



Developing a Child Cohort Research Strategy for Europe

“Towards improved coordination of birth cohort research in Europe”

Workshop
Barcelona, 11-12 April 2011

Location:
Centre de Recerca en Epidemiologia Ambiental
Parc Recerca Biomèdica de Barcelona
Auditorium



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Programme

DAY 1, 11 April 2011

Chair: Manolis Kogevinas, CREAL, Barcelona, Spain

- 9:00-9:30** **Welcome and introduction** - CHICOS aims and objectives
Martine Vrijheid, Project Coordinator, CREAL, Barcelona, Spain. .
- 9:30-10:00** **Data for child health research in European birth cohorts and pan-European Registers** - Anne-Marie Nybo Andersen, University of Copenhagen, Denmark.
- 10:00-11:00** **Keynote Lecture 1: Birth cohort research in low- and middle-income countries: The COHORTS collaboration** - Linda Richter, University of the Witwatersrand, South Africa.
- 11:00-11:30** **Coffee break and posters – terrace**
- 11:30-13:00** **European birth cohort work on child health outcomes** - Camilla Stoltenberg, Nasjonalt Folkehelseinstitutt, Oslo, Norway.

- Overview and discussion of specific topics
- Perinatal outcomes
 - Asthma and respiratory health; allergies
 - Obesity; vascular and metabolic health
 - Neuro-cognitive and behavioural development
 - Accidents and injuries
 - Infectious diseases
 - Childhood Cancer

13:00-14.00 **Lunch and posters – terrace**

Chair: Franco Merletti, University of Turin, Italy

- 14:00-15:30** **European birth cohort work on child health determinants** - Vincent Jaddoe, Erasmus Medical Centre, Rotterdam, The Netherlands

- Overview and discussion of specific topics
- Social and cultural conditions and inequalities
 - Nutrition and physical activity
 - Life-style and substance exposures
 - Environmental exposures
 - Genetic materials

15:30-16:00 **Coffee break and posters - terrace**

Chairs: Franco Merletti and Ruth Etzel, World Health Organisation, Geneva, Switzerland.

- 16:00-16:20** **The scope and actions of EU policies for child health** - Patricia Lucas, University of Bristol (CHICOS)
- 16:20-16:30** **First results of cohort interviews** – Hein Raat, Erasmus Medical Center, Rotterdam, The Netherlands (CHICOS)
- 16:30-15:50** **The role of the knowledge broker: Getting research into policy in Wales** - Chris Roberts, Head of Public Health Branch, Social Research Division, Welsh Assembly Government, UK

- 16:50-17:10** **RICHE – A place for research into child health in Europe** – Anthony Staines, Dublin City University, Ireland.
- 17:10-17:45** **Discussion** – lessons for researchers. Led by Ruth Etzel.
- 17.30-18.30 Meeting of CHICOS SAB and PEC – terrace
- 20:30** **Dinner – Restaurant Ca La Nuri (see map)**

DAY 2, 12 April 2011

Chair: Camilla Stoltenberg - Norwegian Institute of Public Health, Oslo, Norway

- 9:00-10:00** **Keynote lecture 2. Childhood obesity - the role of birth cohorts in policy relevant research** - Debbie Lawlor, University of Bristol, Bristol, United Kingdom (CHICOS)
- 10:00-11:00** **Proposals for case studies to pool birth cohort data.**
- Pooling birth cohort data: the experience of ENRIECO and GA²LEN** - Thomas Keil, Charité University Medical Center Berlin, Berlin, Germany and Mark Nieuwenhuijsen, CREAL, Barcelona, Spain.
- Proposals for CHICOS case-studies
- 11:00-11:30** **Coffee break and posters - terrace**
- 11:00-12:00** **Proposals for case studies to pool birth cohort data - continued**
- 12:00-13:00** **Conclusions – End meeting**

14:00-18:30 CHICOS project meeting - CHICOS partners and SAB only

List of Delegates

Affiliation

All Babies in Southeast Sweden (ABIS)
Amsterdam Born Children and their Development (ABC) cohort
Avon Longitudinal Study of Parents and Children (ALSPAC)
ALSPAC
ALSPAC
Born in Bradford (BiB)
Born in Bradford (BiB)
CHICOS, CREAL
CHICOS, CREAL
CHICOS, University of Bristol
CHICOS, University of Bristol
Co.N.ER (Bologna birth cohort)
The Danish Fetal Origins 1988-89 Cohort (DaF088)
The Danish Allergy Research Centre (DARC) cohort
DONALD Study
Duisburg Cohort
The Danish Longitudinal Study of Children in Out-of-Home Care (DALSCIC)
DALSCIC
DALSCIC
DALSCIC
DNBC (Danish National Birth Cohort), CHICOS
DNBC, CHICOS
DNBC, CHICOS
DNBC, CHICOS
DNBC, CHICOS
DNBC, CHICOS
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ELFE
Environments for Healthy Living (EHL) Wales study
Environments for Healthy Living (EHL) Wales study
EUCCONET
FLEHS

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Jean Golding
Debbie Lawlor
Sumaiya
Diane Farrar
Pauline Raynor
Diana van Gent
Mark Nieuwenhuijsen
Patricia Lucas
Swantje Schmidt
Maria Pia Fantini
Marin Ström
Esben Eller
Anette Buyken
Michael Wilhelm
Tine Egelund
Mette Lausten
Mai Heide Ottosen
Pernille Skovbo
Laust Hvas Mortensen
Mete Juhl
Mads Kamper-Jorgensen
Pernille Stemann Larsen
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INMA Sabadell, CHICOS
INMA Sabadell
INMA Sabadell
INMA Gipuzkoa
INMA Valencia
INMA Valencia
INMA VAencia
INUENDO
Isle of Wight birth cohort study
Kaunas cohort (KANC)
Kaunas cohort (KANC)
KOALA Birth Cohort Study, The Netherlands
Krakow cohort
Lifeways Cross-Generation Cohort Study
LucKi Birth Cohort Study
Multizentrische Allergie Studie (MAS-90)
Millenium Cohort Study
MoBa
MoBa, CHICOS
MoBa, CHICOS
MoBa, CHICOS
MUBICOS
NINFEA
NINFEA, CHICOS
NINFEA, CHICOS
NINFEA, CHICOS
Norwegian Influenza Cohort Study (NorFlu)
Piccoli+

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Liesbeth Duijts
Ana Cristina Santos
Henrique Barros
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Mika Gissler
Maribel Casas
Martine Vrijheid
Monica Guxens
Michelle Mendez
Jesús Ibarzuela
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Clara Rodriguez
Sabrina Llop Pérez
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PIAMA (Prevention and Incidence of Asthma and Mite Allergy)
Pélagie (Bretagne)
Pélagie (Bretagne)
Survey of Neonates in Pommerania (SNiP)

Scientific Advisory Board

RICHE Study, Ireland
World Health Organisation, Switzerland
University Tampere, Finland
Polish Birth Cohort, Poland

Invited Speakers

Global Fund to Fight AIDS, Tuberculosis and Malaria, SA
Welsh Assembly Government, UK

Delegate

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Vicky Patelarou
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Mark Pearce
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CHICOS Partner Descriptions

Partner 1 and Coordinator: Centre for Research in Environmental Epidemiology (CREAL) representing *INMA ‘Childhood and Environment cohort study’*.

Principal Investigator: Martine Vrijheid

Researchers: Maribel Casas, Mark Nieuwenhuijsen, Jordi Sunyer

INMA is a research network of several Spanish groups which objective is to study the more relevant environmental pollutants in the air, water and diet during the pregnancy and beginning of life, and their effects in the growth and development. The project includes data of 3.873 children collected between 1997 and 2008.

Partner 3: University of Crete (UoC) representing the *RHEA* study.

Principal Investigator: Leda Chatzi

Researcher: Vicky Lebentakou, Vassiliki Melaki, Vicky Patelarou

The *RHEA* study commenced data collection in February 2007 amongst female residents of Heraklion, Greece, including epidemiological data and biological materials. *RHEA*'s objective is to evaluate early life exposures in relation to reproductive outcomes and outcomes in later life.

Partner 4: Università Degli Studi Di Torino (UNITO) representing the *NINFEA* study.

Principal Investigator: Franco Merletti

Researchers: Lorenzo Richiardi, Emanuele Pivetta, Milena Maule, Claudia Galassi

NINFEA is an internet-based multi-purpose mother-child cohort set up to investigate the effects of exposures acting during pre-natal and early post-natal life on infant, child and adult health. Italian women with access to the internet were recruited during pregnancy and completed questionnaires during the pregnancy at, six and 18 months after delivery. Topics include several exposures and some outcomes. Follow-up starting at age 4 is being conducted every 2 years via ad-hoc short online questionnaires, in addition to linkage to population registries.

Partner 5: Erasmus Universitair Medisch Centrum Rotterdam (Erasmus MC) representing *Generation R*.

Principal investigators: Vincent Jaddoe, Hein Raat

Researchers: Liesbeth Duijts, J de Jongste, Ilse Flink, Esther Hafkamp, Albert Hofman, Eric Steegers, Mirjam Struijk, Ineke Vogel, Anne Wijtzes

The *Generation R* study is a prospective cohort study from fetal life until young adulthood in a multi-ethnic urban population. The study is designed to identify early environmental and genetic causes of normal and abnormal growth, development and health from fetal life until young adulthood. In total, 9.778 mothers with a delivery date from April 2002 until January 2006 were enrolled in the study. Of all eligible children at birth, 61% participate in the study. A large part of this study cohort consists of ethnic minorities. Follow-up happens at age five through a visit to the research centre.

Partner 6 Nasjonalt Folkehelseinstitutt (NIPH) representing the *Norwegian birth cohort study (MoBa)*

Principal Investigator: Camilla Stoltenberg

Researchers: Per Magnus, Elisabeth Hagen, Merete Eggesbo

MoBa is an ongoing pregnancy cohort study, aiming to include 100.000 pregnancies by 2008. The study is based on questionnaires to the mother and father, with biological specimens being collected from mother, father and child. The main purpose of the study is to find causes of serious diseases in mothers and children. The questions cover environmental factors, such as medication, nutrition, infection and work exposure. Genetic factors and the interplay between genes and the environment will be studied, for which paternal blood samples are being collected to enable association studies between genes and diseases.

Partner 7: University of Bristol (UNIVBRIS) representing The *Avon Longitudinal Study of Parents and Children (ALSPAC)*

Principal Investigators: Debbie Lawlor, Patricia Lucas

Researchers: George Davies-Smith, Jean Golding, John Henderson, Katerina Koutra, Sumaiya Patel, Swantje Schmidt

ALSPAC – also known as Children of the 90s - is a long-term health research project. More than 14.000 mothers enrolled during pregnancy in 1991 and 1992, and the health and development of their children has been followed in great detail ever since. More than 14.000 pregnant women were recruited with estimated dates of delivery between April 1991 and December 1992. These women, the children arising from the index pregnancy and the women's partners have been followed up since then and detailed genetic and environmental data collected throughout childhood. *ALSPAC* is a two-generational resource available to study the genetic and environmental determinants of development and health.

Partner 8: National School of Public Health (NSPH) representing *RHEA*

Principal Investigator: Manolis Kogevinas

Lead of the Crete-based *RHEA* study and co-founder of www.birthcohorts.net.

Partner 9: University of Copenhagen (UCPH) representing the *Danish National Birth Cohort (DNBC)* and *Birthcohorts.net*.

Principal Investigator: Anne-Marie Nybo Andersen

Researchers: Mete Juhl, Mads Kamper-Jorgensen, Laust Hvas, Mortensen Katrine Strandberg-Larsen

The *DNBC* was established to investigate the long-lasting impact of exposures at time of conception, which influence fetal growth, cell divisions and organ functioning, on health and disease susceptibility. Data collection started in 1996 and the project covered all regions in Denmark in 1999. In October 2002, the goal of 100.000 recruitments was achieved. The cohort expanded its initial data collection with a 7-year follow-up, which was completed in August 2010. At the same time the 11-year follow up was launched.

CHICOS Scientific Advisory Board

European child health research - Prof Arja Rimpelä

Arja Rimpelä is Professor of Public Health at School of Public Health (TSPH), University of Tampere. Her previous post was Professor of Community Health at the Nordic School of Public Health (NHV), Gothenburg Sweden (1994 – 1996). Before that she worked at the University of Oulu where she was appointed in 1992 as Professor of Public Health. She worked as a Director of Education at NHV (1995) and as a Director at TSPH (1996 – 99). Before 1991 she had research and teaching posts at the Departments of Public Health, Universities of Helsinki and Tampere and worked as an epidemiological researcher at the Finnish Cancer Registry followed by postdoctoral training at the London School of Hygiene and Tropical Medicine. Her education is in medicine (M.D. 1978, Ph.D. 1982), administrative sciences (M.Sc., 1990) and epidemiology (M.Sc., 1985).

Major international activities include Director of the Baltic public health training programme (BRIMHEALTH) at NHV (1994 - 96); Project Manager of the Finnish part of the EU-Tempus public health training programme in Lithuania (1996 – 99); a member of the task forces in ASPHER (Association of Schools of Public Health in the European Region) planning European Master in European Public Health programme (1996 -1999) and quality improvement and accreditation of training programmes in public health (2000-2001); appointed as a member of ASPHER Executive Board (1996 – 2000); coordinating the Finnish parts of the European projects concerning glossary on public health and health promotion (1998 - 2000), smoking in restaurants (2000-2002) and adolescent health promotion in 2002-; participating in the evaluation of EU Europe Against Cancer Programme (1998, the Public Health Institute of Sweden (2000), Public Health training programmes in Swedish universities (2006-2007), research application procedures in Sweden (FAS and Medical Research Councils) and Denmark, professorships in Sweden and Denmark; participating in establishing School of Public Health in the Northern State Medical University, Russia; as well as research collaboration in Sweden, Norway and Scotland, and some others.

Her main research topics include adolescent health and health behaviours, inequalities in health, and evaluation of tobacco policies with new openings in health effects of information and communication technology. She is running NEDIS research network (Research on Children's and Adolescents Health and Health Promotion) that is a part of Doctoral Programs in Public Health graduate school.

Eastern European cohorts - Prof Wojciech Hanke

Wojciech Hanke, MD, is Professor of Occupational Medicine and Epidemiology at the Medical University in Lodz, Poland. He is the coordinator of the Polish birth cohort – environmental hazards to reproduction (2008-2011). His research interests are in; Effectiveness of smoking cessation interventions for pregnant women: environmental and occupational risk factors of low birth weight and preterm delivery (maternal smoking, exposure to ETS and other environmental pollutants, pesticides; biomarkers of exposure to tobacco smoke in epidemiological studies), risk assessment for reproductive hazards. Areas of Expertise: smoking cessation interventions, environmental epidemiology, reproductive health, environmental tobacco smoke.

Prof Hanke has been a board member – treasury - of the International Society for Prevention of Tobacco Induced Diseases (Winnipeg, Canada, 2001-2005) and a member of the Scientific Committee on Health and Environmental Risks (SCHER) at DG SANCO (2004-2009). He is furthermore member of the Polish Society of Occupational Medicine, the Polish Society of Environmental Epidemiology and the Polish National Committee for Risk Assessment for Carcinogens in Workplace as well as Polish National Committee for TLV values (2000- present).

Expert on policy-research interface - Prof Peter van den Hazel (apologies)

Peter van den Hazel, MD, MPH, is the co-founder and International Coordinator of INCHEs. He has a medical background and received advanced training in Management of Non-profit Organizations, Epidemiology, Medical Statistics, Radiation Safety, Policy Writing, Corporate Environmental Care, and Project Management. Since 1986 he has worked as an Environmental Health Specialist for the Combined Municipal Health Services in Gelderland, the Netherlands. Since 1993 he has been a consultant for and partner in the Bureau of Environmental Medicine. He is the past President of the International Society of Doctors for the Environment, ISDE, (2001-2003) and served as an advisor to Margot Wallstrom, EU Commissioner for the Environment. He also serves as Chair of the board for the International Network for Children's Health, Environment and Safety (INCHEs). Peter van den Hazel successfully worked to ensure children's environmental health was an issue taken up at the World Summit for Children and the World Summit on Sustainable Development. Since 2002 has been coordinator for several EU-funded projects like PINCHE (Policy Interpretation network on children's health and environment), CHEST (Children's Health, Environment and Safety

Training)(EU DG Sanco 2003310), PRONET, PHEEDUNET, Climate TRAP and for a tender called TOP (Training of Professionals).

Public health and policy research – Prof Anthony Staines

Prior to his appointment as the first Professor of Health Systems Research in the School of Nursing in DCU in August 2007, Anthony Staines spent a decade in UCD in the School of Public Health. His qualifications are PhD, MSc (Epidemiology), GDip (University Teaching and Learning), DCH, MB, BCh, BAO, BA, MRCPI (Medicine of Childhood), MFPHM, FFPHMI.

He has worked on many aspects of public health, often with a focus on policy relevant research. His particular skills are in study design, epidemiology, and policy analysis. He studies the uses of information in many different settings, including health service funding, health service planning, environmental health policy epidemiology and has often used a combination of qualitative and quantitative methods to develop policy relevant information.

Anthony is the coordinator of the FP7 funded RICHE project on child health research policy, and is a partner in three further FP7 projects: TACTICS, on childhood injury prevention; RN4CAST, on forecasting the nursing workforce, both in terms of quantity and of skill, and EUROHEIS2, on health and environment information systems.

He has done a lot of work on haematological disease epidemiology, especially multiple myeloma. He was the Irish lead for the Epilymph project, and is a member of the Interlymph consortium, and one of the founders of the International Multiple Myeloma Consortium.

Other recent work includes the ongoing Health Atlas Ireland, a new web based health information, analysis and planning tool for HSE; a developing program of work on autism; a health technology assessment for colo-rectal cancer screening; the allocation of resources within the Irish health system; blood transfusion in Ireland. Earlier work includes policy-oriented reports on issues in the Irish environment, namely electromagnetic fields, contaminated drinking water and waste management, infectious disease in care facilities for people with learning disabilities, health information systems, and injury epidemiology.

Representative WHO (Geneva) – Dr Ruth Etzel

Dr. Etzel is Senior Officer for Environmental Health Research in the Department of Public Health and Environment at WHO. She completed residencies in Pediatrics and Preventive Medicine and received her Ph.D. in epidemiology from the University of North Carolina at Chapel Hill. She was a Robert Wood Johnson Clinical Scholar at UNC in 1983-85. As a Commissioned Officer in the US Public Health Service, Dr. Etzel served in numerous public-sector leadership positions including: CDC (Founding Chief of the Air Pollution and Respiratory Health Branch), Department of Agriculture (Director of the Division of Epidemiology and Risk Assessment) and Indian Health Service (Research Director at the Alaska Native Medical Center). In addition to being board-certified in Pediatrics, Dr. Etzel is also board-certified in Preventive Medicine and served for 9 years on the American Board of Preventive Medicine.

Dr. Etzel was a member of the NHLBI's First Expert Panel on the Management of Asthma and the Department of Defense Science Board Task Force on Gulf War Health Effects. She is Founding Editor of *Pediatric Environmental Health* and an Associate Editor of *Current Problems in Pediatrics and Adolescent Health Care*. Dr. Etzel has received numerous awards, including the 2007 Children's Environmental Health Champion Award from US EPA, the Distinguished Service Award from the US Public Health Service, the Don C. Mackel Memorial Award from CDC, the Arthur S. Flemming Award, and the Clinical Society Award from the US Public Health Service Commissioned Officers Association for her discovery of the association between infant pulmonary hemorrhage and exposure to toxigenic molds. Her epidemiologic research interests include identifying the environmental precipitants of asthma attacks and studying the health effects of exposure to indoor and outdoor air pollutants.

Abstracts & Keynotes

Keynote 1: Birth cohort research in low- and middle-income countries: The COHORTS collaboration

Linda Richter, Senior Specialist, Human Sciences Research Council, Dalbridge, South Africa.

The five largest and longest running birth cohort studies in low- and middle-income countries - in Brazil, Guatemala, India, Philippines and South Africa - pooled their data in 2005 for a special issue in the Lancet on maternal and child nutrition. With a grant from the Wellcome Trust, COHORTS was established as a formal collaboration to jointly explore the implications of early growth on adult health and human capital. Under subsequent grants from the Wellcome Trust and the Bill and Melinda Gates Foundation, COHORTS continues to examine the implications on adult wellbeing of growth from infancy through adolescence, as well as the role of early environmental factors in moderating infant growth effects on adult outcomes. COHORTS is staffed by a full-time data coordinator and part-time coordinators in each site. The Principal Investigators and various work groups meet several times a year for joint data analysis and writing.

Professor Linda Richter (PhD) is a Distinguished Research Fellow at the Human Sciences Research Council in South Africa. She is an Honorary Professor in Psychology and an elected Fellow of the University of KwaZulu-Natal; an Honorary Professor in the Department of Paediatrics and Child Health at the University of the Witwatersrand, and a Research Associate in the Department of Psychiatry at the University of Oxford (UK). From 2003-2006, she was a Visiting Researcher at the University of Melbourne, and from 2007-2010 a Visiting Scholar at Harvard University USA). Currently, she is on contract from the Human Sciences Research Council to the Global Fund to Fight AIDS, Tuberculosis and Malaria in Geneva for half of her time. Trained in developmental psychology and public health. Linda is the Principal Investigator of several large-scale, long-term collaborative projects, including Birth to Twenty, a Wellcome Trust-funded birth cohort study of 3 273 children with follow up to age 20 years and the Consortium of Health Oriented Research in Transitioning Societies (COHORTS).

Keynote 2: Childhood obesity – the role of birth cohorts in policy relevant research

Debbie Lawlor, Professor of Epidemiology, MRC Centre for Causal Analyses in Translational Epidemiology, University of Bristol, UK

Childhood obesity is associated with adverse cardiovascular risk factors in childhood/adolescence and with adult cardiovascular disease mortality in adulthood. It has been suggested that the global childhood obesity epidemic could result in the current generation of children/adolescents having shorter life expectancy than their parents, though not all evidence supports this. Appropriate health policy for preventing and treating obesity should be informed by well conducted randomised controlled trials of potentially effective interventions. Birth cohorts can inform policy indirectly by identifying the most likely interventions for prevention and treatment, using best methods for causal inference, such as cross-cohort comparisons, family based comparisons and Mendelian randomization studies. They can also be used to examine the likely burden of future disease and for modelling economic costs of interventions. This talk will examine the extent to which birth cohorts have been used in these ways and the future potential for EU birth cohorts to contribute to EU health policy in the area of childhood obesity.

Professor Debbie Lawlor comes from a background in clinical and public health practice. Her research interests are concerned with the genetic and lifecourse epidemiology of obesity, diabetes, cardiovascular disease and women's reproductive health. She has contributed to developing and applying methods for improving causal inference in observational epidemiological studies.

The Amsterdam Born Children and their Development (ABCD) Study

Manon van Eijsden¹, Tanja GM Vrijkotte², Reinoud JBJ Gemke³ and Marcel F van der Wal¹

¹Department of Epidemiology, Documentation and Health Promotion, Public Health Service of Amsterdam, Amsterdam, The Netherlands. ²Department of Public Health, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands.

³Department of Pediatrics, VU University Medical Center, Amsterdam, The Netherlands

Aim: To investigate the association between maternal lifestyle, medical, psychosocial and environmental conditions in pregnancy and children's health at birth as well as in later life, with specific attention for ethnic differences.

Procedure: Prospective observational study with follow-up in infancy and every 5 yrs thereafter. Phase I (2003-2004): all pregnant women were approached (n=12373), 8266 returned a questionnaire and 4389 participated into biomarker study. Ethnic groups were: Dutch, Surinamese, Antillean, Ghanaian, Turkish, Moroccan or other western or non-western country. Additional medical information is available through Dutch Perinatal Registry. Phase II (2004-2008): Information on birth outcome (youth health care) is available for 7863 lifeborn singleton infants of which 6735 gave permission for follow-up. 5131 infant questionnaire at 13 wks and 5104 growth data digitized. PHASE III (2008-2010): 6554 were

approached for follow-up at age 5 years. Topics are: body composition, cardio-metabolic profile, behavioural and emotional problems, cognition and nutrition.

Main results: Data collection Phase III is finished, data cleaning is started, papers are in preparation. Results can be found at www.abcd-study.nl. Main results so far are: factors related to adverse pregnancy outcomes (i.e., low birth weight and preterm birth) include having work-related stress, folate and/or vitamin-D depletion, an adverse fatty acid profile, smoking, overweight/obesity, high blood pressure and a low educational level. Infant feeding is associated with early growth patterns. Between ethnic groups, large differences were observed in pregnancy outcomes, maternal thyroid function, lipid profiles, infant's postnatal growth patterns and previously mentioned risk factors. The observed disparities in birth weight and pregnancy duration were in part explained by these risk factors.

Strengths: The unique features of the ABCD-study are related to its general design and mode of operation, and include: 1) implementation along routine care, 2) co-operation between public health service and university medical centers, 3) limited, well-defined measures (determinants as well as outcomes) and 4) specific attention to ethnic diversity.

The ABIS study in Sweden

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All Babies in Southeast Sweden (ABIS) is a prospective study of 17.000 Swedish children (78% response rate) born between October 1 1997 and October 1, 1999. The main aim of ABIS is to study the etiology of diabetes and other diseases associated with the immune system like allergies, asthma and celiac disease but also other health problems.

Data is prospectively collected by regular questionnaires and biological samples from children and parents starting from birth and at 1, 3, 5, 8 and 12 years of age and is still on-going. The information collected from the comprehensive questionnaires includes indicators of health and disease, socioeconomic, psycho-social, life-style and other environmental factors. The study comprises an extensive biological data bank with more than 200.000 biological samples from over 35.000 unique individuals. From the children we have cord blood, blood and serum, hair, urine, and stool samples. There is blood and serum from the parents, as well as breast milk and hair from the mothers. E.g. at birth we have samples of cord blood from 17.000 children, breast milk from 16.500 mothers, hair from >16.000 mothers, blood from >3.000 of the fathers and from >3.000 mothers during pregnancy.

For a regional subsample of 3.000 children (TwinABIS) we have linked our data with a computerized regional Healthcare Register (HCR), with medical records concerning disease diagnoses, health care utilization and medication at all levels of healthcare, both primary care and hospital care (internationally quite unique). In Sweden the health care sector is completely dominated by the public health care and there are excellent and reliable registers that are accessible for research purposes. Also data from official Swedish registers on a yearly basis on parents income, mortality, cancer diagnosis, diabetes, heart infarction, hospitalization etc. can be connected to the ABIS information on children and parents. The ABIS study is well established both nationally and internationally and a long list of international publications as well as dissertations have come out from the study.

Official website: www.abis-studien.se/ - Contact: Professor Johnny Ludvigsson, Johnny.ludvigsson@lio.se

(ALSPAC) Identifying European Union birth cohorts with data on BMI, waist circumference and cardiovascular outcomes and willingness to participate in a CHICOS collaborative project.

Patel S, Lawlor DA - MRC Causal Analyses in Translational Epidemiology Centre School of Social and Community Medicine, University of Bristol, Bristol, UK. Funding: CHICOS

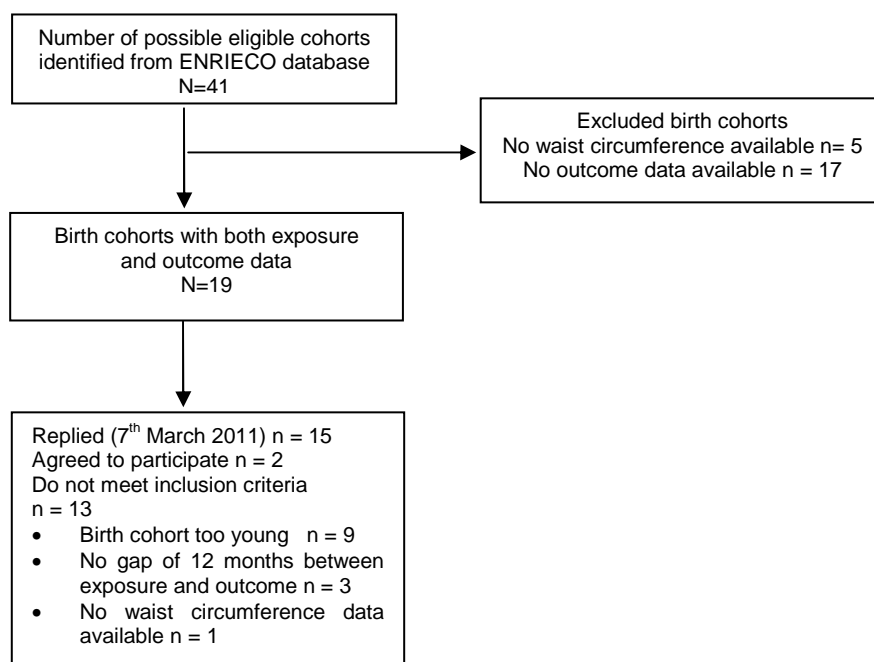
Background: Collaborative cohort studies help to increase statistical power and reliable findings. Therefore it is necessary to establish what measures are available in existing cohorts, identify gaps in data and assess willingness to participate. To examine these issues, a case study assessing the prospective associations between central adiposity, BMI and cardiovascular outcomes in adolescence is underway.

Methods: This collaborative study aims to explore whether associations of waist circumference are more strongly associated with cardiovascular outcomes than BMI. Eligibility criteria were: an EU birth cohort, had at least one measure of height, weight and waist circumference assessed between 7-18 years and one cardiovascular outcome measured a minimum of 12 months after growth assessment.

Results: In total 41 EU birth cohorts were identified and 22 excluded (figure 1). The remaining 19 birth cohorts were contacted and replies received from 15 (78.9%) of which only 2 met the inclusion criteria. The majority of cohorts (n=9) had participants <7 years at anthropometry assessment, 2 had no prospective outcome data, and waist circumference measurement was unavailable in one cohort.

Conclusions: Current EU birth cohorts are young consequently few met our inclusion criteria. Future plans include relaxing the inclusion criteria to include cohorts with measurements at younger ages and cross-sectional data and re-contacting birth cohorts.

Figure 1: Participation flow diagram



(BiB) Evaluation of the impact of universal screening for gestational diabetes mellitus on maternal and neonatal health outcomes

Diane Farrar, John Wright, Donald Whitelaw, and Derek Tuffnell - Bradford Institute for Health Research

Background: Rates of gestational diabetes mellitus (GDM) are increasing. Treatment seems to reduce perinatal mortality and morbidity [1] however the impact on outcomes of different strategies for both screening and diagnosing GDM are unclear [2,3]. The aim of this study was to evaluate the impact on health outcomes of a change from selective to universal screening as a component of the Born in Bradford cohort study.

Methods: Data were compared for the three years before and after universal screening and are presented as rate ratios (RR) for percentages of all births and births to women with GDM. Births in 2007 were excluded as they included a mixture of women who had been selectively and universally screened.

Results: Women diagnosed with GDM increased significantly, RR 3.78 (CI, 3.31 to 4.33), as did induction of labour for all births, RR 1.43 (CI 1.35 to 1.50) and for GDM births, 1.21 (CI, 1.0 to 1.49). For all births, caesarean RR was unaffected, 1 (CI, 0.96 to 1.05), but reduced for GDM births, 0.7 (CI, 0.57 to 0.87). Admissions to the neonatal unit decreased significantly for all births, RR 0.82 (CI, 0.77 to 0.88) and GDM births, 0.43 (CI, 0.32 to 0.59). RR of infants born greater than 4kg for all births was unaffected, 1.04 (CI, 0.95 to 1.12), but reduced significantly for GDM births, RR 0.25 (CI, 0.16 to 0.37).

Conclusion: Universal screening significantly increased the identification of women with GDM. Although induction of labour increased this did not lead to an increase in caesarean birth. Universal screening seemed to improve perinatal outcomes; however increased identification of those women with less severe disease may lower adverse outcome rates for GDM births.

References: 1. Alwan *et al.*, (2009) Treatments for gestational diabetes. *Cochrane Database Syst Rev*; 2. Farrar *et al.*, (in press) Different testing strategies for diagnosing gestational diabetes mellitus to improve maternal and infant health. *Cochrane Database Syst Rev*; 3. Tieu *et al.*, (2010) Screening and subsequent management for gestational diabetes for improving maternal and infant health. *Cochrane Database Syst Rev*

Comparison of distributions of common indicators of socioeconomic position by ethnicity and migration: preliminary findings from the Born in Bradford birth cohort study

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Funder: NIHR, MRC, EU

Objective: To describe and compare the distributions, including extent of missing data, in measures of socioeconomic position (SEP) between women of White British and Pakistani ethnicity.

Design: The Born in Bradford birth cohort study recruits pregnant women at 26-28 weeks gestation when they complete a baseline questionnaire.

Results: 57% of the Pakistani ethnicity women were born in Pakistan and there was a bimodal distribution of age at migration to the UK with peaks at ages 1 and 18 years. 92% of the White British women and 51% of Pakistani women were, or had been, in paid employment. This figure was 82% for UK born Pakistani women, 73% for those born in Pakistan who moved aged 5 or under and 22% for those who moved after the age of 5. Overall 23% of women reported that they didn't know their family income; this varied by ethnicity and country of birth (8% for White British women, 21% for UK born Pakistani women and 49% for those born in Pakistan). The percentage of women reporting an income of less than £20,000 was highest in Pakistani women, while the percentage of women reporting an income of £20,000 and over was highest for the White British women. 11% of White British women had no educational qualifications compared to 22% of Pakistani women; this figure was lowest for UK born Pakistani women. The percentage of women with degree level education was higher in Pakistani than White British women (26% and 19%, respectively) and was similar for all Pakistani women irrespective of migration history. The percentage of women's partners with no qualifications was similar between ethnic groups, however the percentage of partners with degree level education was higher for the Pakistani women.

Conclusion: These differences in the distributions of SEP measures by ethnicity and migration are important to understand health inequalities and for ensuring appropriate adjustment of SEP confounding.

Health problems among Children in Care (CiC) in a Danish context

Tine Egelund & Mette Lausten - The Danish National Centre for Social Research. Funded by the Ministry of Social Affairs

This paper concerns the prevalence of general health and mental health problems among children in out-of-home care within a Danish context. All children, born in Denmark in 1995, who are or formerly have been placed in out-of-home care ($n = 1,072$), are compared with a group of vulnerable children of the same age, subjected to child protection interventions but living at home ($n = 1,457$, referred to as the 'in home care children'), and to all contemporaries who are not child protection clients ($n = 71,321$, referred to as the 'non-welfare children').

Prevalence data are established on the basis of national administrative register data, including data on every diagnose given to the child, whether somatic or psychiatric diagnoses, and on survey data scoring children in out-of-home care, in home care children, and non-welfare children by means of the Strengths and Difficulties Questionnaire (SDQ).

Results show that 20% of children in out-of-home care have at least one psychiatric diagnosis compared to 3% of the non-welfare children. Almost half of the children in care (48%) are, furthermore, scored within the abnormal range of SDQ, compared to 5% of the non-welfare children. Additionally, factors indicating higher risk of being in out-of-home care are identical to factors indicating higher risk of having mental health problems. Therefore, mental health screening of children in out-of-home care does not work.

DaFO88 Cohort, The Danish Fetal Origins 1988-89 Cohort; A follow up study over 20 years

Marin Strøm and Sjúrdur Fróði Olsen, on behalf of the project group - Centre for Fetal Programming. Funding for the project has been obtained mainly from the Danish Council for Strategic Research (grants no: 09-067124, 2101-07-0025 and 2101-06-0005).

The aim of the DaFO88 Cohort is to unravel the impact of early life exposures on health.

From 1988-89 a total of 965 pregnant women were recruited for a birth cohort study (80% of a consecutive sample attending a midwife center in Aarhus, Denmark). Data collection instruments included a self-administered dietary questionnaire, a 15minute face-to-face interview on lifestyle, socio-economic and medical factors and a blood draw. Further information was extracted from hospital records and the Danish Medical Birth Registry.

Most women who entered the study were nulliparous (58.0%), non-smokers (59.8%) and reported being physically active >3h/week (59.0%). Mean gestational age was 282.4days (SD11.5), mean birthweight was 3489g (SD538g).

In 2008-09 the women were contacted and their children asked to fill out a web-based questionnaire including inquiries on current health and lifestyle and to participate in a clinical examination. Of the original sample 71.7% responded to the questionnaire, 44% attended the clinical examination, which included standardized anthropometric measures, blood draw, spirometry and a semen sample from boys while girls had ultrasound examination for polycystic ovaries.

At 20y 75.5% of the children were enrolled in education, 15.4% were in full time occupation. Smoking was reported by 18.7%, 71.7% engaged in physical activity, 6.3%(boys) and 17.4%(girls) reported being on a diet, and mean BMI was 22.8(boys)/22.2(girls).

Hypotheses under study at present include adverse effects of endocrine disrupting chemicals in pregnancy on reproductive health of the offspring and beneficial effects of maternal intake of long chain n-3 fatty acids during pregnancy on cognition (i.e. academic performance and psychiatric/behavioural disorders extracted from registries). Registry linkages are also being made to depict socio-economic conditions of the child from birth to 20y.

The DaFO88 Cohort is one of the oldest cohorts comprising detailed dietary and lifestyle assessments combined with biosamples during pregnancy and stored over two decades.

(DNBC) The Danish National Birth Cohort. 11-year follow-up

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In July 2010, the 11-year follow-up in the Danish National Birth Cohort (DNBC) was launched. It will continue until end of 2014, when the youngest DNBC participants turn 11 years old.

The data collection in the 11-year follow-up consists of two web-based questionnaires: one for the responsible parent and one for the child.

The data collection methods intend to appeal to the children of today. When the children turn 11 years old, they are invited to Club-11 – the official website for the children in the DNBC. By entering Club-11 the 11-year olds may learn more about the DNBC. At the website the child is guided to the child-questionnaire in the 11-year follow-up. Hopefully, this strategy will help us to maintain the participants in the study and make the child feel part of the study.

The focus areas in the 11-year follow-up encompass specific exposure information on eating habits, physical (in)activity, use of cell phone, social relationships (family and friends), medication, vaccinations, housing, alcohol and smoking etc. Additionally, the questionnaires comprise outcome measures such as asthma and allergy, psychosis-like-symptoms, infections, musculoskeletal problems, sleeping problems, puberty, obesity and growth. Validated and documented questions are applied in the study.

The response rate in the first months of the 11-year follow-up was relatively low, 48% for the parents and 45% for the children. In order to increase the response rate, competition gifts, when answering the questionnaire within a given time frame, has become a part of the strategy.

The DONALD Study (DOrtmund Nutritional and Anthropometric Longitudinally Designed Study) – design, methods and recent findings

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The DONALD Study is an ongoing longitudinal (open cohort) study conducted in Dortmund, Germany. The study was designed to (i) examine the complex relations between nutritional intake, metabolism and growth in healthy children (ii) analyse inter- and intra-individual trends in dietary habits (iii) collect metabolic reference data from healthy children (iv) provide data for the estimation of dietary exposures.

Since recruitment began in 1985, detailed information concerning diet, growth, development, and metabolism between infancy and adulthood has been collected for approximately 1400 children. Every year, an average of 40-50 infants are newly recruited. Comprehensive examinations are conducted at ages 3, 6, 9, 12, 18, 24 months and then once annually until young adulthood, comprising anthropometry, medical examinations, parental interviews and the completion of a 3-day weighed dietary record. From the age of 3-4 years onwards the participants are also asked to collect a 24-h urine sample on the 3rd day of dietary recording. At specific ages further assessments are performed (e.g. pubertal status, measurements of intima-media thickness). Since 2005, participants are invited for follow-up visits at ages 18, 21 and 25 years, which include withdrawal of fasting blood samples.

Recent findings revealed e.g. (i) relations between early life factors (breastfeeding, rapid weight gain, sleep duration) or dietary intake (e.g. protein intake) and the development of body composition throughout childhood (ii) the relevance of these factors as well as prepubertal adrenal androgen secretion and estrogen production for the timing of puberty onset (iii) age and time trends in iodine status and modern dietary habits (e.g. use of convenience foods) (iv) potential furan and benzol exposition by commercial weaning foods. New analyses will provide insight into the extent to which health in young adulthood is receptive to diet, anthropometric pattern and hormonal status in distinct potentially “critical periods” during childhood.

(EHL) Factors associated with fasting glucose level: a Birth Cohort Study.

Kelly Morgan, Sinead Brophy, Rebecca Hill, Ashra Khanom, Ronan Lyons - Swansea University, Swansea, United Kingdom.

Background: Recent findings from the HAPO study [1] suggest that raised glucose (but below the diabetic range) is associated with premature and/or large for gestational age births.

Aim: (1) To identify the prevalence of risk factors for gestational diabetes among pregnant women (2) To examine factors associated with raised maternal fasting glucose levels.

Methods: Women were recruited in pregnancy. Risk factors examined included; maternal body mass index at antenatal booking, sedentary behaviour assessed by accelerometer, smoking status, dietary saturated fat (assessed by 1-week diet diary) and self-reported family history of diabetes. Fasting plasma glucose measures have only recently been added for collection within this study.

Results: 253 women have participated to date. A high proportion of women in pregnancy have a poor lifestyle (table 1). Both smoking ($p=0.018$) and saturated fat consumption ($p=0.025$) were associated with elevated glucose levels using crude analysis. However, adjusted analysis (both variables included in the same model) revealed that only dietary fat ($p=0.028$) remained a significant predictor of raised fasting glucose.

Conclusions: Preliminary findings reveal that a majority of women present undesirable but modifiable lifestyle choices. Furthermore, dietary saturated fat was significantly associated with glucose levels implying that future interventions aiming to prevent poor neonatal outcomes should target women’s dietary content.

Reference: [1] New England Journal of Medicine 358:1991-2002

Table 1: Characteristics of Participants

Characteristic	Mean ±SD or proportion
Age (Yr) <i>n</i> =222	29.3±6.0
Ethnicity <i>n</i> =253	80% European and 9% ethnic minority
Gestation at data collection (wk) <i>n</i> =224	25.6±6
Booking body-mass index <i>n</i> =172	24.8±5.1 (45% overweight/obese)
Sedentary behaviour <i>n</i> =169	7±1.8 (70%≥6hs sedentary per day)
Saturated fat <i>n</i> =176	12.7±2.5 (85%≥10% per day)
Frequent smoke exposure <i>n</i> =225	25% exposed (indirect or direct <2 days a week)
Family history of diabetes <i>n</i> =120	17% had at least one first degree relative with diabetes
Fasting plasma glucose (mmol/l) <i>n</i> =61	4.6±0.6 (3.3%>6.1mmol/l)

(EHL) Sedentary Behaviour in Pregnancy

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Background: Sedentary behaviour – or prolonged sitting with the absence of whole-body movement [1] – is negatively associated with health and mortality, irrespective of physical activity and weight status [1,2]. To date no research has investigated sedentary behaviour as an independent risk factor for pregnancy and childbirth complications.

Aim: To investigate potential associations between time spent in sedentary behaviour during pregnancy and complications of pregnancy and childbirth.

Methods: Women are recruited during pregnancy. Objective measures of time spent sedentary are obtained by ActiGraph accelerometers (worn for 7 days). Routine data are extracted from participants’ maternity records (during and after pregnancy) and from the Secure Anonymised Information Linkage (SAIL) electronic databank of disparate health and social care records [3].

Emerging findings: The majority of our sample* (82.2%) were sedentary for 6 hours or more during at least one day, and all women were sedentary for at least 4 hours a day. Whether time spent sedentary is a risk factor for adverse pregnancy and childbirth outcomes is a subject of ongoing research in the EHL study.

*93 of the first 214 study participants had valid data (4/7 days) and were included in this analysis.

Implications: Understanding time spent sedentary as a modifiable risk factor can inform the development of population strategies for reducing: sedentary behaviour during pregnancy; associated risks of pregnancy and childbirth complications; and rates of costly obstetric interventions and their related risks.

References [1] Owen, N et al. Too much sitting: The population health science of sedentary behaviour. Exercise and Sport Science Reviews. 2010, 38: 3. 105-13; [2] Dunstan, D et al. Television viewing time and mortality: The Australian Diabetes, Obesity and Lifestyle Study. Circulation, 2010, 121. 384-91; [3] Lyons, R.A et al. The SAIL databank: Linking multiple health and social care datasets. BMC Medical Informatics and Decision Making. 2009, 9:3

(ELFE) The French birth cohort Elfe: Environmental aspects

Henri Leridon and the Elfe Team, National Institute for Demographic Studies (INED) and Elfe, Paris

Children are susceptible to health impacts triggered by proportionately larger doses of environmental contaminants than adults, while their organs and tissues are still developing. Childhood respiratory disorders including asthma, neuro development disorders, leukemia and cardiovascular diseases were found to be associated with prenatal and early life exposures. A nationwide cohort study to examine the effects of environmental contaminants, social status, economic conditions and demographics on cognitive development, health and behavior of children has just been launched in France. The French Longitudinal Study of Children (ELFE) will involve the recruitment of 20,000 newborns (with a gestational age of at least 32 weeks) throughout the country from April to December 2011. Data on demographics, social, economic, dietary and habits will be collected using questionnaires at birth, 2 months and every year until adulthood. Exposures to environmental stressors (air pollutants, heavy metals, pesticides, phthalates, endocrine disruptors, bisphenol-A, persistent organic pollutants, waterborne contaminants and radiations) will be determined

through the collection of biological samples, in-situ measurements, questionnaires, dispersion modeling and/or geospatial analysis. Health data will be obtained from medical records and questionnaires.

Creating synergy and exchange between European child cohort studies

Anne-Claire Blanchard (Coordinator), EUCCONET – The European Child Cohort Network

The European Child Cohort Network is a Research Networking Programme financed by the European Science Foundation (ESF). The aim of the programme is to bring together large pluridisciplinary child cohort studies in order to exchange experience and best practices about methodology issues (data collection, data management, communication with cohort members etc), and to encourage collaborative and comparative research projects between studies. To achieve these objectives, the programme finances the organisation of workshop as well as exchange visits through an annual call for proposals. The outcomes of all activities are presented on the website www.eucconet.com so as to serve as a resource for any person interested in longitudinal studies. The website intends to be a platform of discussion and information on European large cohort studies. The poster will present the network's past and future activities.

Birth cohorts in Flanders (Belgium): where are we now?

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To collect data on environmental contamination and related health, two Flemish Environment and Health Survey (FLEHS I and II) (2002-2006 and 2007-2011) for human biomonitoring were so far started up by the Flemish Government. In FLEHS I and II respectively, 1196 and 250 mothers and their newborns were sampled in various areas of Flanders. About 300 of the FLESH I children were followed-up till the age of 8 years for either airway or neurodevelopmental problems. Aside from that, recruitment of a more regional cohort (3xG) is running (2010-2013), aiming to include 300 newborns for a 18 years follow-up.

The main outcomes studied are asthma/allergy, growth and neurodevelopment. In cord blood, heavy metals, chlorinated compounds, polybrominated flame retardants, plastic compounds (BPA, TBBPA) and perfluorinated compounds were/are measured. Also gene expression and DNA methylation patterns are examined. Data on air pollutants are obtained from air quality measuring units, spread over Flanders. In the follow-up studies, questionnaires on airway health, allergies, growth and neurological development are included, and special focuss is given to non-invasive monitoring of oxidative stress and inflammation in saliva, exhaled breath condensate/gases and urine.

The cohorts are managed by a consortium of several institutes and universities. Some data on growth and development are obtained in cooperation with the regular health care follow-up system for newborns and school children (Kind&Gezin, Centrum voor Leerlingen Begeleiding). The FLEHS birth cohort is also nested in the EU funded OBELIX study on “OBesogenic Endocrine disrupting chemicals: Linking prenatal eXposure to the development of obesity later in life”. Within the framework of the EU ENRIECO and OBELIX projects, the FLEHS cohort was integrated in the meta-analysis approach to study the influence of polychlorinated biphenyls (PCBs) on fetal growth impairment. In general, aim is to maximally explore environmental health information from the birth cohorts by integrating them in the existing Belgian health care framework and by collaboration with similar European initiatives.

Gene and Environment: A prospective study on infancy in Italy (GASPII)

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Background and Objective: Despite several large birth cohort studies are under way in Europe, no long term follow-up of newborns has been previously conducted in Italy. We describe the design and the methodology of a birth cohort enrolled in Rome.

Methods: Newborns resident in the district of the local health unit Rome E were enrolled between June 2003 and October 2004 in Rome from two hospitals. Cord blood and maternal blood were collected to extract serum and DNA that were stored in biological banks for future analyses. Baseline information was collected on mothers, fathers and infants using questionnaires and medical records. Maternal diet during pregnancy was also investigated. Infants had clinical examinations at 15 days and 15 months, mothers were interviewed by phone at 6 and 15 months. At 4 years mothers underwent a face to face interview, and anthropometric measures were taken from the children. We collected information on children's diet, on outdoor and indoor environmental exposures, on relationship with parents and on the outcomes under study, that is asthma and allergies, neurodevelopment, obesity, injuries and minor birth defects. We also estimated

outdoor exposure to NO₂ using a land use regression model with application to the addresses of residence, while noise exposure is under development. A new follow-up (7 years) focused on neurodevelopment and obesity is going to start.

Results: Seven hundred and eight newborns were enrolled in Rome. Compliance to follow-up was very high in all the following steps (98.0% at 6 months (N=694), 93.8% at 15 months (N=664) and 82.1% at 4 years (N=581)).

Conclusions: The prospective study allows examination of the role of personal and environmental factors on several aspects of childhood health. These birth cohort together with others developed afterwards in other Italian cities should be considered a starting point for a national multi-center study that would be the first of its kind in Italy.

HEMASCO: Life-course Determinants of Mental Health, Marginalisation, and Social Coping – Interdisciplinary Perspectives of Risk and Protective Factors in Five Birth Cohorts.

Mika Gissler

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The most recent governmental policy documents in Finland, including the National Development Programme in Social Welfare and Health (KASTE), highlights marginalisation and health and welfare inequalities as the two major societal problems facing modern societies. The main aim of this consortium is to provide information on determinants and pathways to both marginalisation and social coping, and hence, to contribute to the evidence base for the development of focused preventive interventions and further political efforts. We will use various outcomes to measure marginalisation, such as educational failure, poor mental health, child protection actions, and criminality in adolescence and early adulthood as well as low socioeconomic status, sickness and disability pension in later adulthood.

Marginalisation and inequalities in wellbeing and health have roots in childhood, but research evidence is weak on providing basis for understanding their life-course development. We hypothesise that the effects of early life health, nutritional factors and family economic crises affect health and economic status in later life, not only on childhood health.

Previous studies have not paid attention to the societal context including the historical epoch in the development of the society or the differences in social context of geographical areas, although social exclusion is deeply tied to the particularity of the social context. We hypothesise that marginalisation processes and pathways are affected by time and place. Our consortium has the access to five birth cohorts which originate from different decades between 1930s and 1980s, and they have a national coverage or cover various regions in Northern and Southern Finland. These data will be completed by new information from high-quality administrative health and social welfare registers which cover the total population.

Furthermore, there is very little knowledge on the processes of resilience, that is, good coping and integration into the society in spite of adversity during childhood. This information is crucial for successful preventive efforts. We hypothesise that, in times adversity, parental education, functional family relationships and good school achievement predict resilience and good social coping later in life.

The aims of the consortium are directly linked with main aims of the Responding of Public Health Challenges – programme. We will study the connection of perinatal, childhood and adolescent health to subsequent health, marginalisation and social coping interdisciplinary from life-course perspective and identify risk factors, but also protective and preventing factors.

The Norwegian Human Milk Study, HUMIS

Merete Eggesbø, Norwegian Institute of Public Health

Background: HUMIS is an ongoing multi-center birth-cohort study of mothers and their newborns with the purpose to gain more knowledge of the health effects of environmental toxicants on child health. Chemical analysis of human milk from the mothers is used to assess postnatal exposure to environmental toxicants. It can also be used as a proxy for prenatal exposure.

Methods and materials: Participants were recruited approximately two weeks after delivery by Health Visitors who routinely see all families in Norway. Nearly all Norwegian women initiate breastfeeding (98-99%), thus breastfeeding was not set as an eligibility criterion. Human milk is sampled over eight days Recruitment started in 2002 and is still ongoing. The data are linked to the Medical Birth Registry of Norway (MBRN) and to the MoBa study. Currently approximately 2500 mother-child pairs have been recruited. Infant and child health is monitored through questionnaires at 1, 6 & 12 months, 2 & 8 years of age, with focus on reproductive outcomes, growth (weight, length, head circumference multiple time points), food allergy, infections and neuropsychological development. Toxicological analysis completed in subsamples (currently 475, soon 1000 samples) on a large number of PCBs, as well as seven specific BFRs, and organopesticides such as pp-DDE, HCB, bHCH, oxychlorodane. PFOS and Phtalates are currently being analyzed and Lead and Mercury will be analyzed.

Publications so far: Eggesbø M et al. Levels of hexachlorobenzene(HCB) in breastmilk in relation to birthweight in a Norwegian cohort. *Environmental Research* 2009; Polder A et al. Levels of chlorinated pesticides and polychlorinated biphenyls in Norwegian breast milk (2002-2006), and factors that may predict the level of contamination. *Science of the Total Environment* 2009; Thomsen C et al. Determinants of brominated flame retardants in breast milk from a large scale Norwegian study. *Environ Int* 2010. MoBa; Approximately 40% of HUMIS participants also participates in the MoBa study.

Participation in EU projects: OBELIX, ENRICO, DENAMICS

(INMA) Prenatal exposure to residential outdoor air pollution and infant mental development: Modulation by antioxidants and detoxification factors.

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Background and Aims: Effects of air pollution on children’s neurodevelopment have recently been suggested. We aimed to assess whether prenatal exposure to residential outdoor air pollution impaired infant’s mental development, and whether antioxidant/detoxification factors modulate this association.

Methods: In the Spanish INMA (Environment and Childhood) Project, 2,644 pregnant women were recruited at 1st trimester. Nitrogen dioxide (NO₂) and benzene were measured with passive samplers covering the study areas. Land-use regression models were developed for each pollutant and applied to predict outdoor air pollution levels at each women address during the whole pregnancy. Information on parental socio-demographic, life-style, and child characteristics was obtained by questionnaire. Maternal diet was obtained in the 1st trimester through a validated food frequency questionnaire. Maternal circulating vitamin D in pregnancy were determined by radioimmunoassay. Around 14 months, infant mental development was assessed using the Bayley Scales of Infant Development.

Results: Median exposure was 28.1µg/m³ for NO₂ and 1.2µg/m³ for benzene. Exposure to NO₂ and benzene showed a negative association with mental development, though not statistically significant, after adjusting for a large array of potential confounders (β (95%Confidence Interval) = -0.74 (-3,73;2,26) and -1.40 (-3,71;0,91), for a doubling in each compound, respectively). Stratifying by antioxidant/detoxification variables, a significant negative relation of both compounds in infants with low maternal intakes of fruits and vegetables during pregnancy was observed (-3.62 (-6,57;-0,68) and -3.56 (-6,12;-1,00), respectively) although interaction terms were only borderline significant (p<0.10). A negative non-significant association in non-breastfed infants and in infants with low maternal levels of vitamin D was also found.

Conclusions: This study supports the hypothesis that prenatal exposure to residential air pollutants may adversely affect infant mental development, and that these effects may be limited to infants whose mothers have low levels of antioxidant intakes and/or detoxification factors.

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(INMA) Breastfeeding, long-chain polyunsaturated fatty acids in colostrum, and infant mental development

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Background and Objective: Breastfeeding has been associated with improved neurodevelopment in children. However, it remains unknown to what extent nutritional advantages of breast milk may explain this relationship. We assessed the role of parental psychosocial factors and colostrum long-chain polyunsaturated fatty acid (LC-PUFA) levels in the relationship between breastfeeding and children’s neurodevelopment.

Methods: In the Spanish INMA (Environment and Childhood)-Sabadell birth cohort, 657 women were recruited in 2004-06 during the 1st trimester of pregnancy. Information about parental characteristics and breastfeeding was obtained by questionnaire, and trained psychologists assessed mental and psychomotor development using the Bayley Scales of Infant Development in 504 children at 14 months of age.

Results: A high percentage of breast feeds among all milk feeds during the first 14 months was positively related with child mental development (0.37 points per month of full breastfeeding, 95% CI 0.06 to 0.67). Maternal education, social class, and intelligence quotient only partly explained this association; other parental factors had little or no effect. N-3 LC-PUFAs and positive ratios between n-3 and n-6 LC-PUFAs in colostrum had beneficial effects on mental development, particularly when children received high levels of breast milk, while some n-6 LC-PUFAs showed a negative association.

Conclusions: Greater levels of accumulated breastfeeding during the first year of life were related to higher mental development at 14 months. LC-PUFA levels, specifically high n-3 versus n-6 fatty acids, seem to play a beneficial role in children’s mental development when breastfeeding levels are high.

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(INMA) Effects of maternal pre-pregnancy overweight, obesity and weight gain during pregnancy on child neurodevelopment in 2 Southern European birth cohorts

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Background Some epidemiological studies have shown that maternal pre-pregnancy overweight and obesity are negatively associated with offspring cognitive abilities and behaviour, but it is unclear if this may reflect confounding by socioeconomic or postnatal factors. Few replication studies exist and the potential physiological mechanisms are unknown. The objective of this study was to assess whether maternal pre-pregnancy body mass index (BMI) and weight gain during pregnancy affects infant’s neurodevelopment in two Spanish and Greek population-based birth cohort studies (INMA and RHEA). Here, we present only the results from the INMA project.

Methods The analysis included pregnant women recruited during the 1st trimester of pregnancy in 4 Spanish areas (Asturias, Gipuzkoa, Sabadell, Valencia) between 2004 and 2008 as part of the INMA project. Maternal pre-pregnancy BMI and weight gain during pregnancy were calculated from self-reported weight and height clinical registries, and classified according to WHO criteria. Mental and psychomotor development of the children was assessed around age 14 months (range 11-23 months) using the Bayley Scales of Infant Development. Scores were standardised by age. Multivariate linear regression models were adjusted for social factors, and other maternal and child characteristics.

Results Out of 1967 included mothers, 18.3% were overweight before pregnancy and 7.6% obese. 23.7% and 37.4% of women were below or above their weight-gain recommendation during pregnancy, respectively. After adjustment, maternal overweight and obesity were negatively associated with the child’s psychomotor score ($\beta=-1.81$, 95% CI:-3.57; -0.05 and $\beta=-1.77$; 95% CI:-4.32; 0.78, respectively). Maternal obesity was negatively associated with mental score ($\beta=-2.80$; 95% CI:-5.35; -0.25). Lower and higher than recommended weight gain were associated with lower psychomotor scores (lower: $\beta=-2.70$, 95% CI:-4.47; -0.93 higher: $\beta=-1.92$, 95% CI:-3.48; -0.37), but not with mental scores. Socio-economic factors did not appear to influence these coefficients.

Conclusion Maternal pre-pregnancy overweight and obesity are associated with a reduction in psychomotor and mental scores at 14 months of age, and inadequate pregnancy weight gain with a reduction in psychomotor scores. This analysis will be replicated in 510 children from the RHEA cohort (Greece).

(INMA) Concentrations and determinants of organochlorine levels among pregnant woman in Eastern Spain

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Persistent organic pollutants (POPs) comprise a large variety of toxic substances with ample distribution. While exposure to these toxins occurs mainly through diet, maternal POP levels may be influenced by certain sociodemographic, environmental, or lifestyle factors. These substances may have adverse effects on fetal development. The aim of this study is to examine the sociodemographic, environmental, lifestyle, and dietary determinants of levels of hexachlorobenzene (HCB), b-hexachlorocyclohexane (b-HCH), 1,1,1-trichloro-2,2-bis(4-chlorophenyl)ethane (4,4'-DDT), 1,1-dichloro-2,2-bis(4-chlorophenyl)ethylene (4,4'-DDE), and polychlorinated biphenyls (PCB congeners 118, 138, 153, 180) measured in the blood of pregnant women participating in a mother-child cohort study conducted in Valencia (Spain).

The study population consisted of 541 pregnant women who formed part of the INMA (Childhood and the Environment) cohort (2004-2006). POP levels were determined in blood taken during the 12th week of pregnancy by gas chromatography with electron capture detection. Sociodemographic, environmental, and dietary information was obtained from a questionnaire. Multivariate Tobit regression models were constructed in order to assess the association between POP levels and selected covariates.

Results showed that all the women had detectable levels of at least one of these compounds while in 43% of the subjects, all eight compounds were detected. The compounds found in the greatest number of women were 4,4'-DDE (100%) and PCBs 153 and 180 (95%). The most important determinants of high POP levels were the mother’s age,

country of origin, increased body mass index, and number of weeks of breastfeeding after previous pregnancies. With regard to diet, 4,4'-DDT and 4,4'-DDE levels increased with the intake of meat, fruit, and cereal. PCB 153 levels increased with the intake of seafood.

More in-depth knowledge of the determinants of POP levels during pregnancy would enhance the effectiveness of public health campaigns and future recommendations for avoiding their negative effects on health of pregnant women and their children

Differences in dietary intake and other lifestyle factors in pregnant women of diverse origins living in a Mediterranean Spanish city. The INMA-Valencia cohort.

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Introduction: There is evidence of better birth outcomes (i.e. birth weight) in Latin-American women living in Spain compared to Spain-born women and to immigrants of other origins. These disparities could be associated to differences in dietary intake and other lifestyle factors. However, no studies have assessed such differences in pregnant women of diverse origins living in Spain.

Methods: We studied 822 women from the INMA-Valencia cohort recruited between 2004 and 2005. Women's origin was categorized as Spanish, Latin-American and other origins (mainly Eastern-Europeans). Differences in maternal characteristics and lifestyle according to origin were assessed using chi-squared tests and the distribution of food group intakes, by means of ANOVA.

Results: Spain-born women accounted for 88% of the study population (n= 723) whereas Latin-Americans and women of other origins comprised 8% and 4% (n= 64 and 35) of the population, respectively. A greater percentage of Spanish women were over 30 years, worked at first trimester, had planned their pregnancies and used iodized salt and micronutrient supplements but also were more likely to smoke compared to their foreign counterparts. Most Latin-Americans belonged to the lowest socioeconomic categories (SES); and showed the lowest prevalence of smoking and caffeine intake. Women from other origins reported the lowest prevalences of use of iodised salt, micronutrient supplements and the highest caffeine intakes. Mean intakes of seafood and fish, nuts and processed meat, were significantly higher in Spanish women compared to their foreign counterparts. Latin-American women showed the highest intakes of fruits and vegetables. Women from other origins were found to have the highest intakes for sweets and added animal fat.

Conclusions: Origin is an important determinant of dietary and lifestyle habits. Inadequate habits were found in all of the groups, somewhat; however, lifestyle factors associated with better birth outcomes -low prevalence of smoking and high intake of fruits and vegetables- were more common among Latin-Americans. Due to the low sample of immigrant women, this study should be replicated to confirm our results.

INUENDO - Biopersistent organochlorines in diet and human fertility

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Objective: The INUENDO project addresses reproductive toxicity of dietary persistent organochlorine pollutants (POPs) with special reference to endocrine disruption.

Populations and methods: Couple fertility and male reproductive function were investigated in Warsaw (Poland), Kharkiv (Ukraine), Sweden and Greenland. Pregnant women and their partners were enrolled during antenatal visits except for Swedish fishermen and their partners who were recruited separately. Time-to-pregnancy interviews were obtained from 2,269 women. Blood was sampled in 1992 women and 1172 men. In addition 798 men provided a semen sample. Serum concentrations of polychlorinated biphenyls (PCBs) [CB-153] and *p*-chlorophenyl-ethylene (DDE) were measured in all blood samples. Male reproductive function was evaluated by: reproductive hormones and sperm characteristics. Birth outcomes were evaluated among 1298 offspring as: sex, gestational age, birth weight, birth length and premature birth. A follow up data collection on 6-9 year old children ending in 2011, will include evaluations of childhood growth, developmental milestones and assessment of ADHD (attention deficit hyperactivity disorder) like behavior.

Results: Serum concentrations of PCBs were related to reduced fertility only among Inuits. In all regions decreasing progressive sperm motility with increasing serum CB-153 was observed. In Caucasians high PCB exposure was associated with more than 50% increase of spermatozoa with sperm DNA damage.

Serum concentrations of DDE were not related to fertility. Serum levels of POP markers were not related to sperm count and morphology.

Birth weight tended to decrease with increasing PCB or DDE serum level, with negative regression coefficients in all countries although the estimates were not statistically significant in all countries.

Conclusions: Sperm motility and DNA integrity were negatively impacted by prenatal POP exposure, however, without major impact on fertility or sperm counts in European populations. Birth weight and gestational age may be affected by prenatal POP exposure.

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Prevalence, natural history and genetic and environmental risk factors for asthma and allergy; The Isle of Wight whole population birth cohort

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Background: The nature and prevalence of asthma and allergic disease varies according to age and often remit and relapse. Hence, it is important to study asthma occurrence and characterise its nature in longitudinal, birth cohort studies. We used data from a birth cohort, prospectively phenotyped from infancy to early adult life to investigate prevalence, natural history and risk factors.

Methods: The Isle of Wight cohort (n=1456) was recruited at birth and assessed at 1-, 2-, 4-, 10- and 18-years. At each stage, questionnaires were completed on parental history, presence of wheeze and asthma, and exposure to environmental factors. Additionally, skin prick test to common allergens was performed at 1 and 2 years in those with symptoms and 4-, 10- and 18-years in the majority of children. Lung function, bronchial responsiveness and sputum induction was carried out and DNA obtained for genetic studies at 10 and 18 years and exhaled nitric oxide measured at 18 years.

Results: Prevalence of asthma is high throughout childhood but it is a disease of remissions and relapses. Risk factors for persistence of early childhood wheeze can be identified and used to predict development of asthma. Parental asthma, recurrent chest infections and parental smoking in early childhood are major risk factors for later development of asthma. Breast feeding increases lung function at age 10 and 18 years. Incidence of allergic rhinitis is high during adolescence. Prevalence of peanut allergy increased during 1990s, then stabilised.

Conclusions: Birth cohort studies are essential to understand the natural history of asthma and identify risk factor associated with its development.

(KANC) The association between environmental exposure to nitrogen dioxide and preterm birth in genetically susceptible women.

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Background/Aims. Preterm births (PB) cause a large public-health burden because of its high prevalence, associated mortality and morbidity, and infant health. Environmental hazards and genetics considered to be potential risk factors. The aim of the study was to investigate whether the polymorphisms of metabolic genes GSTT1 and GSTM1 affect the association of maternal exposure to NO₂ with PB risk.

Methods. We conducted a prospective cohort study in Kaunas (Lithuania) and estimated maternal exposure to NO₂ by Airviro dispersion models for 3,341 singleton births at the geocoded residential address. We included a subset of 682 subjects from the cohort study in a nested case-control study to estimate the associations between prenatal exposure to NO₂ and polymorphisms in the GSTT1 and GSTM1 genes. The associations were analyzed by logistic regression models with and without adjustment for maternal education, family status, renal diseases, diabetes, cardiovascular disease, stress, body mass index, smoking, alcohol consumption, parity, previous PB, and infant birth year.

Results. The mean levels of NO₂ to which the women were exposed throughout their pregnancies ranged from 5.3 to 53.2 mg/m³. We found positive, statistically non-significant associations between exposure to NO₂ during entire pregnancy and during the three trimesters of pregnancy and PB. When GSTT1 genotype was considered, the association between exposure to NO₂ and PB differed by genotype: ORs for PB among women exposed to NO₂ during the second trimester pregnancy was 1.61 (95% CI 0.82–3.15) and 3.76 (95% CI 0.81–17.50) for the present and absent genotypes, respectively. The findings were similar for GSTM1 genotype: in carriers of GSTM1-0 genotype NO₂ exposure was associated with higher ORs than in carriers of GSTM1-1 genotype. *Conclusions.* These data suggest that maternal exposure to traffic-related NO₂ pollution may affect PB and that maternal GSTM1 and GSTT1 genotypes modify the NO₂ exposure effects on PB.

Vulnerability of the Fetus/ Infant to PAH, PM_{2.5} and ETS - cohort study in Krakow, Poland

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This study received funding from an RO1 grant entitled “Vulnerability of the Fetus/Infants to PAH, PM_{2.5} and ETS” (5 RO1 ES10165-01 NIEHS) and from NIEHS (5 RO1 ES010165-0451), the Lundin Foundation, and the Gladys T. and Roland Harriman Foundation. Principal Investigator: Prof. F.P. Perera: Columbia Center for Children’s Environmental Health, Mailman School of Public Health, Columbia University, New York, USA, Co-Investigator: Prof. W. Jedrychowski: Jagiellonian University Medical College, Krakow, Poland

The main objective of this study was to assess the association between prenatal exposure to airborne polycyclic aromatic hydrocarbons (PAHs) on fetal growth as well as cognitive and neurobehavioral development of children, after controlling for fine particulate matter <2.5µm (PM_{2.5}), environmental tobacco smoke (ETS), nutritional status and other potential confounders. This is prospective molecular epidemiologic study, combining environmental monitoring and molecular approaches with comprehensive neurodevelopment assessments.

Only women 18–35 years of age, who claimed to be non-smokers, with singleton pregnancies, without illicit drug use and HIV infection, free from chronic diseases were eligible for the study. All women completed a detailed standardized questionnaire on the demographic data, house characteristics, lifestyle and health. A total of 505 enrolled women gave birth to their children between January 2001 and February 2004. Weight, length and head circumference at birth were recorded for all infants. After delivery, children were followed-up every 3 months over 2 years, every 6 months from 3rd-5th year and every year in further period and mothers of infants were interviewed on infants' health and household characteristics at each visit.

Prenatal personal exposure to PAHs and PM_{2.5} over 48h during the second trimester was measured using individual monitors. Measurements were repeated on indoor and outdoor exposure when children were 3 and 6 years old.

Maternal and cord blood were sampled at delivery for measuring DNA-adducts and concentrations of cotinine and heavy metals (mercury, lead). In addition, capillary blood of children at age of 5 was taken to measure cotinine, heavy metals and urine samples were collected at age 3, 6 and 7 to obtain PAH metabolites, creatinine and cotinine levels.

The children's development was assessed using the Fagan test (6th month of life), the Bayley Scales of Infant Development (12th, 24th and 36th month), Child Behavior Checklist (4th, 6th-9th year), Raven Colored Matrices (5th, 8th year) and Wechsler (6th, 7th, 9th year).

The total retention rate for the six-year follow-up amounted to 62.2%.

Evidence of Cross-Generational Grandparental Influence in the Lifeways Cohort Study of a Thousand Families in Republic of Ireland 2001-2011

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Introduction: Lifeways was established with the a priori purpose of exploring cross-generational transmission in families and is unusual in having detailed nutritional and examination data from four family lines.

Methods: Recruitment was at antenatal stage with 1124 families consenting to participation, including 2734 grandparents (868 maternal-grandmothers, 662 maternal-grandfathers, 681 paternal-grandmothers and 523 paternal-grandfathers). A random subset of 1231 grandparents underwent either a cardiovascular risk examination at home at baseline (European Health Risk Monitoring protocol), completed a health status questionnaire or both. In a 2005 follow up with General Practitioners, further information on cause-specific morbidity and mortality of grandparents was obtained. In 2010, the computerised General Registrar's Office database was searched also for grandparental deaths in this sub-set.

Results: Mother's self-rated health during pregnancy was positively predicted by maternal grandparents' third level education [adjusted-OR(95%CI)=7.7(1.8-33.8)]. Infants' birth-weight was predicted by their grandparents' CVD risk factor profile. The maternal-grandmothers' diastolic blood pressure (mmHg) [adjusted-βcoefficient(95%CI)=5.9(0-11.9)], paternal-grandmothers' serum triglycerides (mmol/l) [adjusted-βcoefficient(95%CI)=70.1(3.5-136.7)] and paternal-grandfathers' systolic blood pressure (mmHg) [adjusted-βcoefficient(95%CI)=6.2(0.8-11.5)] were predictive of probands' birth-weight (gms). An inverse or U-shaped relation between infants' birth-weight and grandparental mortality was observed in maternal line, whereas a significant direct linear association was apparent with paternal-grandfather's mortality [adjusted-HR(95%CI)=1.002(1.000-1.0003)]. Body Mass Index at child's average age of 5 years was transmitted along maternal (40% variance) but not paternal familial lines, whereas height was transmitted across all grandparents (32-64% variance), particularly the paternal line.

Future plans: This cohort has confirmed clear cross-generational and familial patterns. An expanded mortality follow-up is planned now for all registered grandparents to examine associations with cause specific mortality. A further follow up for inter-current events will be undertaken with General Practitioners of all family members. Anthropometric measurement and collection of blood and tissue samples for genotyping and assessment of metabolic risk factors is to be undertaken with children.

Investigating Emotional and behavioural disorders in the Millennium Cohort Study

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This poster draws on a range of existing and ongoing research to describe patterns of emotional and behavioural disorders across the children of the MCS, using information collected using the Strengths and Difficulties Questionnaire (SDQ). The SDQ was asked of parents at sweeps 2, 3 and 4 of the MCS and at sweep 4 it was additionally asked of the children's teachers. The SDQ measures emotional symptoms, conduct problems, hyperactivity, peer problems, which together can be combined to give a measure of overall difficulties. It also measures pro-social behaviour. We thus have measures of emotional and behavioural disorder over time and from different perspectives for the Millennium children. The poster outlines the circumstances associated with lower and higher scores on the elements of the SDQ, as well as giving insight into stability over time in difficulties and the congruence between different perspectives. It discusses the

implications of differential reporting of difficulties by parents and teachers. Across the sweeps, boys tend to have higher rates of serious behavioural problems than girls. Rates of behavioural problems were low among those children whose parents had higher levels of parental qualifications and where both parents were in work. Ethnic differences in behavioural problems are complex with mothers of black African children reporting the lowest rates of behavioural difficulties and black Caribbean mothers the highest. The causes of these differences and their implications for the development of difficulties and appropriate strategies for responding to them are clearly complex. The poster thus gives some indications for future directions for research into understanding the context of emotional and behavioural disorders and the factors that may protect against them.

Integrity and yield of RNA from adult and cord blood stored in Tempus Tubes: Feasibility of gene expression studies in samples from a large mother-child biobank

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In the MoBa biobank, comprising more than 100,000 births, urine and blood samples were collected together with extensive questionnaire data on diet, medication and lifestyle. For more than 40,000 of these births, extra blood was sampled from the mother and the cord in Tempus tubes, transported to Oslo and then stored at -80°C for future use. The quality of the RNA isolated from such tubes is crucial for successful transcript profiling analyses.

During four consecutive years we assessed the RNA yield, purity and integrity of multiple parallel samples from three adults and three newborns. Furthermore, we applied specific quantitative PCR to analyse transcripts from six selected genes (CDKN1A, FOS, IL1B, IL8, MYC and TP53). We confirmed that RNA yield and purity were fairly stable for up to four years of storage; the yields of the cord blood samples did show some variation with time but they were always significantly higher than for adult blood. The RNA integrity, expressed as RIN-value, was found to be stable. Furthermore, the transcript levels for most of the selected genes were not affected by storage, with MYC expressing more variation than the others. Overall, we demonstrate that adult and cord blood collected in Tempus tubes and stored for up to four years at -80 °C yield intact and high h-quality RNA suitable for transcript profiling analyses. This is good news for future projects studying association of disease with altered patterns of gene expression.

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Heritability of birth weight from the Multiple Births Cohort Study (MUBICOS)

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Twins represent a unique model in genetic epidemiology to study the genetic and environmental effects and their interaction on different complex traits/diseases. The key point is represented by the comparison between the phenotypic resemblance in monozygotic twins (MZ) and in dizygotic twins (DZ). This comparison yields to the estimation of heritability, i.e. the proportion of total phenotypic variance explained by genes.

The Italian Twin Register (ITR), in collaboration with 8 Italian hospitals spread all over the Country, is currently enrolling a newborn twin cohort with the objective of estimating the heritability of health-related pediatric outcomes, accounting for other etiological factors. Main outcomes are: growth, neuropsychological development, allergies and sleeping behavior. Twins are usually enrolled at birth (in some cases during pregnancy) and information is collected retrospectively from parents for pregnancy and before pregnancy periods. Follow-up interviews are done at 6, 12, 18 24, 36, 48 and 60 months of age. Data are electronically stored in a online database using an ad-hoc system based on a virtual content management system (VCMS) platform. DNA is collected from saliva for twins and both parents.

The study started in 2009. As of March 2011, 191 twin pairs have been enrolled. For a subsample of same gender pairs, for which zygosity determined through DNA analysis has been performed, we have estimated the heritability of birth weight. In details, genetic and environmental components are estimated separately for the two genders. For females we found that genetics account for 44.6% of the whole variability while shared and unique environments account for 29.7% and 25.7% respectively. The same figures for males are 33.5%, 41.5% and 25.0% respectively.

This is only a small example of the potential of this cohort of newborn twins that will represent a resource for future research in pediatrics.

60 years of following birth cohorts from Tyneside, Northern England: The Newcastle Thousand Families Study and the Gateshead Millennium Study.

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Birth cohort research in the North of England began over 60 years ago when the Newcastle Thousand Families Study was initiated in response to high levels of mortality in children living in the city of Newcastle upon Tyne. The cohort of all 1142 children born in Newcastle in May and June 1947 were followed in great detail through childhood with regular assessments by health visitors and nurses attached to the research team. Data in childhood include health, growth, socio-economic, breast feeding data and school experience. There is also residential data in early life allowing potential linkage with exposure data such as air pollution. The cohort underwent two small follow-ups in their 20's and 30's before a large scale follow-up of the cohort at age 50 years. This allowed both early life and later social, health and lifestyle data to be analysed simultaneously. A new follow-up of the cohort at age 62/63 years is in progress.

The second ongoing Tyneside birth cohort is the Gateshead Millennium Baby Study (GMBS). Inspired by the earlier study, this was established in Gateshead, which lies across the River Tyne from Newcastle, and recruited 1029 infants born there between June 1999 and May 2000. This initially studied infant feeding behaviour and how this related to weight gain and weight faltering. Now known as the Gateshead Millennium Study, with recent follow-ups at ages 6-8 and 8-10, the study now focuses more on obesity and now includes additional areas of interest such as physical activity, diet, mental health and epigenetics..

In both studies we use path analyses to identify a) significant predictors of health and well-being, b) pathways between predictors, including non-significant predictors with effects mediated through significant predictors and c) relative contributions to variation in health and well-being. We will present our latest findings for both studies.

The Norwegian Influenza Cohort Study , NorFlu

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Funding: The Norwegian Influenza Cohort Study (NorFlu) is supported by the Norwegian Ministry of Health.

Background and aim: The Norwegian Influenza Cohort Study (NorFlu) is a prospective population-based pregnancy cohort study conducted by the Norwegian Institute of Public Health. The study was set up to capture pregnant women during the influenza A H1N1 pandemic of 2009/ 2010, aiming to study pregnancy outcomes, maternal health and childhood development following exposure to the pandemic.

Population: Participants were recruited from four hospitals in Norway from February 2010 through September 2010. Participants had their last menstrual period (LMP) between June 1st and December 1st 2009. Recruitment was during pregnancy week 28-40. All participants had given birth by September 25th 2010. Non-pregnant controls were recruited to NorFlu among participants in another large pregnancy cohort study in Norway, the MoBa study.

Study sample: 41.2% of the invited women consented to participate. The cohort included 3228 mothers giving birth to 3278 children. 227 non-pregnant controls were also included.

Data collection: Blood samples were obtained from mothers and children (umbilical cord) at birth, and from non-pregnant women in October 2010. Maternal samples include DNA, RNA, serum, plasma and peripheral blood mononuclear cells (PBMC). The umbilical cord samples include DNA, RNA and plasma. Two questionnaires were administered at inclusion, one addressing general health and pregnancy, the other influenza, vaccination, anti-viral medication, symptoms of disease and suspected adverse events following vaccination or medication. Non-pregnant women answered similar questionnaires. Follow-up will be conducted by questionnaires at regular intervals until the child reaches 16 years of age. Pregnancy outcomes are obtained through linkage to the Medical Birth Registry of Norway (MBRN). Linkage to other national health registries may also be performed.

Preliminary results: Overall 14.9% of the women reported having had influenza in pregnancy. 56.5 % of the participating women were vaccinated against H1N1, and the majority among these ,83.3 %, were vaccinated in pregnancy. Linkage to the MBRN for pregnancy outcomes is still in process.

Acknowledgement: We are grateful to all the participating families in Norway for taking part in this ongoing cohort study.

Intervention for smoking cessation nested within a web-based birth cohort (The NINFEA Study)

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Introduction: Pregnancy is a favorable time for counseling on smoking cessation. We tested an intervention for smoking cessation among participants in the NINFEA study (www.progettoninfea.it), a web-based Italian mother child cohort.

Objectives: We aimed at assessing whether providing information on the availability of anti-tobacco centers to active smokers during pregnancy decreases smoking habit at 6 and 18 months after delivery. This study is intended as a proof-of-concept for online interventions nested in web-based cohort studies.

Methods: Participants in the NINFEA birth cohort complete a 1st online questionnaire during pregnancy and two other questionnaires at 6 and 18 months after delivery. All questionnaires include information on smoking. At the time of the first questionnaire, women who reported being active smokers or having quit smoking during early pregnancy have been randomised between 1) receiving no intervention and 2) receiving online information on the health effects of active and passive smoking and a link to the list of public anti-tobacco centers in which the woman can receive help to quit smoking.

Results: 206 women were randomized: 102 were in the treatment group (who received information on smoking cessation) and 104 in the control group (who did not receive information). Currently 192 women have completed the 1st follow-up questionnaire at 6 months after delivery: the relative risk of smoking for the intervention was 1.08, 95% CI 0.81-1.44. Some 175 women have completed the questionnaire at 18 months (RR 0.99, 95% CI 0.68 – 1.44).

Conclusions: Although we did not find an effect of the intervention, this study demonstrates the feasibility of randomized intervention studies nested in a web-based birth cohort. We will use this setting to test other similar interventions.

The PÉLAGIE cohort, a mother-child cohort in Brittany (France)

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Funders: INSERM, National Institute for Public Health Surveillance (InVS), National Research Agency (ANR); the French Ministry of Labor, the Regional Council of Brittany, the Regional health services (DRASS de Bretagne)

The PÉLAGIE cohort was set in 2002 in Brittany, characterized by intensive agricultural activity and commercial fishing, exposing population respectively to pesticides and organochlorine compounds in addition to the more ubiquitous pollutants (solvents, water disinfection by-products, phthalates,...).

A total of 3421 pregnant women were enrolled in the cohort by gynaecologists during their first prenatal visit (participation rate: 80%). Participants were provided with a questionnaire and material to collect first-morning-void urine samples (for 95% of the cohort). Questionnaire asked about social and demographic characteristics of the family, obstetric history, occupational activity, nutrition and lifestyle. At birth, medical information about pregnancy, delivery and the newborn's health was obtained from midwives, pediatricians and hospital medical records (99.4% of the cohort) and a piece of placenta (63%), cord blood (62%) and maternal hair (58%) were collected. At the age of 2-year, questionnaires were sent to participants. They collected data on growth, health and cognitive and motor development of the children as well as data on activities of the child and lifestyles of families (participation rate: 70%). A similar follow-up at 6-year old is ongoing. Detailed neurodevelopment assessment including home visit is currently being conducted on a random subset of the cohort (n=300).

Exposure assessment has been conducted from self-reports in questionnaires, job-exposure matrices (occupational exposure to solvents), biomonitoring (pesticides and phthalates in urine, persistent pollutants in blood), geographical information system (crop activities) and water surveillance data (disinfection by-products). First published results focused on the possible impact of prenatal exposures to solvents or pesticides on adverse pregnancy outcomes, on the validation of indirect measures (solvents) and on the identification of main exposure determinants in the study area (insecticides). The cohort will then allow the study of the possible consequences of pre-/post-natal exposure on child health including behavior and cognitive functions.

Early-life determinants of total and HDL cholesterol concentrations in 8-year-old children; The PIAMA birth cohort study

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Background: Adult cholesterol concentrations might be influenced by early-life factors, such as breastfeeding and birth weight, referred to as "early programming". How such early factors exert their influence over the life course is still poorly understood. Evidence from studies in children and adolescents is scarce and conflicting. We investigated the influence of 6 different perinatal risk factors on childhood total and HDL cholesterol concentrations and total-to-HDL cholesterol measured at 8 years of age, and additionally we studied the role of the child's current Body Mass Index (BMI).

Methods: Anthropometric measures and blood plasma samples were collected during a medical examination in 751 8-year-old children participating in the prospective Prevention and Incidence of Asthma and Mite Allergy (PIAMA) birth cohort study. Linear and logistic regression were performed to estimate associations of total and HDL cholesterol concentrations with breastfeeding, birth weight, infant weight gain, maternal overweight before pregnancy, gestational diabetes and maternal smoking during pregnancy, taking into account the child's current BMI.

Results: We found an association between total-to-HDL cholesterol and maternal pre-pregnancy overweight ($\beta=0.15$, Confidence Interval 95% (CI): 0.02, 0.28), rapid infant weight gain ($\beta=0.13$, 95%CI: 0.01, 0.26), and maternal smoking during pregnancy ($\beta=0.14$, 95%CI: 0.00, 0.29). These associations were partly mediated by the child's BMI.

Conclusion: Total-to-HDL cholesterol in 8-year-old children was positively associated with maternal pre-pregnancy overweight, maternal smoking during pregnancy and rapid infant weight gain.

Serum micronutrient concentrations and childhood asthma: The PIAMA birth cohort study

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Background: Research suggests a role for micronutrients in the development of childhood asthma, but evidence remains inconclusive.

Objective: This study aimed to investigate the association between serum iron, magnesium, selenium, vitamin D and zinc concentrations, and asthma, atopy and bronchial hyper responsiveness (BHR) in childhood cross-sectionally, prospectively and longitudinally.

Methods: Subjects were enrolled in the Prevention and Incidence of Asthma and Mite Allergy (PIAMA) birth cohort study. Serum nutrients were available for a 4-year-old population (n=372) and an 8-year-old population (n=328). Yearly questionnaires inquired about asthma until 8 years of age. Atopy (specific IgE in serum) was measured at 4 and 8 years of age, BHR at 8 years of age. In the 4- and 8-year-old population cross-sectional analyses were conducted using logistic regression. In the 4-year-old population prospective analyses with outcomes at age 8 were conducted using logistic regression, and longitudinal analyses over ages 5-8 were conducted with Generalized Estimating Equations (GEE) models.

Results: We observed a consistent, but non-significant inverse association between serum magnesium concentration and asthma in all analyses. Analyses in the 4-year-old population showed an inverse association between serum vitamin D concentration and asthma, which was significant in the longitudinal analyses. In the 8-year-old population, vitamin D was positively associated with asthma, although non-significantly. No relevant associations between serum iron, selenium and zinc concentrations, and asthma, atopy and BHR were found.

Conclusion: Our study contributes to the evidence that children with higher serum magnesium concentrations are less likely to have asthma. Our findings regarding the association between serum vitamin D concentration and asthma were age-dependent. Further research is needed to elucidate the complex associations found in our study.

PICCOLI+: a new mother-child cohort in Italy looking for integration in the European research

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PICCOLI+ is a project recently funded by the Italian Ministry of Health with the aims of:

- establishing a large population-based birth cohort in Italy to be followed during childhood;
- evaluating the effects of environmental exposures occurring during pregnancy and early childhood on the development of common pediatrics problems such as respiratory problems, neurodevelopment, obesity etc;
- establishing a centralized biobank of serum and DNA for future studies;
- cooperating with other mother-child cohorts in Europe.

The enrolment will start on late summer 2011 in four regions of the Country (Piedmont, Friuli Venezia Giulia, Tuscany and Lazio) with at least 500 newborns in each area. Baseline information, including pregnancy exposures and diseases, will be collected on mothers and infants by questionnaires and medical records at birth. Infants will have a clinical examinations at birth and mothers will be interviewed again at 12 and 24 months. The exposures of interest will be traffic-related air pollution, maternal and children's diet, other outdoor and indoor environmental exposures, for which information will be collected. The most important outcomes for the first two years of follow-up will be wheezing and other respiratory symptoms, respiratory infections, weight gain, sleeping patterns and neurodevelopment. In addition, the study will integrate new technological advances in biobanking and use all the expertise, the methods and the results that are produced within the ESCAPE (www.escape.org) EU funded project.

At the moment there are two other national birth cohorts active in Italy, the internet-based initiative (NINFEA) on pregnant volunteers and the population based cohort on multiple deliveries (MUBICOS), both of them collecting also biological samples from mums and newborns. Being the overlap among the researchers of NINFEA, MUBICOS and

PICCOLI+ substantial, it is expected a fruitful interaction at national level that will enlarge the Italian contribution to the European CHICOS effort.

Supplements use in early pregnancy and birth outcomes: The Mother-Child “Rhea” Cohort in Crete, Greece

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Objective: Poor nutrient intake during pregnancy can adversely affect both infant and maternal health. The aim of this study was to examine whether folic acid, iron, and calcium supplementation in early pregnancy (<18 week of gestation) affects the risk of preterm birth, low birth weight or small for gestational age (SGA) neonates, of the mother-child cohort “Rhea” study in Crete, Greece.

Methods: The analysis included 1,275 women with singleton pregnancies, providing complete data on supplements use in early pregnancy and birth outcomes. Supplements use was obtained from questionnaires that were completed by a trained research nurse between 14th and 18th week of gestation. Main outcome measures were gestational age, preterm birth, low birth weight, and SGA neonates. Information on anthropometric measures at birth was obtained from the hospital delivery logs and medical records. Multivariate log-binomial and linear regression models were performed to adjust for several confounders.

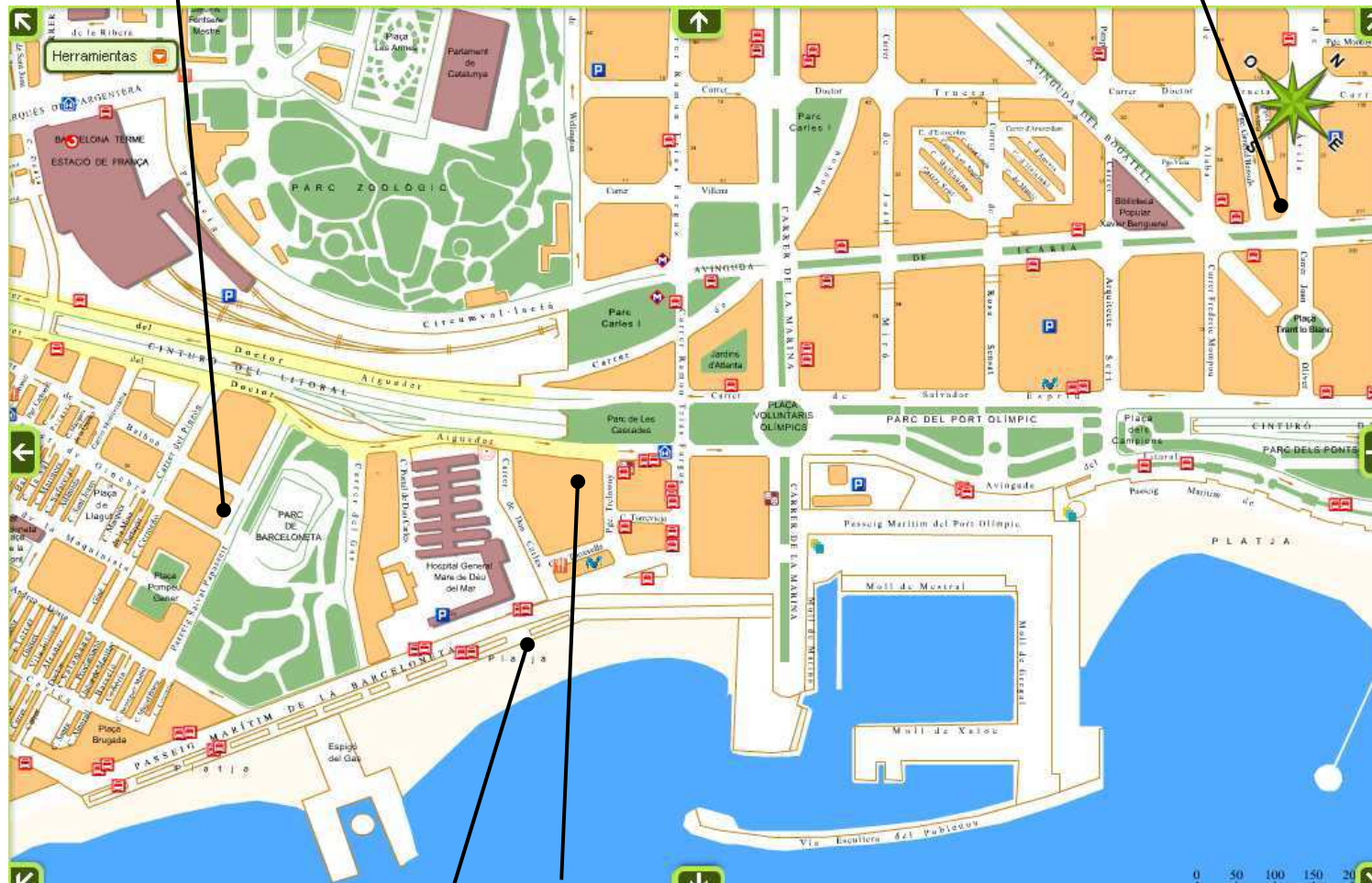
Results: Micronutrient supplement users comprised the majority (1187, 93%) of the study population. Moderate to high supplemental folic acid use (1-5mg/day) was positively associated with gestational age (β coefficient 0.46, 95%CI 0.17, 0.74), and decreased risk of spontaneous preterm birth (RR 0.55, 95%CI 0.34, 0.90), low birth weight (RR 0.43, 95%CI 0.24, 0.76) and SGA neonates (RR 0.52, 95%CI 0.29, 0.94) after adjustment for maternal age, education, origin, parity and smoking during pregnancy. Non significant associations were found for higher doses of folic acid supplementation. Daily doses of iron supplementation up to 100 mg were positively associated with gestational age (β 0.33, 95%CI 0.06, 0.59) while non significant associations were found with fetal growth measures. There was found no significant association between supplemental calcium intake and adverse birth outcomes.

Conclusion: In conclusion, folic acid supplementation in early pregnancy is associated with decreased risk of spontaneous preterm births, low birth weight and SGA neonates.

Maps

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