



## Clean Air Programme

### Data Science in Air Quality and Health Research Workshop

### 16<sup>th</sup> & 17<sup>th</sup> September 2021

#### Some issues raised/suggestions to move the field forward

1. Construct a library of datasets. Signpost datasets as part of the SPF programme to help guide researchers to resources. This will be curated and maintained. We currently have gathered together an extensive list of databases from the data workshop preparation and framework activities.
2. Consideration of data protection especially health data. Adopting a tiered approach of different levels of protection but all linked would facilitate and encourage access/use. (Trusted sites - TRES). Developing this work with health data experts (HDR UK, CPRD). Require better integration of data (i.e. spatial models, personal and hyperlocalised exposures, mixture effects, diversity issues etc.)
3. Traceability and extensive description of data is required to support use and good practice.
4. Create a small and ideally ongoing/long lasting fund for researchers to explore collaborations over atmospheric pollutant and health datasets.
5. Need for creating the right environments for interdisciplinary research and Team Science (<https://acmedsci.ac.uk/more/events/succeeding-in-team-science>). Need to build trust and common language between different science communities.
6. Important to consider indoor as well as outdoor exposures and role of social determinants of health in pollutant effects over the life course. Important to include behavioural scientists, and economists.
7. Greater appreciation and understanding of uncertainties in both air pollutant and health data and how to deal with these. Important to consider alignment, accuracy and uncertainty of data.
8. Long-term datasets are of particular value e.g. Biobank, Born in Bradford, ALSPAC for which outdoor air pollutant data is available but indoor not.
9. Indoor air pollution heavily influenced by activities and number of occupants in a building and therefore difficult to generalise but important that we develop this ability.
10. Personal exposures and hyper local monitoring require special consideration to understand more about exposures and responses to them. Low-cost sensors and real-time exposure and medical/physiological monitoring e.g. [https://www.researchgate.net/publication/348928436\\_DigitalExposome\\_Quantifying\\_the\\_Urban\\_Environment\\_Influence\\_on\\_Wellbeing\\_based\\_on\\_Real-Time\\_MultiSensor\\_Fusion\\_and\\_Deep\\_Belief\\_Network](https://www.researchgate.net/publication/348928436_DigitalExposome_Quantifying_the_Urban_Environment_Influence_on_Wellbeing_based_on_Real-Time_MultiSensor_Fusion_and_Deep_Belief_Network)
11. Importance of Regional databases and local air pollutant modelling. Also, weather and humidity important.
12. Important to link with other projects that are building environment/health links e.g. *Data Assimilation for the REsilient City* (DARE - a research project and network funded by an EPSRC Senior Fellowship in Digital Technology for Living with Environmental Change; <https://research.reading.ac.uk/dare/>) and ONS SPRINT (<https://digitalblog.ons.gov.uk/2017/12/15/finding-data-by-location-my-first-design-sprint/>) as well as data SPF, AI and Data Science for Engineering, Health, and Government - Strategic



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<https://gow.epsrc.ukri.org/NGBOViewGrant.aspx?GrantRef=EP/W006022/1>.

13. Encourage interfacing increasingly “granular” air pollution models (street level) with health (post code) data.
14. Biological pollutants are important in health (e.g. pollen and fungal fragments, microorganisms etc). Combined impacts of biological and chemical (Air Quality) is an area that needs more attention.
15. Greater speciation of chemical pollutants in particles from different sources and at different times of the year e.g.  
<https://nerc.ukri.org/research/funded/programmes/cleanair/news/obs-periods/>
16. Is there a greater role for citizen science?
17. We need to plan for the future state of air quality in both our monitoring and modelling e.g. lower quantities may require new instruments; integrated indoor/outdoor requires linked modelling, etc.
18. To learn what the different sector data requirements are to enable improved collaborative work under the Clean Air Programme; ○ Access – what are the current problems and barriers? How can we enable better access? How much data? What format is required?
19. What data is currently being used (for us) especially by the Health Impacts sector?
20. To learn how different institutions/sectors will use this data; ○ Not enough to learn what data is required – must understand how they will use this data.
21. Forum for shared experiences regarding access and use of data.
22. Gather enough information to write a post workshop report plus an informative paper with possible suggestions for improving data access.
23. Would be good to have a more focussed look at health impact studies:
  - Data confidentiality as a barrier;
  - Data required to perform population weighted analyses;
  - Data for long term chronic effects at a large population level as well as acute responses to poor air quality – i.e. as relating to specific air quality events;
  - What sort of pollution data is required and at what spatial and temporal resolution?
24. Specific questions for other sectors:
  - Academia
    - Air Quality researchers what do they ideally need from emissions, meteorology etc;
    - Health impacts researchers – chronic and acute impacts
  - Policy ○ What analysed data would be most helpful at a national and local scale to aid policy development?
  - Consultancies ○ What is required to make the development of an environmental impact assessment for the atmosphere (atmospheric impacts assessment)? What is required and in what form?
  - Charities ○ What analysed data /information is required by their members? What form should that data and information take? ○ How should this be visualised?