REFLECTIONS ON AIR QUALITY FOCUS GROUPS

CONNOR SMITH – THE UNIVERSITY OF EDINBURGH – 06.07.2023

AIM

- The aim of this study was to explore London residents' perceptions of, and attitudes towards, indoor and outdoor air quality, in part by leveraging novel air quality modelling outputs.

- In particular, we wanted to better understand the extent to which there might be scope for individual behaviour change to mitigate against exposure, vis-à-vis the need for systemic change.

- And whether or not this differs in indoor versus outdoor contexts.

METHODOLOGY

- 6 online focus group discussions with 31 participants in total.

- Sessions lasted approximately 1 hour and 45 minutes each.

- Groups were categorised by geography and "vulnerabilities".

METHODOLOGY CONTINUED…

- FG 1 – Inner London, Pre-Existing Health Condition

- FG 2 – Inner London, Elderly (65+)

- FG 3 – Inner London, Parent with Young Child

- FG 4 – Outer London, Pre-Existing Health Condition

- FG 5 – Outer London, Elderly (65+)

- FG 6 – Outer London, Parent with Young Child

SCHEDULE

Task	Time	Task	Time
Project introduction	6:00 – 6:05	**Part 3.1**	6:55 – 7:00
Participant introductions	6:05 – 6:10		
Part 1	6:10 – 6:35	*Introduce the ventilation & cooking scenario*	
Explore pre-existing knowledge and concern regarding air pollution & the mitigating behaviours that individuals may employ in their day-to-day lives		**Discussion**	7:00 – 7:15
		Discuss ventilation and cooking scenario	
Part 2	6:35 – 6:40	**Part 3.2**	7:15 – 7:20
Introduce information on pollutants		*Introduce the ULEZ scenario*	
Discussion	6:40 – 6:55	**Discussion**	7:20 – 7:35
Discuss pollutants		*Discuss ULEZ scenario*	
		Round-up/ Wrap-up	7:40 – 7:45

KNOWLEDGE, CONCERN & MITIGATING BEHAVIOURS

Knowledge

- The vast majority of participants only thought of air pollution in relation to poor ambient air quality. Only one or two referenced indoor air quality before we introduced the topic.

- For most (if not all) participants, transport was perceived as the main cause of air pollution in London.

- Other sources cited included factories/industry, with a few participants also highlighting gas heating and smoking.

- Participant knowledge of specific pollutants was very low (e.g. NO2, PM2.5)

- ULEZ was discussed by most groups before we introduced the topic (i.e. a hot topic)

KNOWLEDGE, CONCERN & MITIGATING BEHAVIOURS

Concern

- Level of concern varied drastically between participants

- For a handful of participants, poor ambient air quality was a major concern.

- Only one participant was highly concerned about poor indoor air quality prior to information on this topic being introduced.

- For others (perhaps the majority), concern was generally low but heightened when triggered by certain stimulus, e.g. visual, smells, grime/dirt on clothes/body

- It seemed that those who considered themselves vulnerable had higher levels of concern than those who did not

- Many of those who were not concerned for themselves were still concerned for others, including their kids and vulnerable relatives or friends

KNOWLEDGE, CONCERN & MITIGATING BEHAVIOURS

Mitigating behaviours

- Mitigating behaviours seemed to be linked to concern; those who were more concerned were more likely to undertake mitigating actions.

- For the most concerned, actions were pretty drastic: e.g., one participant worked the night shift so that he could cycle to work at times of low traffic and thus lower ambient exposure.

- Less drastically, a few participants stated that they try to plan routes through greenspaces and avoid busy roads

- However, most participants suggested that they very rarely altered their behaviours or habits to mitigate against exposure.

THE MODELLING – VENTILATION & COOKING

Scenario A: Cooking & Ventilation (Gas & Electric)

1. Natural ventilation

2. Natural ventilation, trickle vents, and extractor fan

3. Natural ventilation, trickle vents, extractor fan and a HEPA filter
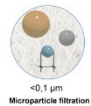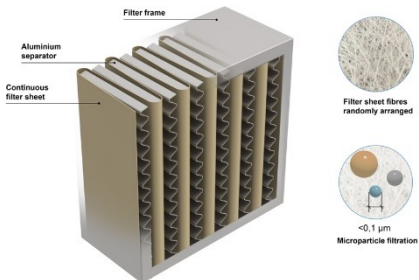
- Cooking can increase indoor $PM_{2.5}$ concentrations significantly, the exact amount depends on the type of cooking and ventilation.

- Gas cooking increases $PM_{2.5}$ exposure more than electric cooking.

- The less ventilation you have, the higher your $PM_{2.5}$ exposure is likely to be.

- Trickle vents and an extractor fan can reduce indoor $PM_{2.5}$ levels when cooking by 20 - 60%.

- Trickle vents and an extractor fan plus a HEPA filter could reduce indoor PM2.5 when cooking by 79-89%.

VENTILATION & COOKING

- The vast majority of participants were surprised or shocked about the impact of cooking on indoor air quality, with most suggesting it was something that they had never really thought about (or heard of) before.

- Ventilation habits varied from no ventilation at all to opening all windows and door plus extractor fan. Most participants used the extractor fan or opened a window or door, but only one owned a HEPA filter and this was not used in the kitchen. A few participants had trickle vents but usage varied.

VENTILATION & COOKING

- Broadly speaking, participants were impressed with the potential reductions to exposure that could be achieved by improving ventilation and using a HEPA and thought that this information should be more widely shared.

- Many participants stated that the information provided would influence their future behaviours: a handful of participants suggested that they would look at purchasing a HEPA filter; the majority of participants who didn't currently use an extractor fan or open windows stated that they would going forward.
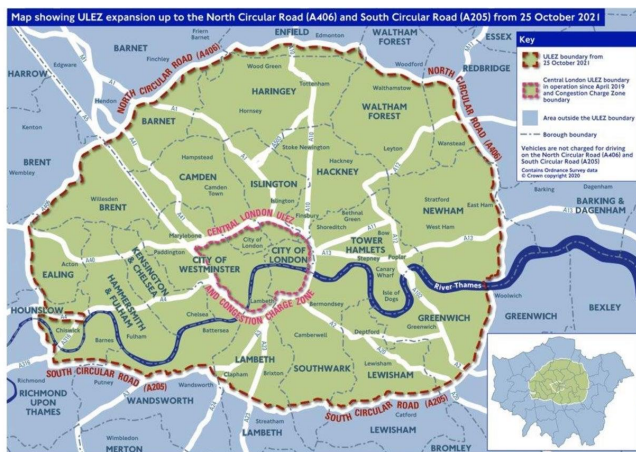
THE MODELLING - ULEZ

Scenario B: Ultra-Low-Emission-Zone (ULEZ)

1. ULEZ
2. No ULEZ

- Decrease in NO_2 exposure due to ULEZ (3.2-12.3% depending on mode of transport).
- Tiny drop in $PM_{2.5}$ exposure due to ULEZ (0.4-2.7% depending on mode of transport).

- Travelling on the underground can increase exposure to $PM_{2.5}$ by up to x10 that of other travel modes (regardless of ULEZ)

- Underground exposure depends on the line; deeper lines have less ventilation (e.g. Northern; Bakerloo; Jubilee; Victoria) so greater exposure

- Those closer to the surface or above ground (e.g. Metropolitan; Circle & District) have significantly more ventilation and therefore less exposure

ULEZ – ULTRA LOW EMISSION ZONE

- Participants broadly perceived the reductions as less than expected/hoped for, but for the majority there was the sentiment that "anything is better than nothing" (it was stressed that this is modelling, not actual pollution data).

- Trust came into the discussion, with a minority of participants suggesting that ULEZ was just a cash cow for "the Government" or the mayor.

- Tube as an alternative problematic from a public health perspective

ULEZ – ULTRA LOW EMISSION ZONE

- There was an air of uncertainness or uneasiness in many groups when discussing ULEZ, perhaps owing to the fact that this is a current and somewhat divisive issue.

- Most suggested that there are trade offs, with it being less than ideal for people who are struggling financially (i.e. COLC) but that something needs to be done from a health and environmental perspective.

- A few participants suggested that dependence on private vehicles (especially in cities) is a cultural or mind-set issue.

WHAT DOES THIS MEAN FOR BEHAVIOUR CHANGE?

Awareness

- A prerequisite of behaviour change? Many of our focus group participants stated that the information provided would influence their future behaviours

Trust

- Lack of trust in Government (national and local) may impede social acceptance of policies / interventions (e.g. ULEZ)

Responsibility

- For most, there was a balance where individuals had a responsibility to take small actions in their day-to-day lives (e.g. drive less) but that there were some areas where Government or other actor intervention was needed (information provision; international collaboration).

- Many participants suggested a willingness (if they weren't already) to take actions to this effect; however, a few indicated exacerbation or powerlessness in tackling such a widespread and embedded problem.

WHAT DOES THIS MEAN FOR BEHAVIOUR CHANGE?

Cost of living crisis

- Several participants suggested that the cost of living crisis meant they were using their heating less and subsequently ventilating their homes less to retain maximum heat

- Also referenced as potential to be exacerbated by ULEZ

Between a rock and a hard place

- How to offer an attractive alternative for those faced with a trade off between personal health and reduced car dependency / usage

WHAT DOES THIS MEAN FOR BEHAVIOUR CHANGE?

Indoor vs Outdoor

- Upon reflection, there would appear to be greater scope for behaviour change (mitigating actions) indoors than outdoors.

- More personal control and perceived capacity to affect meaningful change

- But first, people need to be informed

"If you can't take responsibility in your own home, then when are you going to be able to?"

(Participant x)

THANKS FOR LISTENING ☺

If you would like to chat more about this research, then please email me at connor.smith@ed.ac.uk

With thanks to everyone on the APEx (An Air pollution exposure model to integrate protection of vulnerable groups into the UK Clean Air Programme) project team for their fantastic modelling work; Heiccam for hosting this wonderful conference; and special thanks to my colleagues & co-researchers at the University of Edinburgh: Dan van der Horst, Alice Drinkwater and Malina Modlich.

NO$_2$ AND PM$_{2.5}$

Information provision

- Air pollution is linked to around 40,000 deaths in the UK every year.
- Two of the most dangerous pollutants are nitrogen dioxide (NO$_2$) and particulate matter (PM$_{2.5}$).

Statistics

- Research suggests that in 2019, PM$_{2.5}$ was responsible for more than 33,000 deaths in the UK, and nitrogen dioxide (NO$_2$) for 5,750.
- Impact on human life depends on the population of an area and how close people live to dangerous concentrations of NO$_2$ and PM$_{2.5}$.
- More remote areas tend to experience less deaths linked to air pollution than more built up areas, for instance areas of London.

INFORMATION PROVISION - NO$_2$ – NITROGEN DIOXIDE
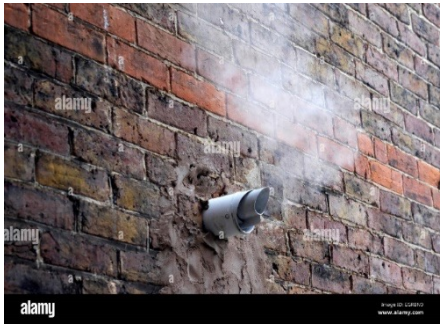

Fumes from combustion engine vehicles

Power stations

Gas Cooking

Gas heating

INFORMATION PROVISION - PM$_{2.5}$ – PARTICULATE MATTER

Gas heating

Gas cooking

Electric cooking

Fossil fuel power generation

Combustion engine vehicles

AFTER INFORMATION PROVISION - NO$_2$ AND PM$_{2.5}$

- Although all participants perceived air pollution negatively prior to the information, the majority of participants were still surprised (or even shocked) by the scale (i.e. approx. 40,000 deaths per year in UK).

- More than one participant likened the scale to the Covid-19 pandemic, noting the mobilisation of resources around that crisis.

- Many participants also expressed surprise or shock concerning sources of indoor air pollution (i.e. related to cooking).

- There was widespread consensus that this type of information should be communicated much more extensively to the wider public, and that participants wouldn't know where to go to access information about air quality.

- There was also widespread consensus that UK Government are not best placed actors to inform the public (significant lack of trust), with health professionals, the mayor or London and celebrities/influencers all cited as more suitable alternatives. More broadly, there was consensus around the notion of a "lack of leadership" in this space.