Elfe - French Birth Cohort Study

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Partnership

Joint Research Venture JRV - Contract signed on March 8th, 2006

ELFE TEAM
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• Project coordinator: Pascal Arduin (Ined)
• Themas manager :
 - social science: Jean-Louis Lanoë (Inserm)
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• Survey: Ruxandra Breda-Popa (Ined - Survey)

Elfe in brief...

• "Elfe" is an acronym for "Étude longitudinale française depuis l'enfance" (French Longitudinal Study since Childhood).
• The core methodology of the project will be the enrolment and long-term follow-up of a nationally representative cohort of 20,000 children born in 2010.
• The objectives of the project cover the fields of Social Sciences and Public Health, with an emphasis on **Environmental Health** (multidisciplinary approach) and biomonitoring.

A multidisciplinary approach

MAIN LINE: THE CHILD'S DEVELOPMENT
• Situation at birth (perinatal data) and future health (behavior, nutrition, diseases, accidents…).
• Context and interactions: familial, social, economic, physical environment
• Physical and cognitive development of the child, educational course, access to work

DISCIPLINES
• Demography, sociology (of family, education, sociability…), economy, **environmental health, epidemiology**, genetics, nutrition….

Main topics

Social Sciences	Health-environment	Health
• Demographics	• Chemical exposure	• Accidents & trauma
• Socialization-Education	• Physical exposure	• Use of health-care
• Economy-precarity	• Environmental contamination	• Infectious diseases

Cross-disciplinary themes
• Respiratory disease
• Perinatality
• Child development & mental health
• Growth - reproduction
• Cancer
• Nutrition

Methodological aspects

• A cohort design
• A nationally representative sample of children (births)
 - **All** children born in France on specific days of hopefully 2011 (2-3-4-5 of January, April, July and October)
 - First visit (and recruitment) at maternity
• **Members of the cohort will be easily identified in other sources:**
 - fixed dates of birth
 - coincidence with the (new) Insee Demographic panel (EDP+)
• **'Absorption' of regularly planned surveys such as:**
 - the health surveys implemented in the school system at specific ages (6 yrs, 11 yrs…)
 - the educational panels built by the Ministry of Education to follow the children through the whole school system
• **Access to other sources:**
 - Those of the Demographic panel (Census data, vital statistics and more?)
 - Family Allowances - Medical security system (RNIIAM, PMSI)
 - Data on children living out of their family (institutions, other families)
• **Direct data collection:**
 - At maternity
 • a 20' questionnaire administered by a midwife, medical data from medical file and a Self administered questionnaire (nutrition environment)
 • informations on Pregnancy; Perinatal period and Mothers' and Babies's health at delivery
 - By phone, by interviewers: 8 weeks (50'), 1, 2, 4 year + fathers
 • At home: 3 yrs , 5-6 yrs
 • Daily records on nutrition (3/5 months; 6/8 months and 9/12 months)
• **Biological samples**
 - **Biomarkers of exposure to pollutants, various nutrients and genetics traits**
 - Blood of the umbilical cord, Mother's hair, urine and milk and mother's venous blood at maternity
 - Urines of child at 3 and 6 years
• **Data on environment:**
 - Geo-matching with external data on air pollution, quality of water etc.
 - Sensors left at home (dust...)
• **Medical examination**
 - Health center (6 years): Medical examination (center of health) and psychological tests
 - Questionnaire to physician (2 years)

Data collection

Passive longitudinal follow-up from:	Pregnancy Birth 6 weeks old 1 y 2 y 3 y (nursery sch) 5 y 6 y (prim. sch.) 8 y 10 y 11 y (sec. Sch) 14 y old	Repeated surveys at different ages:
Insee Demographic Panel (EDP) **Medical Data** (use of data from Medical System: SNIIRAM) Environmental data/GIS (InVS) School follow-up, DEP, Ministry of education (3 y+)		- Interview + med files, *midwives* *Biological samples, midwives* - Phone Interview - *Environmental sensors* - Phone Interview - Face-to-face Interview, - Phone Interview - Face-to-face Interview, <u>Phy exam</u> + *Psych.tests, Blood Sample (nurse)??* - Phone Interview; *Psych. tests, School Dr.* - Face-to-face Interview, <u>Phy exam</u> - Phone Interview; *Psych. tests, School Dr.*

Questions to answer ...

IN THE FIELD OF PHYSICAL EXPOSITIONS
• What are the cumulative exposure levels to radon exposure?
 - Radon sensors at home
 - During 3 month / 5 years
 - In areas with high levels
• What are the cumulative individual exposure levels to medical radiations?
 - Questionnaire each year
 - Data from medical security system (RNIIAM, PMSI)
• What are the cumulative exposure levels to UV exposure (UVA and UVB)?
 - Data from satellite
 - Geo-matching with home and holiday places
 - Questionnaires
 - Medical examination (naevi) at 6 years

IN THE FIELD OF AIR POLLUTION
• Impact of exposure to air pollution (NO_2, O3, $PM_{2,5}$, PM_{10})
 - During pregnancy on health outcome at birth
 - On child development, in particular respiratory diseases (asthma and ventilatory function)
• Data from
 - Residential histories
 - Questionnaires (respiratory health, socio economic data, tabacco exposure) and echographic data
 - Medical examination with respiratory function measurment (at 6 years)

IN THE FIELD OF CHEMICALS EXPOSURE AND BIOMONITORING
• What are the exposure levels to emerging pollutants?
 - Reprotoxic and neurotoxic chemicals (pesticides, Bisphenol A, phtalates, PCBs, dioxins, lead, mercury…)?
 - In umbilical cord, mother's hair, urine and milk and mother's venous blood (at birth) then child's urine (at 3 and 6 years)
• Is there geographical disparity? What are the determinants of exposure to these emerging pollutants?
• Impact of exposure to pollutants to reproductive functions and child's development
 - Questionnaires / year
 - Questionnaire to physician at 2 years
 - Medical examination with psychological test at 6 years

Two Pilot surveys

OBJECTIVES
• To validate the recruitment and first interview procedures
• To validate the content of the questionnaires
• To test the acceptability of the study
• To test the feasibility of the biological samples

POPULATION
• Single or twin births during April 2,3,4th 2007 in Bourgogne and Picardie
• Single or twin births during October 1,2,3,4th 2007 in Rhones Alpes and Seine Saint Denis

Participation to pilot survey

PARTICIPATION
• 58% (n=198) in April (32/35 maternity) and 53% (n=301) in October (30/40 maternity)
• 90% accepted biological samples and 80% were collected (October)

FIGURE	REALISATION OF BIOLOGICAL SAMPLES AT BITH
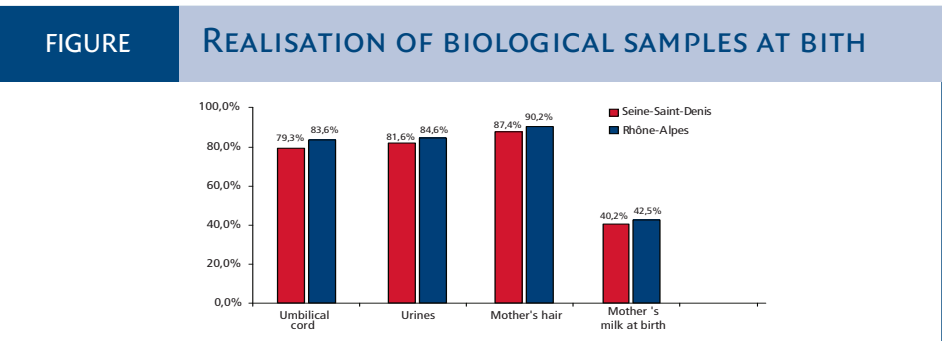
BIOLOGICAL ANALYSES
Available in 2010

Conclusion

• Cohort study will investigate the long term effects of environmental exposures on child health using various innovative approaches.
• An emphasis will be placed on the combined interactions between neuro-toxic products (lead, mercury, PCB, pesticides) and various endocrine disturbers.
• This is a first step in perinatal biomonitoring (vulnerable population) in France.

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