Air Pollution in Cities
Part 2: Overcoming barriers to healthy planning solutions

Global Sustainability Summer School
Santa Fe Institute

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Learning outcomes

- Discuss barriers to and enablers of urban planning solutions to health
- Propose a model of co-creation of knowledge and solutions
- Identify opportunities for societal engagement, specifically around air pollution and health
City Planning and Health Publication Trends

Numbers of publications per year 1995-2017
Web of Science search terms: (City OR Urban) AND (Planning OR transport OR design OR built environment) AND Health
Barcelona Super Blocks
Why are we not designing healthier cities and what can we do to make it happen?

Towards a model of co-creation of knowledge and solutions

- Digital tools for societal engagement
I think one of the first things that comes to mind for the urban planners is health services. So they start talking about where they're going to put GP practices and dentists and things’

UK Public Health Director

The new director of public health is very much following the sort of smoking cessation and physical activity drugs treatment; you know a very medical model so you know we are losing the social determinants stuff. I guess my view is that public health don't understand the benefit they could have by investing in transport’

UK planner
“...this is a bit of a generalisation here, but in general public health people would love to see [...] an effectiveness study with a low p value and a good return on investment, and a high impact, [...] but transport people would like to hear a good story and know that it’s [...] working”. (SE02; research, health)
Real world and policy relevant research

- **Researching complexity** *(Clark et al. 2016)*:
  1) multiple impacts at multiple scales
  2) context-dependent impacts
  3) irreversible changes to the system

- **Translating complexity**
‘I don’t think there’s any doubt on the evidence. … they’re very clear that a modal shift will improve the health of the public. I think where the politicians are hesitant is where they think it’ll lose them votes.’ (UK planner)

Survey of 413 UK Stakeholders on barriers to investing in cycling (Aldred et al. TR-A 2017):

– ‘Political leadership still seems to view the car as the key to economic growth. Large businesses in our town with parking problems are given sympathy and encouragement to extend their car parks.’
‘Health people just don’t seem to do politics; they just don’t have any experience of it [...] they need to remember that local government is a political environment and they need to engage with the politicians’ (UK Planner)

The political determinants of health—10 years on
Public health professionals need to become more politically astute to achieve their goals
Ilona Kickbusch director

Role of politics in understanding complex, messy health systems: an essay by David J Hunter
Rather than exclude politics from health, David Hunter argues that we must embrace it if we are to improve our complex health systems
Political engagement: advocate for changes in institutional arrangements
Public opinion and cultural shifts?

Study of 10 Canadian cities/provinces identified CULTURAL change as most important factor in explaining increased cycling rates (Assuncao-Denis TR-A 2019)

– ‘There are a lot more people who at least recognize [cycling] as legitimate. They don’t think you’re some kind of nerd if you show up at a meeting on a bicycle. I think there’s been a change there.’

– ‘the City promoting cycling and the media drawing positive attention have [raised awareness] and [helped make] cycling more acceptable to the general public and create a change in culture’
Changing the agenda: air quality example

Air pollution cuts two years off global average lifespan, says study

Analysis finds toxic air trims lifespans by 1.8 years, making it main threat to human health

Diesel pollution stunts children's lung growth, major study shows

Research carried out in London also shows charging polluting tracks had no effect on health

Prenatal exposure to air pollution linked to autism risk, study says

By Susan Sculli, CNN

Childhood obesity linked to air pollution from vehicles

Revealed: Poorest parts of London have the highest number of asthma attacks

ROSS LYDALL, Health Editor / Wednesday 31 October 2018 11:57 | 2 comments
Incorporate stakeholders, policy makers in research team

Compelling methods to policy makers

e.g. Evidence briefs

Engagement with decision makers and knowledge brokers
Co-creation in research and beyond, Facilitating engagement on air pollution and more:

The digital opportunity

Unique opportunities offered by digital technologies for a 3-way process of collecting data, reshaping behaviour, and influencing public policies
Engaging citizens on air pollution

• Lessons learned from air pollution communication research:
  • Key to success:
    - Localized information
    - **Action-oriented**
    - Related to personal interests (including health interests)
    - Simplified but not over-simplified message
    - Positive

→ **Ideal for smartphone applications**

• Beware of Pitfalls: Inadequately planned communication may be ineffective or even counterproductive (leading to resignation and rationalization)
What actions?

Dimensions of behaviour change (RAPSS):

• **Reduce** contribution to air pollution (e.g. by taking alternative transport),
• **Avoid** exposure to air pollution (e.g. by use of less polluting route),
• **Protect** against pollution (e.g. healthy lifestyles), and
• **Share** your experience (e.g. talk to your neighbours)
• **Support** air pollution measures (e.g. writing to local authorities).
Experiment: Providing personalized feedback on exposures

- MSc thesis 2014, Roseline Polle

Your trips on 15/07/2014: Average NO2 exposure = 104 μg/m³

By quiet back streets: ~50% reduction!

Walking: ~55 μg/m³
Cycling: ~65 μg/m³

Walking: ~110 μg/m³
Cycling: ~140 μg/m³

Walking: ~90 μg/m³
Cycling: ~110 μg/m³

Stages of change analysis
(transtheoretical model of behaviour change)
The role of personal air pollution sensors and smartphone technology in changing travel behaviour

Hebba Haddad*, Audrey de Nazelle

I think I will be motivated to take into account the information provided by Plume Labs App when planning my journeys and activities (M = 5.76)

Only significant change before/after:

Drop in trust in the performance of the sensor and ability to change behaviours
Ongoing: evidence-based app development

Highlighting co-benefits; providing ranges of actions for all
Engaging stakeholders and policy makers

Incorporating locally specific data relevant to address barriers and enablers to health-promoting urban policy making
Planning for health: identifying exposure hotspots accounting for people’s activity patterns

Individual smart phone or sensor-based activity tracking (air pollution exposure and physical activity)

Aggregate (on a grid) mobile phone usage data from Telecom companies
Planning for health: Concept mapping tools

- Stakeholder views and perceptions (e.g. on urban form interventions)
- Identify barriers and opportunities
- Harness collective intelligence
- Incorporate digital data collection opportunities

Example: Aspects of the built and social environments that influence older adults' outdoor walking.
Hanson et al. 2013 Precentive Medicine 57
Identifying the potential for health improvements and making co-benefits and trade-offs more salient

Length of cycling lane network vs cycling mode share

Mueller et al. 2018
Preventive Medicine 109

Mortality impacts of increasing cycle lane network
Air pollution and healthy urban planning: Conclusion

- Addressing air pollution is an opportunity to address health in cities in a more holistic manner.
- Decision-makers need to be engaged towards integrating health in urban planning decisions.
- Digital technologies provide opportunities for 3-way engagement between researchers, citizens, and stakeholders/policy makers.
Challenge questions

• What novel data opportunities can be used to engage decision makers in healthier urban planning practices?

• What could be an effective digital platform design (contents, message, metrics, process, interactions, etc) to engage policy makers towards healthy urban planning?
• Sallis et al. The Lancet, vol 388 (2016)
• Clark et al. PNAS, vol 113 (2016)
• Huang et al. The Lancet vol 385 (2015)

Guell et al. BMC Public Health (2017)
Assuncao-Denis Transportation Research Part A (2019)
Nieuwenhuijsen and Khreis Eds. (2018) (Riley and de Nazelle Chapter 31)