

ENvironmental health Risks In European birth COHORTS (ENRIECO) 2009-2011 – Executive Summary with the Final Project Report

Technical Details

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Website : www.enrieco.org
Cohort Inventory : www.birthcohortsenrieco.net

Introduction

The objective of the EC funded ENRIECO project was to advance our knowledge on specific environment and health causal relationships in European pregnancy and birth cohorts by providing support to exploitation of the wealth of data generated by past or ongoing studies funded by the EC and national programmes. Specific objectives were to make inventories of birth cohorts, assure quality and interoperability of exposure, health and exposure-response data, obtain data access, build databases, conduct analysis, make recommendations for data collection in the future to improve environment-health linkages and information, and disseminate the information. To achieve the aims and objectives the work was divided into five scientific work packages (WP1 - Inventory of birth cohorts; WP2 – Evaluation of health outcomes; WP3 – Evaluation of health outcomes; WP4 – Evaluation of exposure-response relationships; WP5 – Database building), subdivided into 27 topical working groups. WP6 focussed on the publication and dissemination of project information, while the overall management was overseen by WP7.

Findings

There are more than 35 birth cohorts in Europe, studying more than 350,000 mother-child pairs that have data that can be used to examine associations between chemical, physical and biological environmental exposures and child health. The cohorts are situated in 19 European countries, principally in Northern and Western Europe, with fewer cohorts in Southern and Eastern Europe. Twenty-four of the cohorts defined themselves as regionally-based studies, while the rest defined themselves as nationally-based or hospital-based. Two studies, the Danish National Birth Cohort (DNBC) and the Norwegian Mother and Babies study (MoBa) have recruited more than 100,000 mother-child pairs each. Ten studies have recruited between 5,000 and 20,000 pairs, and 18 between 1,000 and 5,000. The rest are cohorts of less than 1,000 subjects.

In many of cohorts (n=18) children are now aged between 5-10 years, in 12 cohorts children are over 10 years old, and in 5 cohorts the children are less than 5 years old. Most of the cohorts started recruitment of mothers during pregnancy (n=22); the rest start at birth. Most cohorts have multiple follow-up points after birth, and the majority has follow-up points in each of the following relevant child age periods: 1-6 months, 6 to 18 months, 18 months to 5 years, 5 to 10 years, over 10 years. Health outcomes that have generally been investigated in the birth cohorts and were also evaluated in the ENRIECO study are a) pregnancy-related outcomes, b) childhood allergies and asthma, c) neurodevelopment and cognitive function, d) cancer and e) child growth, metabolic and endocrine disorders.

All cohorts collect some information on second hand tobacco smoke exposure and many cohorts assessed occupational exposures of the parent(s) (n=32), exposure to allergens and biological organisms (n=26) and outdoor air pollution (n=26). Assessment of exposure to water contaminants (n=12), metals (n=19), pesticides (n=18), persistent organic pollutants (n=17), noise (n=14), and radiations (n=12) is limited to fewer cohorts.

Exposure information was generally available for the vast majority of the study participants if exposure is assessed by means of exposure modeling, questionnaires, routinely collected data or a combination of these. Biomonitoring was sometimes performed in addition (e.g. for assessment of exposure to water contaminants, smoking and second hand tobacco smoke exposure) usually for a small subset of the study population for validation purposes. For other exposures such as pesticides, persistent organic pollutants, phthalates and phenols (incl Bisphenol A), where exposure assessment largely relied on biomonitoring, the situation was different. Most of the smaller cohorts with roughly up to 1,300 participants tried to measure at least some of the biomarkers in the whole cohort, whereas the larger cohorts performed biomonitoring in subpopulations

General Conclusions

- There are many pregnancy and birth cohorts in Europe with information on environmental exposures and health outcomes.
- The sizes of the cohorts vary considerably. In the context of the project, it should be noted, however, that studies of environmental contaminant exposures, specially those measuring exposure biomarkers, can generally not cover large numbers of subjects, but can still make an important contribution.
- There is fairly good cover of Europe, except Eastern Europe
- There is considerable expertise and experience associated with the cohorts.

- The cohorts have provided important environmental exposure, health and environmental exposure-response data
- The amount and detail of information provided by cohorts on environment and health differs considerably
- Cohorts tend to report individually, but recent initiatives have tried to combine data from various cohorts to increase study power
- Existing European birth and mother-child cohorts provide a real potential for combined analyses on pregnancy-related outcomes and child health outcomes in relation to environmental exposures. Key health outcomes that could be used for further analyses include time to pregnancy, birth weight, preterm births, wheeze or asthma and allergy (using e.g. ISAAC-based questionnaires), postnatal changes in body mass index, waist circumference, occurrence of obesity. Additionally, specific congenital malformations, stillbirth, neurodevelopment, attention deficit/hyperactivity disorders and onset of puberty are worth considering, but the degree of harmonization between cohorts is more limited.
- Combining information from different cohorts appears to be beneficial and increase the value of the cohorts and resulting information
- Combining data from various cohorts requires careful consideration of the aims, protocols, data, ethical issues, analyses and management, and it is time and labour intensive but potential fruitful
- There are currently limited resources to combine existing studies/data. Exposure aspects that need further study are standardization, validity of exposure assessment, timing of exposure assessment, time-activity pattern, exposure at non-residential addresses and residential mobility (noise, water air pesticides).
- Follow up of existing cohorts is essential to determine health effects in later life of pre natal and early childhood exposure, for which there is some but not conclusive evidence
- New pregnancy and birth cohorts are needed to evaluate any potential health effects of new environmental exposures, or existing environmental exposures under new conditions
- Greater and more efficient use needs to be made of the existing cohort data at the European level to:
 - *Provide speedy response to key policy questions
 - *Provide speedy response to concerns about “new” environmental exposures
 - *Improve understanding of geographical and cultural inequalities in disease, exposure, and health related behaviours
 - *Replicate findings with important public health implications in different settings
 - *Link with routinely collected environmental and health data
 - *Improve methodological approaches, including validated exposure assessment tools, protocols of biological and environmental sample collection and analysis.
 - *Improve statistical power through combined analyses

The full evaluation report and inventory of ENRIECO cohorts is publicly available through the ENRIECO website: www.enrieco.org.