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

The George Institute for Global Health

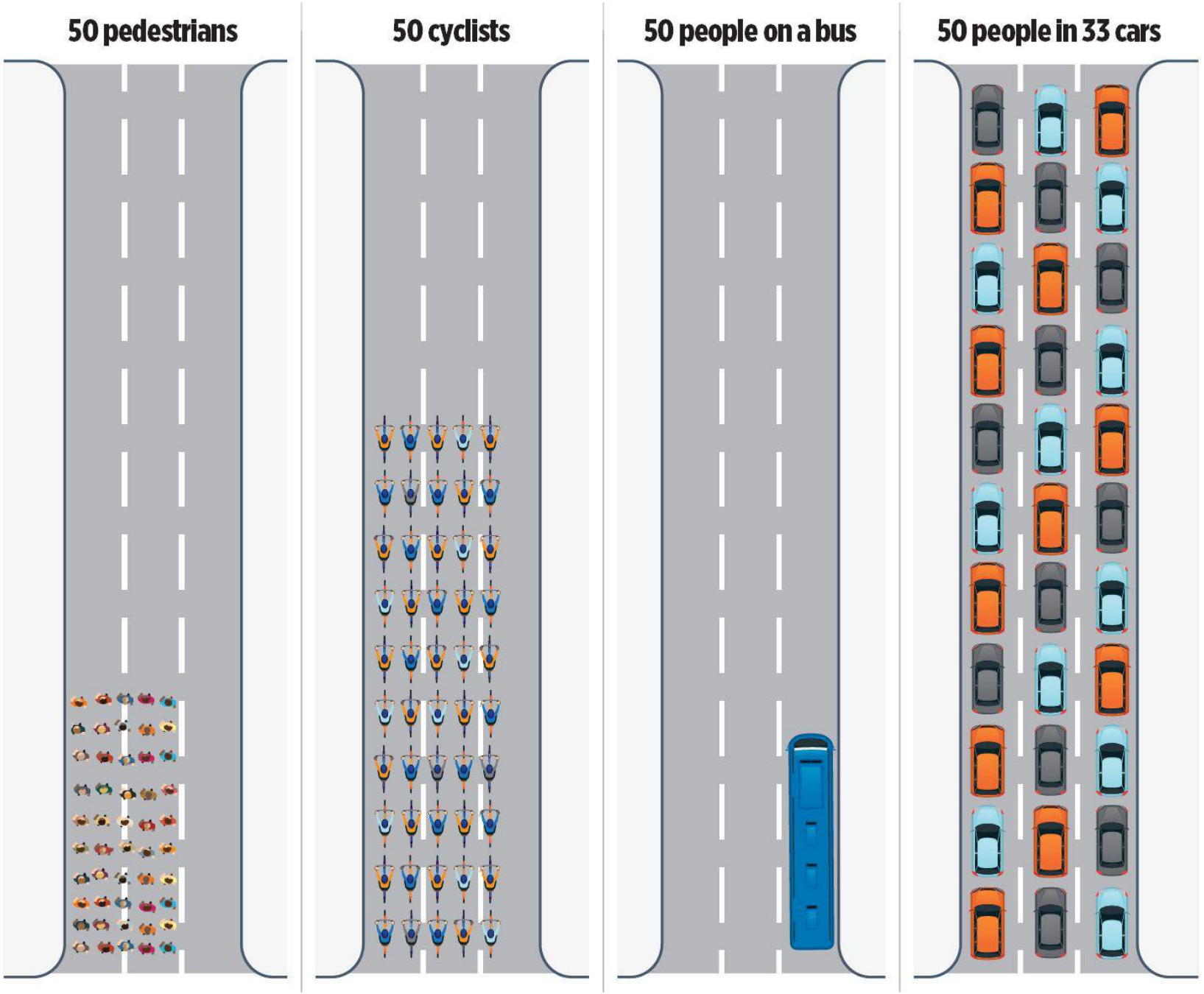
UNIVERSITY OF OXFORD

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 ef
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 Profess
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 E
physical activity across all age groups, contributing between 26-42% of total physical activity, and has been demonstrated
and gender."

Cheonggyecheon @ Seoul, Korea

Embarcadero @ San Francisco, United States

BUSINESS INSIDER

Subscribe

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 em
2035, the councils said. Photogr

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 |

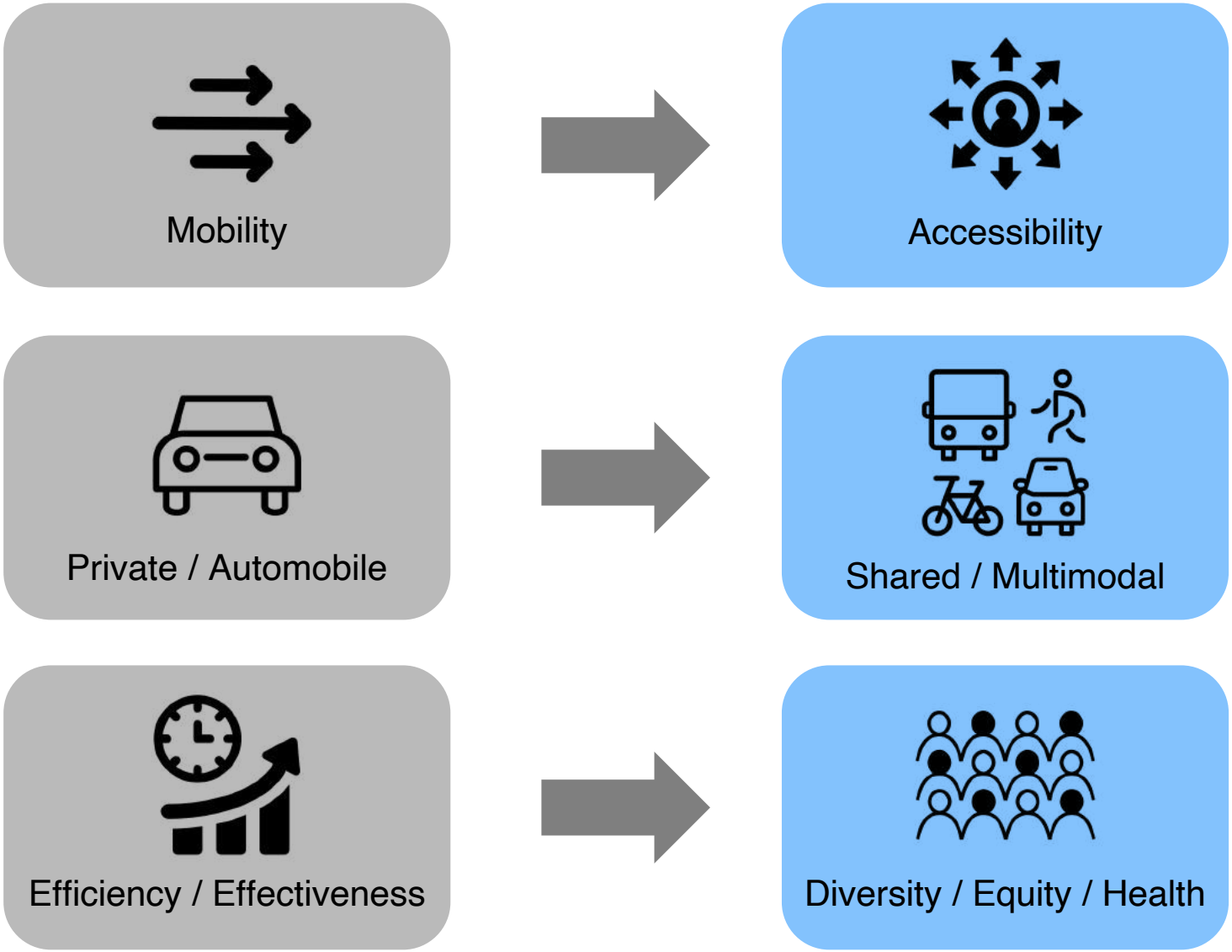
Clean Air Zone charge launch date set for summer in Birmingham

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

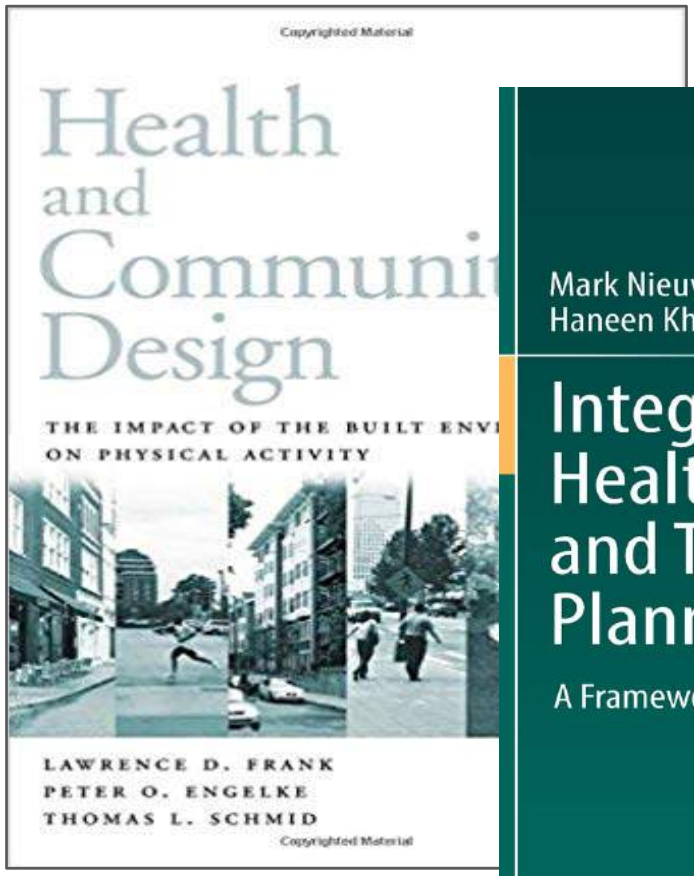
SHARE

ocracy Reporter
5, 14 FEB 2020

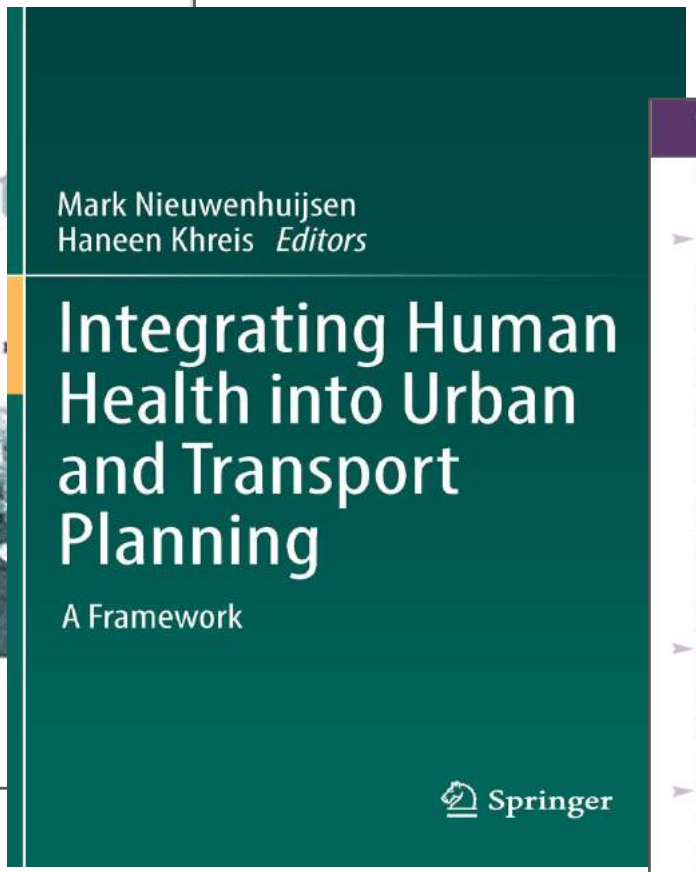
Paradigm Shift in Transport Planning



Putting Health at the Centre of Transport Policy



Frank et al (2003)



Nieuwenhuijsen & Kreis (2018)

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 Grazioli[1], Ivan Dimauro[1], Neri Mercatelli[1], Guan Wang[2], Yannis Pitsila
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
DNA sequence. The current literature clearly demonstrates that the epigen
influenced by different biological and environmental factors such as aging
exercise. As such, it is well accepted that physical activity and exercise can
epigenetic alternations although the type and duration of exercise eliciting
result in health benefits and prevent chronic diseases remains to be deter
significant findings from epigenetic studies involving physical activity/exer
chronic diseases such as metabolic syndrome, diabetes, cancer, cardiovasc

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

Grazioli et al (2017) BMC Genomics

Health Challenges Linked to Transport

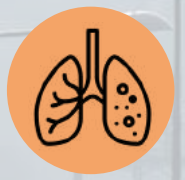
"Air Pollution"

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

Major risk factor for:

Stroke

Heart disease



Respiratory disease

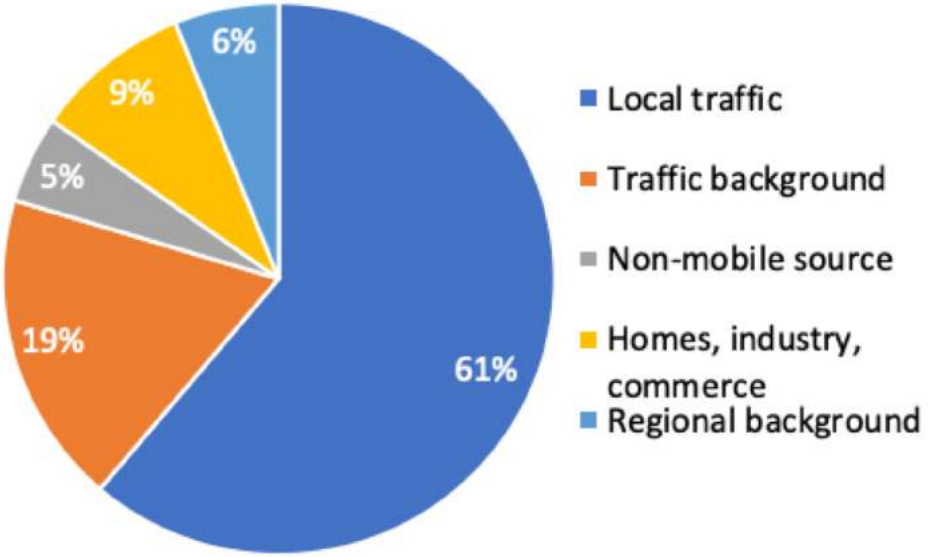
Air Pollution Problem in the UK

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

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

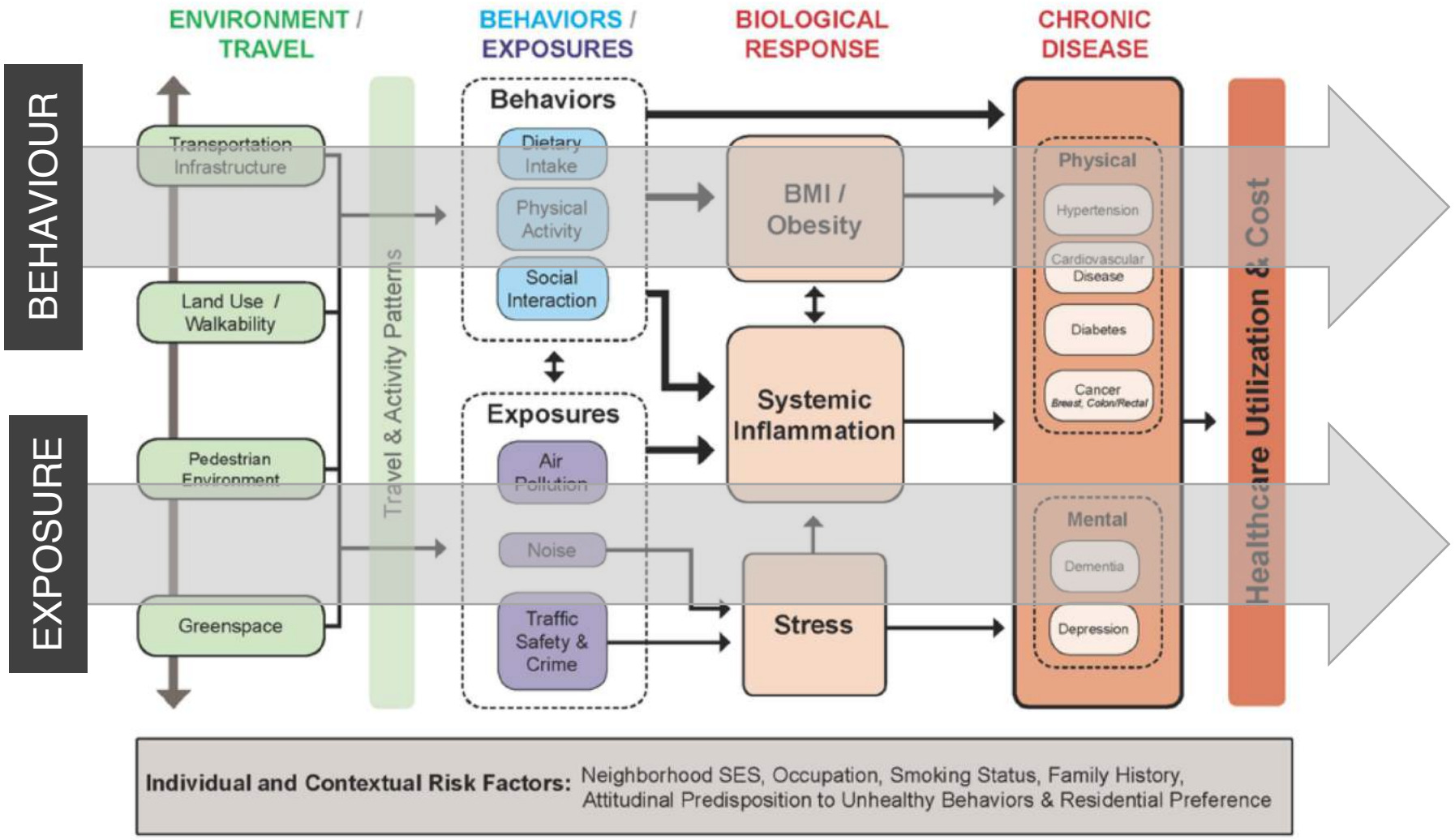
▲ The mayor of London issued a high pollution alert for the capital on Tuesday. Photograph: Nick Ansell/PA

Sources of NOx in the UK



Defra/AQP (2018)

Transport and Health: Conceptual Model

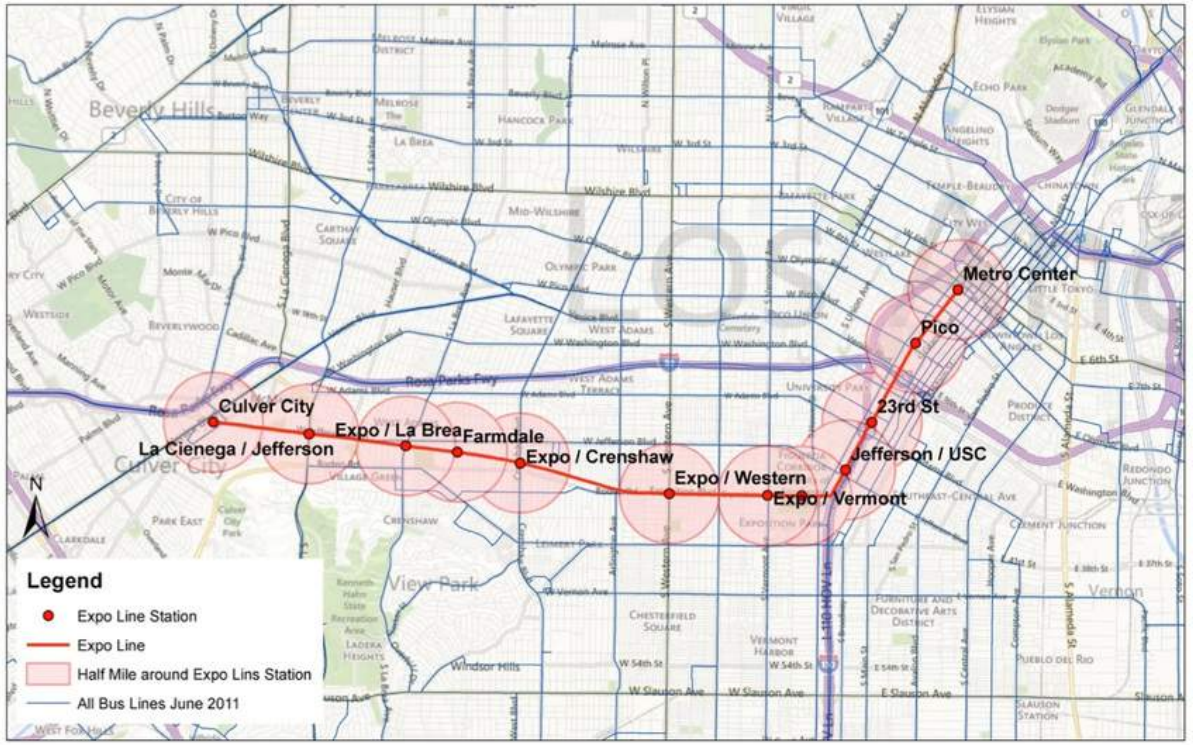


Frank, Iroz-Elardo, MacLead, and Hong (2019) *Journal of Transport and Health*

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

Driving
Public transport
Walking/Cycling

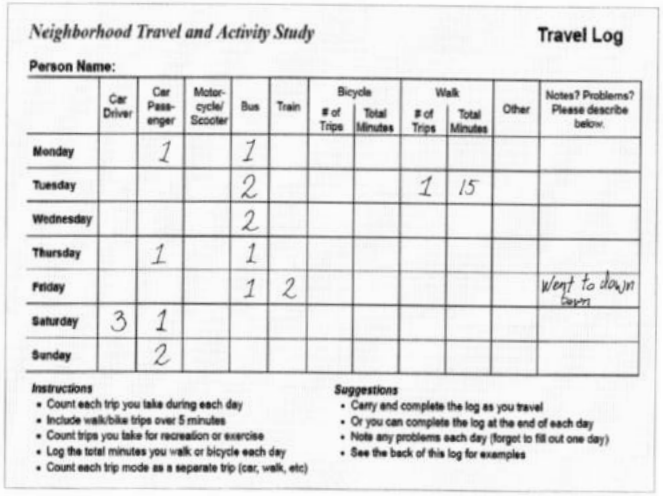
Travel survey

GPS

Locational information

Accelerometer

Physical activity



Neighborhood Travel and Activity Study — **Travel Log**

Person Name:

	Car Driver	Car Passenger	Motorcycle/ Scooter	Bus	Train	Bicycle # of Trips	Bicycle Total Minutes	Walk # of Trips	Walk Total Minutes	Other	Notes? Problems? Please describe below.
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)

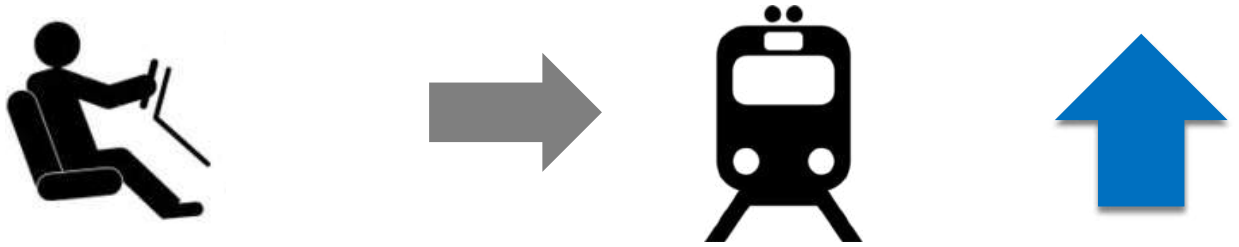
Suggestions
- Carry and complete the log as you travel
- Or you can complete the log at the end of each day
- Note any problems each day (forget to fill out one day)
- See the back of this log for examples

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

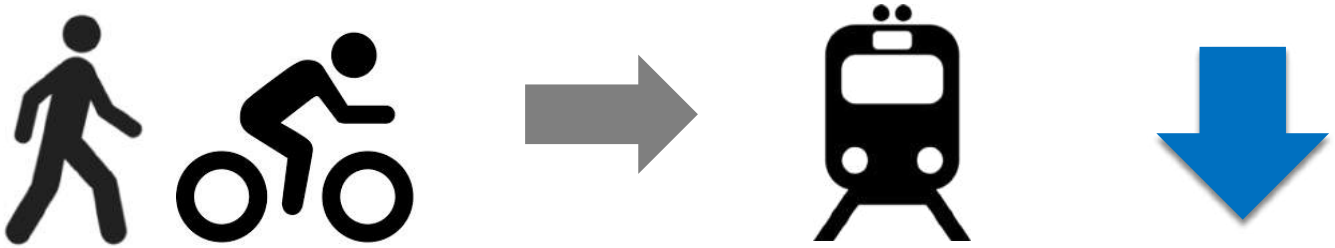
Hong et al (2016) *Transportation Research Part A: Policy and Practice*

Before-and-After Impact on Physical Activity



For those who previously drove a car

Increased PA levels **



For those who previously walked and cycled

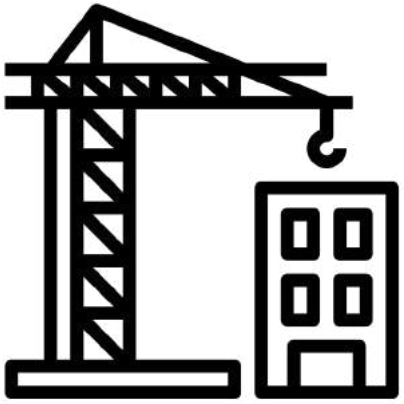
Decreased PA levels **

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

Hong et al (2016) *Transportation Research Part A: Policy and Practice*

Lessons Learned: Contexts and People

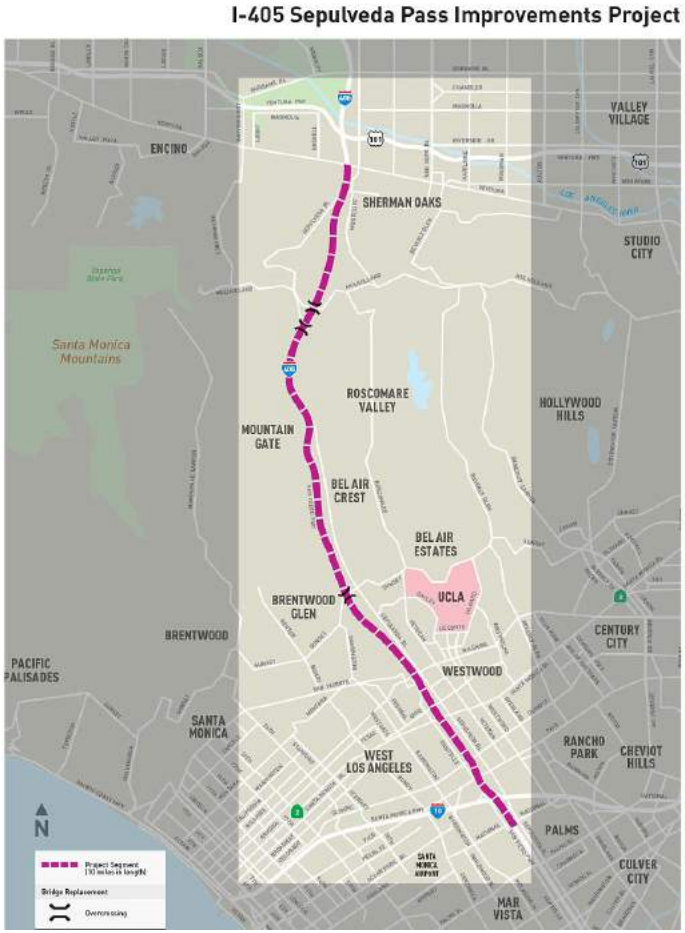
"If you build it, they will come"



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



- 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

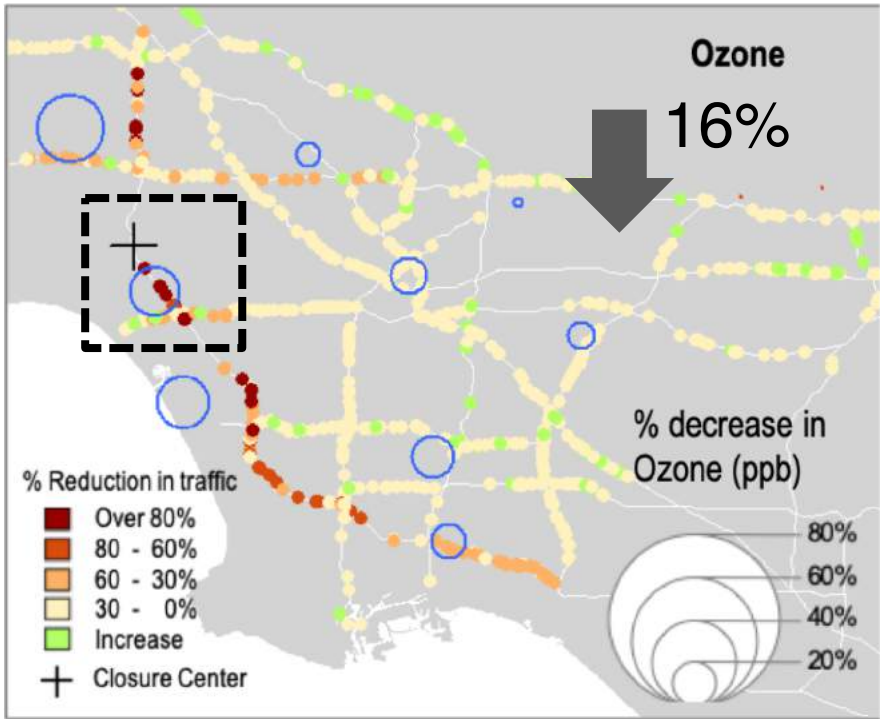
Air pollution data
Daily air pollution data from Cal ARB

Weather data
Hourly meteorological data from Cal DWR

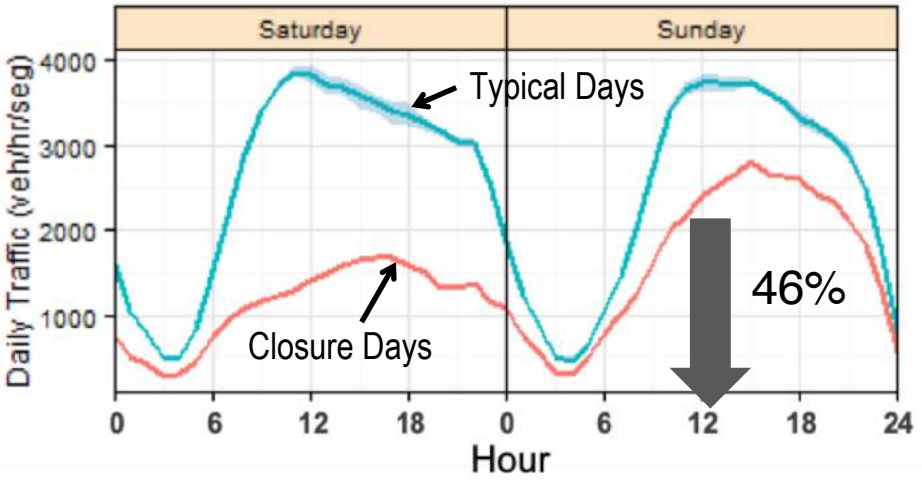
Hong et al (2015) *Environmental Science & Technology*

Impact of Highway Closure on Traffic and Ozone

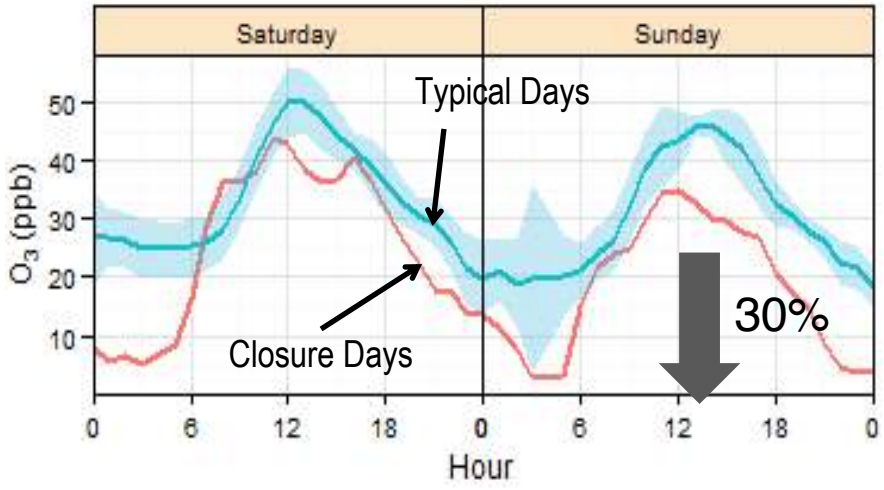
Regional Reduction in Ozone



Reduction in traffic at the West LA site



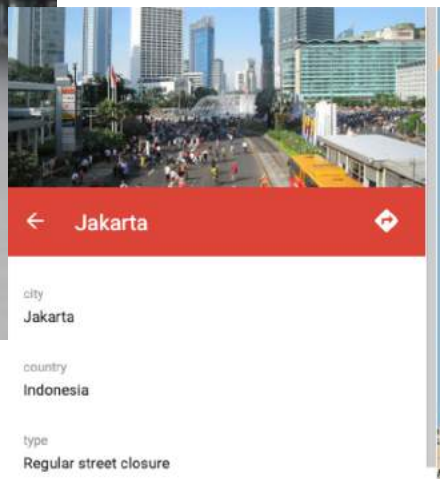
Reduction in Ozone at the West LA site



Hong et al (2015) *Environmental Science & Technology*

Impact of Local Street Closure: Car-Free Days

Ciclovia, Bogota
(Late 1970s)



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

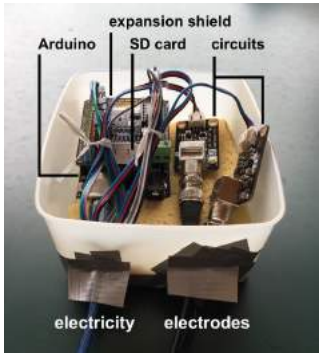
Impact of Local Street Closure: CicLAvia

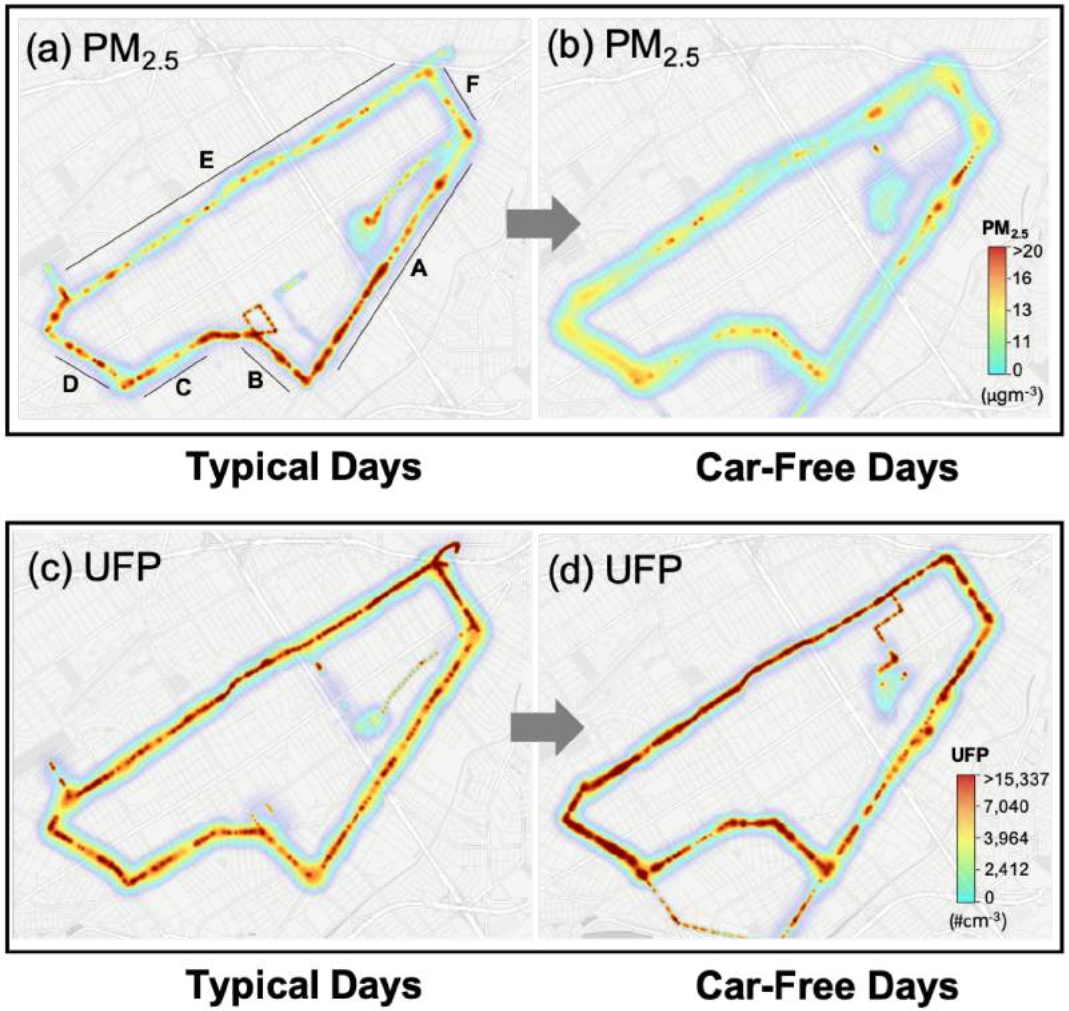
Impact of Local Street Closure on Particulate Matters

(a) Mobile monitoring platform

(b) Backpack system

(c) Data Streaming System





Hong et al (under review) *Science of the Total Environment*

Survey of Participants to the Car-Free Days

Survey: How did you come to the event?

Location	Wilshire (n = 1,085)	Downtown (n = 1,439)	Culver City (n = 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)

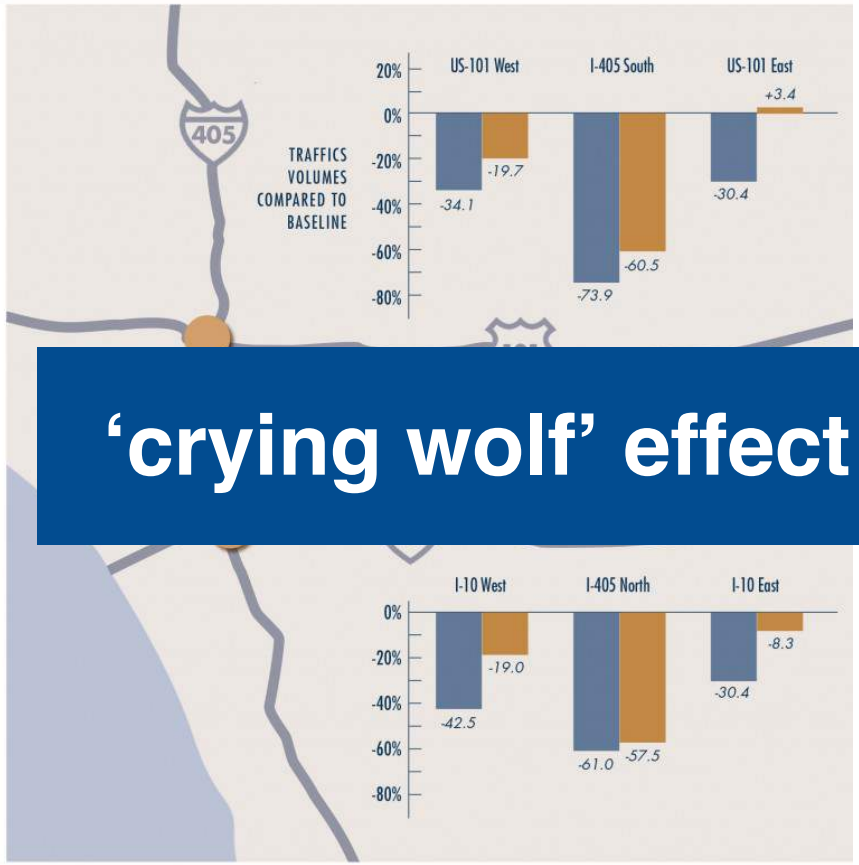
Communicating on Air Quality for Behavior Change

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



'crying wolf' effect

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

Healthy Cities Network

Tweets 27 | Following 35 | Followers 115 | Follow

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

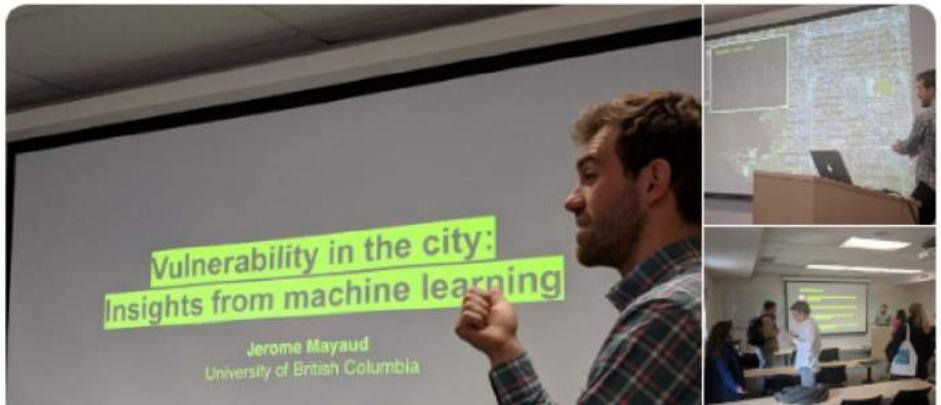
Joined June 2018

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



Where is My Research Headed?

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

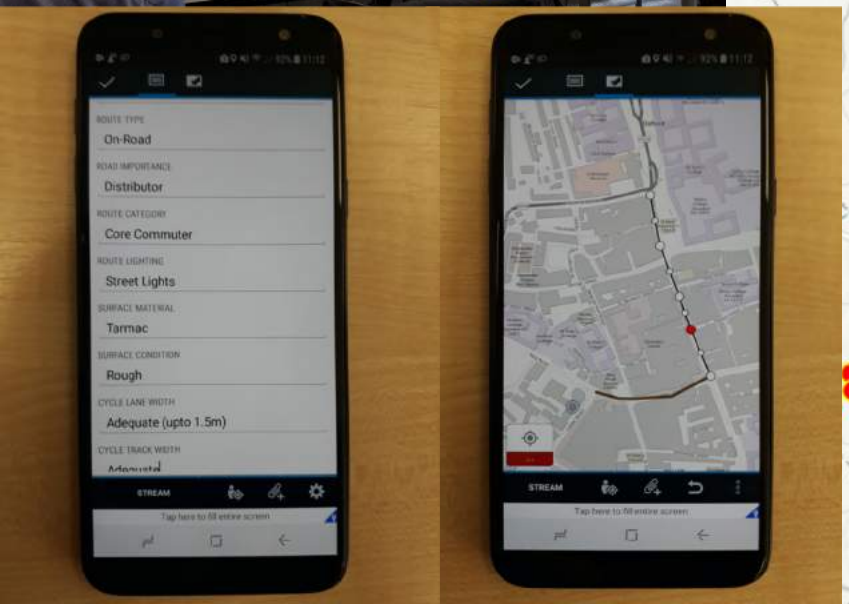
Physical activity	TR-A (2016), JPER (2017), JPER (2019), Prev Med (2019), Obesity Reviews (2020)
Air / noise pollution	TRB (2012), ES&T (2015), Atmos Env (2019), EPB (2019)
Social cohesion	SSM (2018)
Integrated approach	JTH (2019)

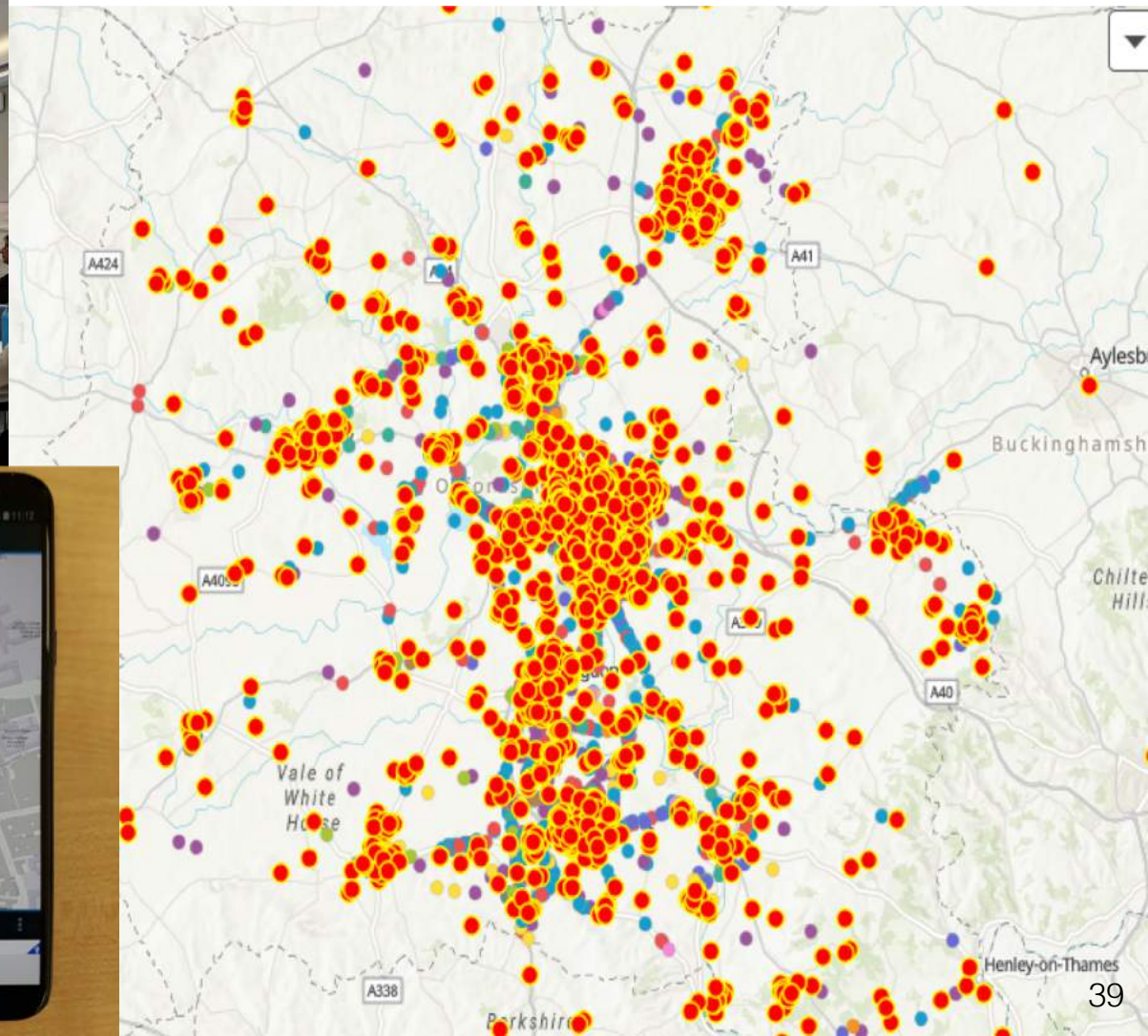
Where is My Research Headed?

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

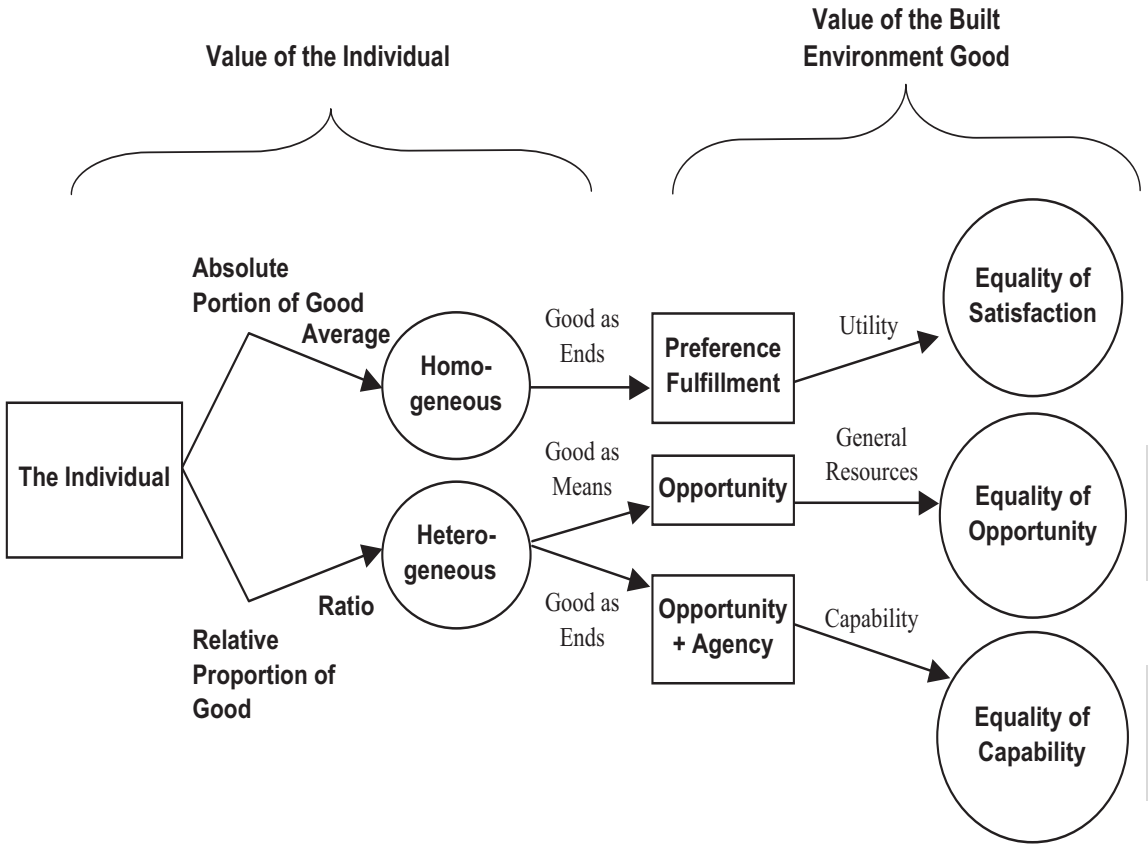
Research in Progress (1)

Developing a smartphone-based audit tool for participatory planning





Theoretical Underpinning behind the Tool Development



Mill's **utilitarian** approach

Rawls' equality of **opportunity**

Sen's **capability** approach

Easier to measure

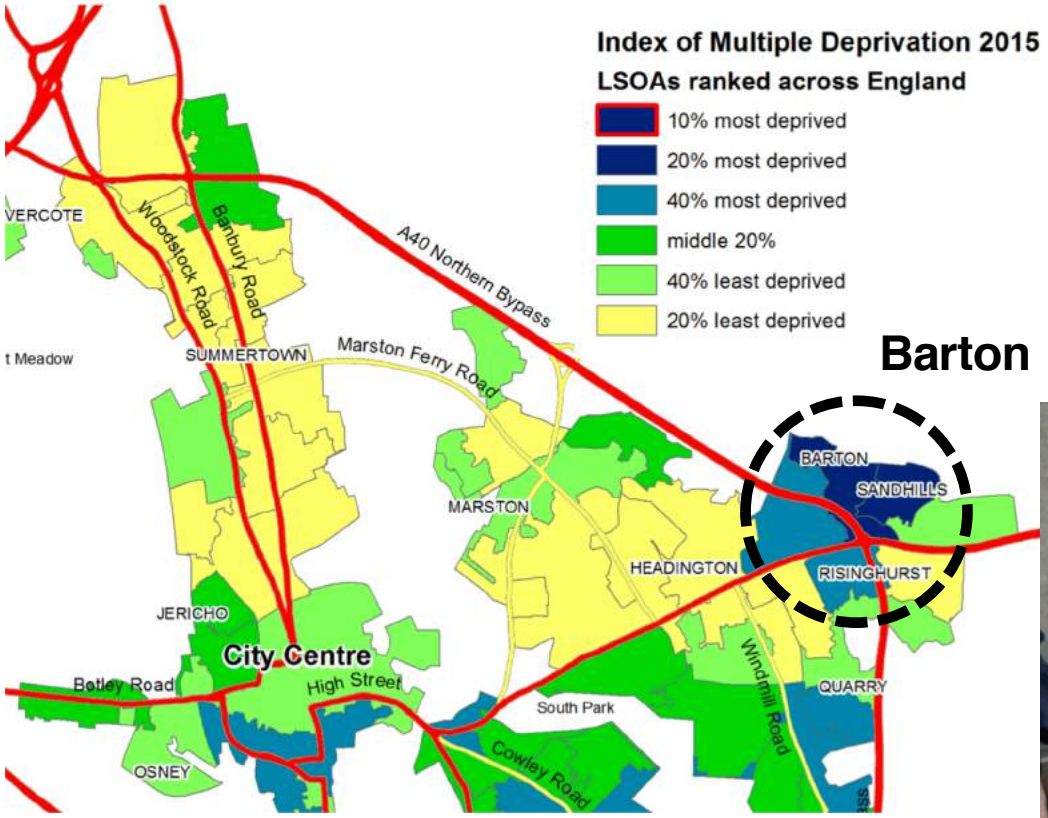
Difficult to measure

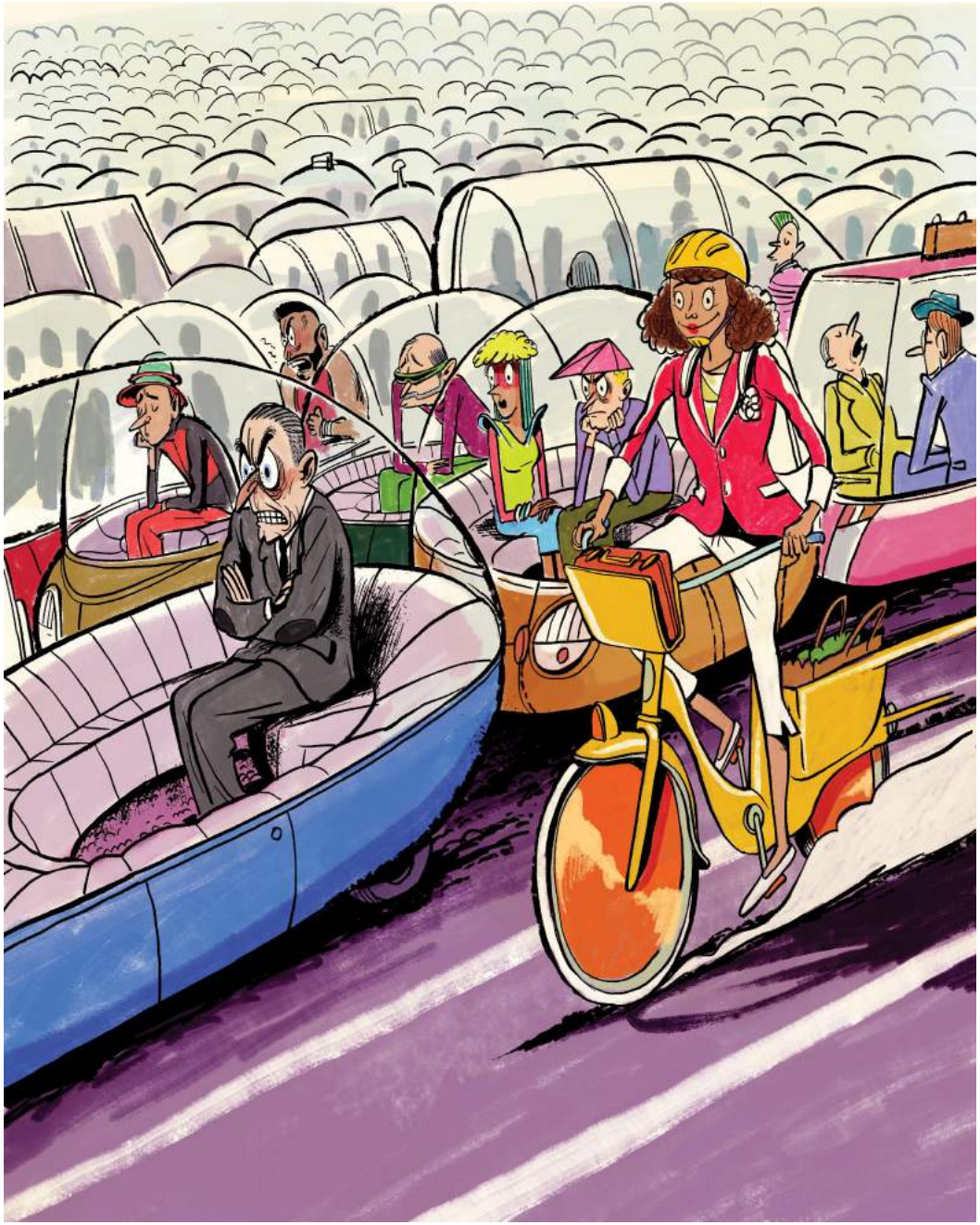
Lewis. 2011. Towards a general model of built environment audit. *Planning Theory*

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

Source: wired.com