Environmental Health Risks in European Birth Cohorts (ENRIECO)

ERA-ENVHEALTH Project Workshop, The Hague, NL
15 September 2010

CREAL⁹
centre for research
in environmental
epidemiology

SEVENTH FRAMEWORK
PROGRAMME

ENRIECO

Programme information:

<u>SEVENTH FRAMEWORK PROGRAMME THEME 6 - ENVIRONMENT (INCLUDING CLIMATE CHANGE)</u>

Grant agreement for: Coordination and support action (Coordinating)

1 March 2009-28 February 2011

Grant agreement no: 226285

Project co-ordinator: Mark J Nieuwenhuijsen (CREAL, Barcelona)

EC project officer: Tomas Turecki

www.enrieco.org

ENRIECO

Background:

There are **many pregnancy and birth cohorts in Europe**, with sample sizes ranging from a few hundred to tens of thousands.

These cohorts are currently collecting a wealth of information on environmental exposures and child health outcomes, but data are often of fragmented nature and there is relatively **little coordination to structure and consolidate scattered research.**
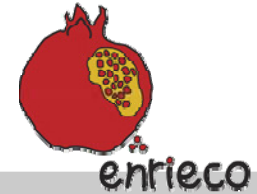
ENRIECO

Aim:

To advance our knowledge on specific environment and health causal relationships in pregnancy and birth cohorts by **providing support to exploitation of past or ongoing studies.**

Objectives:

• Make **inventories** of birth cohorts: health data, environmental exposure data, biological samples, environmental exposure response functions, expertise, access

• **Evaluate** exposure, health and exposure-response data

• Attempt to **combine** data from various cohorts

• Make **recommendations**

Work Packages

WP1. Inventory of birth cohorts
   WP leader: Martine Vrijheid

WP2. Evaluation of exposures
   WP leader: Bert Brunekreef

WP3. Evaluation of health outcomes
   WP leader: Remy Slama

WP4. Evaluation of exposure-response relationship
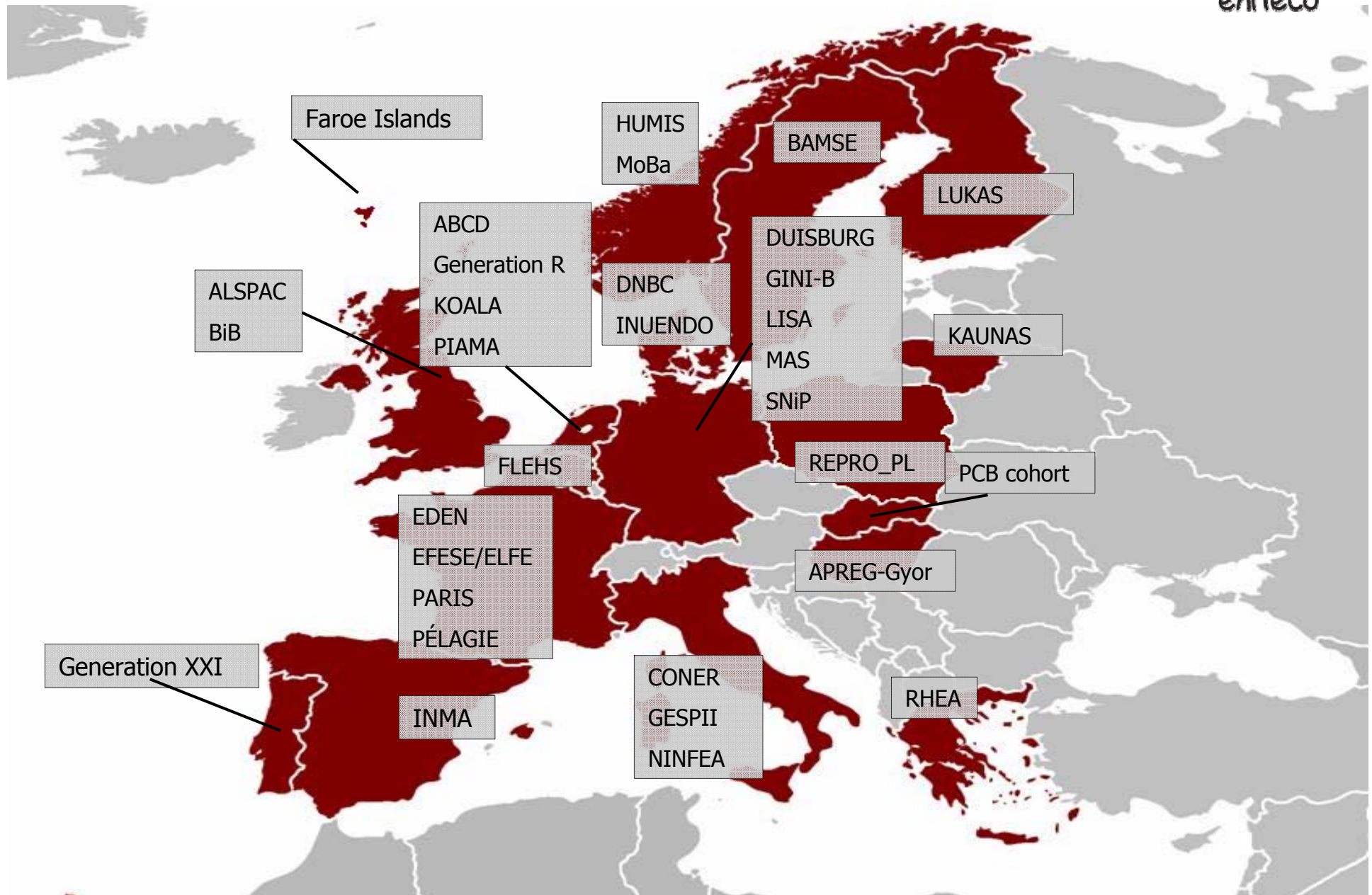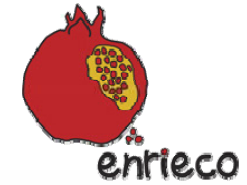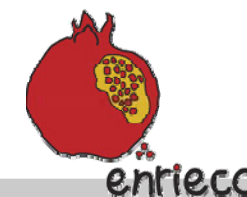   WP leader: Joachim Heinrich

WP5. Database building
   WP leader: Thomas Keil

WP6. Dissemination
   WP leader: Manolis Kogevinas

Birth Cohorts List

Cohort	Country	Start of enrolment	N participants
1. Aarhus Birth Cohort	Denmark	1990-ongoing	90000
2. ABCD	Netherlands	2003-2004	7863
3. ALSPAC	UK	1991-1992	14062
4. APREG	Hungary	2000-2006	2800
5. BAMSE	Sweden	1994-1996	4089
6. BiB	UK	2007-2010	13000
7. Cohort Faroe Islands			
Cohort I	Faroe Islands	1986-1987	1022
Cohort II		1994-1995	182
Cohort III		1997-2000	656
Cohort V		2007-2009	491
8. CONER	Italy	2004-2005	654
9. DNBC	Denmark	1996 - 2002	96986
10. Duisburg	Germany	2000-2001	234
11. EDEN	France	2003-2006	1873
12. EFESE/ELFE	France	2011-2012	20000
13. FLEHS	Belgium	2002-2004	1196
14. Generation R	Netherlands	2001-2005	9778
15. Generation XXI	Portugal	2004-2006	8654
16. GESPII	Italy	2003-2004	708
17. GINIplus	Germany	1995-1998	5991
18. HUMIS	Norway	2002-2009	2500

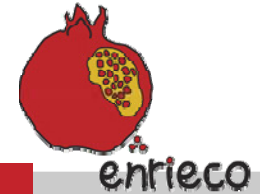| Cohort	Country	Start of enrolment	N participants
19. INMA	Spain		
Asturias		2004-2007	482
Gipuzkoa		2006-2008	600
Granada		2000-2002	668
Menorca		1997-1998	482
Ribera Ebre		1997-1999	102
Sabadell		2004-2007	749
Valencia		2004-2005	787
20. INUENDO	Denmark	2002-2004	1322
21. KANC	Lithuania	2007-2009	4000
22. KOALA	Netherlands	2000-2003	2834
23. LISA	Germany	1997-1998	3097
24. LUKAS	Finland	2002-2005	442
25. MAAS	UK	-	-
26. MAS	Germany	1990	1314
27. MoBa	Norway	1999-2008	107400
28. NFBC 1986	Finland	1985-1986	9479
29. NINFEA	Italy	2005+	7500
30. PCB cohort	Slovakia	2001-2003	1134
31. PÉLAGIE	France	2002-2006	3460
32. PIAMA	Netherlands	1996-1997	3963
33. REPRO_PL	Poland	2007-2011	1300
34. RHEA	Greece	2007-2008	1500
35. SNiP	Germany	2003-2008	4840

Exposures
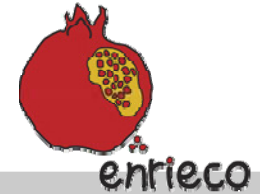
Cohort	Air pollution	Water contamination	Heavy Metals	Pesticides	Radiations	POPs	Occupation	Environmental Tobacco Smoke
Aarhus Birth Cohort						√	√	√
ABCD	√		√	√	√		√	√
ALSPAC	√		√	√	√	√	√	√
APREG	√			√			√	√
BAMSE	√						√	√
BiB	√	√					√	√
Cohort Faroe Islands			√	√		√	√	√
CONER	√						√	√
DNBC	√			√	√	√	√	√
Duisburg	√	√	√			√	√	√
EDEN	√	√	√		√		√	√
EFESE/ELFE	√	√	√	√	√	√	√	√
FLEHS	√		√	√		√	√	√
Generation R	√	√		√		√	√	√
Generation XXI							√	√
GESPII	√							√
GINIplus	√							√
HUMIS	√		√	√	√	√	√	√
INMA	√	√	√	√	√	√	√	√
INUENDO			√	√		√	√	√
KANC	√	√					√	√
KOALA	√	√			√		√	√
LISA	√			√				√
LUKAS	√		√	√		√	√	√
MAS	√						√	√
MoBa	√	√	√	√	√	√	√	√
NINFEA	√		√	√	√		√	√
PCB cohort			√	√		√	√	√
PÉLAGIE		√	√	√		√	√	√
PIAMA	√							√
REPRO_PL	√		√			√	√	√
RHEA		√	√	√	√	√	√	√
SNiP	√						√	√

Outcomes

Cohort	Birth outcomes	Asthma and allergies	Neurodevelopment	Growth and obesity
Aarhus Birth Cohort	√			
ABCD	√	√	√	√
ALSPAC	√	√	√	√
APREG	√			
BAMSE	√	√		√
BiB	√		√	
Cohort Faroe Islands	√	√	√	√
CONER	√	√		√
DNBC	√	√	√	√
Duisburg	√	√	√	√
EDEN	√	√	√	√
EFESE/ELFE	√	√	√	√
FLEHS	√	√	√	√
Generation R	√	√	√	√
Generation XXI	√	√		√
GESPII	√	√	√	√
GINIplus	√	√	√	√
HUMIS	√	√	√	√
INMA	√	√	√	√
INUENDO	√		√	√
KANC	√			
KOALA	√	√	√	√
LISA	√	√	√	√
LUKAS	√	√		√
MAS	√	√	√	√
MoBa	√	√	√	√
NINFEA	√	√	√	√
PCB cohort	√	√	√	√
PÉLAGIE	√	√	√	√
PIAMA	√	√	√	√
REPRO_PL	√	√	√	√
RHEA	√	√	√	√
SNiP	√			

Findings and Implications

There are many pregnancy and birth cohorts (N=35, **>400000 children**) in Europe with information on environmental exposures and health outcomes

There is fairly good cover of Europe, except **Eastern Europe**

There is considerable **expertise** and experience associated with the cohorts, and a great effort goes into them

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**

Findings and Implications

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 protocols of biological and environmental sample collection and analysis.
- Improve statistical power through **combined analyses**

Combined analysis

Cohorts tend to report **individually,** but recent initiatives have tried to combine data from various cohorts to increase e.g. power (overall and subgroups).

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**.

Case Studies combining studies

WP	Case study	Responsible person
WP2	Occupational Exposures during pregnancy	Sylvaine Cordier
WP3	POPs; PCB153 and birth weight	Jens Peter Bonde
WP5	Case study on dampness and the association with asthma and allergy in European birth cohorts	Chen-Chih Mey Joachim Heinrich Christina Tischler
	Case study on foetal tobacco smoke exposure and asthma among 4-6 year olds	Magnus Wickmann
	Case study on foetal tobacco smoke exposure and wheezing among 0-2 year olds	Constantine Vardavas

Final considerations
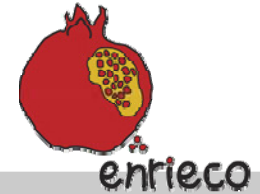
Follow up of existing cohorts is essential to determine health effects in later life of pre natal and early childhood exposure, for which there is some but not conclusive evidence.

New pregnancy and birth cohorts are needed to evaluate any potential health effects of **new environmental exposures**, or existing environmental exposures under **new conditions**.

CHICOS - "Developing a **Child Co**hort Research **S**trategy for Europe"

"**FP7 HEALTH-2009-3.3-4**: Birth/Mother-Child Cohorts co-ordination.

Project Coordinator:

Martine Vrijheid (CREAL, Barcelona)

Cohorts, Partners:

Danish National Birth Cohort
RHEA, Greece
NINFEA, Italy
Generation R, The Netherlands
MoBa, Norway
ALSPAC, Bristol, UK
INMA, Spain

Start: Jan 2010, 3 years

EC Project Officer: Kevin McCarthy

CHICOS

Outcome Themes

- Perinatal outcomes
- Asthma, respiratory health, allergies
- Obesity, vascular and metabolic health
- Neuro-cognitive and behavioural development
- Accidents and injuries
- Infectious diseases
- Childhood cancer

Determinant Themes

- Social/cultural inequalities
- Nutrition and physical activity
- Life-style exposures
- Environmental exposures
- Biobanks and genetics
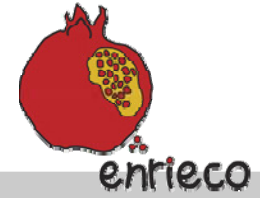- Multiple determinants (integrated risk assessment)

THE ENRIECO TEAM

Barcelona
workshop 2009

enrieco

ISEE 2011
Barcelona
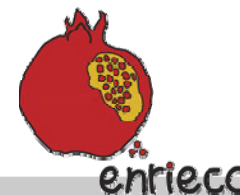
● International Society for
Environmental Epidemiology

September, 13th-16th 2011
Palau de Congressos de Barcelona

Ongoing work

WP2: Exposure evaluation

WP leader: Bert Brunekreef

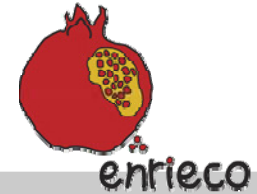| Working Group	Responsible person
Air pollution	Ulrike Gehring
Water Contamination	Mark Nieuwenhuijsen
Allergens/Biological organisms	Joachim Heinrich
Metals	Jordi Sunyer
Pesticides	Sylvaine Cordier
Emerging Exposures (phthalates, BPA, PFCs, BFR)	Martine Vrijheid
Radiations: EMF/UV/ionising	Martine Vrijheid
Second Hand Tobacco Smoke (SHS)	Magnus Wickman
Noise	Thomas Keil
Persistent organic pollutants (POPs)	Jens Peter Bonde

WP3: Outcome evaluation

WP leader: Remy Slama

Working Group	Responsible person
Birth Outcomes	Remy Slama
Allergies/Asthma/Respiratory Disease (RD)	Thomas Keil
Neurobehaviour	Jordi Sunyer
Cancer	Manolis Kogevinas
Child Growth / Endocrine & Metabolic Disorders	Marie Aline Charles

WP4: Exposure-Response evaluation
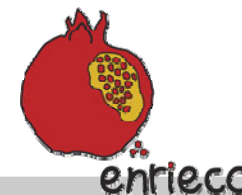
WP leader: Joachim Heinrich

Working Group	Responsible person
Air pollution and Birth outcomes	Manolis Kogevinas
Air pollution and Allergy/Asthma/RD	Bert Brunekreef
Allergens/biological organism and Allergy/Asthma	Joachim Heinrich
SHS and Birth outcomes	Constantine Vardavas
Pesticides and Birth outcomes	Sylvaine Cordier
Water contaminants and Birth outcomes	Mark Nieuwenhuijsen
Occupation and Birth outcomes	Martine Vrijheid
Metals and Birth outcomes	Jordi Sunyer
Metals and Neurobehaviour	Jordi Sunyer
POPs and Birth outcomes	Jens Peter Bonde
POPS and Neurobehaviour	Jordi Sunyer
Noise and Asthma/Birth outcomes	Thomas Keil