



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 —

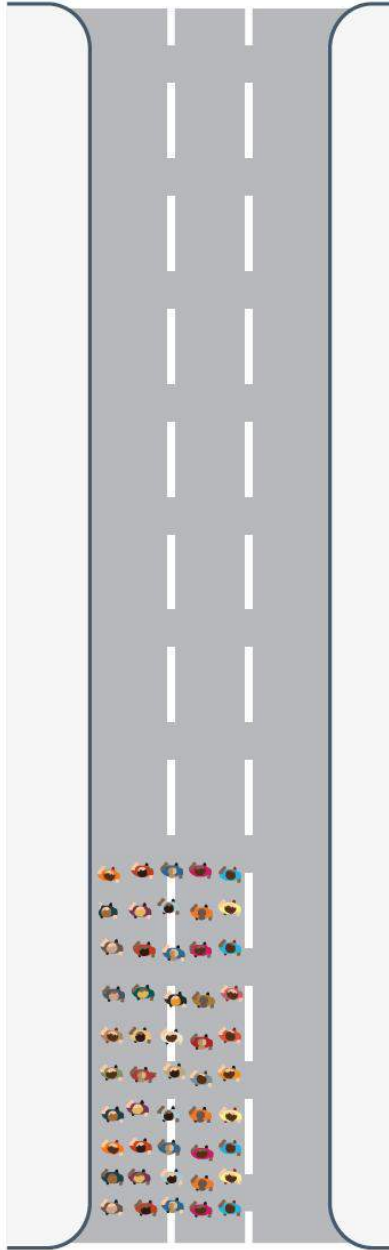


Mumbai, India

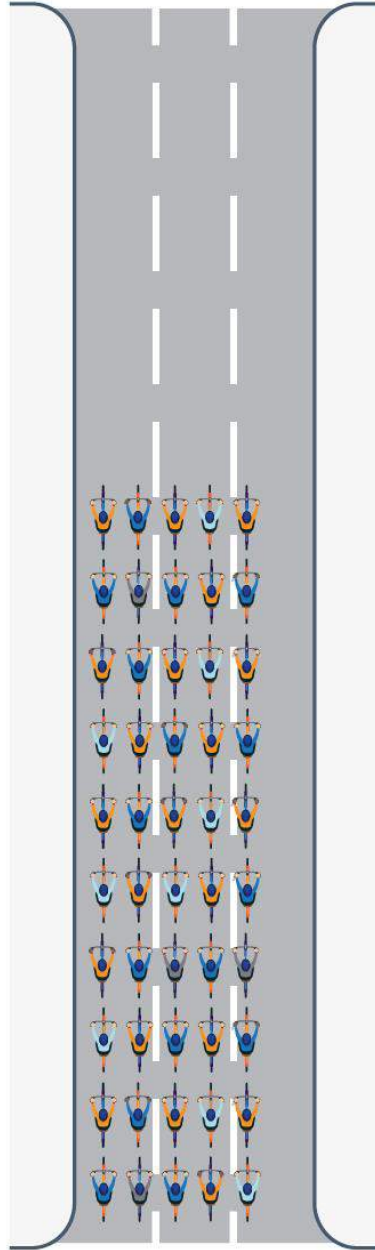


Los Angeles, California

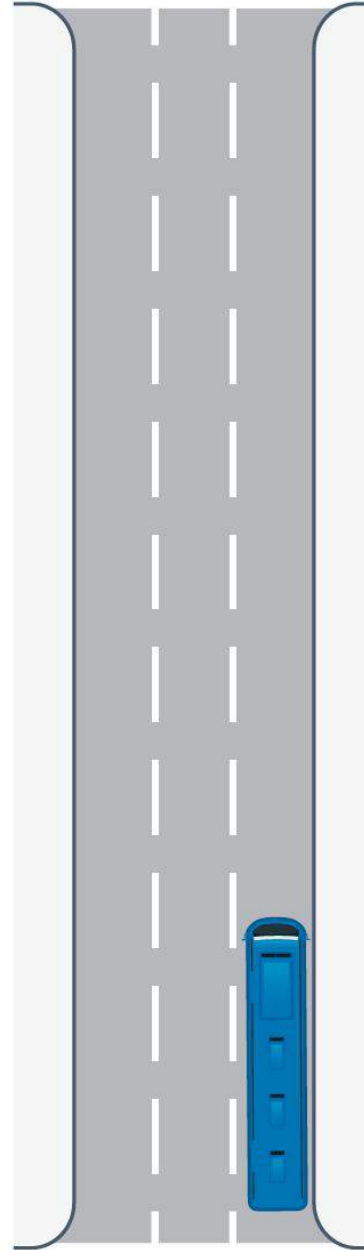
50 pedestrians



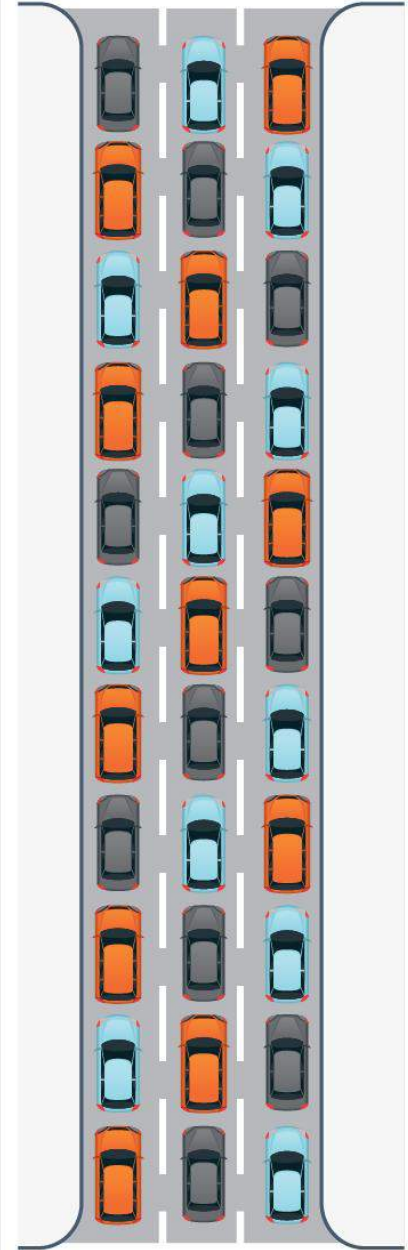
50 cyclists



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

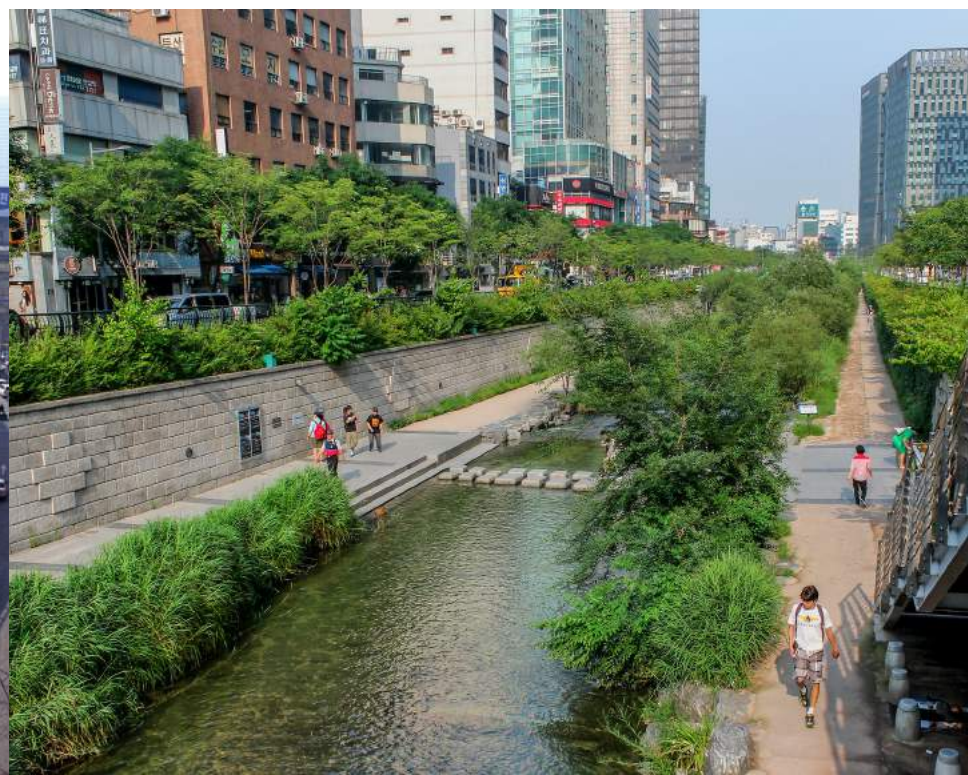
17th March, 2020

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 the virus. We also 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 Sir Patrick Vallance has said, "The measures taken by the government 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 contribute to physical activity across all age groups, contributing between 26-42% of total physical activity, and has been demonstrated to be beneficial for all ages 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 2035, the councils said. Photograph by [unclear]

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 expectations

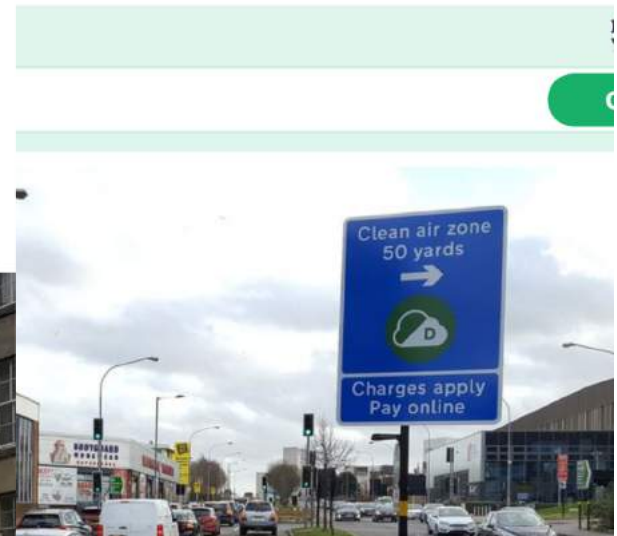
SHARE    

Democracy Reporter
15, 14 FEB 2020

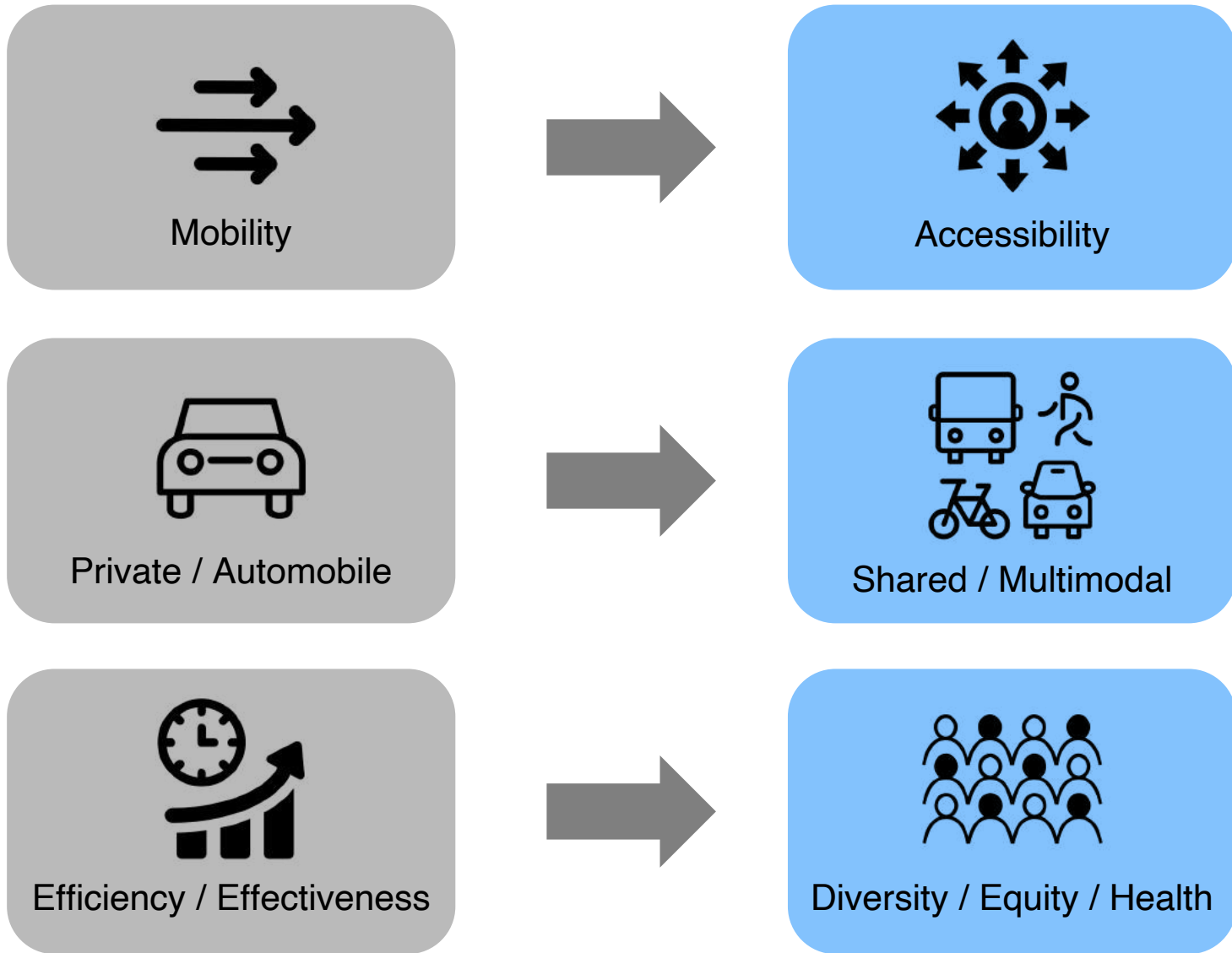
Edinburgh city centre goes car-free to combat air pollution

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



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Health and Community Design

THE IMPACT OF THE BUILT ENVIRONMENT
ON PHYSICAL ACTIVITY




LAWRENCE D. FRANK
PETER O. ENGELKE
THOMAS L. SCHMID

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Mark Nieuwenhuis
Haneen Khatib

Integrated Health and Planning


A Framework for
Health and Community Design



Mark Nieuwenhuijsen
Haneen Khreis *Editors*

Integrating Human Health into Urban and Transport Planning

A Framework

 Springer

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 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. Induced 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-travelled 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 disadvantages 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 associated 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.

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**FURTHER
READING**

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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

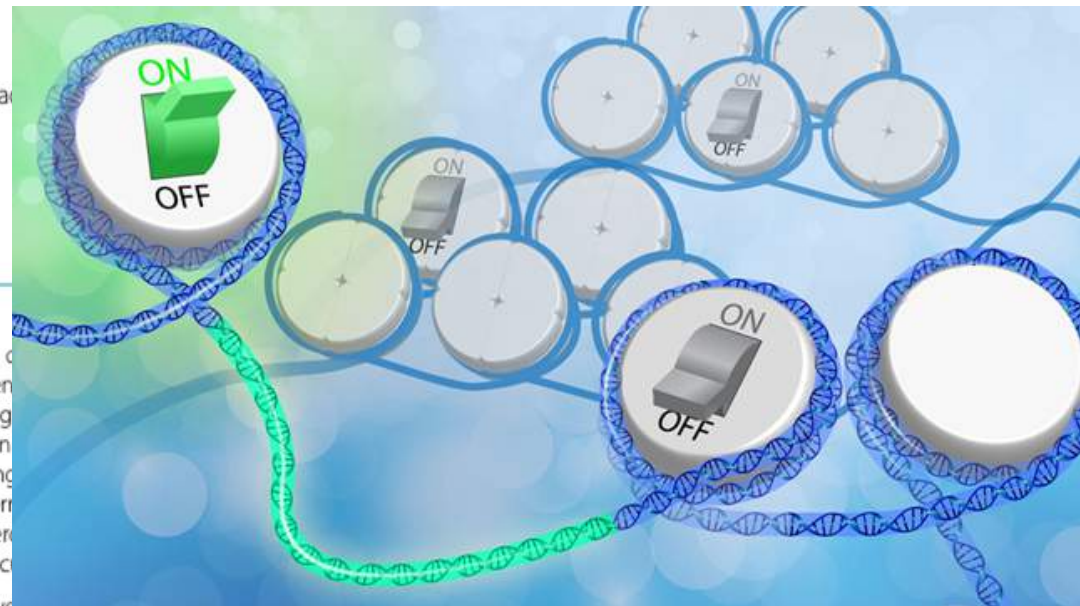
Elisa Grazioli¹, Ivan Dimauro¹, Neri Mercatelli¹, Guan Wang², Yannis Pitsilakos¹ and Daniela Caporossi^{1*}

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 alter 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 specific 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 diseases, 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

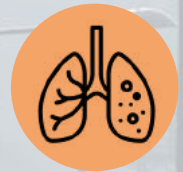
Major risk factor for:



Stroke



**Heart
disease**



**Respiratory
disease**

Air Pollution Problem in the UK

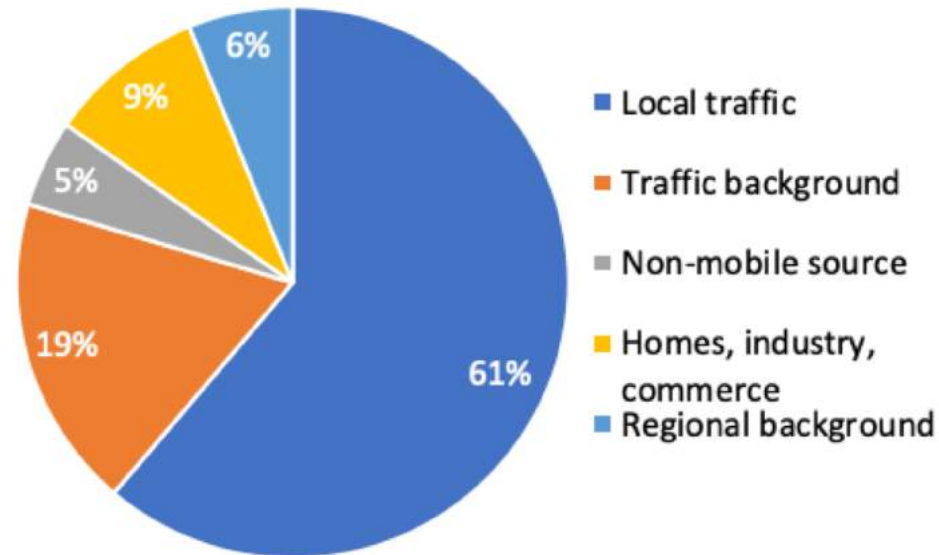
Pollution map reveals unsafe air quality at almost 2,000 UK sites

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



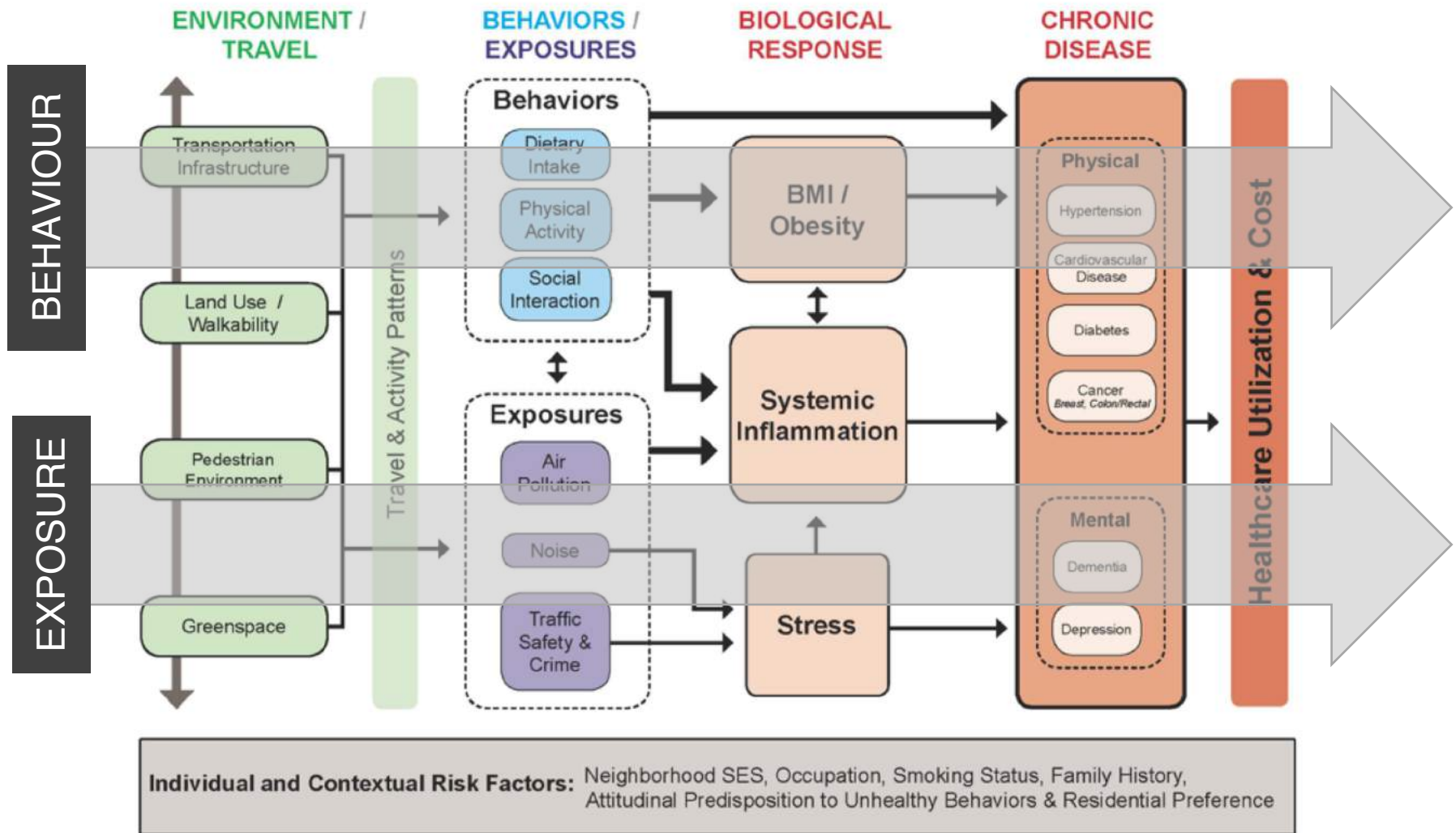
▲ The mayor of London issued a high pollution alert for the capital on Tuesday. Photograph: Nick Ansell/PA

Sources of NO_x in the UK



Defra/AQP (2018)

Transport and Health: Conceptual Model

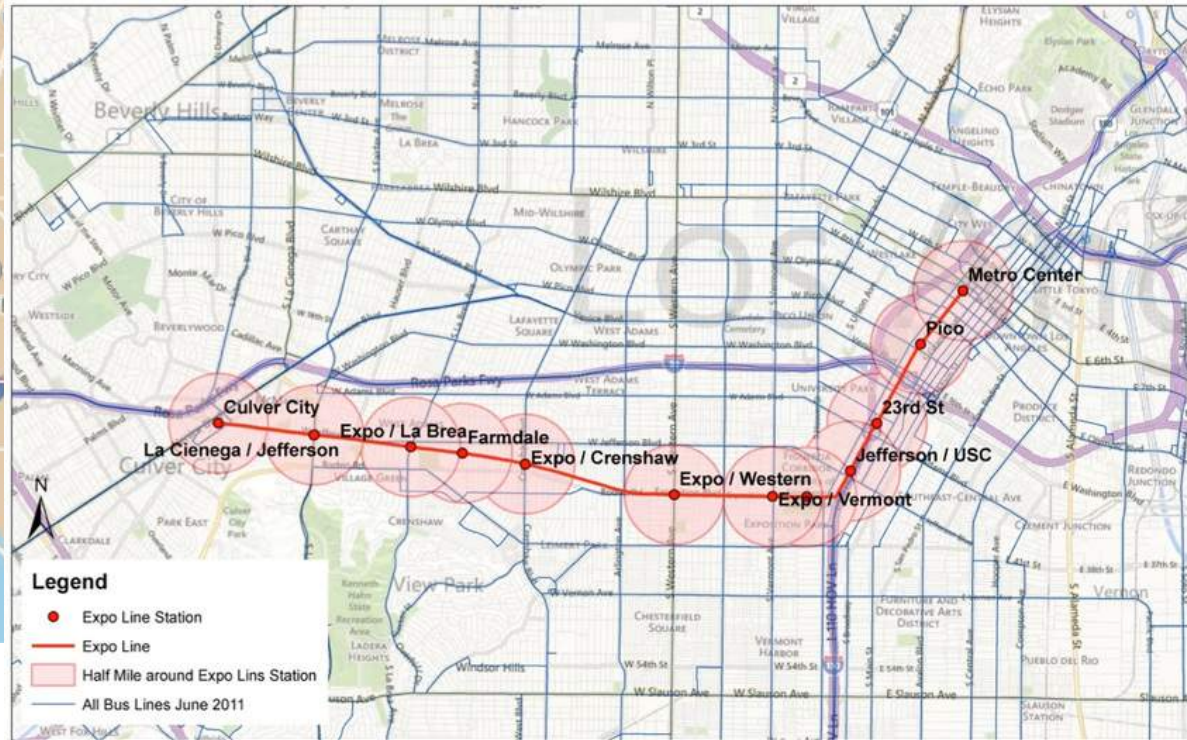


Impact of Public Transport Investment on Physical Activity: Expo Line Study



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

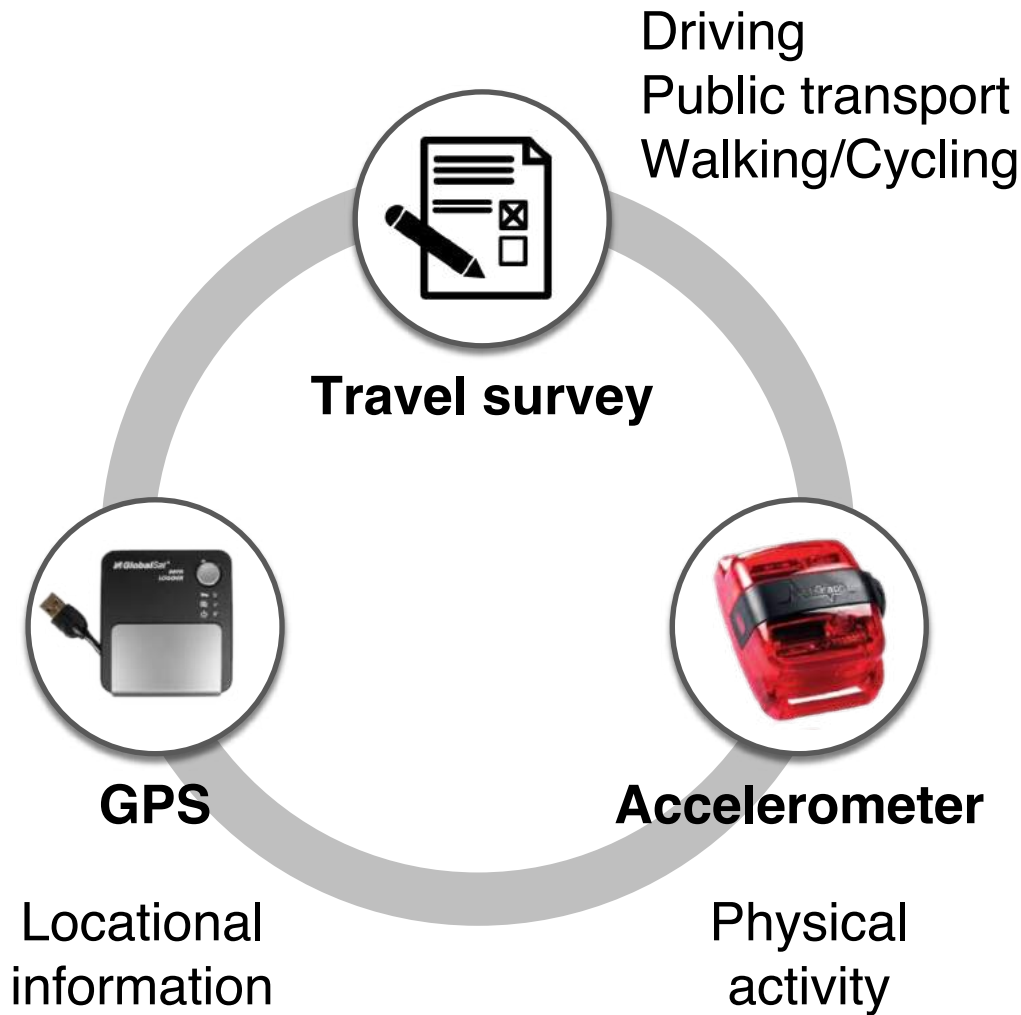
Crenshaw Station



La Brea Station



Multiple Methods for Data Collection



Neighborhood Travel and Activity Study **Travel Log**

Person Name: _____

	Car Driver	Car Passenger	Motorcycle/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 downtown
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

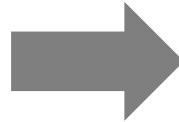
- Carry and complete the log as you travel
- Or you can complete the log at the end of each day
- Note any problems each day (forget to fill out one day)
- See the back of this log for examples



Sociodemographic Profiles of the Study Area

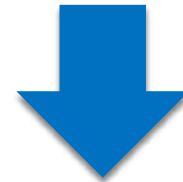
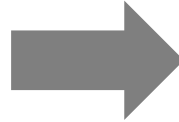
Sociodemographics	Study Area	LA	California
Persons 65 years and over	17%	11%	11%
Female	64%	50%	50%
White	28%	29%	40%
Black	50%	10%	6%
Asian	9%	11%	13%
Hispanic	7%	49%	38%
High school graduate or higher	40%	75%	81%
Bachelor's degree or higher	29%	31%	31%
Homeownership rate	52%	38%	55%
Median household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

Before-and-After Impact on Physical Activity



For those who previously
drove a car

Increased PA levels **



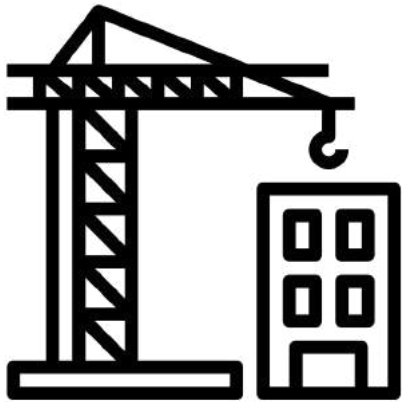
For those who previously
walked and cycled

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.

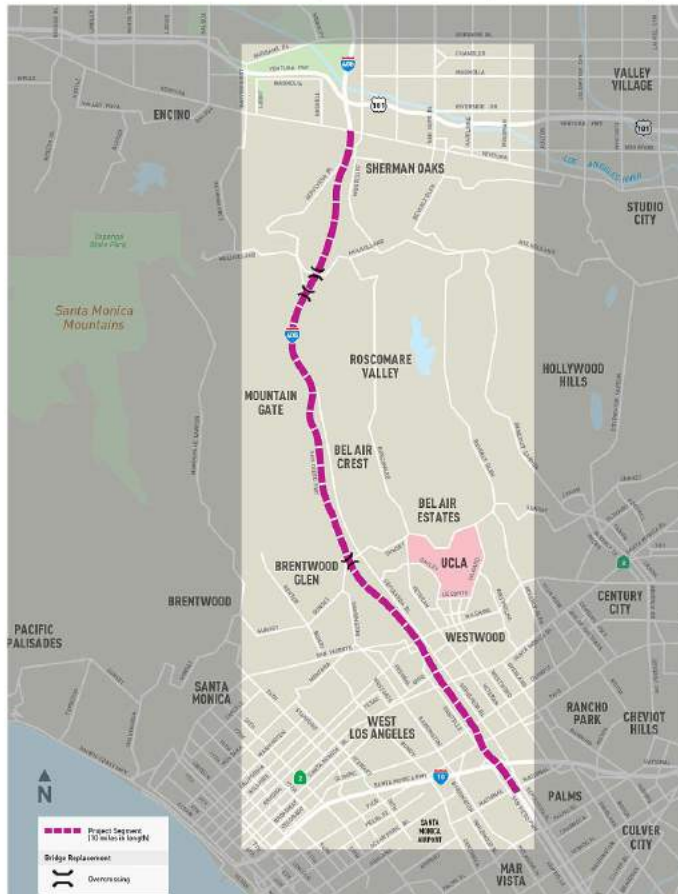


Impact of Roadway Closure on Air Quality



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)

U.S. News & World Report

CIVIC

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

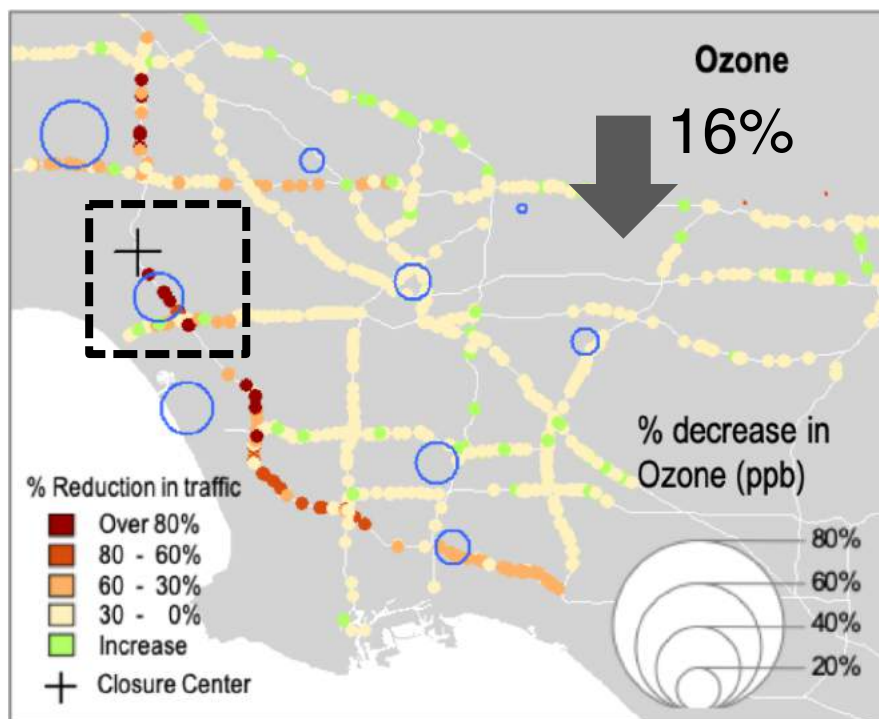


Weather data

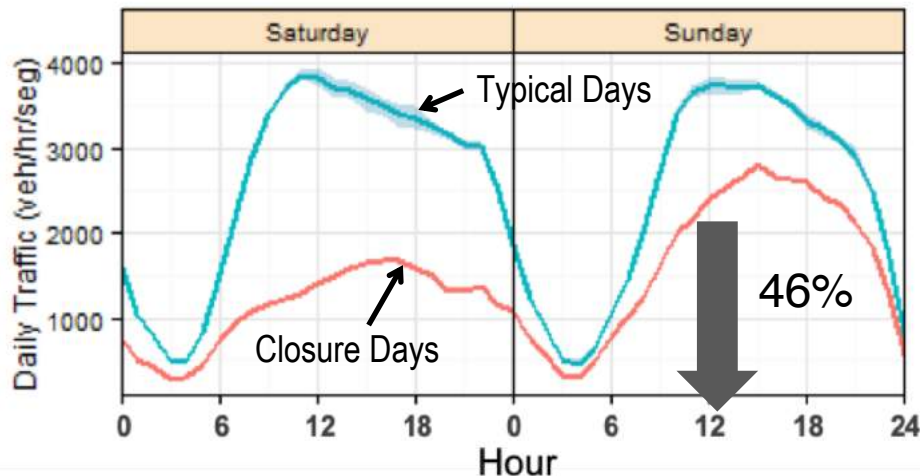
Hourly meteorological data from Cal DWR

Impact of Highway Closure on Traffic and Ozone

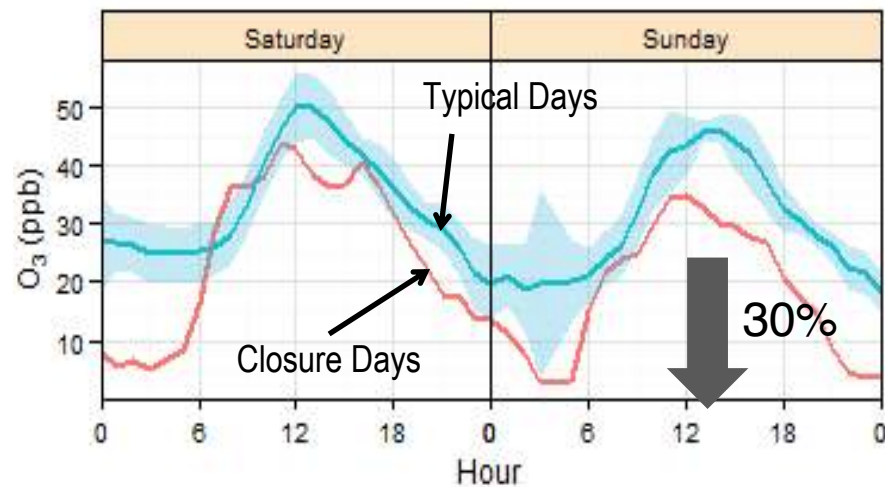
Regional Reduction in Ozone



Reduction in traffic at the West LA site



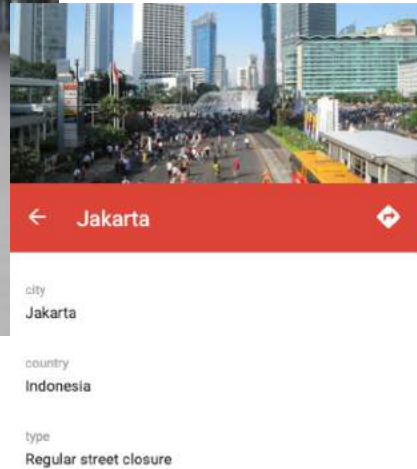
Reduction in Ozone at the West LA site



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

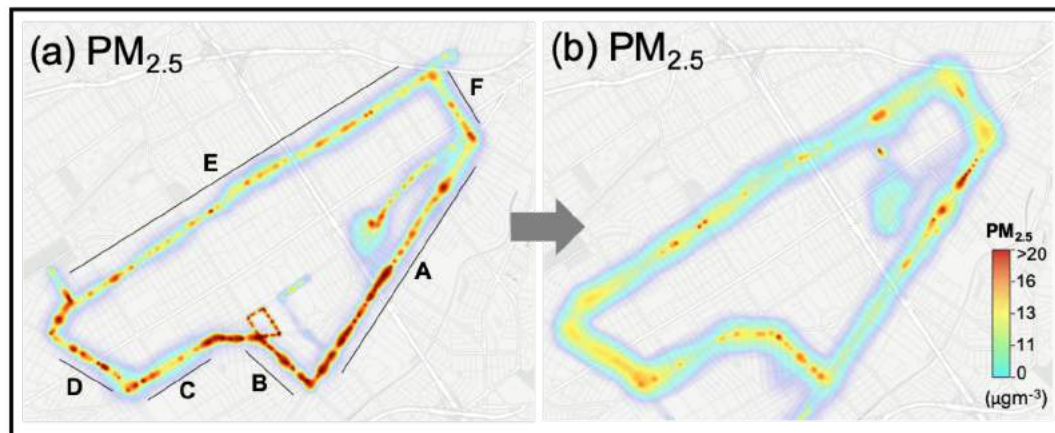
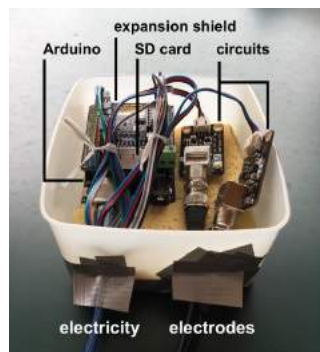


Impact of Local Street Closure on Particulate Matters

(a) Mobile monitoring platform

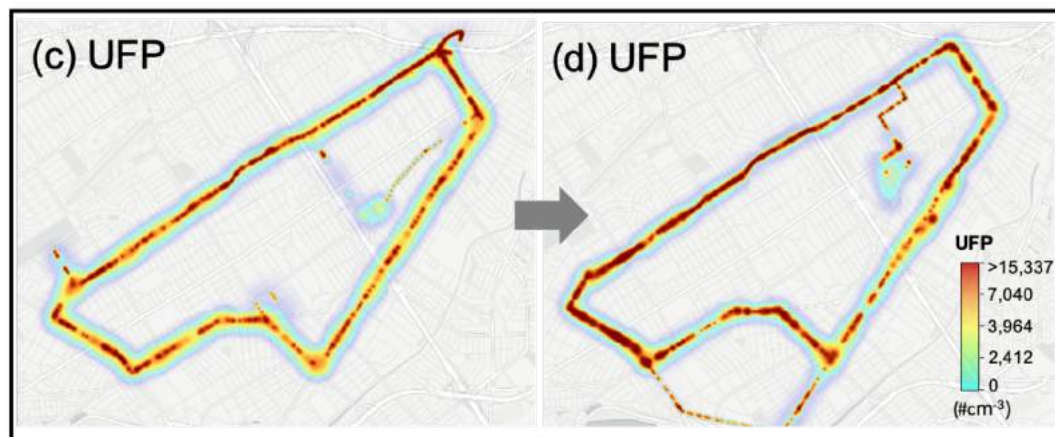


(b) Backpack system (c) Data Streaming System



Typical Days

Car-Free Days



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

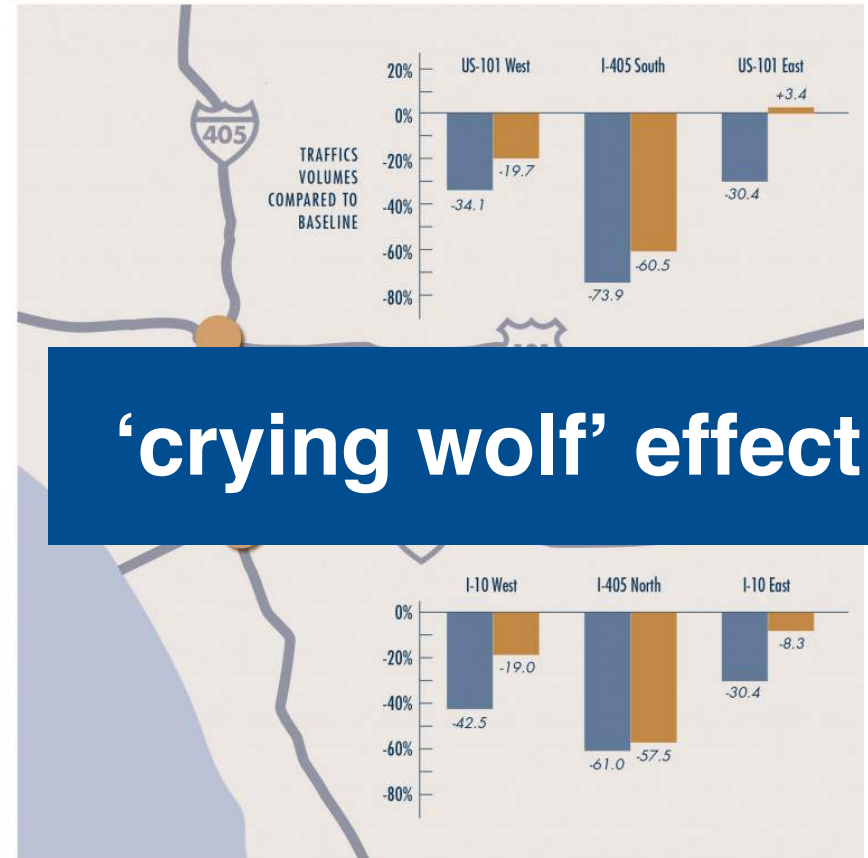
Strategy 1: Using the Message of 'Fear'

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 the Twitter profile of the Healthy Cities Network. The header features a large banner image of people cycling in a city with a skyline in the background. On the left is the Healthy Cities Network logo, which consists of a circle containing the text 'Healthy Cities Network' and a stylized city skyline. To the right of the logo are statistics: 27 Tweets, 35 Following, and 115 Followers, along with a 'Follow' button. Below the header is the profile information section, which includes the name 'Healthy Cities Network', the handle '@HealthyCityNet', a bio stating it is a global nexus of innovators sharing urban health information, the location 'Vancouver, British Columbia', and the date 'Joined June 2018'. There is also a link to '14 Photos and videos'. The main content area shows a tweet from the account dated March 14, thanking @JeromeMayaud for a presentation on machine learning in urban accessibility. Below the tweet is a large image of Jerome Mayaud pointing at a presentation slide titled 'Vulnerability in the city: Insights from machine learning'.

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

Where is My Research Headed?

“How to understand the needs and contexts of diverse communities to support health and wellbeing?”



Research in Progress (1)

Developing a smartphone-based audit tool for participatory planning



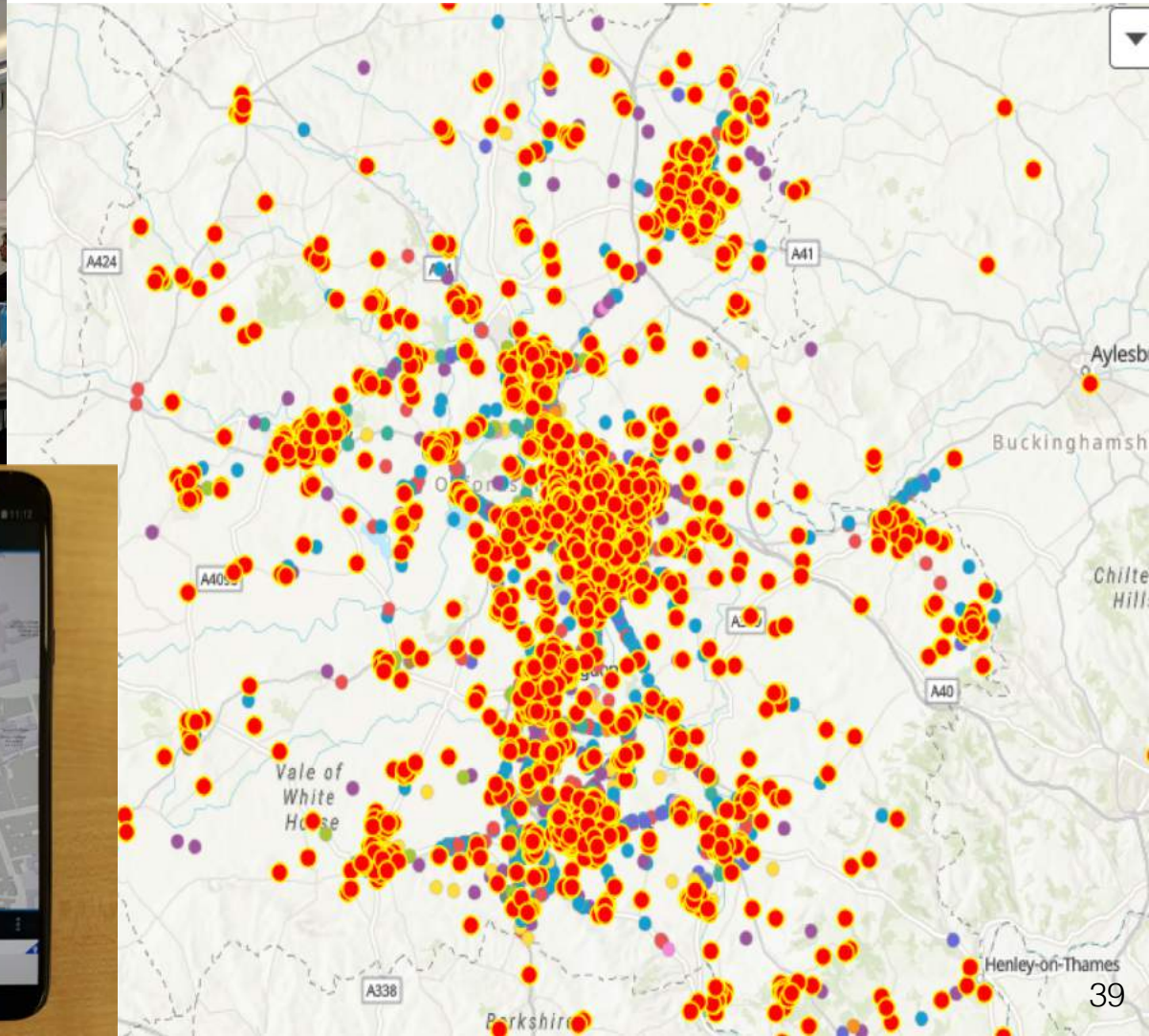
OXFORDSHIRE
COUNTY COUNCIL

SMART
OXFORD
THE LEARNING CITY

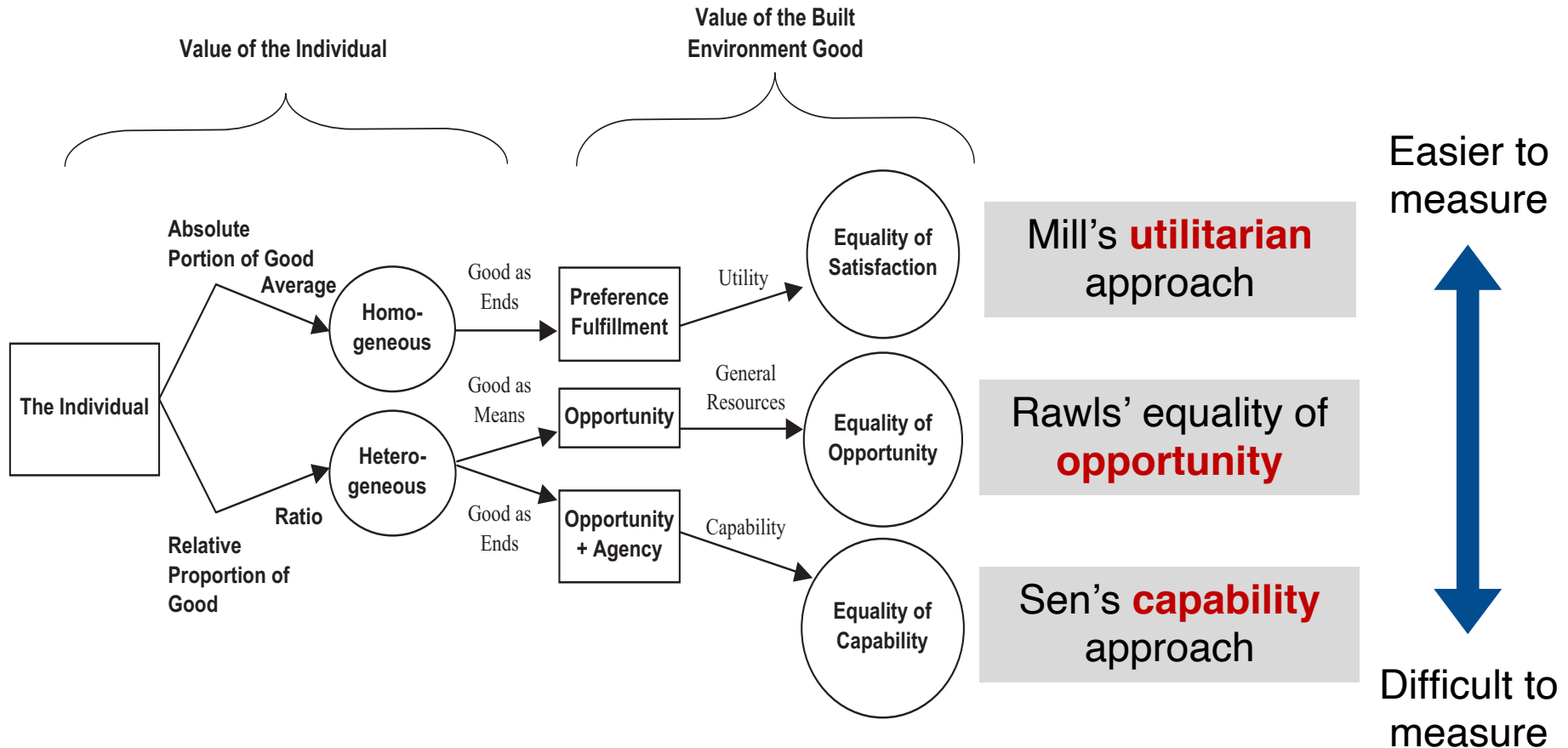


OXFORD
CITY
COUNCIL

cyclo
the voice of cycling in Oxford



Theoretical Underpinning behind the Tool Development

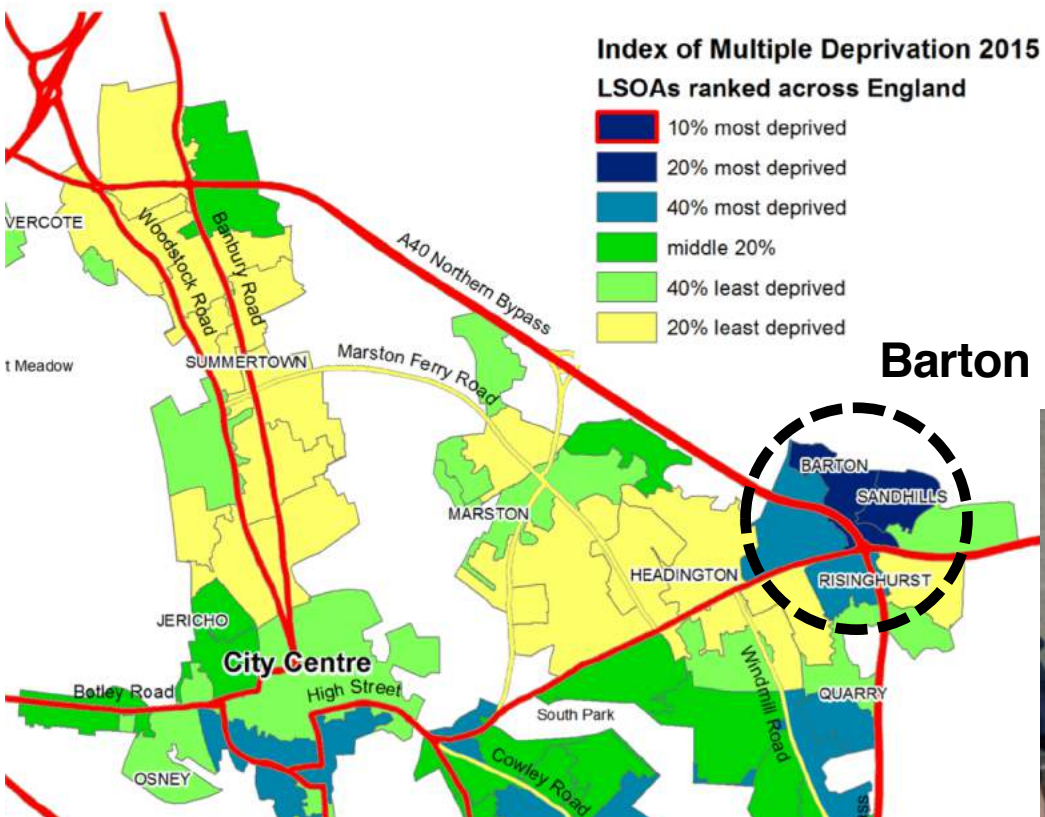


Research in Progress (2)

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