



UK Research
and Innovation



Developing IAQ Observatories

Cath Noakes
University of Leeds

TAPAS

Tackling air pollution at school



Breathing City

Future Urban Ventilation Network

Indoor Air Matters for Health

NEWS

Awaab Ishak: Widespread failings at mould death housing group

© 15 December 2022



The inside story: Health effects of indoor air quality on children and young people

Research & Evaluation team

RCPCH and Royal College of Physicians

Children in the UK spend more and more of their lives indoors, and the health impact of the air within our homes and schools must be taken seriously. This report is based on a systematic review of the science of indoor pollution, and conversations with children, young people and families. We make recommendations for Government and local authorities, and provide guidance for families.

NICE National Institute for Health and Care Excellence

Guidance ▾ Standards and indicators ▾ Life sciences ▾ British National Formulary (BNF) ▾

Home > [NICE Guidance](#) > [Health protection](#) > [Environment](#)

Indoor air quality at home

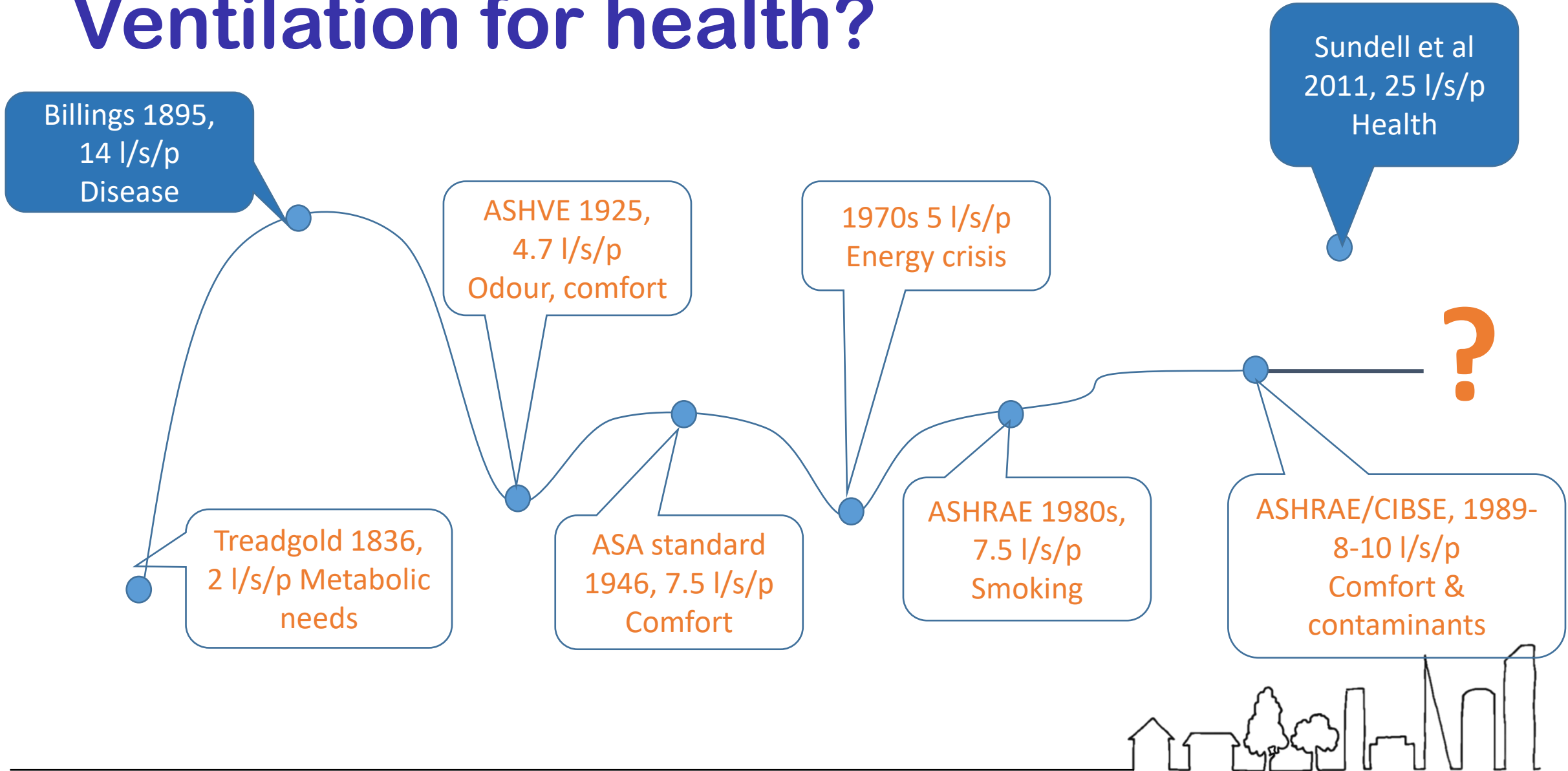
NICE guideline [NG149] Published: 08 January 2020



from 'The inside story'



Ventilation for health?



What do we know about buildings?

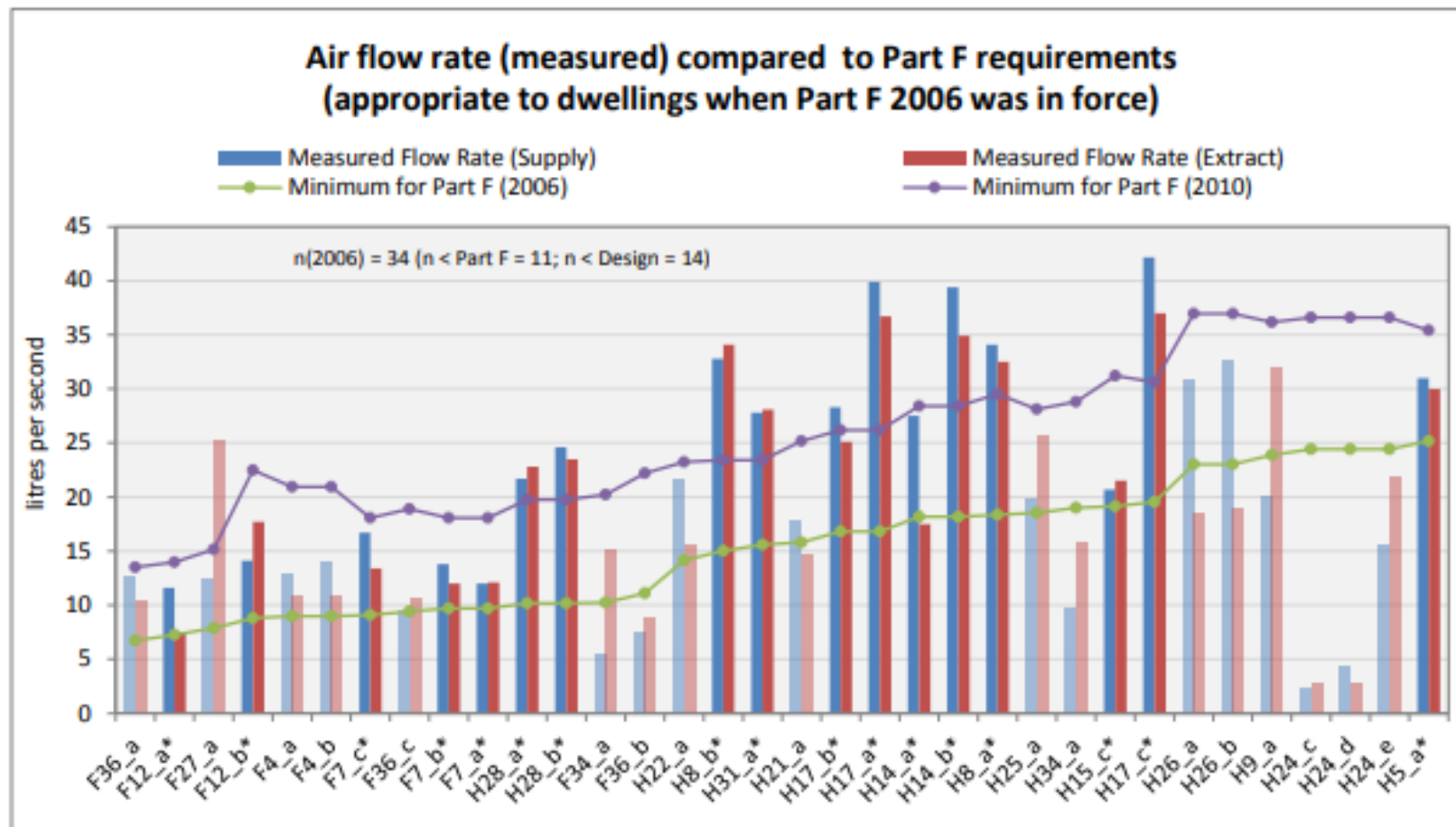
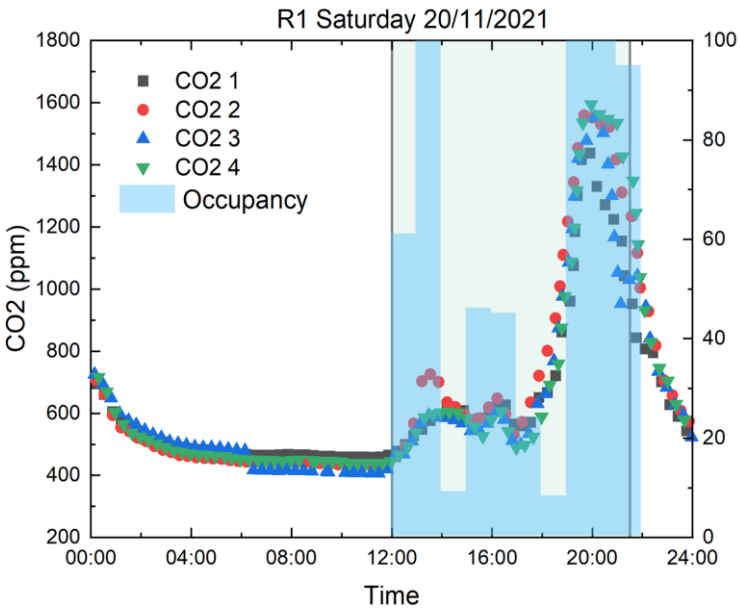


Figure 3.3a. Measured air flow rates compared to AD F (2006)
Bold bars denote Passivhaus dwellings.



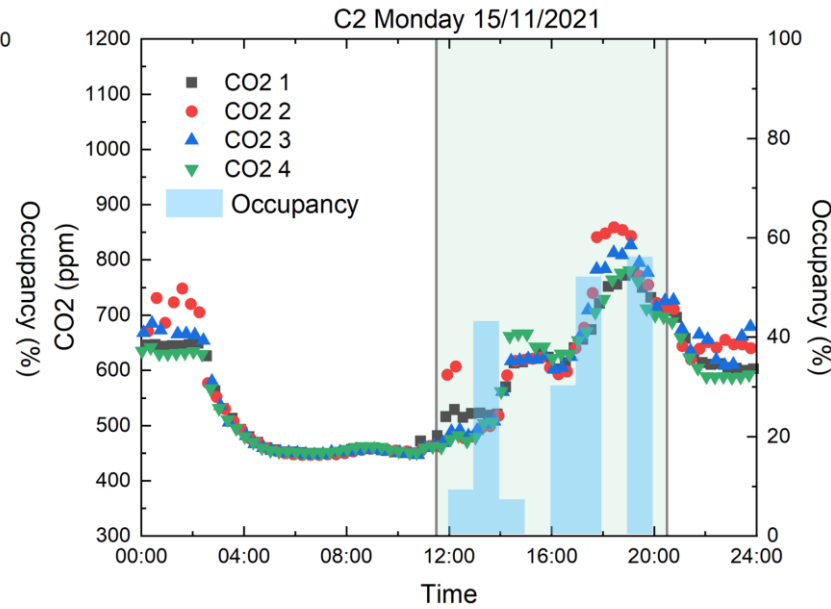
What do we know about buildings?

Investigating ventilation performance and the social and technical barriers to improvements in small scale hospitality.



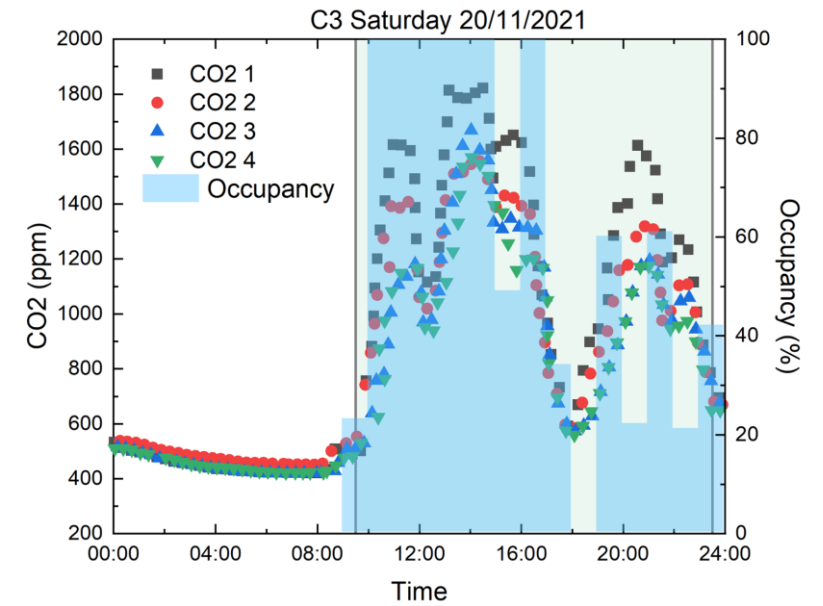
Mechanical ventilation system run by building owner

Business owner no responsibility for maintenance

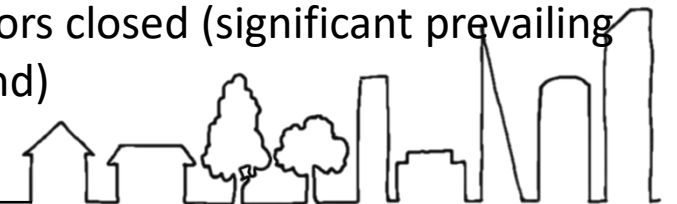


New Build, mechanical ventilation

Owner involved in refurbishment



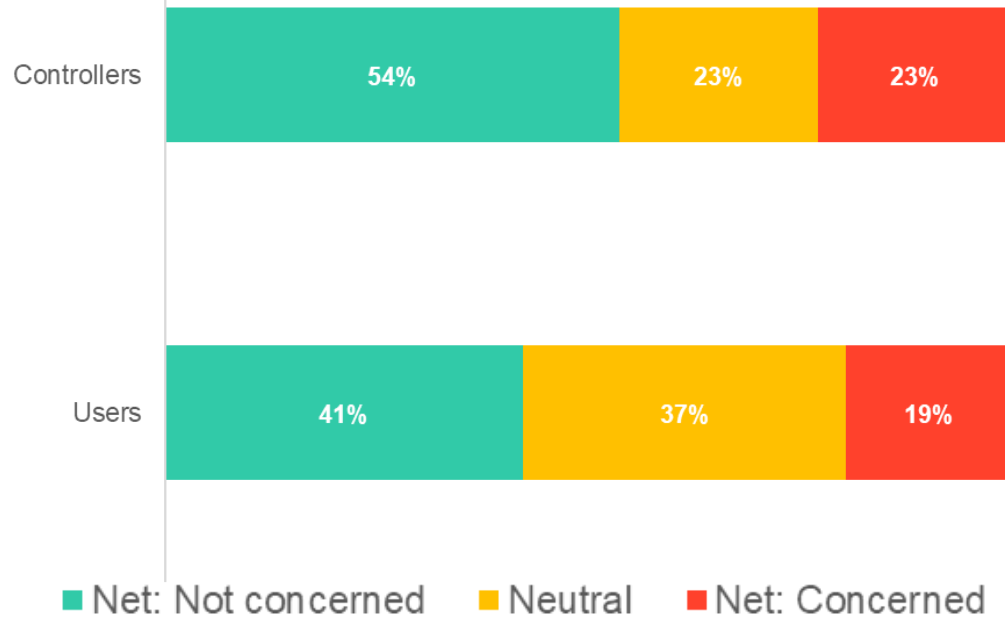
Sealed glazing
Some extract
Doors closed (significant prevailing wind)



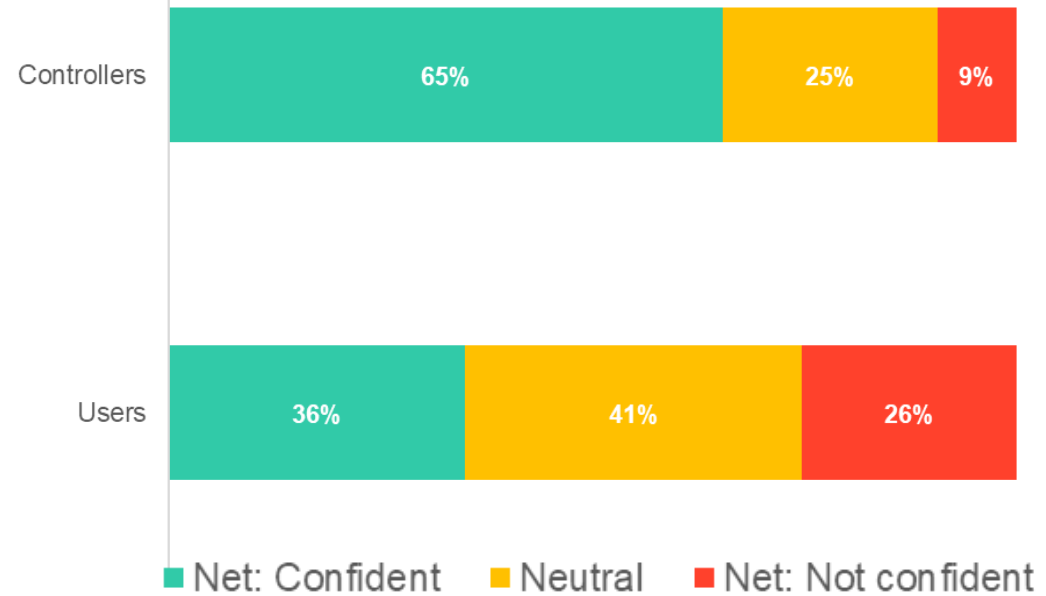
What do we know about buildings?

Controllers are both more concerned about ventilation at work, and more confident in their ability to effectively ventilate

How concerned are you that your building is well ventilated?



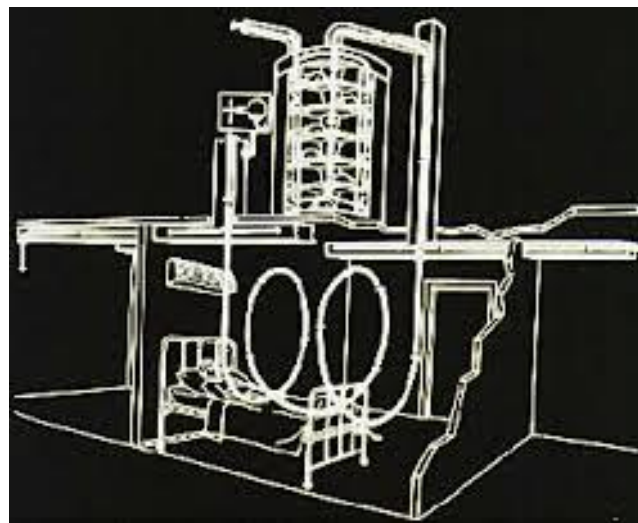
How confident are you that you can ventilated your building well?



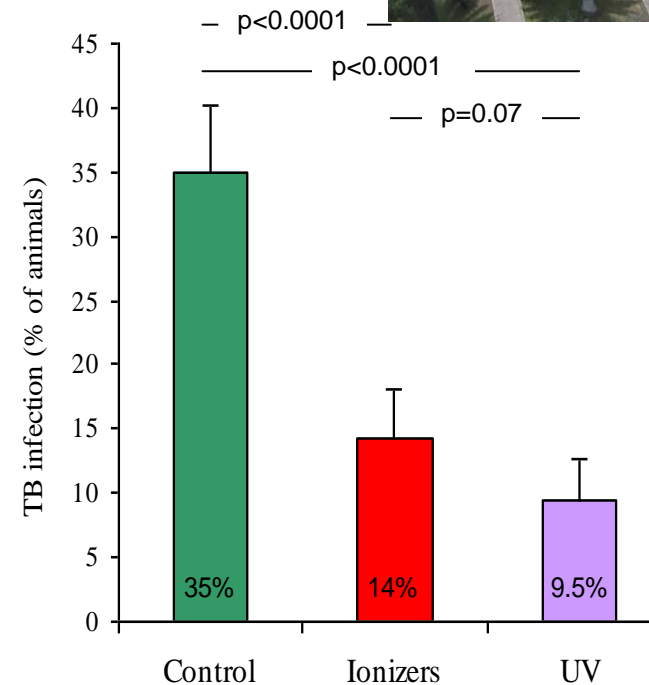
Evidencing health impacts



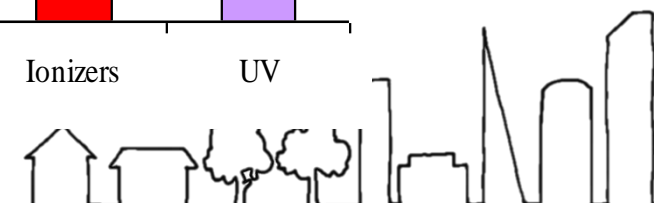
Wells et al, Measles,
1942



Riley & Wells, TB
Baltimore 1958-62



Escombe et al,
TB, 2009



Do air cleaners work?

Class-ACT study

- 30 primary schools in Bradford – over 330 classrooms
- Control group, filter unit group, active air UVC group
- Remote measuring IAQ parameters (T, RH, CO₂, PM) in every room
- Measuring illness absence
- Evaluating practicalities of implementing and using air cleaners – behaviour matters



Gaps in IAQ data

Constrained by resources and capacity in projects + technology

- Short duration data – specific research studies over short periods rather than longitudinal data
- Small data sets that are geographically constrained
- Data tends to be in homes and public buildings – lacking entirely on some settings
- Data often limited to baseline ventilation/thermal parameters – what else is happening?
- Very limited collation of data/consistency of measurement nationally or internationally



Why an observatory?

- Long term IAQ data is essential to understand health impacts, climate impacts and support future policy on urban and building design
- Growth of IAQ sensors mean that long term measurement in multiple settings is now feasible

Could national (or Europe wide) IAQ Observatories collect long term, time-varying data in 1000's of buildings and be a key resource to enable linkage to health, environmental and demographic data?



What could it look like?

Work collaboratively with multiple stakeholders in order to:

- Collect data from participatory buildings across multiple sectors
- Deliver data to researchers, policy, practice via a central portal
- Provide collated information to support:
 - direct evidence to policy makers on temporal performance of buildings
 - design, management and compliance of healthy buildings
- Provide underpinning data to support a raft of other research studies – energy/climate, pollution, interventions, epi studies
- Collaborate with outdoor AQ observatories to link indoor and outdoor data



Potential approaches

Long duration widespread monitoring

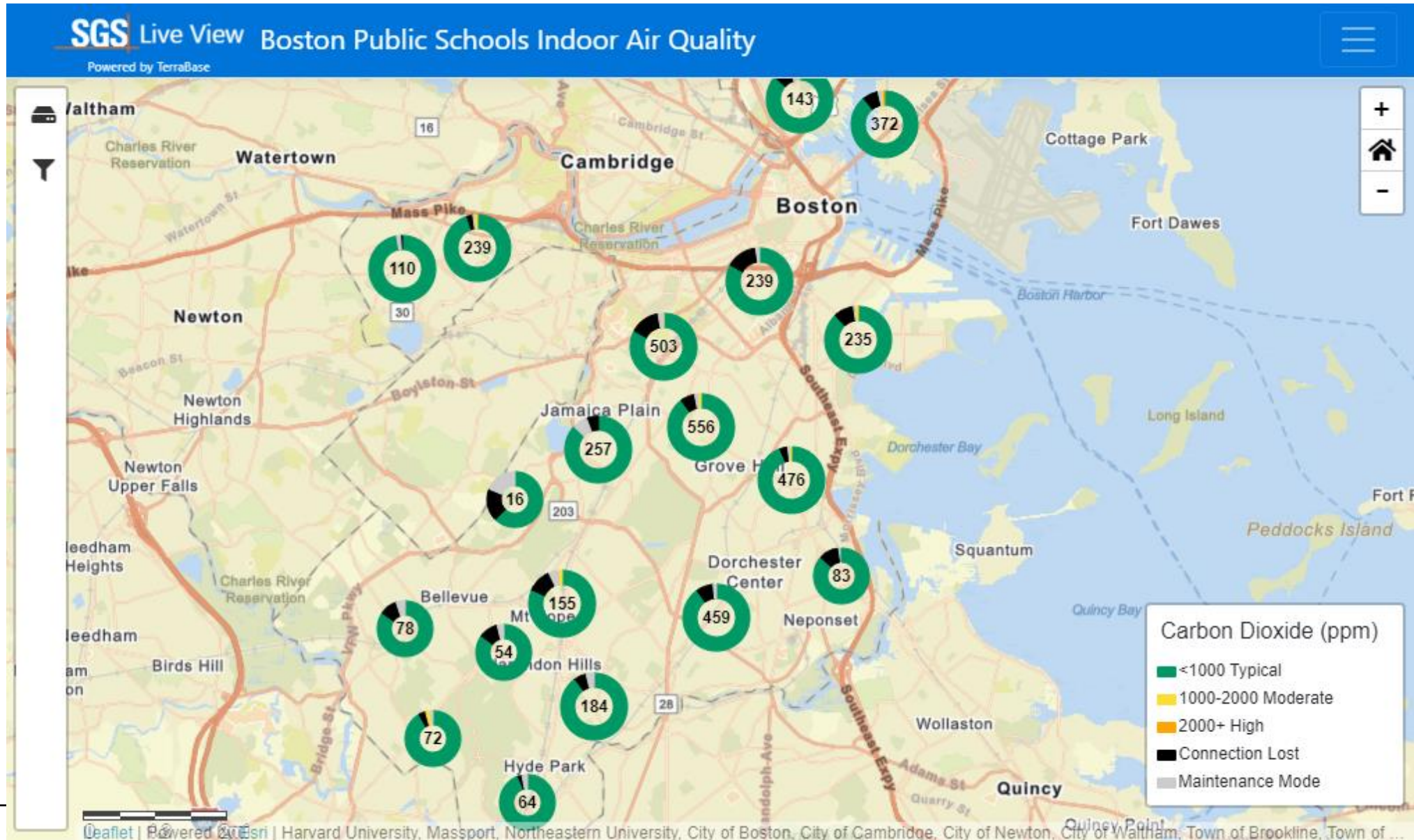
- Set of buildings committed for a long period
- Core data collected over time supplemented by shorter duration sampling
- Distributed geographically and by building type

Targeted campaigns

- Focused on sub-set of buildings, locations and pollutants
- Could be more readily aligned to health studies
- Build more detailed sampling on top of a larger data set



Visualising with real-time sensors



Exploring detailed exposures

CAMPAGNE NATIONALE ÉCOLES DE L'OQAI EN BREF

 301 écoles enquêtées

De 2013 à 2017

Dans 245 communes
de 31 départements

Représentatives des + de 50 000
écoles françaises de métropole

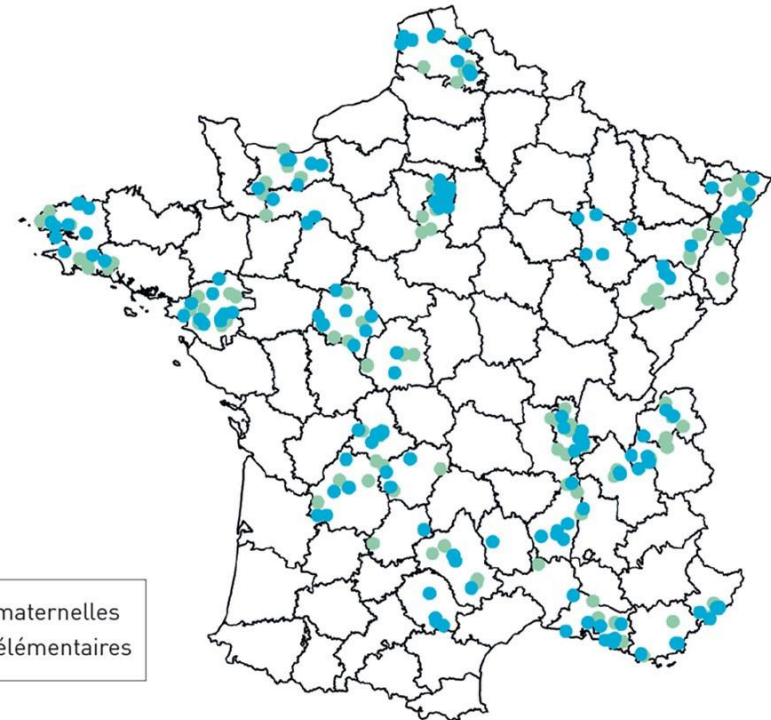
Et aussi des mesures du confinement, du bruit, de l'éclairage et des champs
électromagnétiques

> 200 000 000 de données collectées

 71 polluants recherchés

Dont

- 13 composés organiques volatils
- 3 aldéhydes
- 46 composés organiques semi-volatils



Observatoire de la qualité de
l'air intérieur



Steps towards defining an observatory

Paris, April 2022 – learning from the French experience



Developing the future of indoor air quality observatories for healthy buildings in a net zero world

London, Sept 2022 – IAQ monitoring for building performance and health

May 2023 – facilitated stakeholder meeting



Principles from Stakeholders

- **Large scale** : beyond a normal research study – at least 10 years
- **Action focused**: driven by questions that the data could answer
- **Challenge led**: Primary focus around health, climate/energy, building performance
- **Evidence for solutions**: Needs to support testing of interventions/solutions
- **Tackling inequalities**: Benefit to everyone but focus on disadvantaged groups to bring greatest societal benefits
- **Co-production**: essential part of design (could it include citizen science)
- **Participant benefits**: Data should inform the owners/people who use the space as well as more widely



Next steps



Stakeholder
mapping &
existing data



Parameters to
be measured



Data quality
and integration



Data analysis
and visualisation



Public
engagement



Legal aspects
around IAQ data



We want your feedback

Indoor Air Quality Observatory



<https://forms.office.com/e/smrz7cmPKu>

