Estimating the impact of urban environmental exposures on trajectories of child and adolescent mental health

Supervisory team

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Project in Summary

The significance of the quality of the outdoor environment for protecting and promoting public health is increasingly acknowledged. However, the evidence base for many pollutants is lacking, limiting the development of policies and guidelines to inform mitigation efforts that would translate into major, long-term public health gains. The recent House of Lords Science and Technology inquiry identified environmental noise as a 'neglected pollutant and has called for research to inform understanding of effects and to aid the government set targets for regulation.

This project offers the opportunity to model a range of environmental exposures, including noise exposure, in children's school, home and neighbourhood environments to assess their effect on children's and young people's mental health and wellbeing.

The project will examine the extent to which exposure to environmental noise (road traffic, railway, aircraft) in different settings influences the onset and development of poorer mental health and wellbeing. The project will examine how urban design, urban regeneration, and other features of the neighbourhood (e.g., fast food provision, access to greenspace, air pollution) also influence mental health and wellbeing.

This project will examine these issues using two data resources, affording a range of opportunities to examine different age groups, exposures, and outcomes:

1. The NIHR funded ORiEL study (Olympic Regeneration in East London) of 2254 adolescents from 25 schools in East London.
2. The CLEVER (Cohort for research into Living EnVironments and hEalth in children) ADRUK-funded e-cohort of 11 million children in England.

The project will focus on the quantification of effects to inform environmental and health impact assessment and planning processes for urban design, providing evidence to inform UK policy and guidance for children's and young peoples' environments to promote wellbeing and health. The candidate will work in an internationally leading population health and environmental science team, with a reputation for innovating and undertaking policy

relevant research applying social, health and environmental science to the problem of noise effects on health and communities. The project will include a secondment with UK government to further enhance and develop impact and policy skills, and benefit from the teams existing national and international network.

Project Key Words

Noise; mental health; air pollution; urban design; green space

MRC LID Themes

Global Health = Yes
Health Data Science = Yes
Infectious Disease = No
Translational and Implementation Research = Yes

Skills

MRC Core Skills
Quantitative skills = Yes
Interdisciplinary skills = Yes
Whole organism physiology = No

Skills we expect a student to develop/acquire whilst pursuing this project
Mental Health and Environmental Epidemiology
Statistical Methods
Geographical Information Systems
Public Health and Environmental Health Policy

Routes

Which route/s is this project available for?
1+4 = Yes +4 = Yes

Possible Master's programme options identified by supervisory team for 1+4 applicants:

- LSHTM – MSc Epidemiology
- LSHTM – MSc Health Data Science
- LSHTM – MSc Public Health
- SGUL – MSc Global Health

Full-time/Part-time Study

Is this project available for full-time study? Yes
Is this project available for part-time study? Yes

Eligibility/Requirements

Particular prior educational requirements for a student undertaking this project
SGUL's standard institutional eligibility criteria for doctoral study.
We invite motivated students with an undergraduate degree (1st or 2.1) in Psychology; Geography; Environmental Science; Biomedical Science; Sociology; or allied subjects with a quantitative component to apply.

Candidates should preferably have a Master's degree in discipline with a significant quantitative component (Epidemiology, Social or Medical Statistics, Public Health, Population Health, Data Science, Economics, Quantitative Social Science or related). However, a 1+4 route is possible for those without a Masters.

Other useful information

Potential CASE conversion? = No

Project in more detail

Scientific description of this research project

Project objectives:
The significance of the quality of the external environment for protecting and promoting public health across the lifecourse is increasingly acknowledged. However, the effects of many pervasive environmental exposures (e.g., environmental noise; access to open space and greenspace; housing quality; neighbourhood amenity; access to fast food;) have been poorly quantified, in comparison to air pollutants, despite the potential for chronic exposure to these factors to influence health via psychosocial stress, poor diet, and poor sleep. This limits the development of policy and urban design to support population health.

The 2023 House of Lords Science and Technology Committee 'The Neglected Pollutants' highlights the lack of evidence for the effects of environmental noise for different noise sources (e.g., road, rail, aircraft), for different settings (e.g., home, school, neighbourhood), for day and night-time exposure, and for different mental health and wellbeing outcomes. A similar critique can be put forward for many other environmental exposures. Longitudinal studies are needed to inform UK policy, guidance and health impact assessment to protect public health.

This project will examine these issues using two data resources:

1. The NIHR funded ORiEL study (Olympic Regeneration in East London) of 2254 adolescentsfrom 25 schools in East London.
2. The CLEVER (Cohort for research into Living EnVironments and hEalth in children) an ADRUK funded electronic cohort up to 11 million children generated using linked administrative data

This project will combine environmental modelling using these data resources, with policy relevant epidemiological analyses estimating the effects of environmental exposures in home, school and neighbourhood environments during the day and night on the incidence and trajectories for mental ill-health and poor wellbeing.

This project will model environmental noise exposures for the adolescent participants of the ORiEL study and there will be opportunities to model further environmental exposures, as well as to link or model further features of the urban environment or changes associated with the Olympics for the ORiEL study. The project will benefit from the supervisor's (Gulliver) leadership of the environmental exposure modelling for the ongoing MRC funded Longitudinal Linkage Collaboration, which has estimated a range of exposures (noise, air pollution, green space) using a common data standard in 24 UK cohorts. This state-of-the-art modelling will inform the approach to modelling and range of environmental exposures examined and addresses residential mobility in the datasets. Multilevel statistical analyses will examine the associations between environmental exposures on mental health and wellbeing, and their trajectories, with adjustment for known confounding factors. Implications of the findings for UK policy, guidance and health impact assessment will be developed alongside Defra and UKHSA, including a secondment, and disseminated.

Techniques to be used:

- Epidemiology
- Statistics and Data Analysis

- Environmental modelling
- Geographical Information Systems
- Methods for missing data (multiple imputation)
- Environmental and Health Impact Assessment
- Policy development

Availability of databases or specialist materials:

- ORiEL longitudinal adolescent database (3 phases 2011-2015)
- Geographical Information Systems
- High quality, validated models for noise exposure, air pollutants, open space/green space
- Environmental Noise Directive datasets
- CLEVER e-cohort (available from mid-2024; cohort from 2006-2020)

Potential risks to the project and plans for their mitigation:
Ethical and consent issues associated with use of geographical/environmental linked data in the cohorts. Overall, the risk in terms of being able to conduct the environmental modelling and the availability of the required environmental data is low. The project benefits from the leading MRC LLC environmental modelling methods. Whilst the scale of linkage to individual administrative data sources depends on the completeness of these sources, the relevant participant consents and other permissions, Standard Operating Procedures already developed for existing UK studies are in place to manage the risk of using this type of personal data to derive environmental exposures.

Further reading

(Relevant preprints and/or open access articles)

Additional information from the supervisory team

The supervisory team has provided a recording for prospective applicants who are interested in their project. This recording should be watched before any discussions begin with the supervisory team.
Clark-Cummins-Gulliver Recording

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