**INMA data access request form**

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| **Proposal #** |  |
| **Proposed by** | Tim Cadman ([t.cadman@bristol.ac.uk](mailto:t.cadman@bristol.ac.uk)), Marie Pedersen ([mp@sund.ku.dk](mailto:mp@sund.ku.dk)), Katrine Strandberg-Larsen ([ksla@sund.ku.dk](mailto:ksla@sund.ku.dk)), Deborah Lawlor ([d.a.lawlor@bristol.ac.uk](mailto:d.a.lawlor@bristol.ac.uk)); |
| **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 (NO2) 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 GHQ-12 measured at 12-14 in INMA-Sabadell & INMA-Gipuzkoa. Based on previous research (see below) a cut-off of greater than or equal to 5 should be used to derive the binary variable.  **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** | Yes |
| **If yes, detail variables to be harmonised** | Postnatal depression (ppd) is a core LifeCycle variable, but it has not been harmonised within INMA as data was not available within the 1st year of life (the timescale specified in the harmonisation manual). However, two INMA cohorts do have maternal mental health measured using the GHQ-12 at 12-14 months (INMA-Sabadell & INMA-Gipuzkoa). Whilst falling slightly outside the target period, we still believe it is of scientific interest to examine the effects of environmental stressors on maternal mental health at this timepoint. Other cohorts included in this study have defined PPD using a range of measures and timings, and we will explore the impact of these differences in sensitivity analyses.  Based on the below study, we propose that a GHQ-12 cut-off of **equal or greater than** **5** be used as an indication of caseness for depression:  Navarro 2007 - Postnatal psychiatric morbidity: a validation study of the GHQ-12and the EPDS as screening tools |
| **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. |
| **List of variables** | |  |  |  | | --- | --- | --- | | **Variable name** | **Table** | **Description** | | agebirth\_m\_y | core non-repeated | Maternal age at birth | | birth\_month | core non-repeated | Birth month | | blue\_dist\_preg, | core non-repeated | Distance to blue space | | breastfed\_any | core non-repeated | Any breastfeeding | | breastfed\_ever | core non-repeated | Ever breastfed | | child\_id | core non-repeated | Child identifier | | child\_no | core non-repeated | Child birth order | | cohab\_0 | core non-repeated | Do parents cohabit? | | cohab\_1 | core non-repeated | Do parents cohabit? | | cohort\_country | core non-repeated | Cohort country | | cohort\_id | core non-repeated | Cohort identifier | | con\_anomalies | core non-repeated | Congenital abnormalities | | ethn1\_m | core non-repeated | Ethnicity | | ethn2\_m | core non-repeated | Ethnicity | | ethn3\_m | core non-repeated | Ethnicity | | eusilc\_income | core non-repeated | Income | | eusilc\_income\_quintiles | core non-repeated | Income | | green\_dist\_preg, | core non-repeated | Distance to green space | | lden\_preg | core non-repeated | Traffic noise | | mother\_id | core non-repeated | Mother identifier | | ndvi300\_preg | core non-repeated | NDVI | | no2\_preg, | core non-repeated | N02 | | outcome | core non-repeated | Birth outcome | | parity\_m | core non-repeated | Parity | | pm25\_preg | core non-repeated | PM2.5 air pollution | | pnd | core non-repeated | Postnatal depression | | preg\_alc | core non-repeated | Alcohol in pregnancy | | preg\_alc\_unit | core non-repeated | Units of alcohol | | preg\_cig | core non-repeated | Number of cigarettes smoked in pregnancy | | preg\_dia | core non-repeated | Diabetes in pregnancy | | preg\_ht | core non-repeated | Hypertension in pregnancy | | preg\_no | core non-repeated | Pregnancy number | | preg\_smk | core non-repeated | Smoking in pregnancy | | sex | core non-repeated | Child sex | | ga\_bj | core non-repeated | Gestational age | | prepreg\_dep | core non-repeated | Prior maternal depression | | age\_months | core yearly repeated | Child age in months | | age\_years | core yearly repeated | Child age in years | | age\_years | core yearly repeated | Child age in years | | areases\_quint\_ | core yearly repeated | Area socioeconomic status | | areases\_tert\_ | core yearly repeated | Area socioeconomic status | | blue\_dist\_ | core yearly repeated | Distance to blue space | | child\_id | core yearly repeated | Child identifier | | edu\_m\_ | core yearly repeated | Maternal education | | fam\_split\_up\_ | core yearly repeated | Family split up | | green\_dist\_ | core yearly repeated | Distance to green spaces | | lden\_ | core yearly repeated | Road traffic noise | | ndvi300\_ | core yearly repeated | NDVI | | no2\_ | core yearly repeated | N02 | | pm25\_ | core yearly repeated | PM2.5 | |
| **List of papers (max. 2 papers)** | Maternal exposure to urban environmental stressors and depression in the postnatal period: A multi cohort study using the EU Child Cohort Network |
| **INMA authorship for each paper**  **(Please give details on authorship policy)** | At least two authors from each INMA cohort will be invited to be co-authors |
| **Overlap with INMA ongoing proposals** | We reviewed that there is no overlap with ongoing INMA Joint proposals (SFB). |