LifeCycle Proposal Submission form

Proposal #	
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Cohort(s)	All
WP lead	Anne-Marie Nybo Andersen (WP1), Martine Vrijheid (WP3)
Date	18th August 2020
Title of project	Maternal exposure to urban environmental stressors and depression in the postnatal period
Short title (4-5 words)	Environment and postnatal depression
Brief description of project (<100 words)	Maternal postnatal depression is estimated to affect 6 – 38% of women in high income countries. Not only is it by nature distressing, it is also a risk factor for later child mental health problems. It is vital therefore to identify potentially modifiable risk factors to inform policy and interventions. With an ever-increasing proportion of EU citizens living in cities, increasing attention is turning to the role of urban environmental stressors in mental health. Whilst there is growing research into the effect of these exposures on child mental health, to our knowledge very few studies have investigated their association with maternal post-natal depression. These stressors could impact maternal mental health through biological routes (e.g. neurotoxic effects of air pollution), or as psychosocial stressors (e.g. disrupted sleep due to noise, annoyance, and limited natural spaces to relax, exercise and socialise) Our objective is to use data from nine cohorts within the EUCCN to study associations between exposure to urban environmental stressors in the perinatal period and maternal postnatal depression. Single and joint

	effects of ambient air pollution, road traffic noise and natural space will be studied along with interactions between these stressors and socioeconomic position. This project will generate new data needed to inform EU policy aiming to improve maternal and child mental health.
Statistical analyses	**Eligibility** Analysis will be restricted to singleton pregnancies of women giving birth to liveborn children. The following nine cohorts will be invited to participate as they have data on environmental exposures and maternal postnatal depression: ALSPAC, BiB, DNBC, EDEN, GenR, INMA, NINFEA, MoBa and RHEA. **Exposures** (1) Ambient air pollution with nitrogen dioxide (NO_2) and the inhalable fraction of particulate matter (PM2.5); (2) Noise from road traffic averaged over the day, evening and night (Lden) (3) Natural spaces captured by Normalized Difference Vegetation Index (NDVI) and distance to nearest green and blue spaces >5000m2. Three periods of exposure have been identified a priori: (i) prenatal (LMP to birth), (ii) postnatal (birth to child age 12 months) and (iii) perinatal (both pre and postnatal). **Outcomes** Binary variable indicating the presence of postnatal depression based on questionnaire and/or linked registry data. **Covariates** Whilst many variables are associated with postnatal depression, few are also associated with exposure to environmental stressors. We will adjust for maternal socioeconomic position (SEP) as indicated by maternal education, area-specific SEP, and parity. We will also adjust for other covariates that are not on the pathway

between urban stressors and postnatal depression.

Analysis

Logistic regression will be used to estimate separate and combined associations between the three environmental exposures (noise, air pollution and natural spaces) at each time point and maternal postnatal depression. We will additionally test for effect modification by SEP by comparing the fit of nested models with and without interactions terms. Analyses will be conducted using the "ds.glm" and "ds.glmSLMA" functions in DataSHIELD. Cross-cohort analysis will be performed by individual participant data (IPD) meta-analysis with study-level meta-analysis (SLMA) used as a sensitivity analysis.

Analyses via DataSHIELD	Yes. All required functionality already implemented in DataSHIELD
New harmonised data needed	No
If yes, detail variables to be harmonised	
Are there external cohorts involved?	No
Additional comments	This project proposal is part of a LifeCycle fellowship application for Tim to spend six months in Copenhagen, submitted in the August 2020 call.