



Birmingham, UK

HEALTHY CITIES FROM THE BOTTOM UP:

A Human-centred Approach to Urban and Transport Planning

Andy Hong

Virtual seminar, CEDAR/MRC Epidemiology Unit

University of Cambridge

18 March, 2020





If you make more roads, you will
have more traffic.

— *Jan Gehl* —

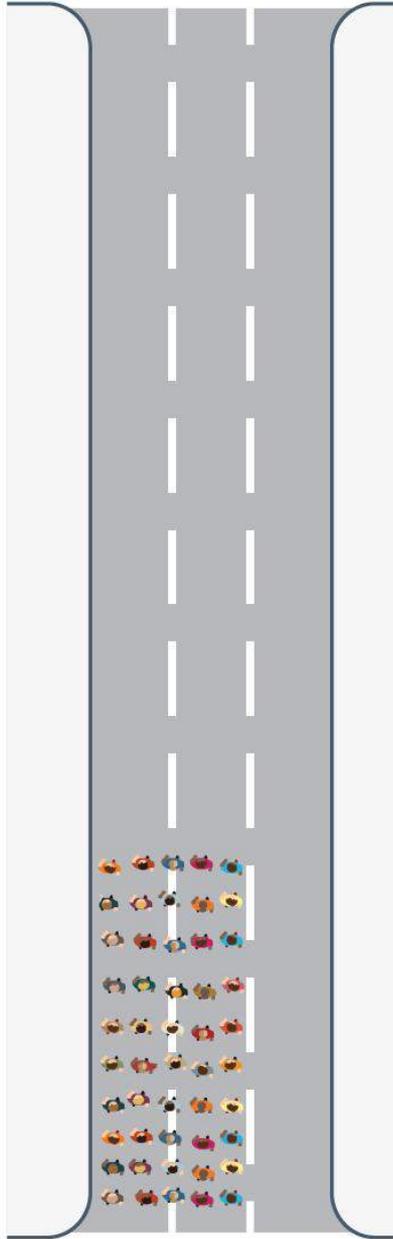


Mumbai, India

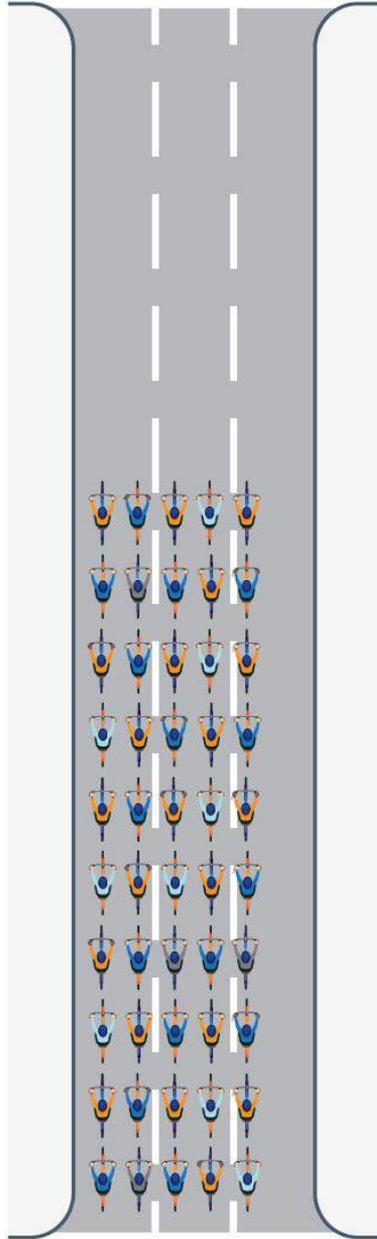


Los Angeles, California

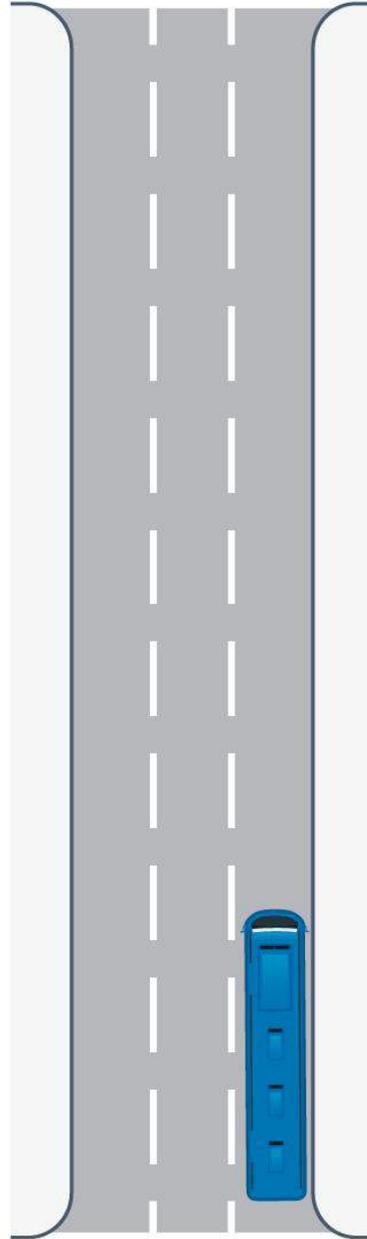
50 pedestrians



50 cyclists



50 people on a bus



50 people in 33 cars





Vancouver, Canada



← Tweet



Arnold 
@Schwarzenegger



Doctors say that riding my bike outside is OK so it's the only way I'm leaving the house but if you do ride your bike or go for a walk, don't stop, avoid social contact. Apologies to everyone but I won't be stopping on my rides for selfies. Stay positive, stay safe.





♥ Daniel Raven-Ellison liked



Sustrans W Midlands

@SustransWMids



From today **#Bogota** has introduced an extra 22km of cycle lanes for busy commuting times as part of their **#COVID19 #coronavirus** response. Check out the hashtag **#SúbeteALaBici** for more info, seems to be working pretty well so far for overnight infrastructure changes.



OPEN LETTER:

Researchers call on government to enable safe walking and cycling during the COVID-19 pandemic

Researchers call on government to enable safe walking and cycling during the COVID-19 pandemic

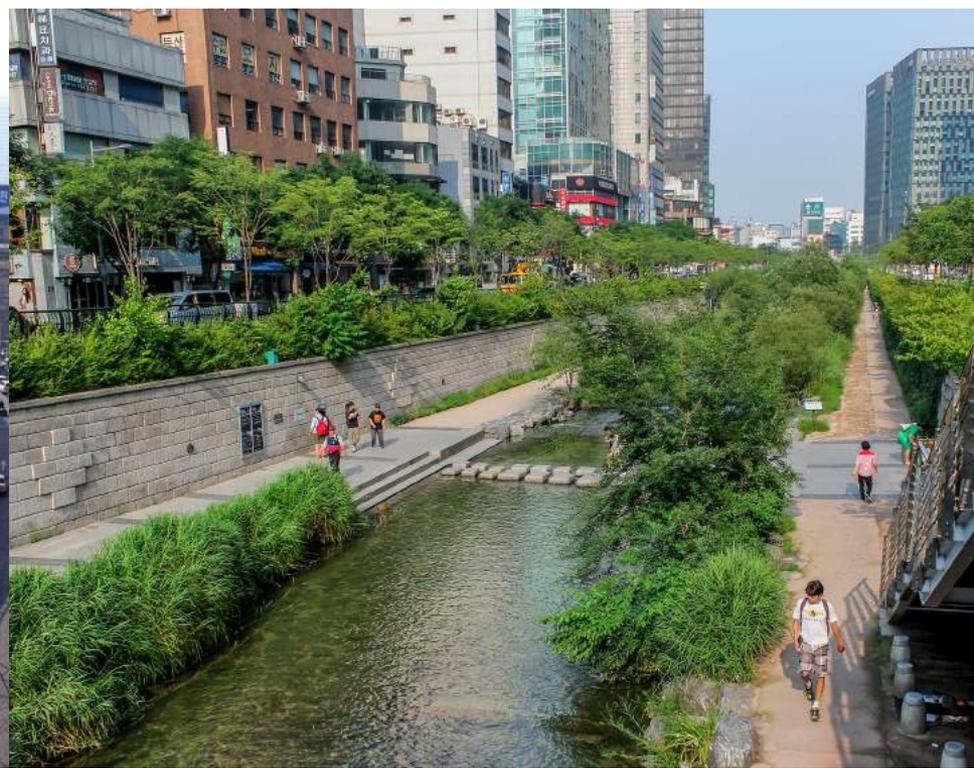
17th March, 2020

Researchers call on government to enable safe walking and cycling during the COVID-19 pandemic

As public health and transport researchers we fully support individuals, communities, and governments taking rapid and effective measures to reduce the spread of COVID-19 and to recognise the importance of social distancing, with particular need to protect the most vulnerable.

During this, however, all of our existing social and health risks do not simply go away. As the Chief Medical Officer Professor Chris Whitty has said, "The measures we are taking to combat Covid-19 might harm health in other ways."

At present, walking and cycling make a large contribution to population physical activity. [A recent report for Public Health England](#) states that walking and cycling are the most common forms of physical activity across all age groups, contributing between 26-42% of total physical activity, and has been demonstrated to be beneficial for mental health and gender."



Cheonggyecheon @ Seoul, Korea



Embarcadero @ San Francisco, United States

15 major cities around the world that are starting to ban cars

Aria Bendix Jan 12, 2019, 4:00 PM



Business Insider (2019)

Oxford aims for world's first zero emissions zone with petrol car ban

Council plans to start phasing out polluting vehicles including taxis, cars and buses from city centre area in 2020



▲ The introduction of a zero emissions zone in Oxford by 2020, the councils said. Photographed by [unreadable]

Clean Air Zone charge launch date set for summer in Birmingham

Bosses say the charge should be introduced by the end of August, in line with previous estimates

SHARE    

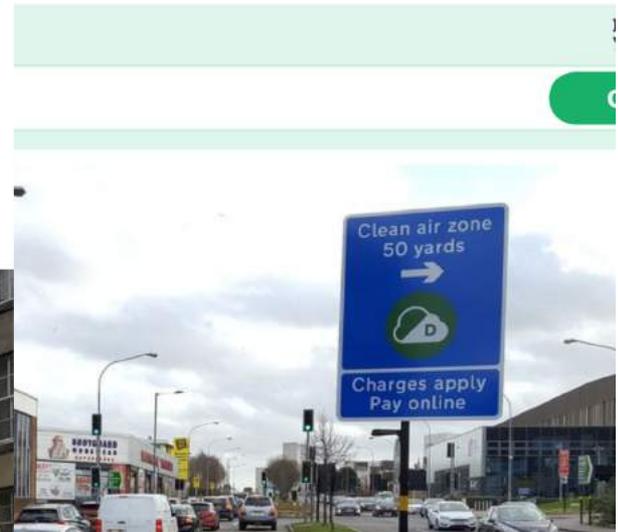
Democracy Reporter
15, 14 FEB 2020

Edinburgh city centre goes car-free to combat air pollution

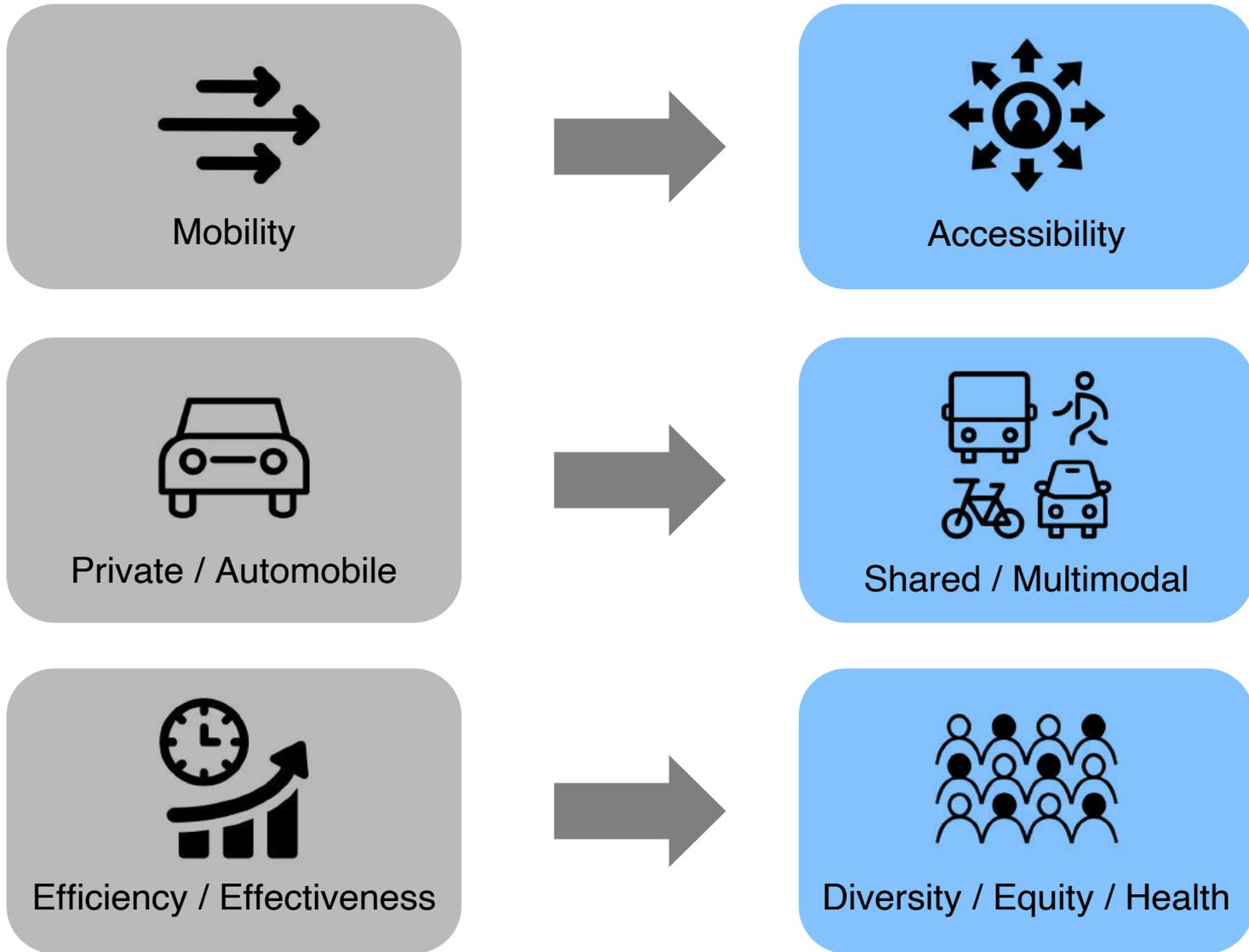
Open air yoga and chess games fill streets for trial initiative

Zamira Rahim | @ZamiraRahim | Sunday 5 May 2019 23:44 |

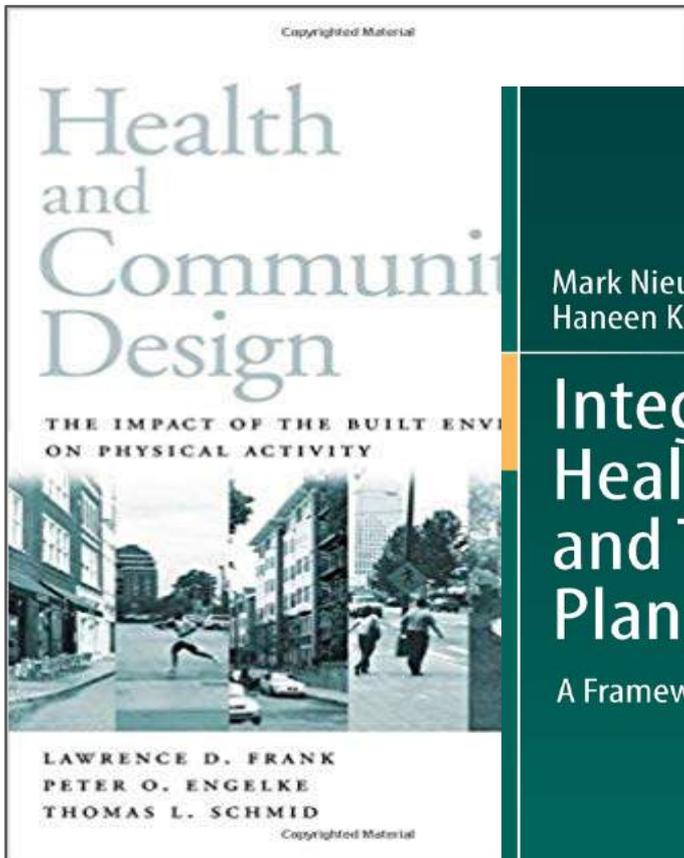
    



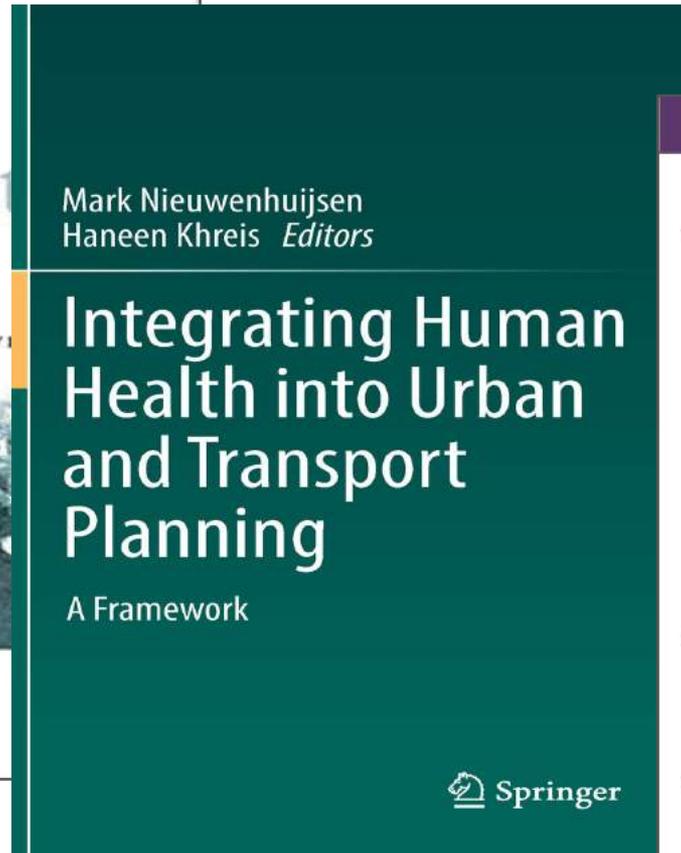
Paradigm Shift in Transport Planning



Putting Health at the Centre of Transport Policy



Frank et al (2003)



Nieuwenhuijsen & Kreis (2018)

Transport & health

A position statement

Background

Transport includes road, rail, water and air. This statement focuses on road transport and public transport as these are where the greatest opportunities for improving public health lie. However new technologies, such as driverless cars and the hyperloop, may change this.

Road transport includes the moving of people and goods including private cars, public transport, freight vehicles, walking and cycling. Roads and streets should be thought about separately – streets are not solely used for transport but also as places for living, working and leisure.

The bulk of public transport is provided by the bus, but it is railways which compete most effectively with the car. Indeed buses are used most in cities where railways are best developed. We believe in a high quality express public transport system of trains, trams, BRT and demand-responsive transport. This should be supported by a comprehensive bus network.

Road transport provides access to opportunities for education, work, social contacts and leisure. It can facilitate physical activity as part of everyday life through walking and cycling, enabling people to maintain good health and help prevent depression, obesity, circulatory diseases, diabetes and some cancers.

Conversely, motorised road traffic threatens health both directly, through injury and pollution, and, more insidiously, by promoting inactivity, limiting independence, producing greenhouse gases and disrupting social networks in heavily-trafficked streets.

Transport and planning policies can also be a barrier to good health, making it harder or more dangerous for people to be physically active and interfering with access to healthcare and other essential services. **Changes to transport policies at a national and local level have huge potential to improve the health of the population and reduce health inequalities.**

The current road transport system in the UK contributes to a number of health hazards and health inequalities, particularly in urban areas; poverty is strongly correlated with air pollution, noise and injuries. More disadvantaged areas tend to have a higher density of roads and traffic, leading to worse air quality, higher noise levels and higher collision rates. Transport can also influence access to education, employment, housing and green space – important determinants of health and wellbeing. Social exclusion, due to dependence on infrequent or expensive public modes of transport, adds to the inequitable impact of community severance, injuries and pollution.

What we think

The underpinning principle of a public health approach to tackling the complex health issues relating to transport should be a **major shift away from cars to active travel: walking, cycling and public transport**. This would reduce the harms of the road transport system, help individuals, society and the environment; and help reduce carbon and improve air quality. To achieve this, more people would need to consider the best option for short-journey stages to be walking and cycling, and for longer-journey stages to be cycling and public transport use.

What we can all do

- ▶ Advocate for a **major shift towards walking, cycling and public transport**.
- ▶ Advocate for a **major shift away from cars**.
- ▶ Advocate for the reallocation of road space in urban areas away from parking and the movement of private vehicles towards people on foot, bicycle and public transport.
- ▶ Advocate for policies which discourage private car use in urban areas, e.g. on-street parking restrictions and selective congestion charging.
- ▶ Advocate for 20mph limits and design speeds for streets used by pedestrians and cyclists.
- ▶ Advocate for public transport accessible for all and integrated with other transport modes.
- ▶ Advocate for proper transport for old and disabled passengers, including demand-responsive transport

PRODUCED BY:  www.fph.ac.uk
 FURTHER READING
 British Medical Association. 2012. Healthy transport – healthy lives. London, UK. <http://www.bma.org.uk/healthytransport>
 Peadar B, Markie B, Coran JM (eds). 2011. *Health at the Move 2: Policies for Health-promoting Transport Systems*. Transport and Health Group. www.transportandhealth.org.uk
 Peadar B, Coran JM, Markie B, Taylor N. 2011. Strategies between low carbon and healthy transport policies. Proceedings of the Institution of Civil Engineers – Transport, 164, 127-29.
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www.nice.org.uk/Guidance/PH12
 World Health Organization (WHO). 2012. *Health Economic Assessment Tool for walking and cycling*. Copenhagen, WHO. www.who.int/whodoc/publications/
 Journal of Transport and Health

Faculty of Public Health (2018)

Health Challenges Linked to Transport

“Physical Inactivity”

The Author(s) *BMC Genomics* 2017, **18**(Suppl 8):802
DOI 10.1186/s12864-017-4193-5

BMC Genomics

REVIEW

Open Access



Physical activity in the prevention of human diseases: role of epigenetic modifications

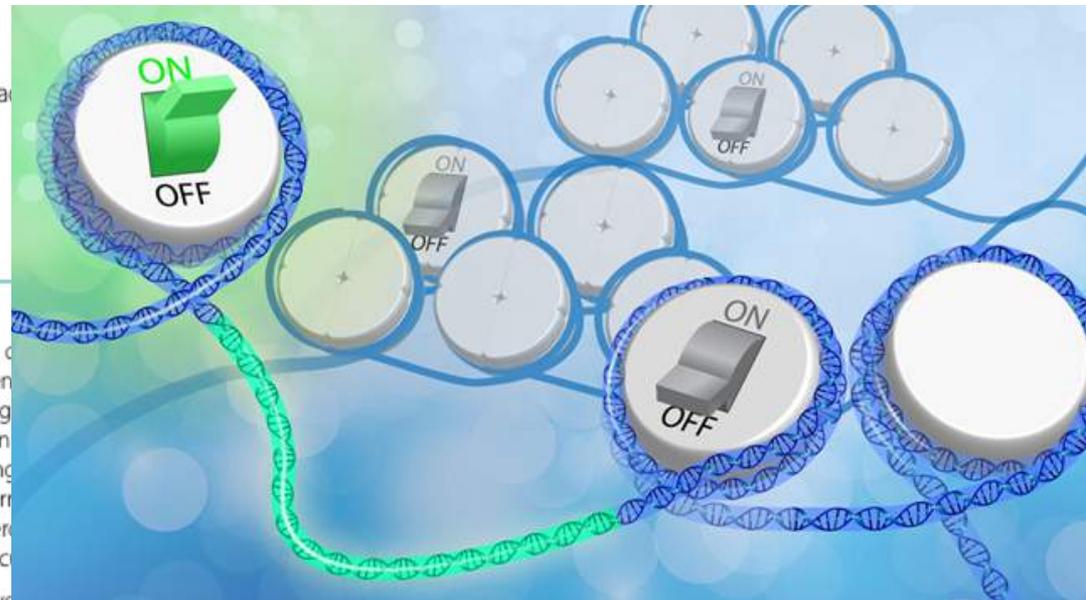
Elisa Grazioli¹, Ivan Dimauro¹, Neri Mercatelli¹, Guan Wang², Yannis Pitsilakos¹ and Daniela Caporossi^{1*}

From 34th FIMS World Sports Medicine Congress
Ljubljana, Slovenia. 29th September – 2nd October 2016

Abstract

Epigenetic modification refers to heritable changes in gene function that do not change the DNA sequence. The current literature clearly demonstrates that the epigenome is influenced by different biological and environmental factors such as aging and exercise. As such, it is well accepted that physical activity and exercise can induce epigenetic alterations although the type and duration of exercise eliciting beneficial changes result in health benefits and prevent chronic diseases remains to be determined. Significant findings from epigenetic studies involving physical activity/exercise and chronic diseases such as metabolic syndrome, diabetes, cancer, cardiovascular disease, and

Keywords: DNA methylation, Histone modification, Exercise, Disease prevention



Health Challenges Linked to Transport

“Air Pollution”

- 5 million deaths / year globally
- 4th leading cause of death

Major risk factor for:



Stroke



Heart
disease



Respiratory
disease

Air Pollution Problem in the UK

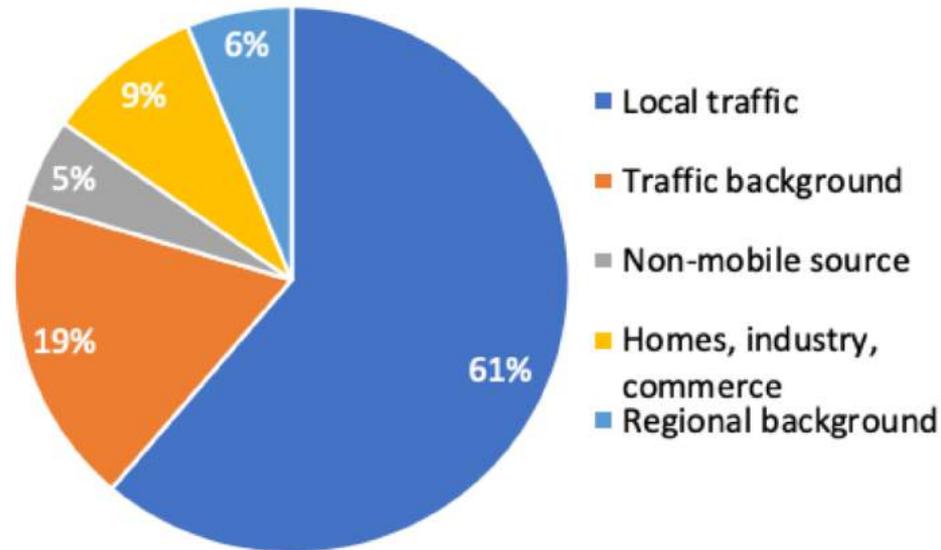
Pollution map reveals unsafe air quality at almost 2,000 UK sites

London, Leeds, Doncaster and Maidstone are among the worst affected



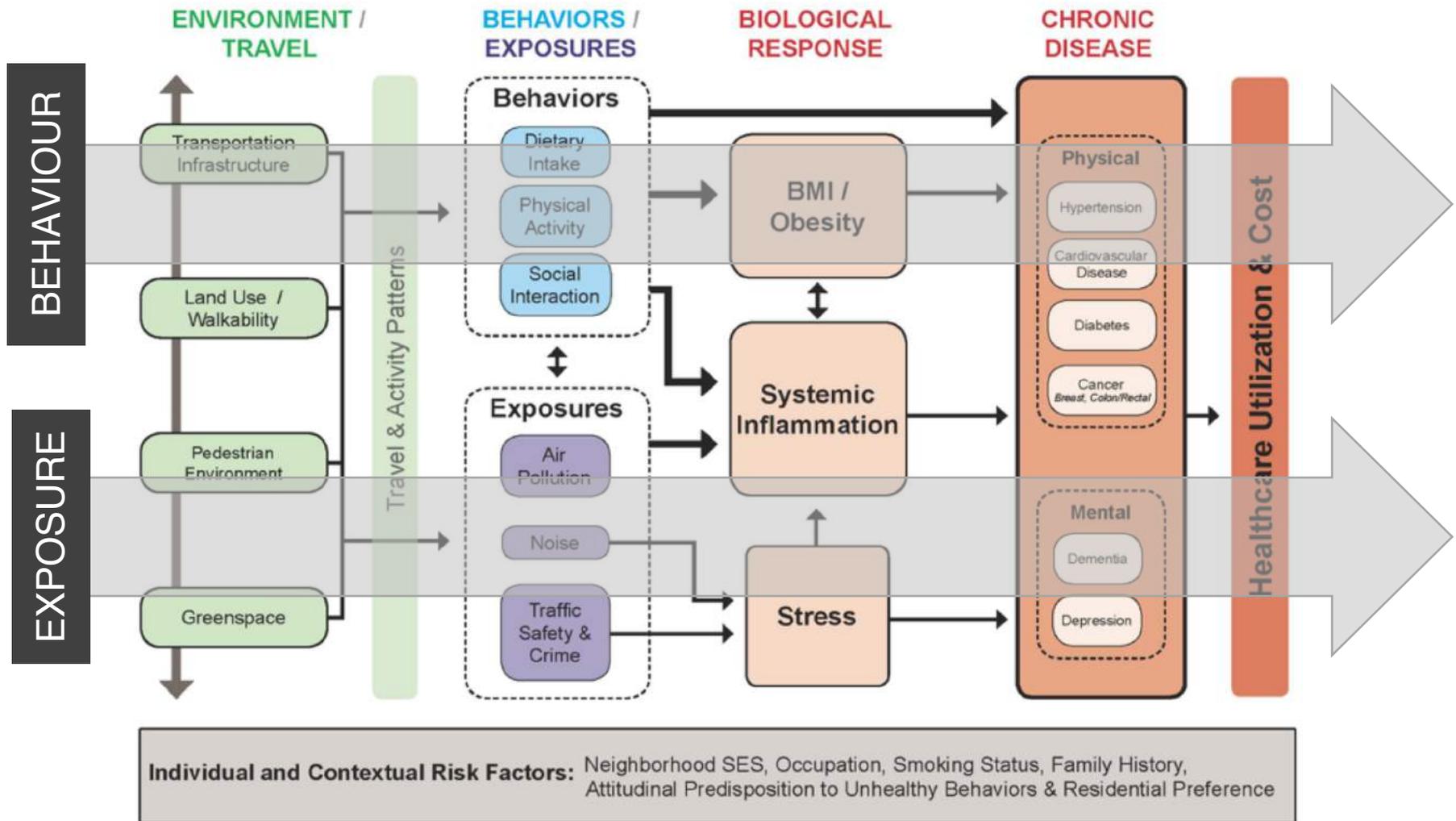
▲ The mayor of London issued a high pollution alert for the capital on Tuesday. Photograph: Nick Ansell/PA

Sources of NO_x in the UK



Defra/AQP (2018)

Transport and Health: Conceptual Model

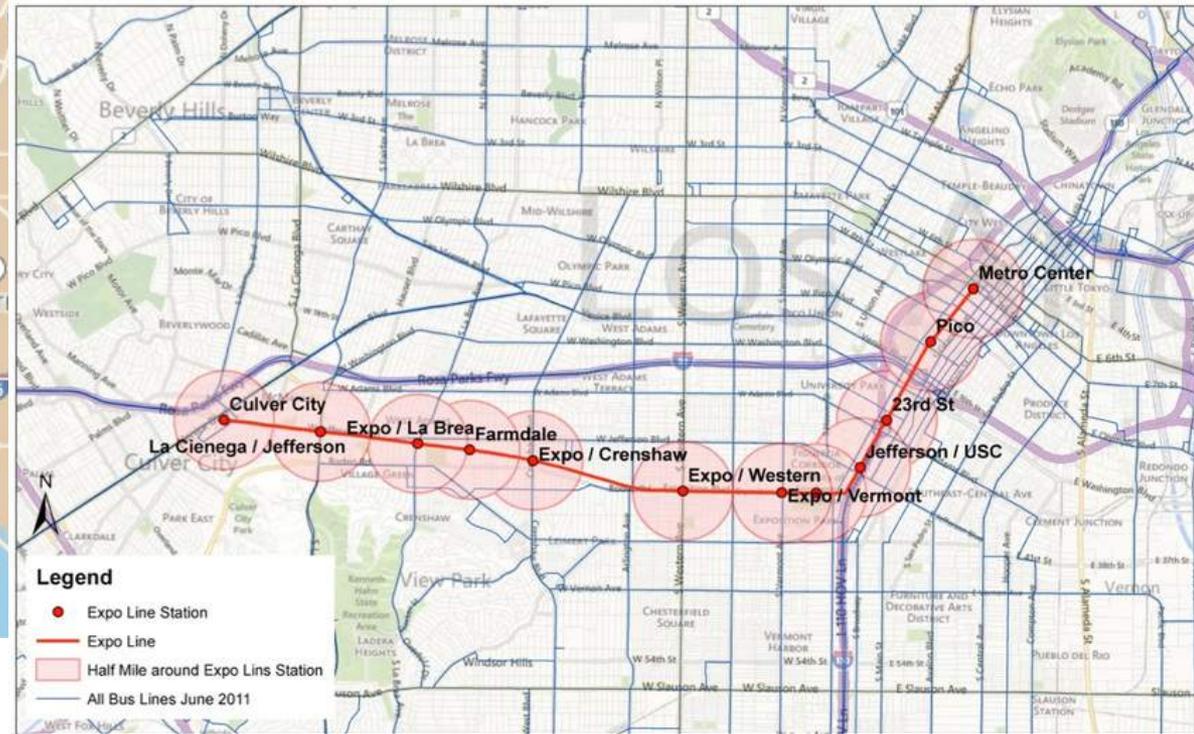


Impact of Public Transport Investment on Physical Activity: Expo Line Study



Los Angeles Rail Transformation

Unique opportunity to conduct a **natural experiment study** of a light rail transit's impact

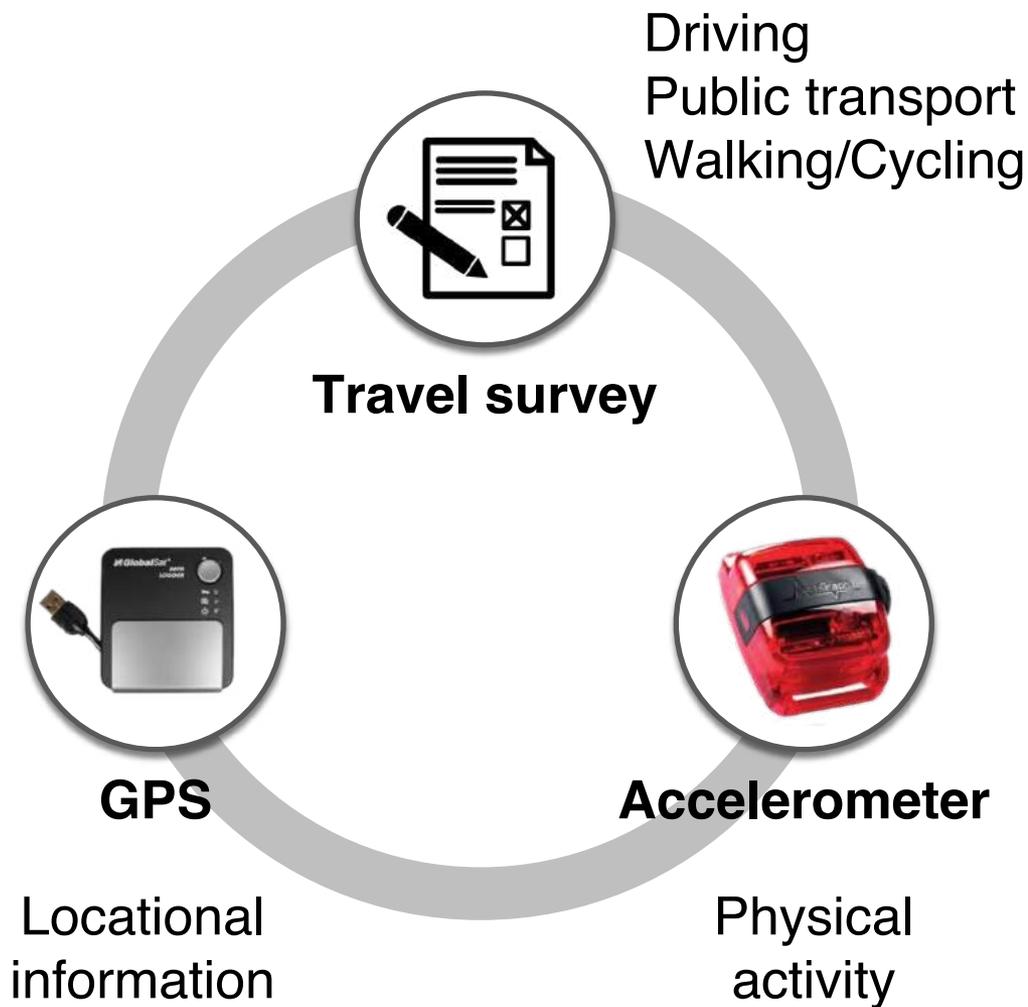


Study Area

Neighborhood Change Before and After Expo Line



Multiple Methods for Data Collection



Neighborhood Travel and Activity Study **Travel Log**

Person Name: _____

	Car Driver	Car Passenger	Motor-cycle/ Scooter	Bus	Train	Bicycle		Walk		Other	Notes? Problems? Please describe below.
						# of Trips	Total Minutes	# of Trips	Total Minutes		
Monday		1		1							
Tuesday				2				1	15		
Wednesday				2							
Thursday	1			1							
Friday				1	2						went to down town
Saturday	3	1									
Sunday		2									

Instructions

- Count each trip you take during each day
- Include walk/bike trips over 5 minutes
- Count trips you take for recreation or exercise
- Log the total minutes you walk or bicycle each day
- Count each trip mode as a separate trip (car, walk, etc)

Suggestions

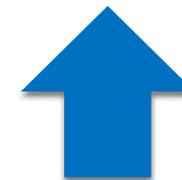
- Carry and complete the log as you travel
- Or you can complete the log at the end of each day
- Note any problems each day (forget to fill out one day)
- See the back of this log for examples



Sociodemographic Profiles of the Study Area

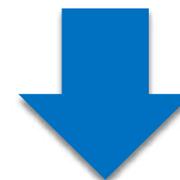
Sociodemographics	Study Area	LA	California
Persons 65 years and over	17%	11%	11%
Female	64%	50%	50%
White	28%	29%	40%
Black	50%	10%	6%
Asian	9%	11%	13%
Hispanic	7%	49%	38%
High school graduate or higher	40%	75%	81%
Bachelor's degree or higher	29%	31%	31%
Homeownership rate	52%	38%	55%
Median household income	\$31,471	\$49,497	\$61,094

Before-and-After Impact on Physical Activity



For those who previously
drove a car

Increased PA levels **



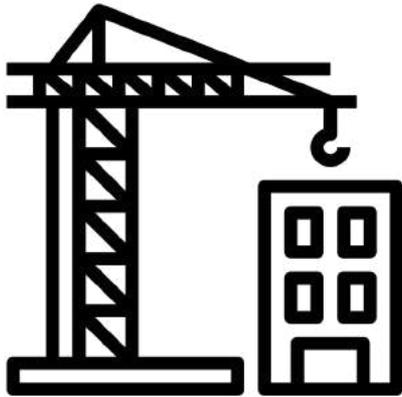
For those who previously
walked and cycled

Decreased PA levels **

*Significance: *** 0.01, ** 0.05, * 0.10*

Lessons Learned: Contexts and People

“If you build it,
they will come”



When it comes to policy impacts, the reality is a lot more **complex**. You need to understand how people respond.

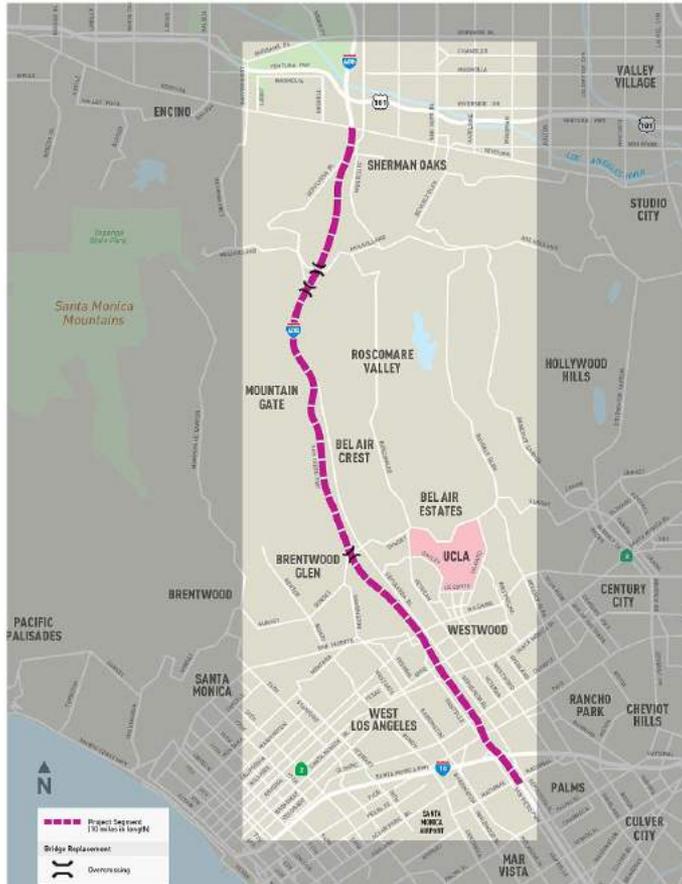


Impact of Roadway Closure on Air Quality



Impact of Highway Closure: Carmageddon

I-405 Sepulveda Pass Improvements Project



- 10 miles of I-405 closed for two days
- One of the busiest highways in the U.S. (>300,000 AADT)



Massive California Freeway Repairs Likened to 'Carmageddon'

A major part of a Los Angeles area freeway will be undergoing repairs for 15 weekend: the next four months, sparking comparisons to "Carmageddon" a 2011 freeway bridge demolition that many feared would be a traffic nightmare.



Impact of Highway Closure: Study Design



Traffic data

Over 500GB of daily traffic data from Cal DOT



Air pollution data

Daily air pollution data from Cal ARB

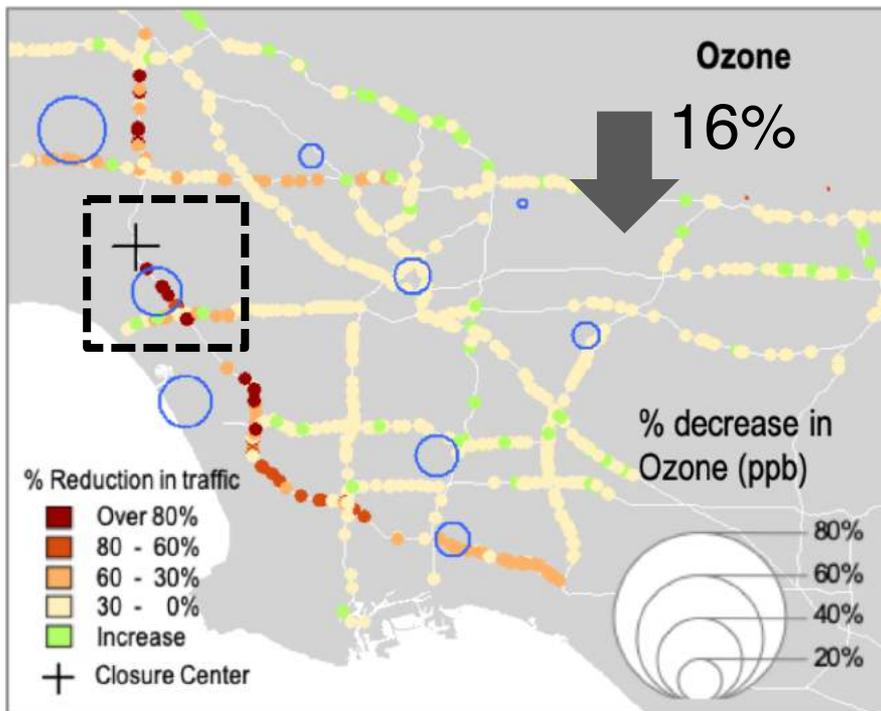


Weather data

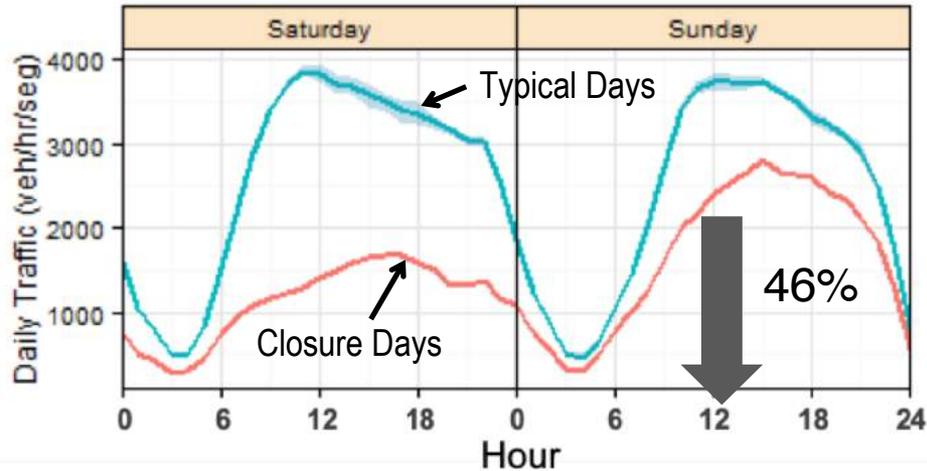
Hourly meteorological data from Cal DWR

Impact of Highway Closure on Traffic and Ozone

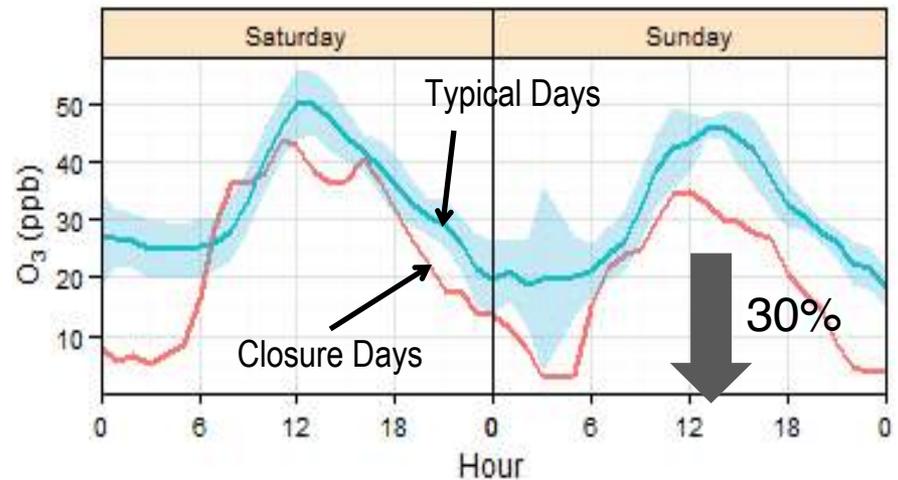
Regional Reduction in Ozone



Reduction in traffic at the West LA site



Reduction in Ozone at the West LA site



Impact of Local Street Closure: Car-Free Days



Ciclovía, Bogota
(Late 1970s)



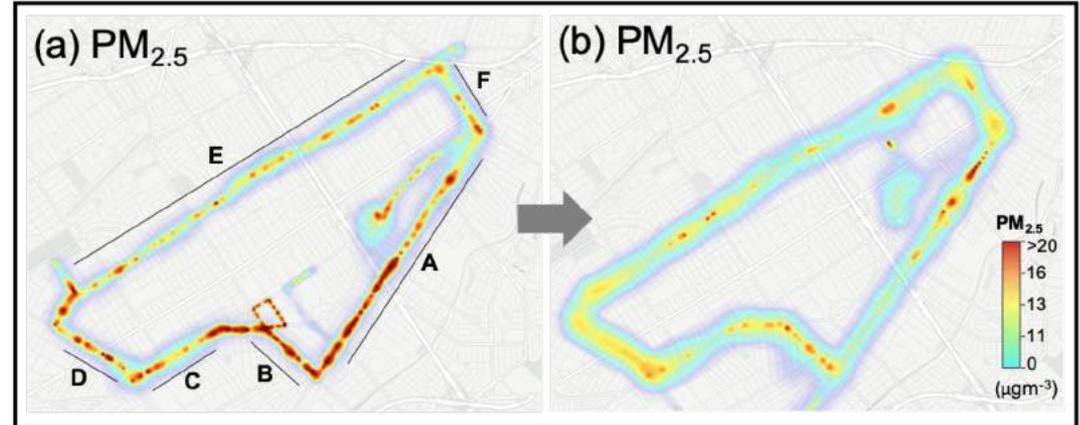
“Over 1000 cities around the world participating in “car-free days”

Impact of Local Street Closure: CicLAvia



Impact of Local Street Closure on Particulate Matters

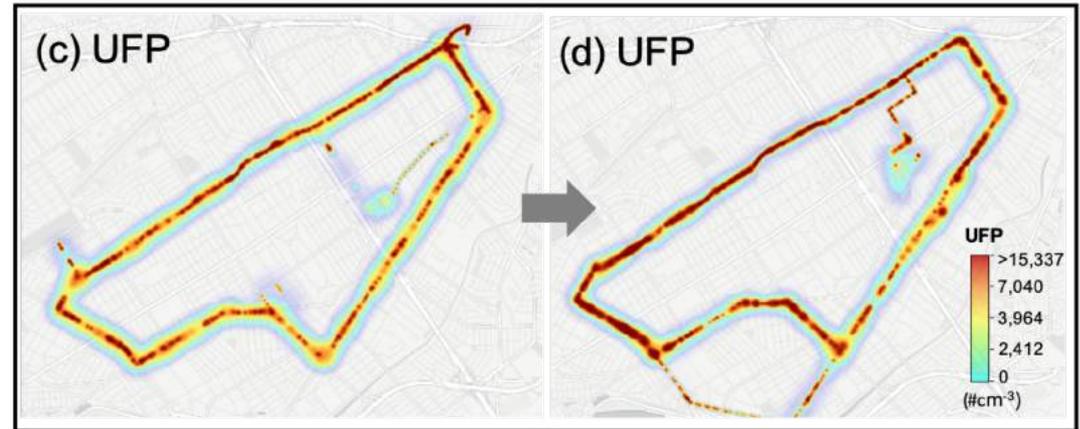
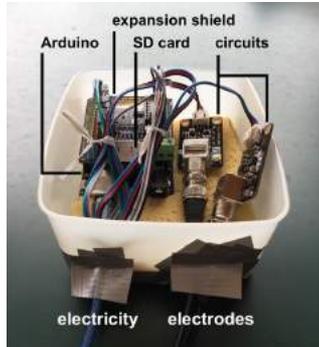
(a) Mobile monitoring platform



Typical Days

Car-Free Days

(b) Backpack system (c) Data Streaming System



Typical Days

Car-Free Days

Survey of Participants to the Car-Free Days

Survey: How did you come to the event?

Location	Wilshire (<i>n</i> = 1,085)	Downtown (<i>n</i> = 1,439)	Culver City (<i>n</i> = 1,217)
Car	38%	44%	38%
Metro/bus	22%	19%	16%
Bicycle	29%	27%	34%
Walk	6%	4%	5%
Other/multiple	5%	6%	8%

CicLAvia Research Team (2018)

Communicating on Air Quality for Behavior Change

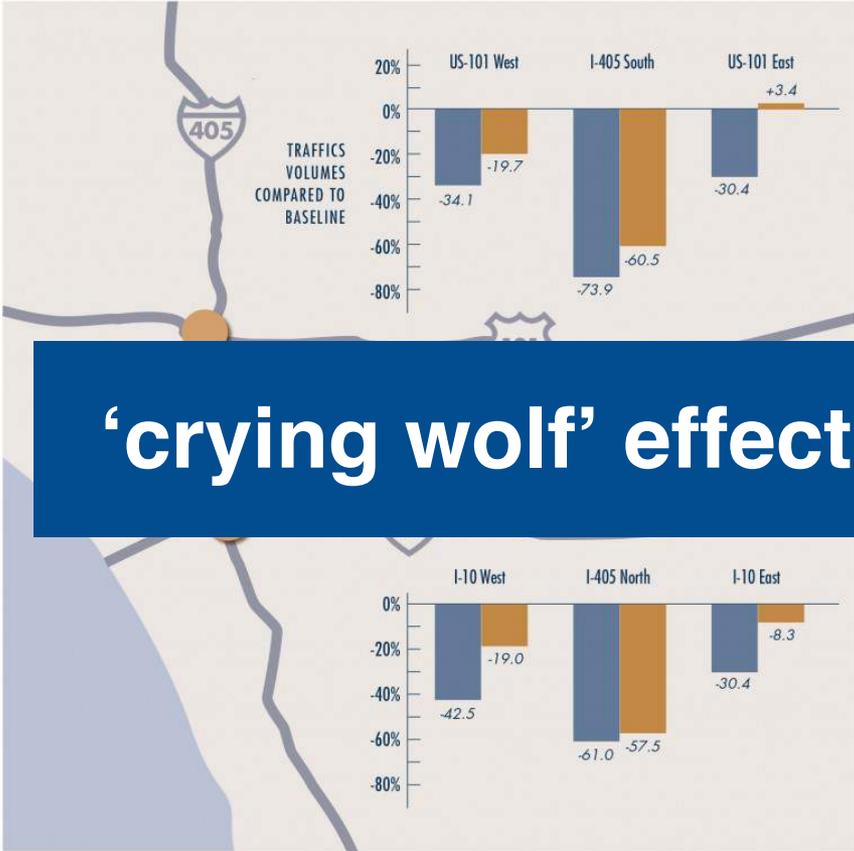
Strategy 1: Using the Message of 'Fear'

New Fears in Los Angeles as Highway Closes Again

By ADAM NAGOURNEY SEPT. 21, 2012



- First closure: significant impact
- Second closure: lesser impact



Taylor and Wachs (2014) Access

Communicating on Air Quality for Behavior Change

Strategy 2: Using the Message of 'Fun' and 'Empowerment'

Reimagine: Car Free Day in London **FREE**

September 2020 (Exact dates to be confirmed)



Linking Research to Policy and Practice

World Car-Free Day Summit



Air Pollution Expert Panel



World Car Free Day Summit
London, Sept. 20, 2019



THOMSON REUTERS
FOUNDATION NEWS

OPINION: What can London learn from car-free cities around the world?

by [Andy Hong](#) | Oxford University

Friday, 20 September 2019 10:09 GMT



Hong (2019, Sept.) *Thomson Reuters Foundation*
(<http://news.trust.org/item/20190920100921-ou5qd>)

Knowledge Sharing and Capacity Building



The image shows a Twitter profile for the Healthy Cities Network. The profile picture is a circular logo with the text "Healthy Cities Network" and a stylized city skyline. The header image shows a group of people cycling in a city park with a skyline in the background. The profile statistics are: 27 Tweets, 35 Following, and 115 Followers. A "Follow" button is visible. The bio states: "Healthy Cities Network is a global nexus of innovators dedicated to sharing cutting-edge information on urban health through creative and dynamic content." The location is "Vancouver, British Columbia" and it was "Joined June 2018". There are 14 photos and videos. A tweet from March 14th is shown, thanking @JeromeMayaud for a presentation on machine learning in urban accessibility, vulnerability, and equity. The presentation slide is visible, titled "Vulnerability in the city: Insights from machine learning" by Jerome Mayaud, University of British Columbia.

Healthy Cities Network
@HealthyCityNet

Healthy Cities Network is a global nexus of innovators dedicated to sharing cutting-edge information on urban health through creative and dynamic content.

Vancouver, British Columbia

Joined June 2018

14 Photos and videos

Tweets **Tweets & replies** **Media**

Healthy Cities Network @HealthyCityNet · Mar 14
Many thanks @JeromeMayaud for a highly engaging presentation on three unique projects that use #MachineLearning methods to reveal important insights on urban accessibility, vulnerability, and (in)equity. #healthycities

**Vulnerability in the city:
Insights from machine learning**

Jerome Mayaud
University of British Columbia

Where is My Research Headed?

My research has so far been focused on understanding the mechanisms linking transport to health

Physical activity

TR-A (2016), JPER (2017), JPER (2019),
Prev Med (2019), Obesity Reviews (2020)

Air / noise pollution

TRB (2012), ES&T (2015),
Atmos Env (2019), EPB (2019)

Social cohesion

SSM (2018)

Integrated approach

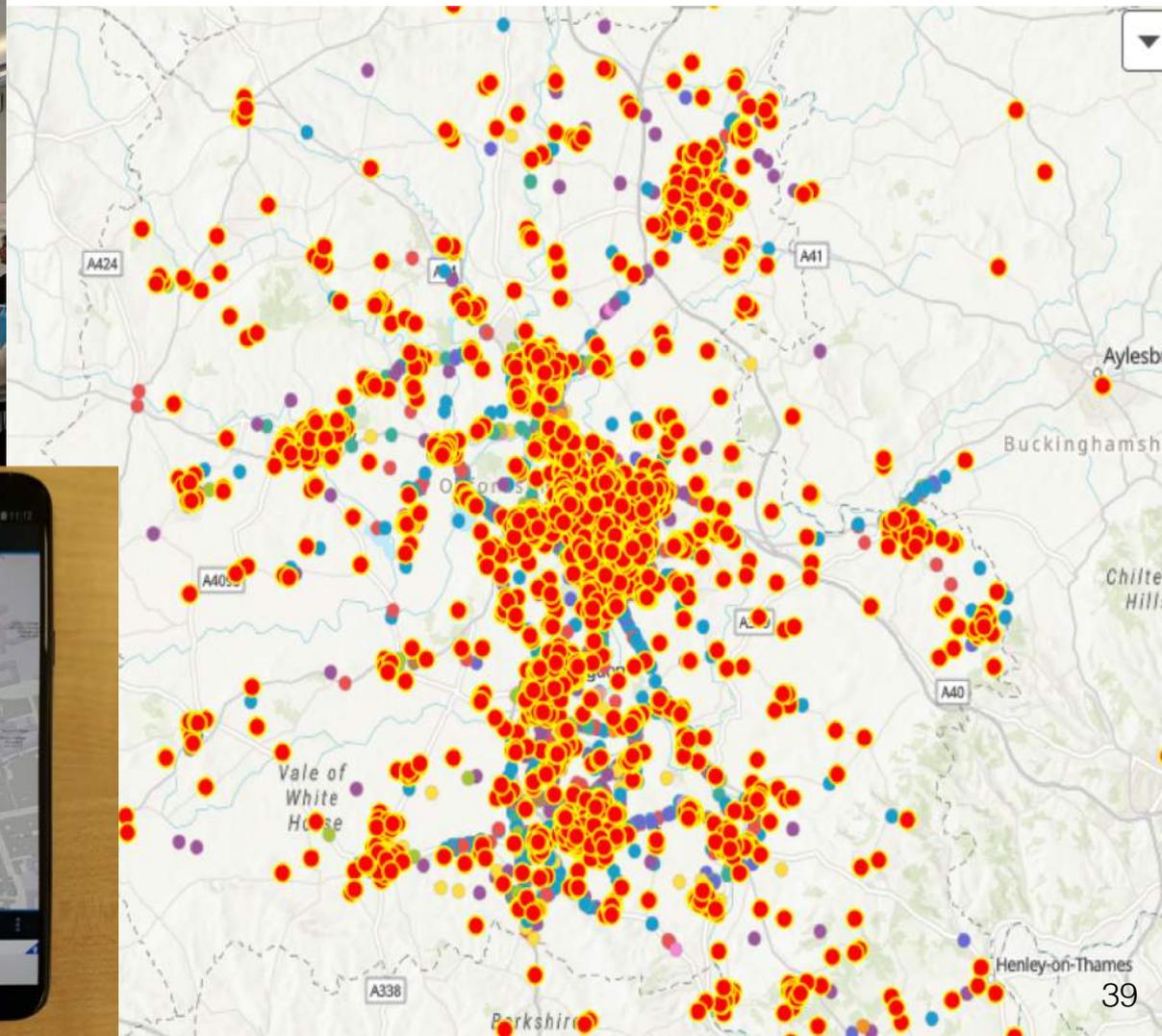
JTH (2019)

CONTEXT

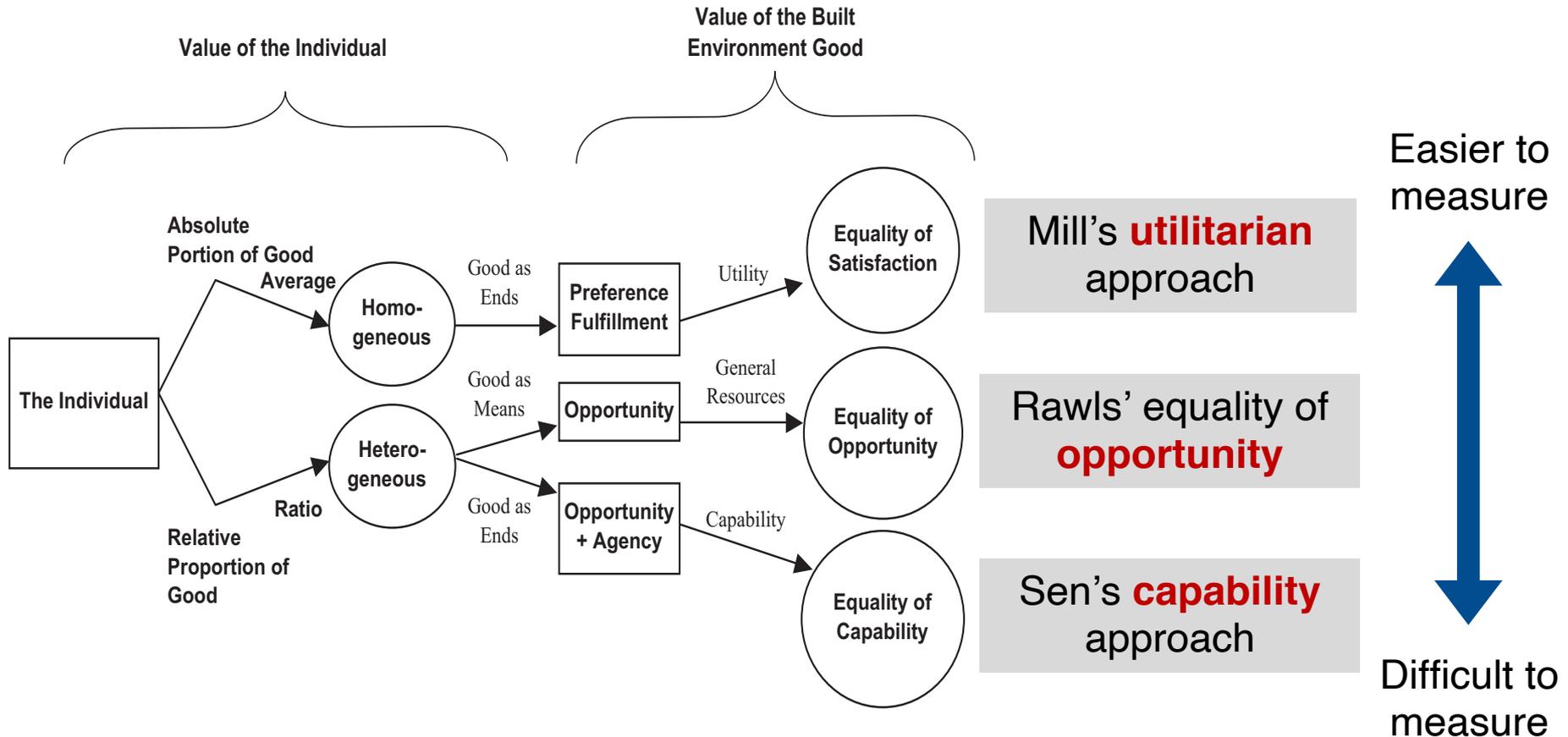
MATTERS

Research in Progress (1)

Developing a smartphone-based audit tool for participatory planning



Theoretical Underpinning behind the Tool Development

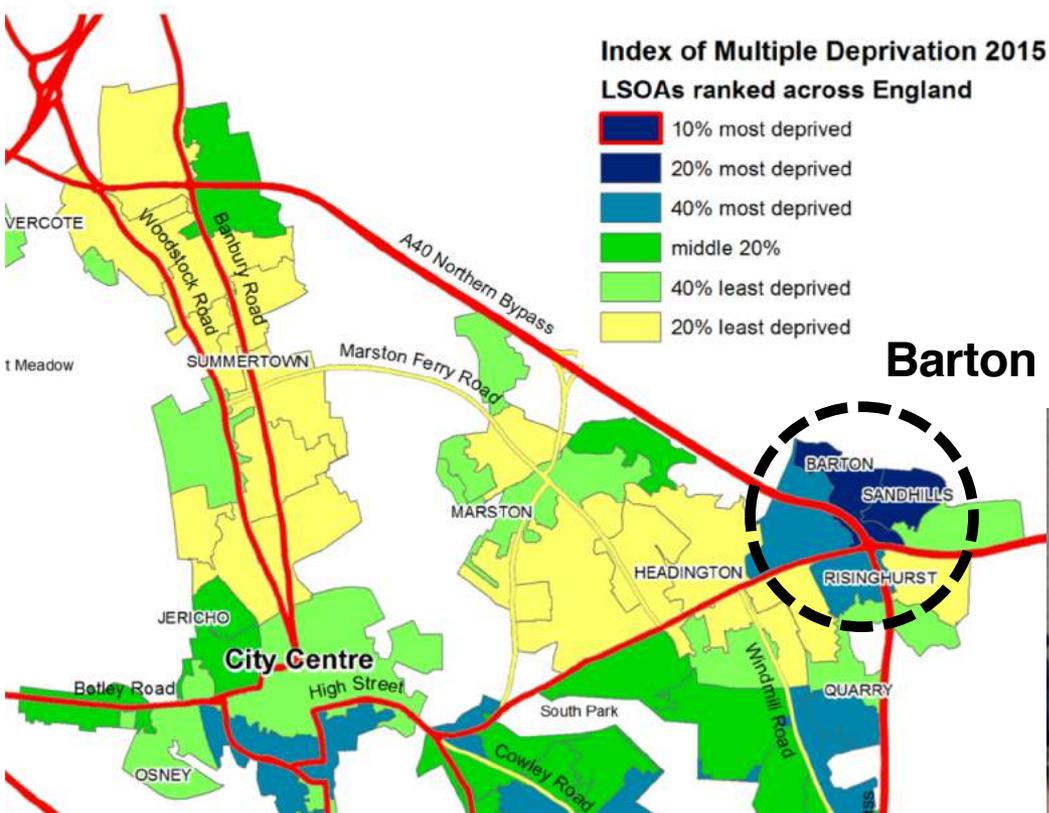


Research in Progress (2)

Using low-cost sensors for community air monitoring and mapping



Barton Clinical
Commissioning
Group





Every time I see an adult on a bicycle, I no longer despair for the future of the human race.

– H. G. Wells