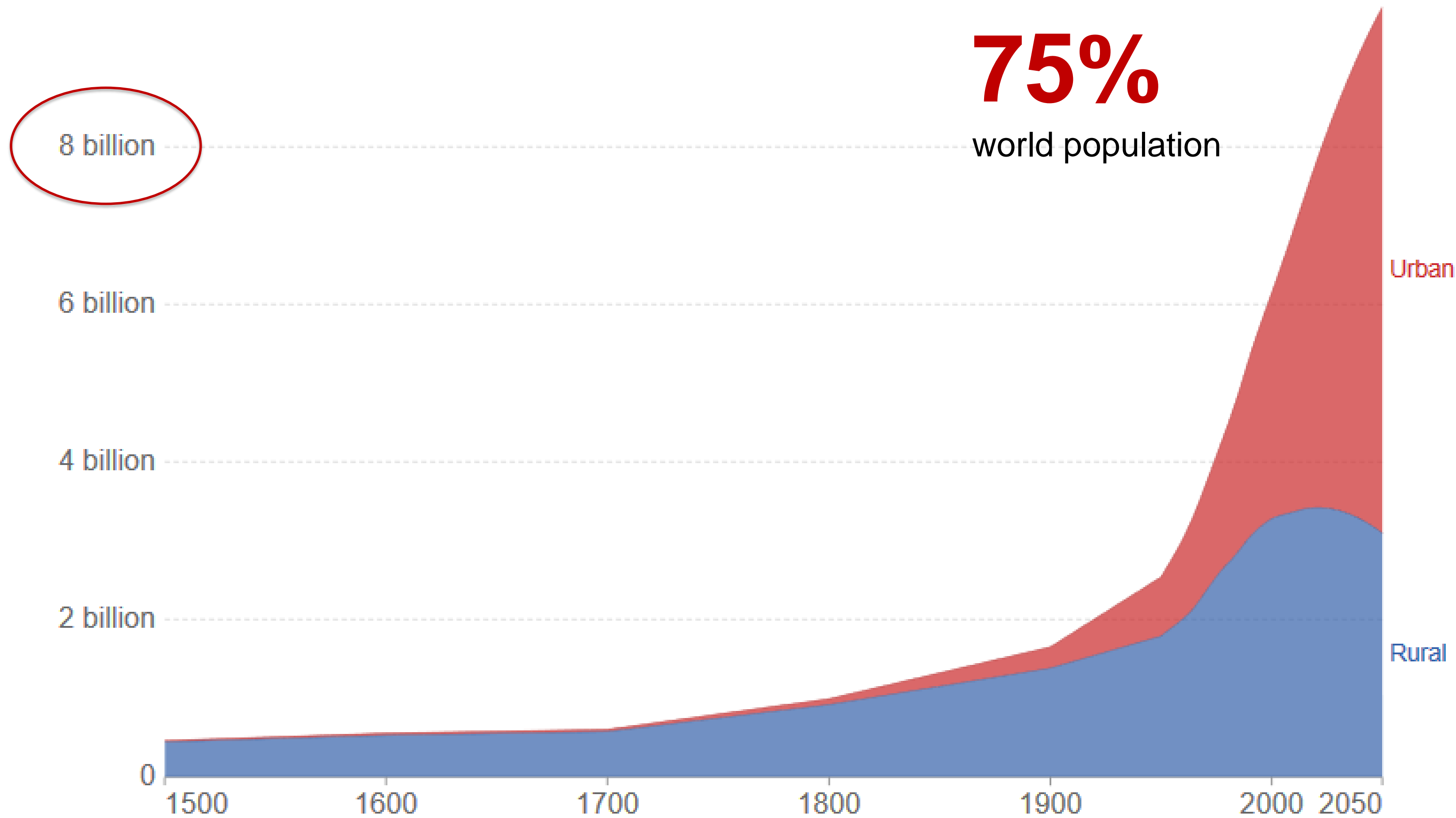
IN THE TIME TAKEN  
TO READ THIS, THE  
URBAN POPULATION  
HAS INCREASED BY...



# Urban and rural population projected to 2050, World, 1500 to 2050

Our World  
in Data

Total urban and rural population, given as estimates to 2016, and UN projections to 2050. Projections are based on the UN World Urbanization Prospects and its median fertility scenario.



Source: OWID based on UN World Urbanization Prospects 2018 and historical sources (see Sources)

CC BY



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



**+**  
**The drivers of health  
in cities come from  
outside the health sector**

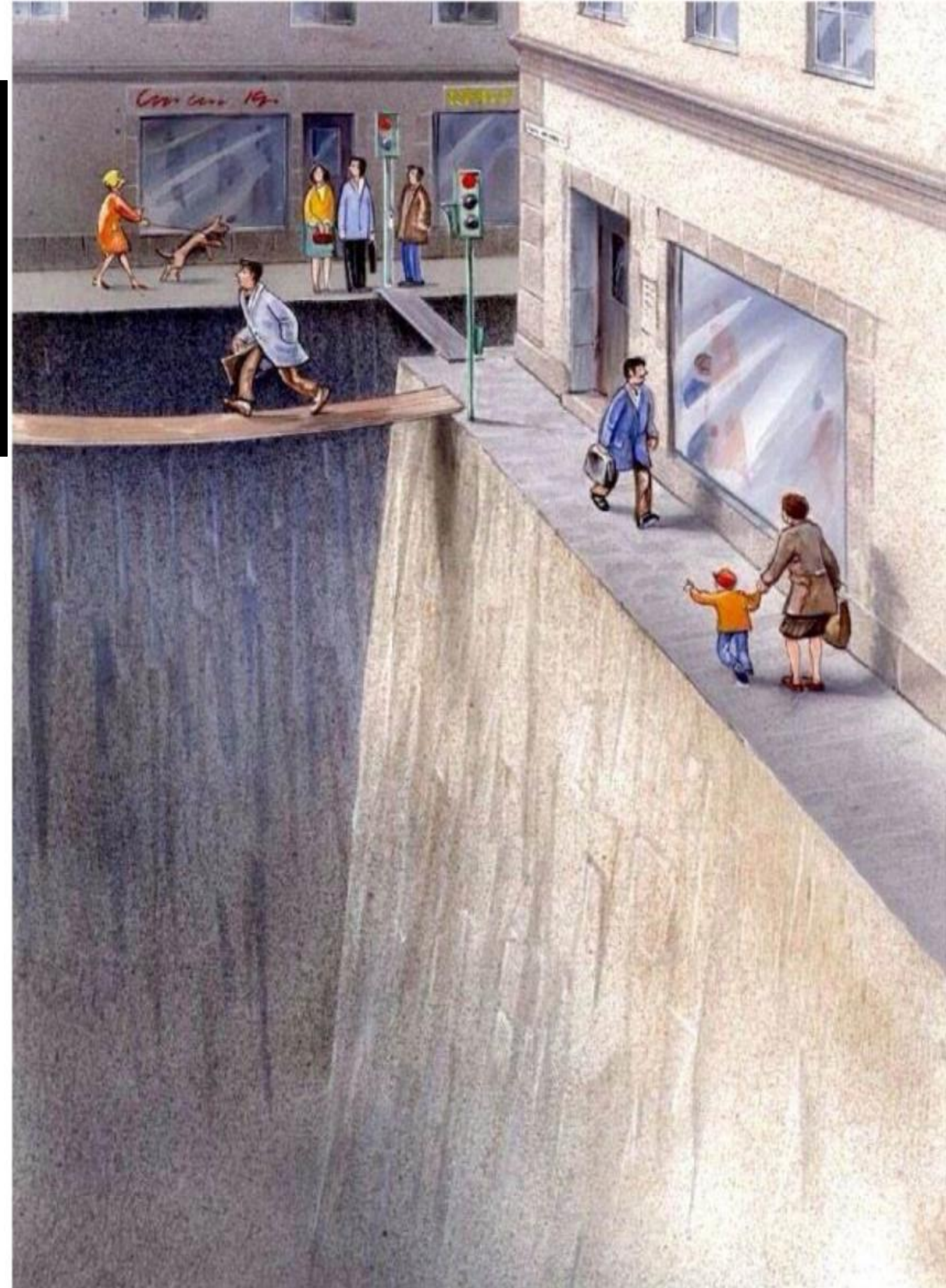
# 5 Keys to Healthier Cities



**60% of its  
surface area is  
dedicated to  
facilitating  
motorised traffic,  
resulting in a  
lack of space for  
people.**



# Pedestrians in the current model



Font: Karl Jilg, for the Swedish  
Road Administration

# Health effects related to mobility



**Air Pollution**



**Heat**



**Noise**

**Have negative health effects**

# Lack of open and green spaces



# Health effects related to mobility



**Green & Blue spaces**



**Physical Activity**

**Have positive health effects**



**Urban planning is a  
Public Health  
Intervention**

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

# Urban Green Spaces Reduce Disease Risk



## BIODIVERSITY

### Ecosystem Services

- Cooling of cities
- Storm-water runoff
- Reduced air pollution
- Providing microbial diversity

### Physical activity

### Social contacts

### Stress reduction

### Reduce the risk of

- Depression
- Cardiovascular diseases and mortality
- Stroke
- Diabetes
- Asthma
- Cancer

### Increase levels of

- Mental well-being
- Happiness
- Academic performance
- Memory capacity
- Sleep quality

Adapted from Hartig et al. 2014:

<http://www.annualreviews.org/doi/abs/10.114>

[6/annurev-publhealth-032013-182443](http://www.annualreviews.org/doi/abs/10.1146/annurev-publhealth-032013-182443)

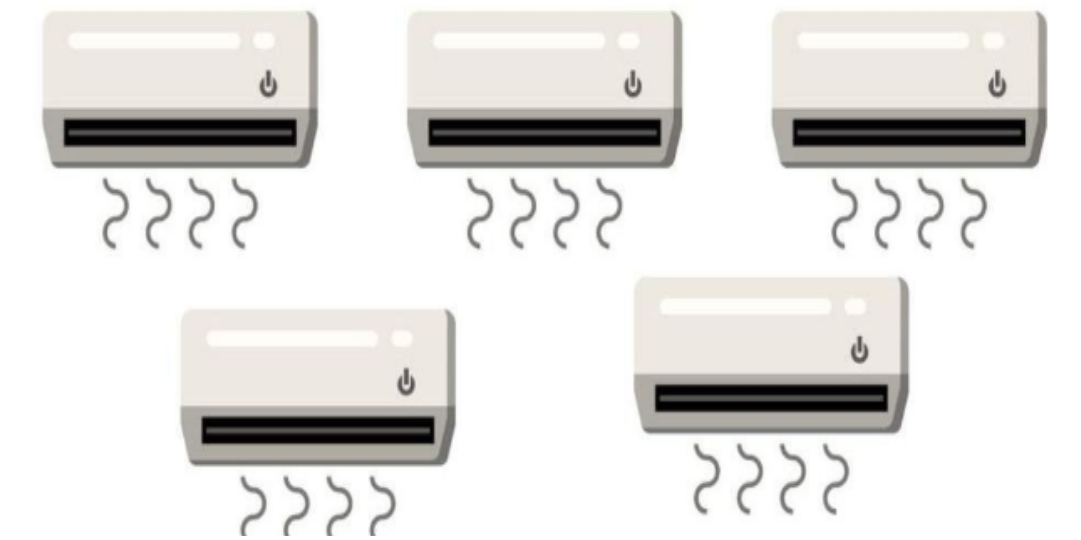


Evapotranspiration

**450 L** water

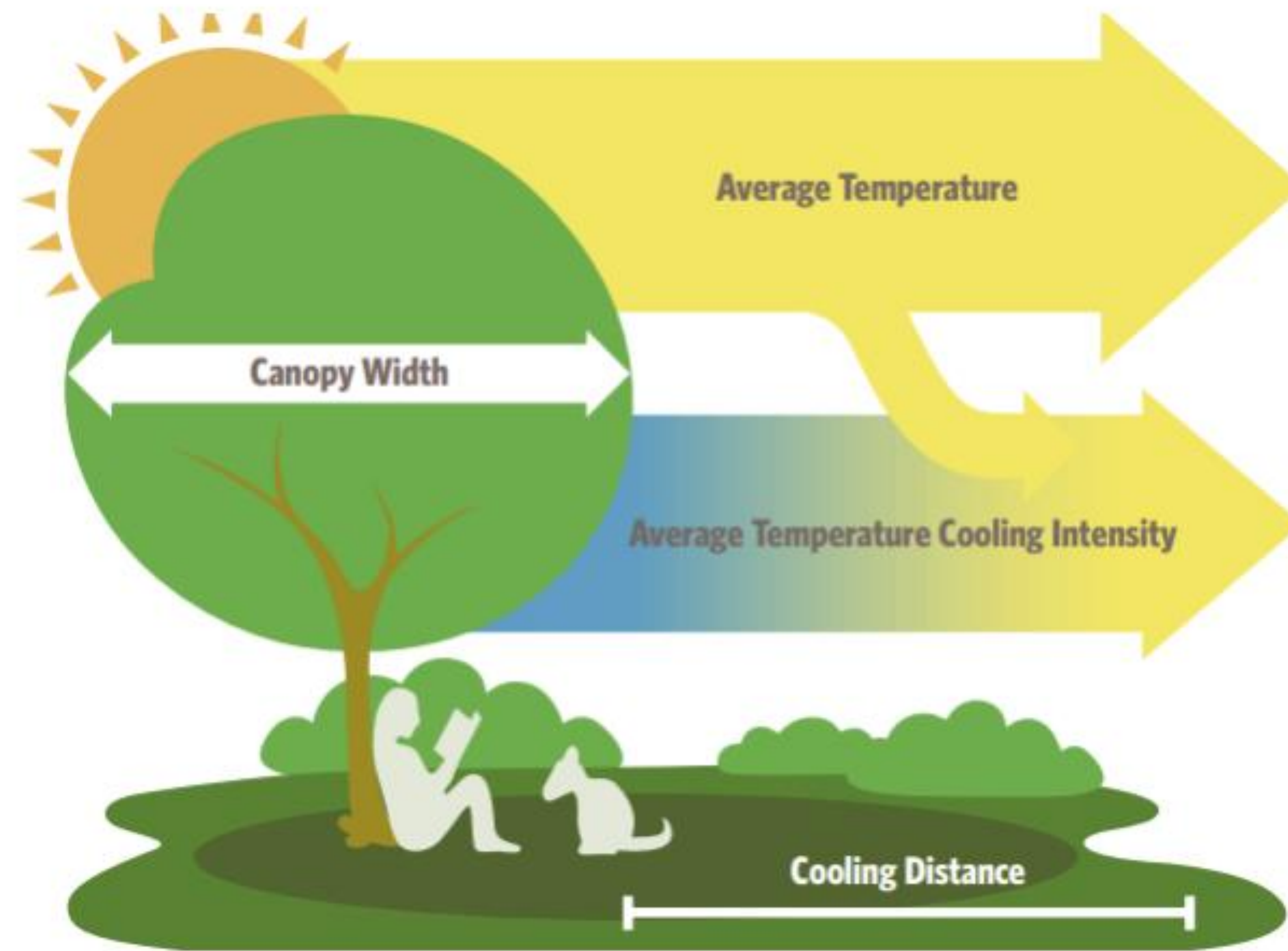


=



mature tree

# Urban parks reduce heat exposure



Cooling intensity: **0.3 – 6.7°C**

One park width

[https://www.nature.org/content/dam/tnc/nature/en/documents/20160825\\_PHA\\_Report\\_Final.pdf](https://www.nature.org/content/dam/tnc/nature/en/documents/20160825_PHA_Report_Final.pdf)

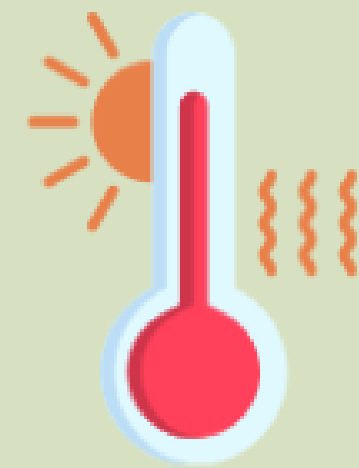
Sugawara et al. (2016); Taha et al. (1991); Jaganmohan et al. (2016); Ketterer & Matzakaris (2014); Legese Feyisa et al. (2014);  
Ng et al. 2012; Shashua-Bar & Hoffmann (2000); Talgehani et al. (2014)

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

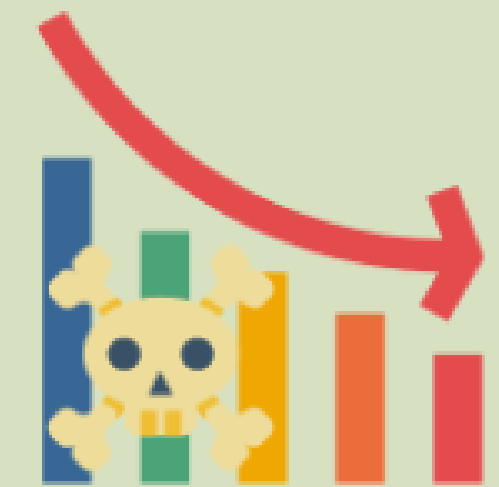


30%

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.



# Modifications to residential neighbourhood characteristics and risk of 79 common health conditions: a prospective cohort study

Mika Kivimäki, G David Batty, Jaana Pentti, Solja T Nyberg, Joni V Lindbohm, Jenni Ervasti, Carlos Gonzales-Inca, Sakari B Suominen, Sari Stenholm, Pyry N Sipilä, Payam Dadvand, Jussi Vahtera

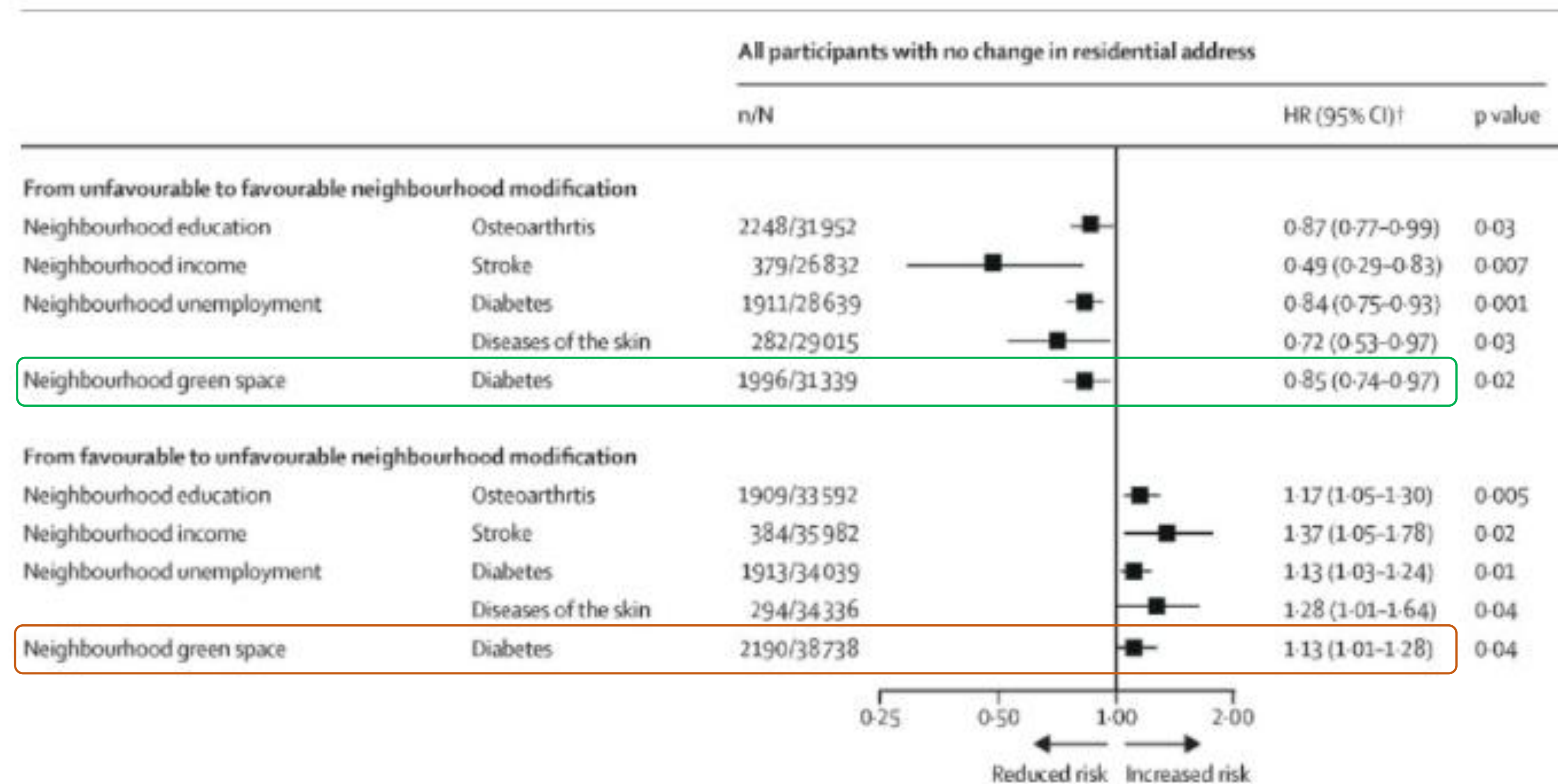
THE LANCET  
Public Health

Volume 6, Issue 6, June 2021, Pages e396-e407

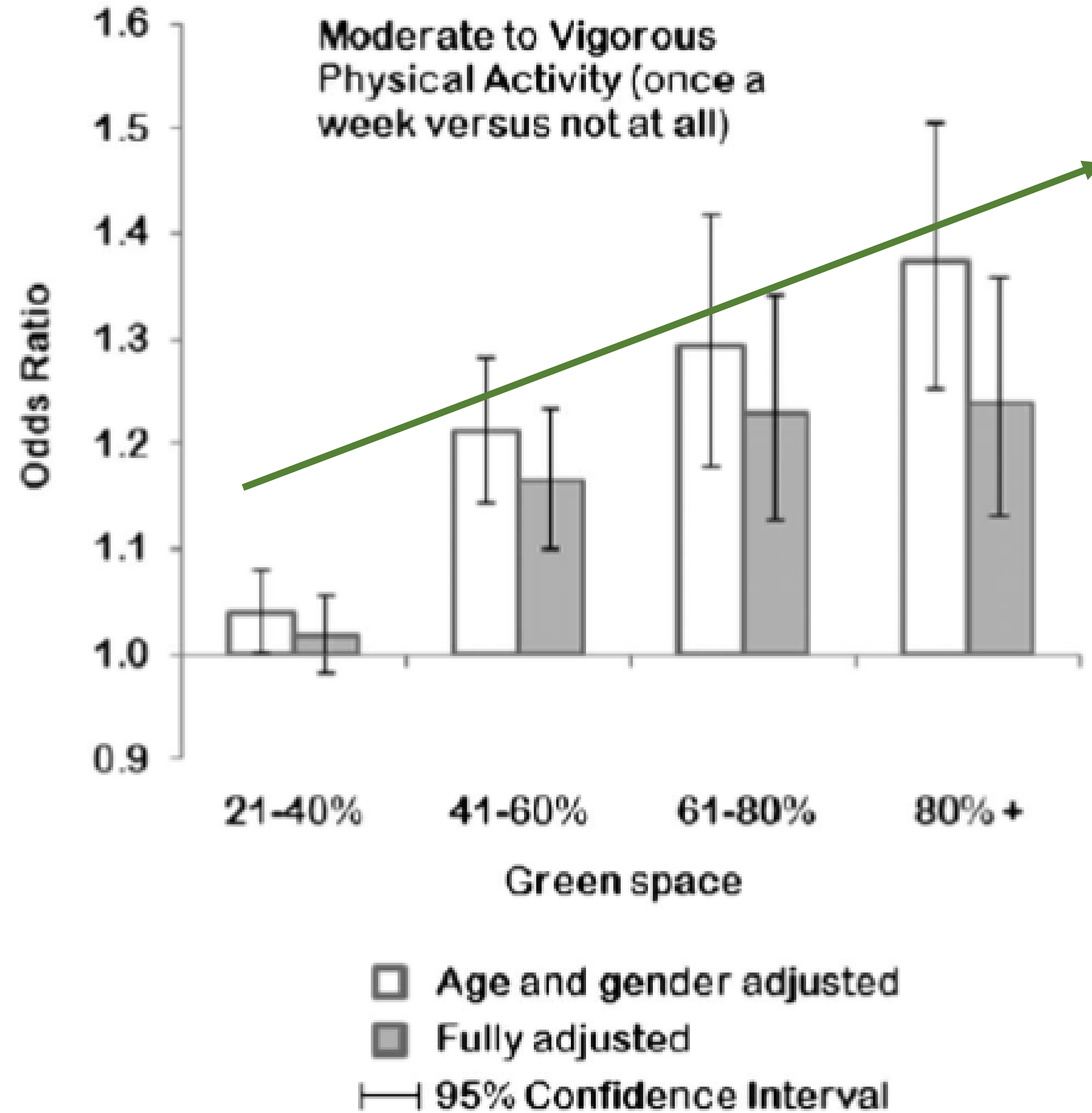
Compared to people who lived in more vulnerable neighborhoods,

People living in neighborhoods that **transitioned** over time **towards more favorable green space**

features had a **15% lower risk** of developing diabetes.



# GREEN SPACE AND PHYSICAL ACTIVITY





# Biodiversity boosts children immune system

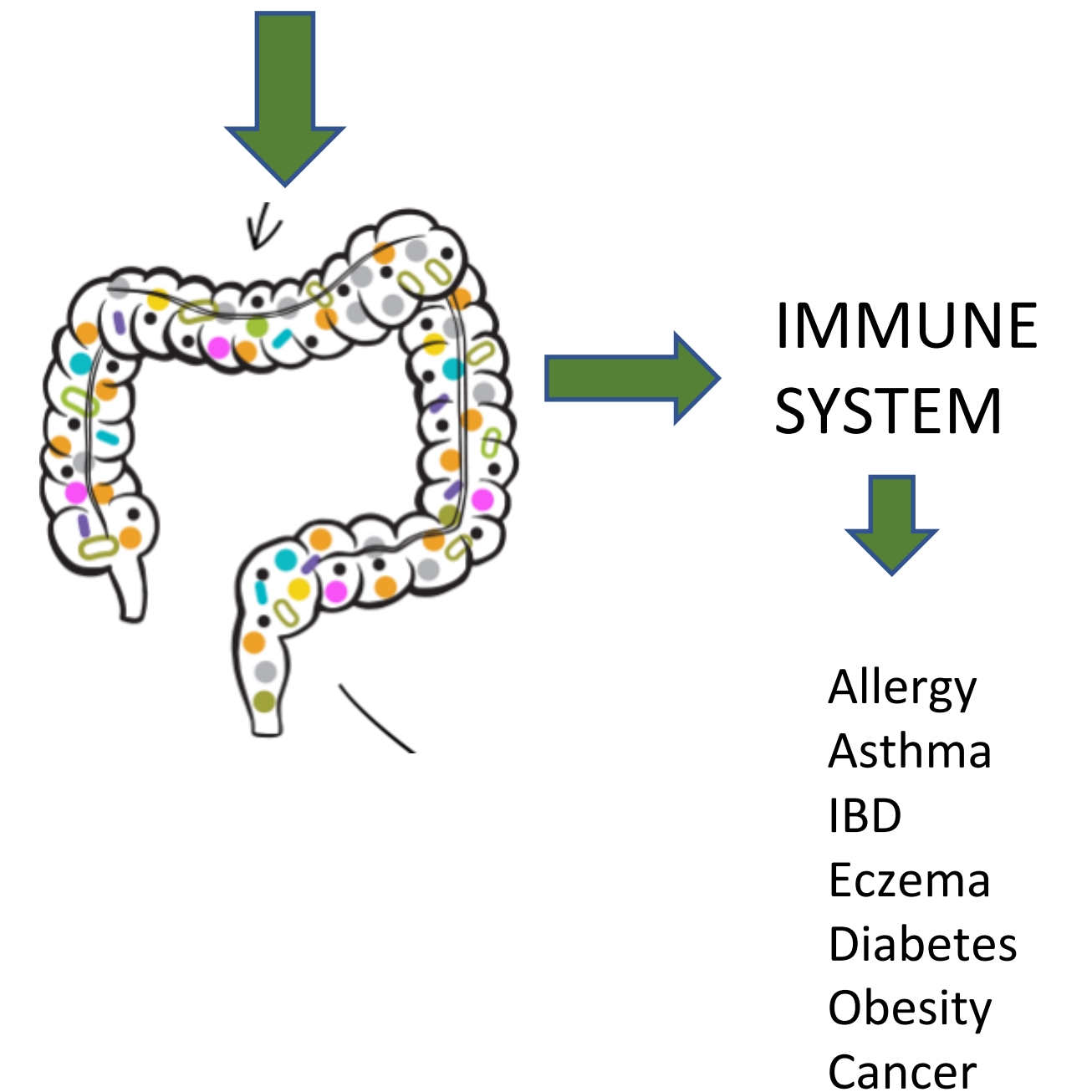
A forest-based yard improved the immune<sup>\*</sup> system of daycare children in only a month



Gravel  
sand  
Concrete

VS

Grass  
Bushes  
shrubs (blueberries)  
mosses

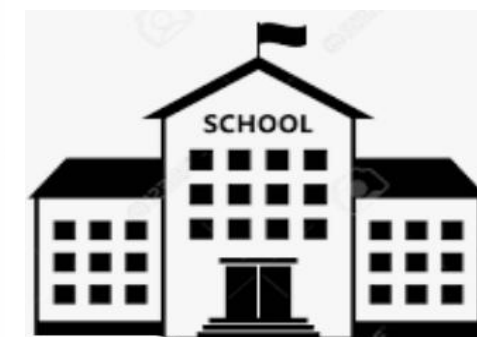


<sup>25</sup>  
<sup>\*</sup> Roslund et al., Biodiversity intervention enhances immune regulation and health-associated commensal microbiota among daycare children. Science Advance, 2020



□ **Tree coverage** surrounding **schools** might help reducing aggressiveness in children

□ **Greening schools** could give an opportunity to **prevent aggressive behavior** in children





UBC Medicine @UBCmedicine · Feb 24

New research led by Dr. Matilda van den Bosch (@Piegonetta), assistant professor at @ubcspph and @ubcforestry, indicates that the likelihood of #ADHD can be reduced with more green space and less air pollution.



med.ubc.ca

Reduce ADHD with more parks, less pollution

New research conducted in Metro Vancouver has found that the r green space and less air pollution children have in their ...



Dr Maria Neira @DrMariaNeira

Children with higher exposure to air pollution and lower exposure to green space have 62% increased risk of ADHD [www.eurekalert.org/news-releases/944392#.YhkgtzNQgJo.twitter](http://www.eurekalert.org/news-releases/944392#.YhkgtzNQgJo.twitter)

Twitter • 10:32 a.m.

## ADHD linked to air pollution, lack of green space in sweeping Metro Vancouver study

LA VANGUARDIA

...000 children in Metro Vancouver has increased levels of air pollution lead to

CALIDAD DEL AIRE

### Los niños con mayor exposición a la contaminación y menos a espacios verdes tienen más de riesgo de padecer TDAH

• Un estudio con datos de 37.000 niños y niñas evidencia desigualdades ambientales de hasta un 62% en relación con el TDAH



Si un niño vive en un barrio con más espacios verdes tiene un 50% menos de riesgo de desarrollar TDAH. (Getty Images)



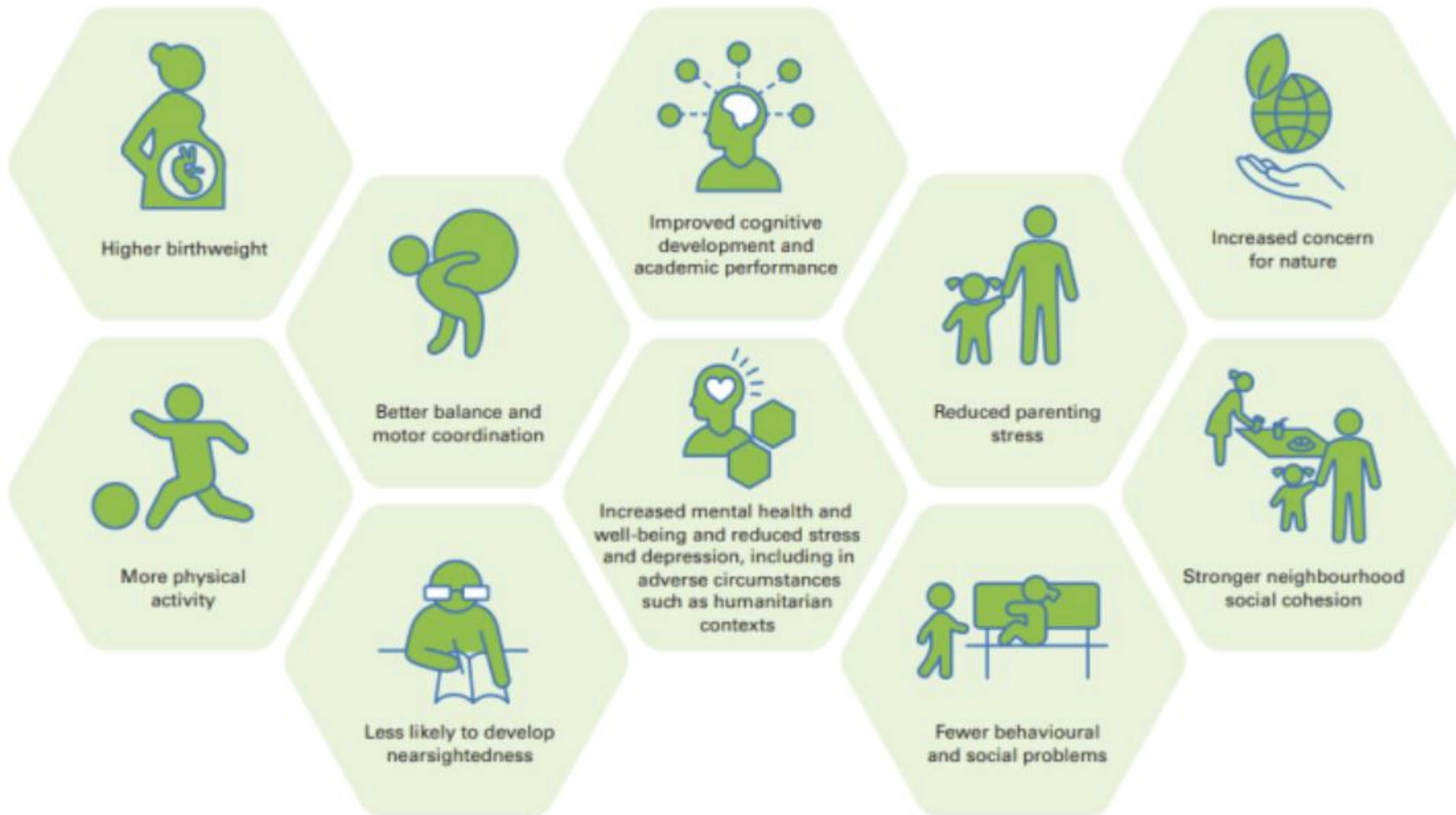
**Playing in nature as a child  
is linked to better mental health in  
adulthood<sup>(1)</sup>**



**Adults** who have had LITTLE CONTACT with nature **during childhood** VALUE LESS contact with **natural environments** <sup>(1)</sup>

*(1) Preuss M, et al. Low Childhood Nature Exposure is Associated with Worse Mental Health in Adulthood. International Journal of Environment Research and Public Health, 2019.*

# Green spaces can significantly benefit children's physical, mental and social development



# Green spaces and premenstrual syndrome (PMS)



of women have clinically relevant PMS symptoms.

Women who live in neighborhoods with more green space have fewer PMS symptoms.



The benefits are found in long-term exposure to green space.

With green spaces, less likelihood of:



Anxiety, depression



Difficulty sleeping



Breast tenderness



Abdominal swelling



# THE HEALTH BENEFITS OF GREEN SPACES FOR ELDERLY POPULATION

## What Does Science Say?

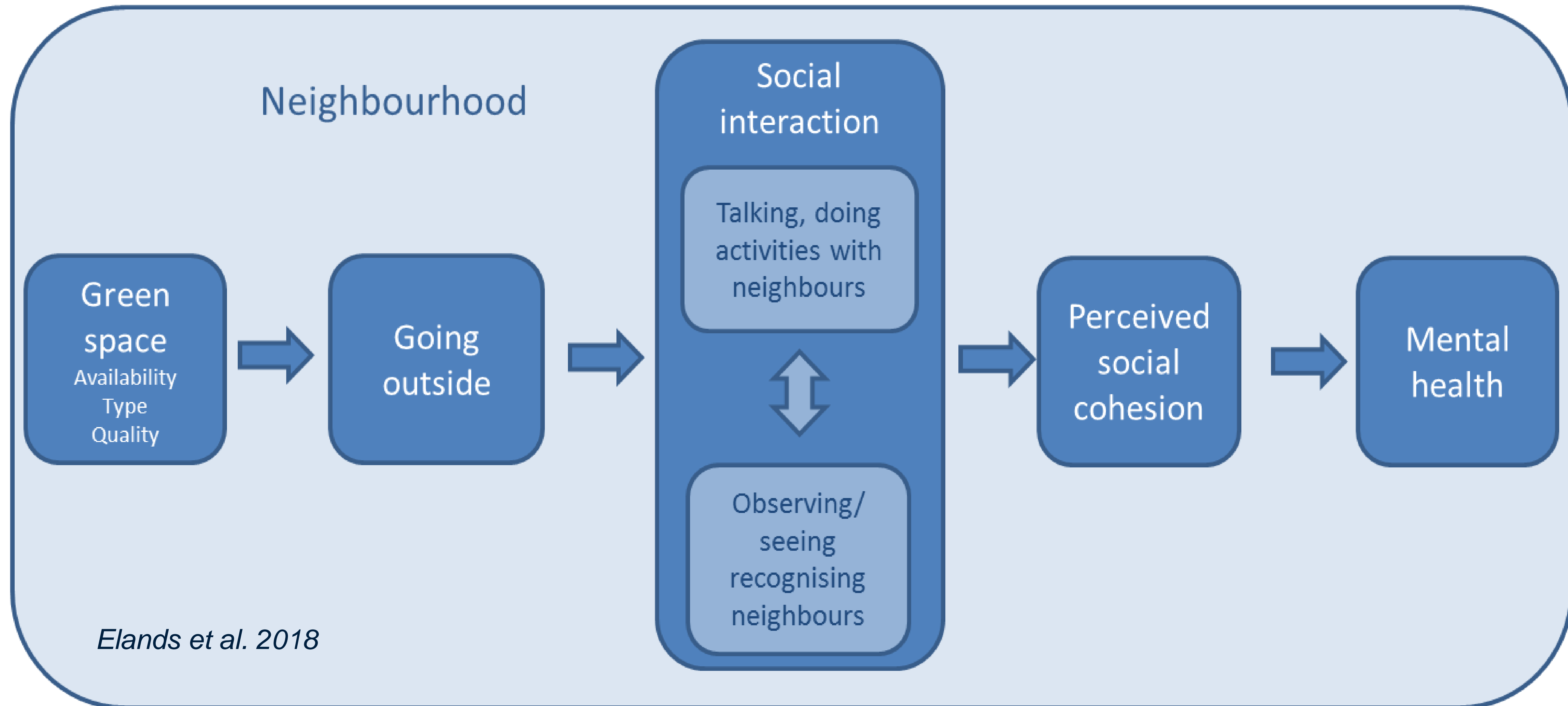


Older people living in neighborhoods with more green space show:

- lower risk of cardiovascular disease
- slower cognitive decline
- slower decline in walking speed
- lower mortality
- better general health
- greater life satisfaction
- less stress



# Green infrastructure promotes **Social interaction**



# Nature-based social prescribing



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 945095

## Nature-based Social Intervention Trials to Assess Impact on Health Behavior Change and Loneliness in Cities:

### An Overview of the RECETAS Project

## Green Care

« The goal is for RECETAS not only to contribute to the scientific evidence, but **to offer healthcare providers, care professionals, social service organizations and communities sensible solutions to address loneliness in a cost-effective way** » J. Litt

## Loneliness

- More dangerous than smoking 15 cigarettes a day
- Number has doubled since the 1980s
- Immigrants, elderly, low-income families
- Big cities
- Heart disease, stroke, dementia, obesity



Building **individual** and **community** **resilience**  
through Nature-based Therapies

## **The RESONATE Project**



The Resonate project is funded by the European Union's Horizon Europe program for research and innovation (no. 101081420) and co-funded by the UK Research and Innovation Grant (no. 10063874).



**UK Research  
and Innovation**

# Barcelona CS objective

To **evaluate the effects** of group **mindful walks** along the **urban coast** on participants' **physical and emotional well-being**,

by promoting increasing **time spent outdoors**, **connection with nature**, fostering **mindfulness practices** and building **individual and community resilience**.





**We need more  
green areas and trees  
and less medicines!**

**WHO recommendations**  
universal access  
to green spaces

a green space of **at least 0.5 ha**

at a distance in a straight line  
of no **more than 300 meters** from **each home**



[isglobalranking.org](https://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**



# 3-30-300 GREEN SPACE RULE AND MENTAL HEALTH

Few people (**6%**) achieved the **3-30-300** green space rule in **Barcelona**

Meeting the rule was associated with a **23-76% reduction** in **mental health indicators:**

- poor mental health
- medication use
- psychologist/psychiatrist visits

## the 3-30-300 rule:





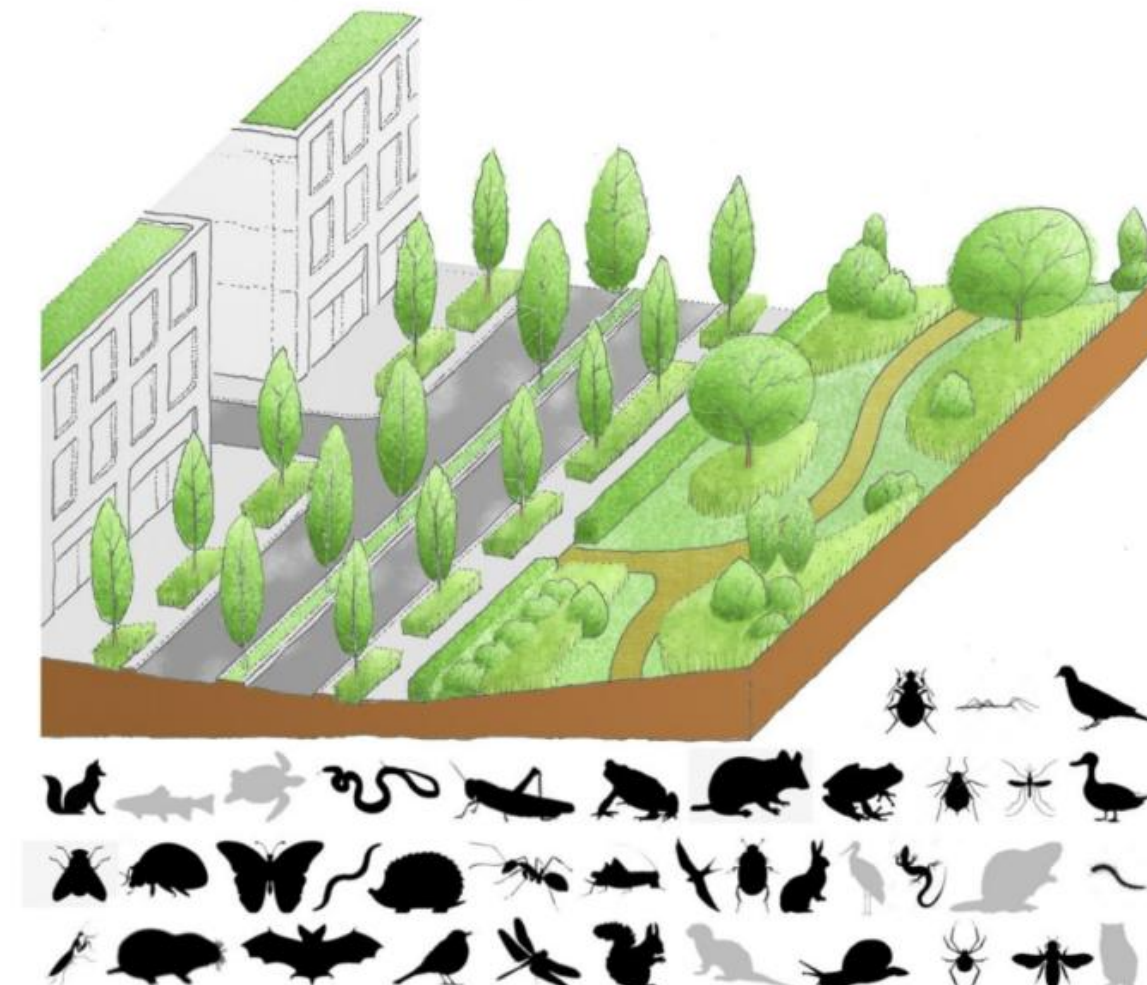
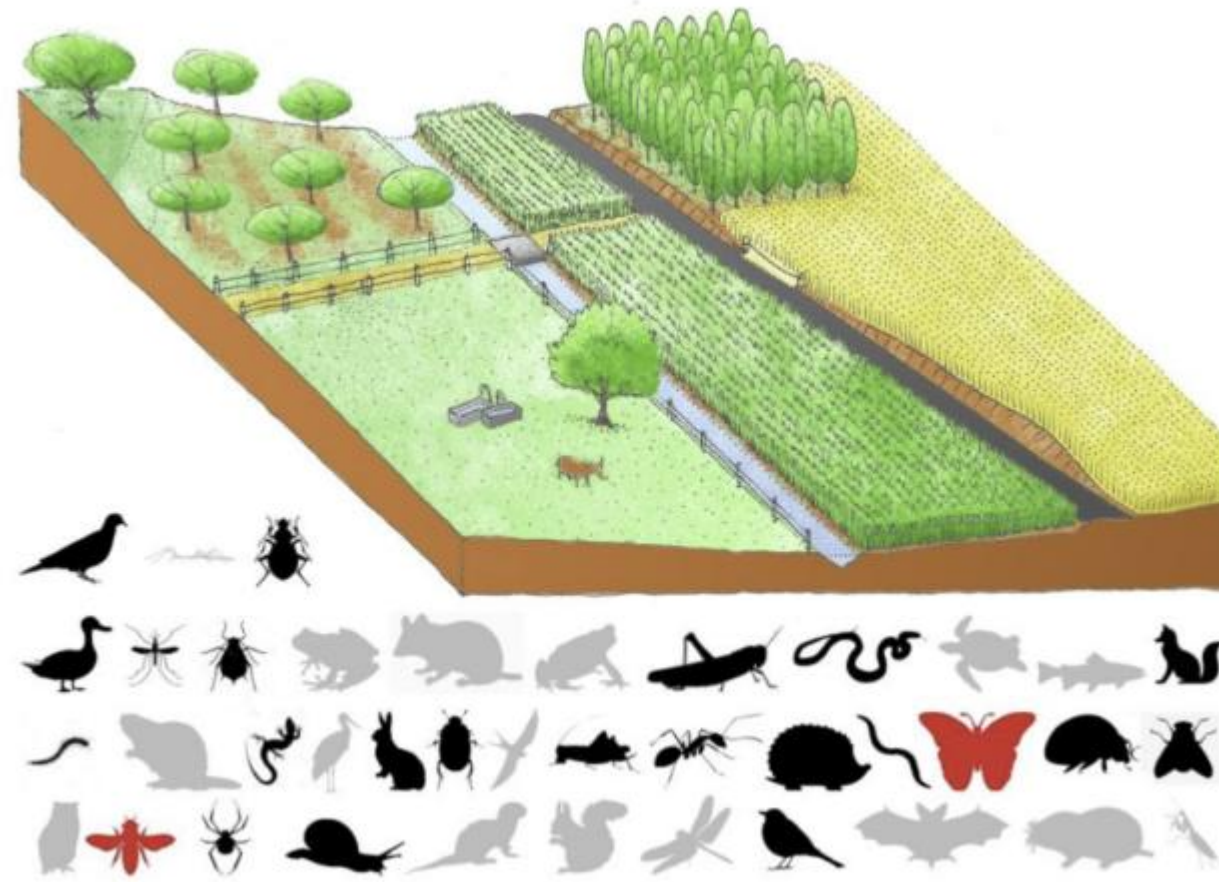
# GREENING SCHOOL ENVIRONMENTS



# We need to promote functional urban biodiversity

WELCOME BUGS AND BAD WEEDS!!

We need you !!

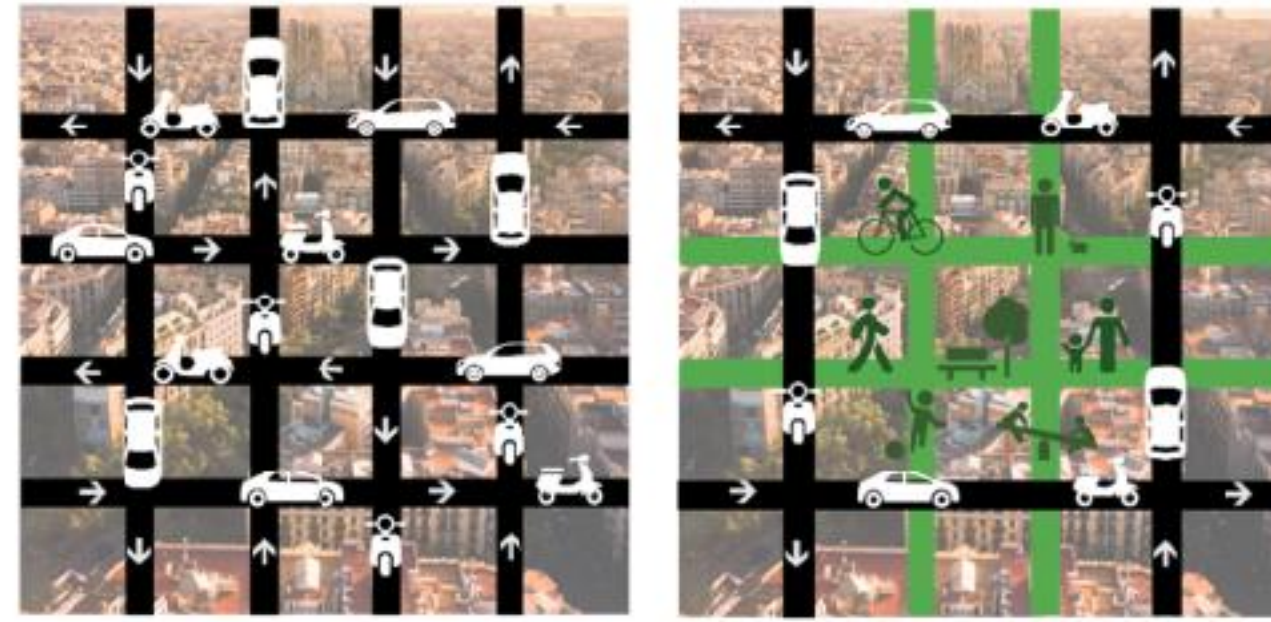




Between 2000 and 2010 there was a net loss in urban forest cover in cities across the world\*



a) low traffic neighbourhood, London



b) Superblock, Barcelona

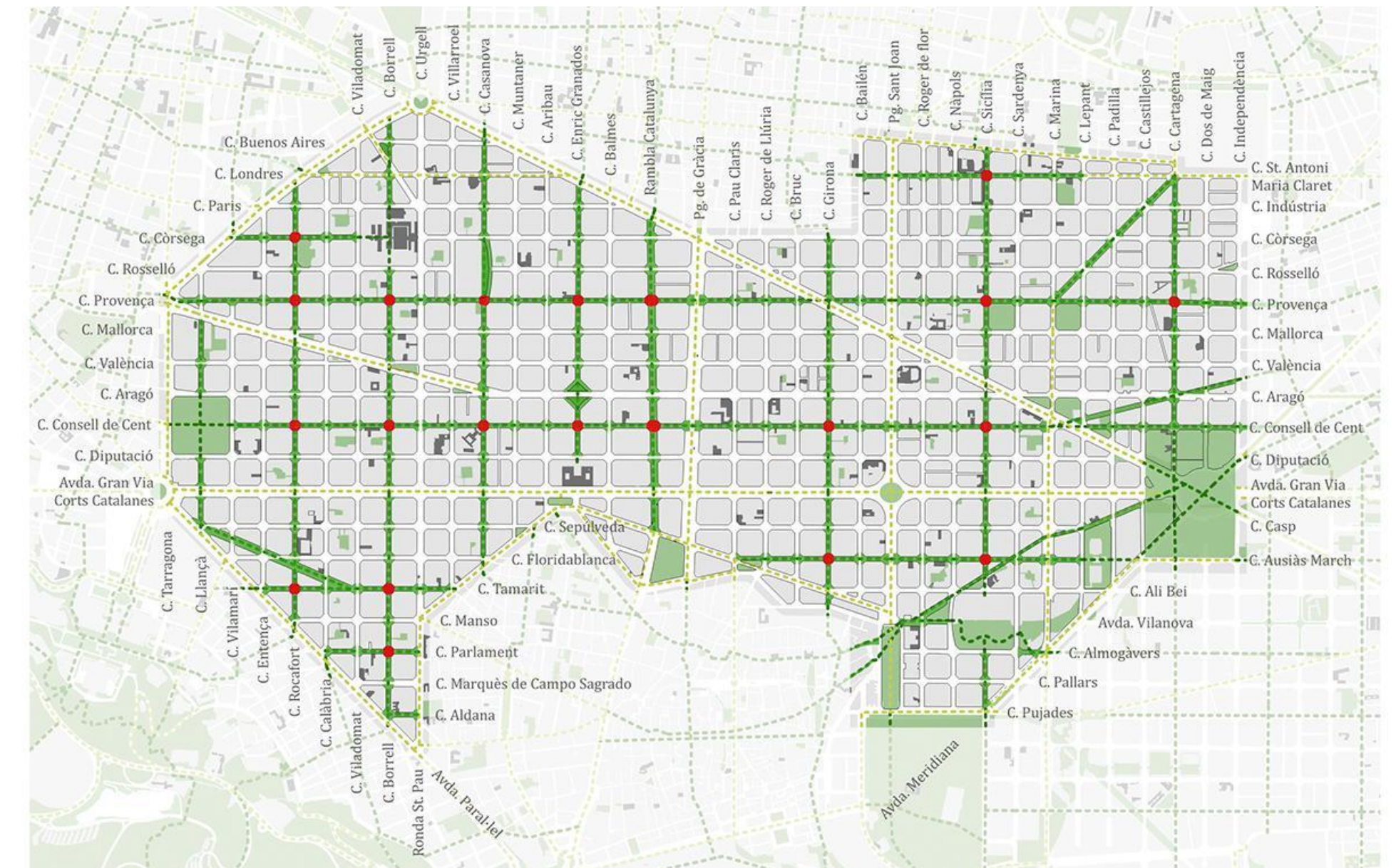
# NEW URBAN MODELS



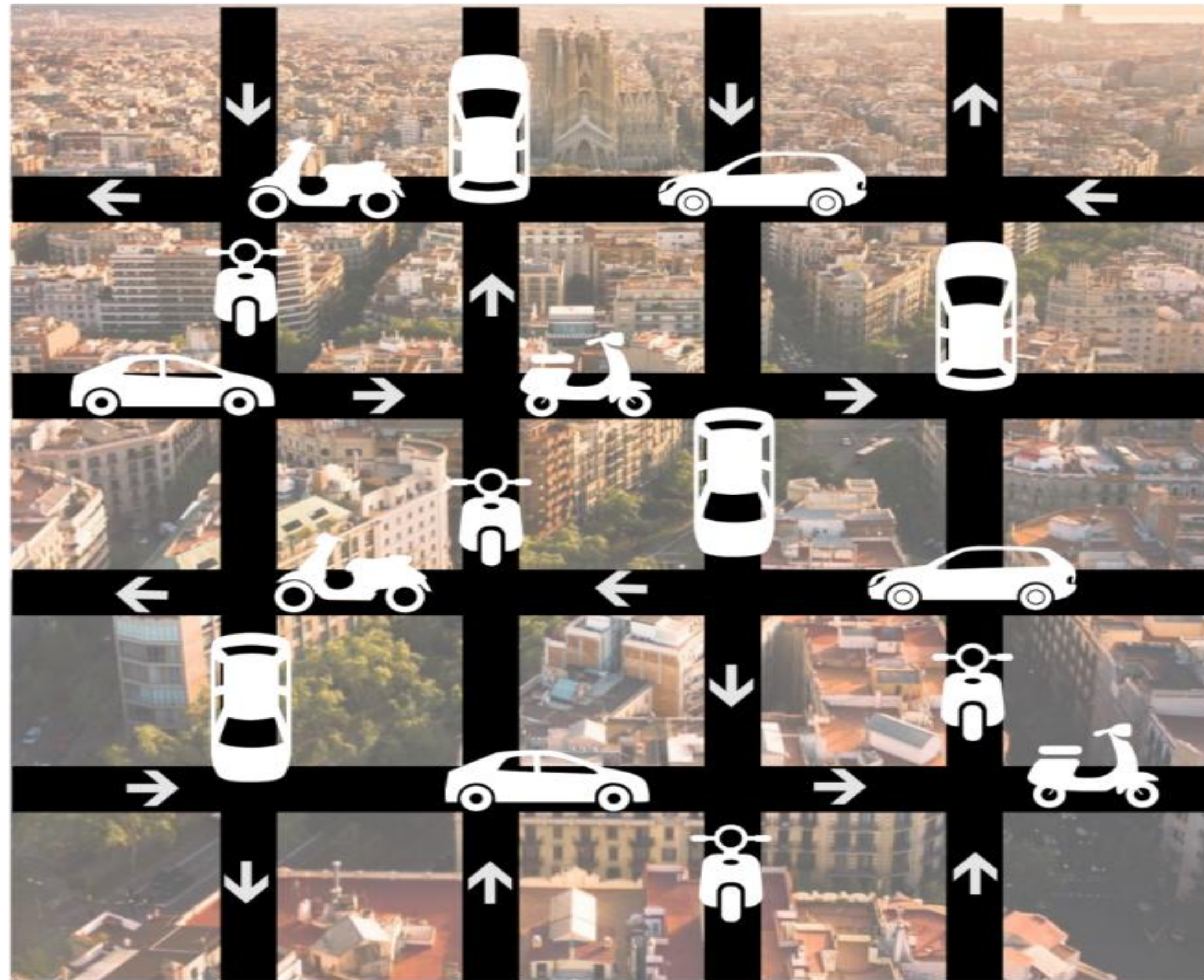
c) 15-minute city, Paris



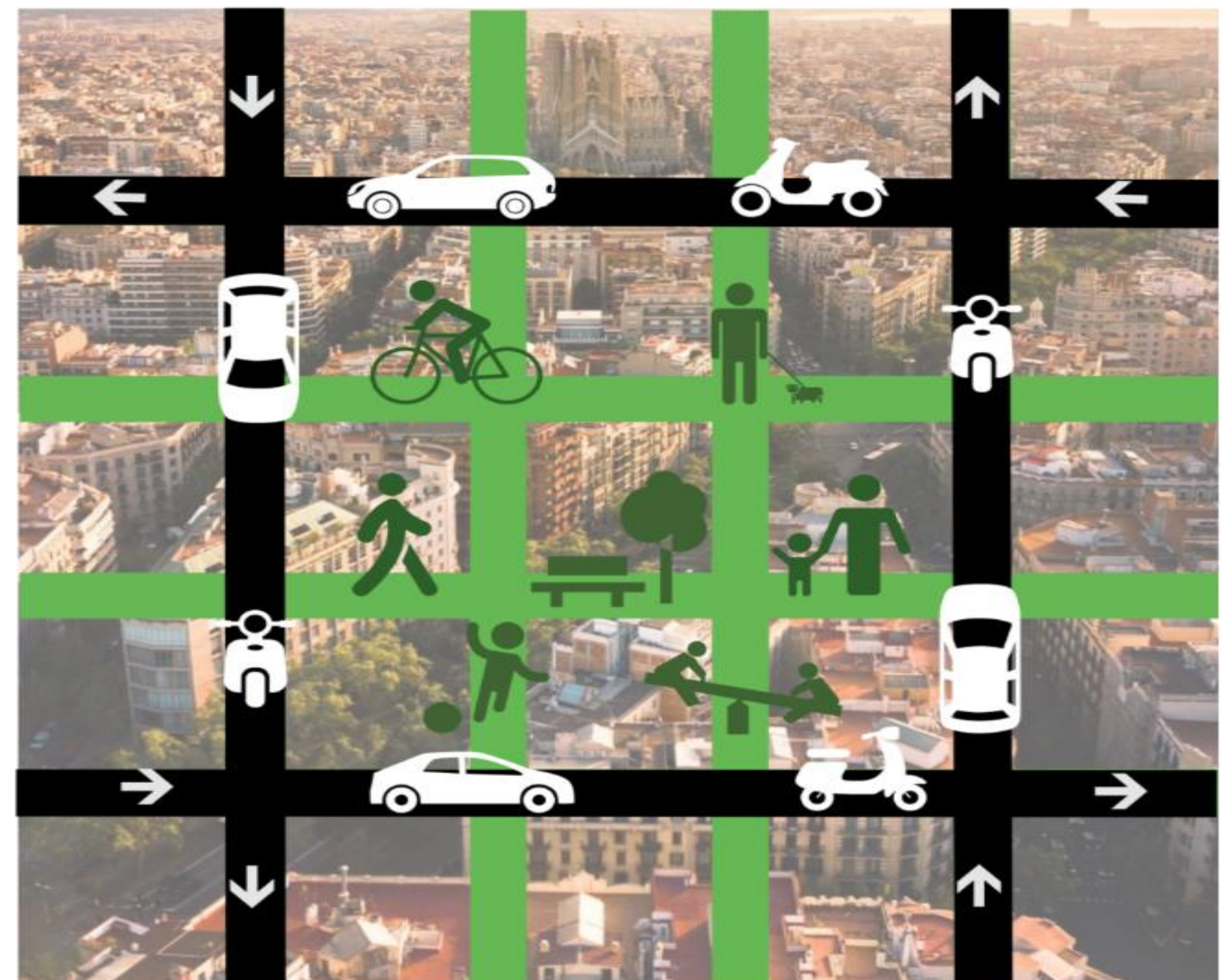
d) Car free Vauban, Freiburg, Germany



# Barcelona Superblock Model



Baseline situation



Superblocks model

# Barcelona Super Block San Antoni



**BEFORE**

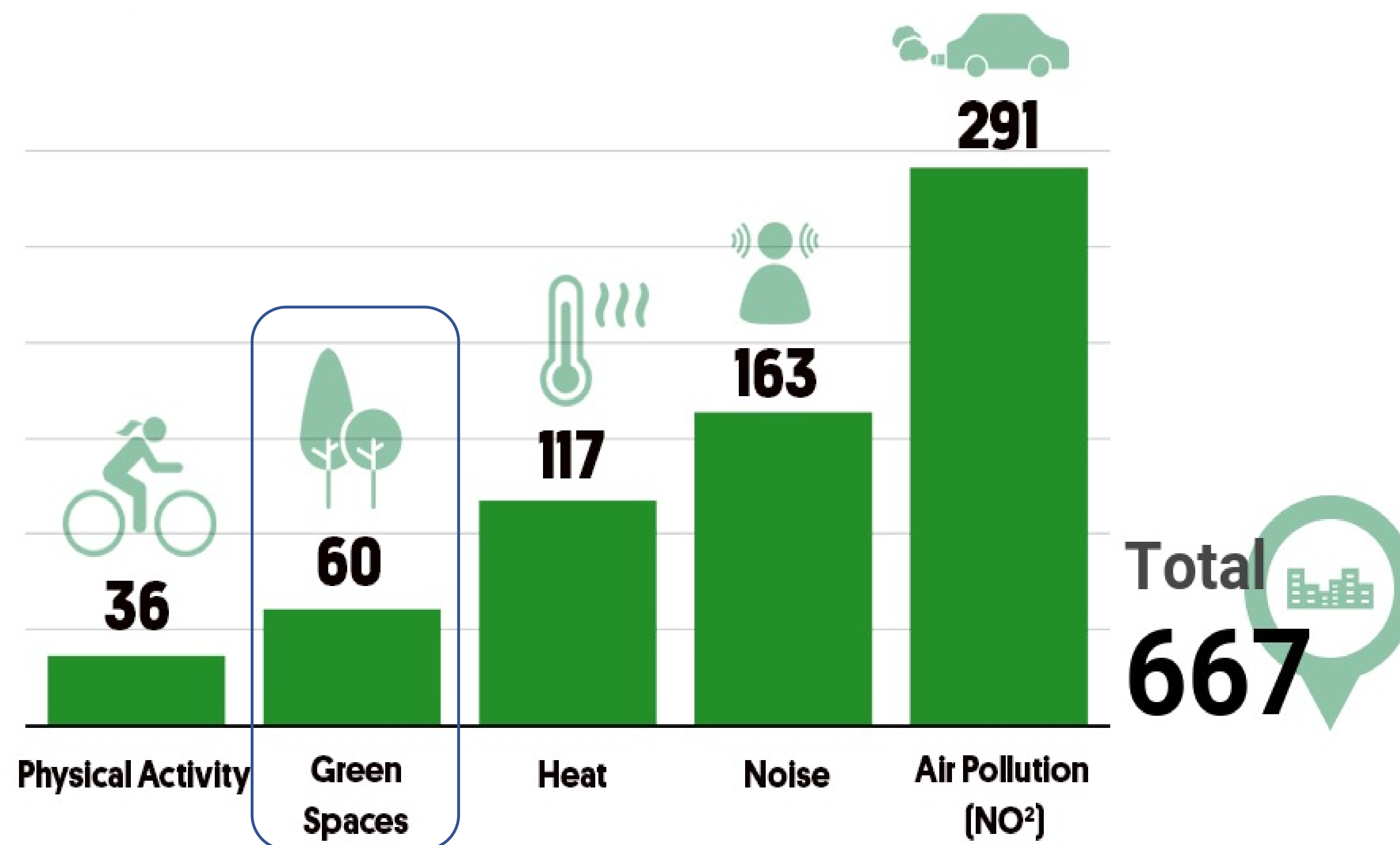


**AFTER**



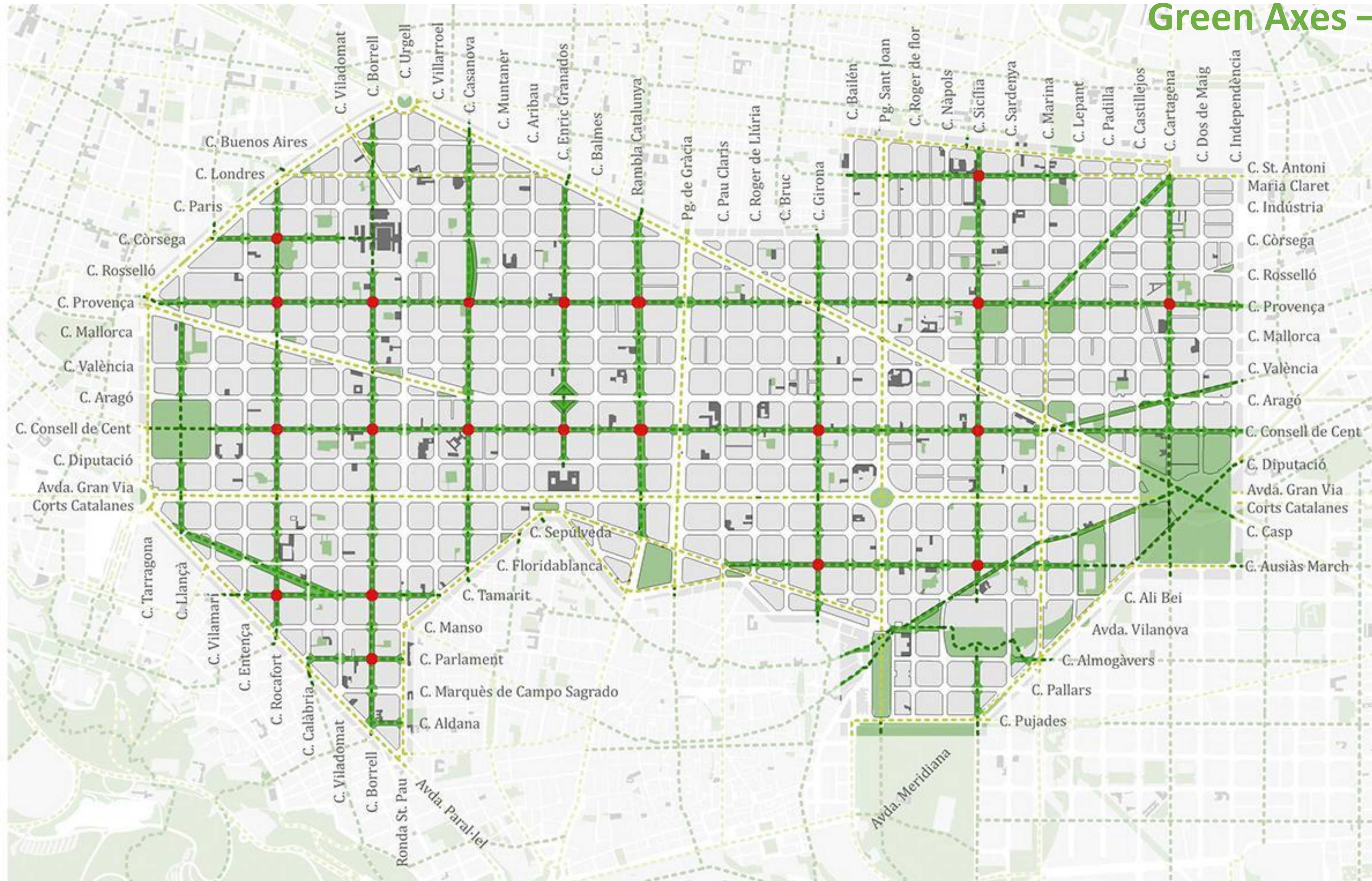
# Annual Premature Deaths that the “Superblocks” Model Could Avoid in Barcelona

Green spaces ↑ 19%



Mueller et al. Changing the urban design of cities for health: the superblock model. *Environment International*, 2019

# Green Axes – Eixos Verds





## Green Axes – *Eixos Verds*

<https://www.barcelona.cat/pla-superilla-barcelona/es/ejes-verdes-y-plazas-de-leixample>

## 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:**

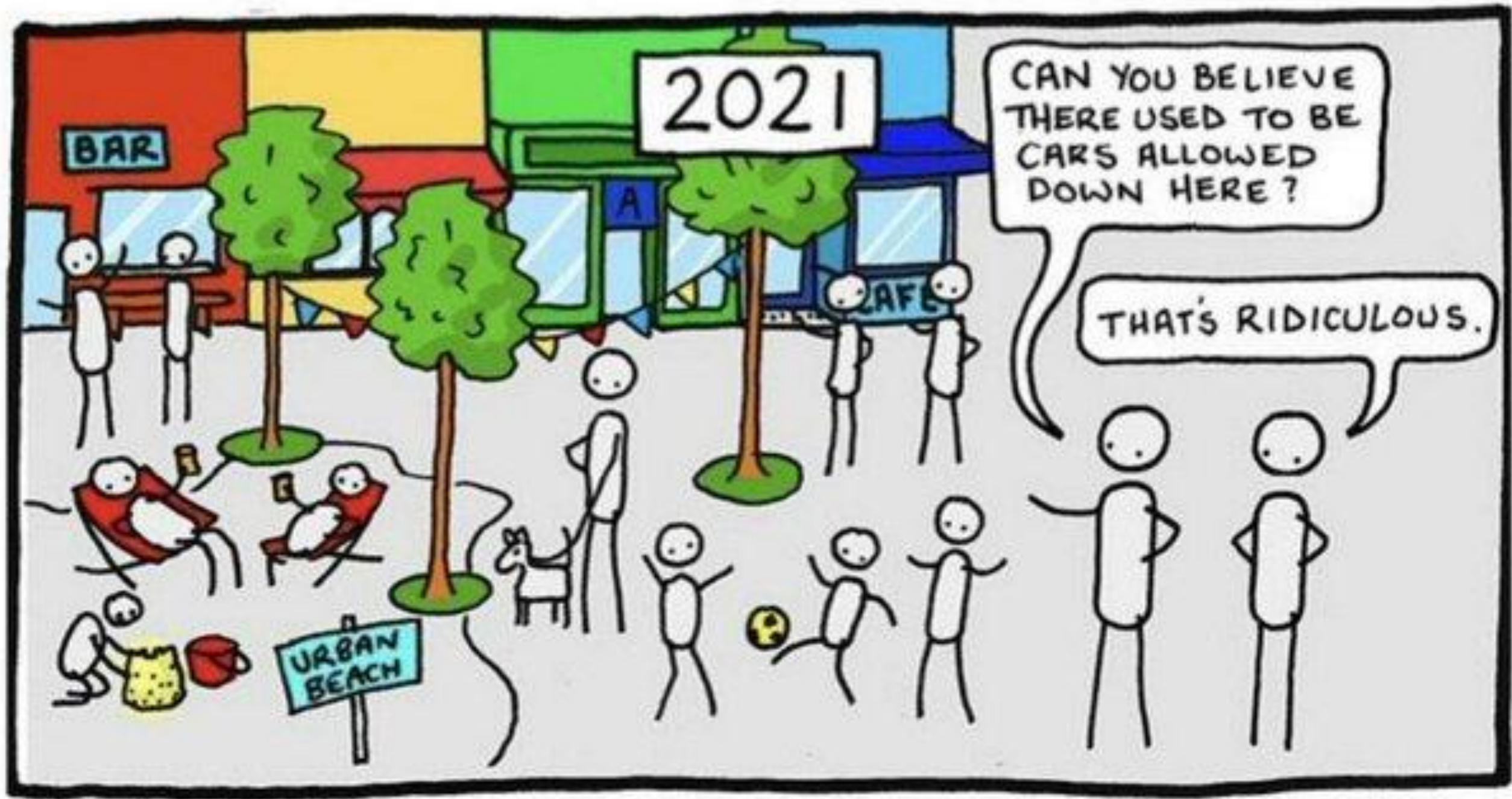
**5,7%** of Barcelona's green surface



Estimated savings in direct and indirect mental health costs are:

**45 million euros** per year







**Green** cities,  
healthy  
people

**Active** cities,  
healthy  
people,

**Clean** cities,  
healthy  
people

**Social** cities,  
healthy  
people



THANK YOU

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 @menahia

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