

Elfe

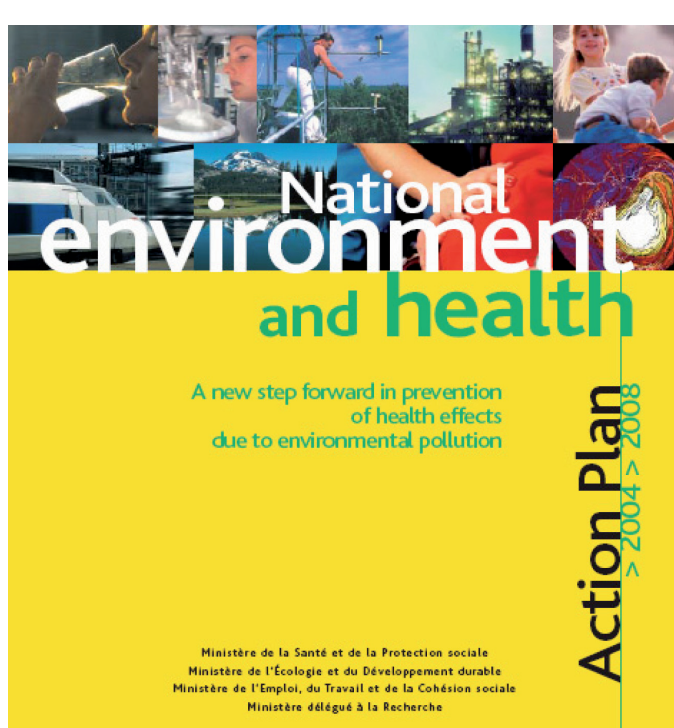
Growing up in France

The French Longitudinal Study on Children

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Context: The French NEHAP

- The French National Environment and Health Action Plan (NEHAP) was adopted for the period 2004-2008.
- One of the priority actions is to conduct an epidemiological study on a cohort of children.
- Main Objectives:
 - Measuring the exposures to pollutants
 - . Identify critical phases in the life of the children,
 - . Determine exposure levels in biological samples to chemical, biological, and physical factors during pregnancy and early childhood;
 - Description of pathologies;
 - Analysis of associations between exposures and pathologies.



Children's vulnerability to environmental dangers

- Repeated cellular divisions makes the DNA more fragile to chemical and physical stressors.
- Cellular growth requires rapid penetration of outside substances.
- Higher intake of water and nutrients per unit of body weight than adults.
- High metabolism.
- Immature immune system and detoxication mechanism.
- Large skin surface in relation to unit of body weight.
- Proximity to floor (small size and playing activities of young children).
- Hand-mouth activities.

Main Objectives

ENVIRONMENT AND NEUROCOGNITIVE DEVELOPMENT AND ENDOCRINE DYSFUNCTIONS

- Describe child contamination during growth to environment neurotoxic and reprotoxic substances,
- Explore the consequences of contamination levels on neurocognitive development and child reproduction functions.
- Pesticides toxicity:**
 - Describe pesticide contamination in children (high values prevalence, concentrations distribution),
 - Explore the consequences of contamination levels of pesticides on neurocognitive development and development of reproduction functions.
- Lead exposure during pregnancy** (consequences: prematurity, small birth weight, growthdelay, fetal death, abnormalities of developing brain)
 - Prevalence of strong impregnation at birth,
 - Geographical variations and its determinants.
- Exposition to PCDD/F, PCB et PBDE.**
- Characterization of child exposure to emerging pollutants (phthalate, ...):**
 - Risk factors analysis.
- Air pollution and adverse pregnancy outcomes:**
 - Exposition to air pollution during pregnancy in France,
 - Explore the consequences of this exposition on birth defects and intrauterine growth.

Methods

1. LONG-TERM FOLLOW-UP OF A NATIONALLY REPRESENTATIVE COHORT OF 20,000 CHILDREN BORN IN 2009 (FRENCH BIRTHS DURING A ONE-WEEK PERIOD FOUR TIMES IN THE YEAR)

2. EARLY DATA COLLECTION IN MATERNITY

- Day 1: Biological sampling Cord Blood.
- Day 2-4: Perinatal National survey:
 - Face-to-Face questionnaire (administered by midwife) and data from medical file,
 - Data collected on pregnancy, perinatal period, health status of women and children at birth.
- Day 2-4 (After Face-to-Face questionnaire):
 - Signature of consent from mother and father,
 - Biological sampling : mother's urine, mother's hair and milk,
 - Self administered questionnaire (nutrition + environment).

3. BIOLOGICAL SAMPLER'S ORGANIZATION FROM MATERNITIES TO BIOBANK

- Sampling by maternity's midwives**
 - Sampling cord Blood (25 mL) directly after birth,
 - Sampling of mother's urine (150 mL) and mother's hair (60 single hairs) during hospitalization.
- A part of sampling will be analyzed according to research objectives. The other part will be stocked in biobank.
- In maternity, sampling will be stocked at 4°C.
- Each day, biological sampler will be transported to a Regional Reference Center for centrifugation and aliquotization.
- Then, biological sampler will be transported and stocked in biobank.

4. 6-8 WEEKS SURVEY AT HOME

- Face-to-Face questionnaire (Insee pollster).
- Setting radon samplers and dust samplers at child home for a 3 month period.
- Tube left for mother's milk collection (100 mL) (only on a subsample).
- Samplers and mother's milk will be returned in stamped envelopes to reference laboratories.

Biological analyses

- Mother's urines analyses:**
 - Cotinine,
 - Phthalates,
 - Alkyl-phenol,
 - Organochlorine Pesticides,
 - Organophosphate Pesticides,
 - Pyrethroids Pesticides,
 - Organo-étains.
- Mother's milk analyses:**
 - POP (PBDE et PCB),
 - POP (PFOS et PFOA),
 - Alkyl-phenol.
- Cord blood analyses:**
 - Nutrients,
 - Environmental pollutants (lead, iron, zinc, selenium),
 - Emergent pollutants (OMICS).
- Mother's hair analyses:**
 - Mercury.

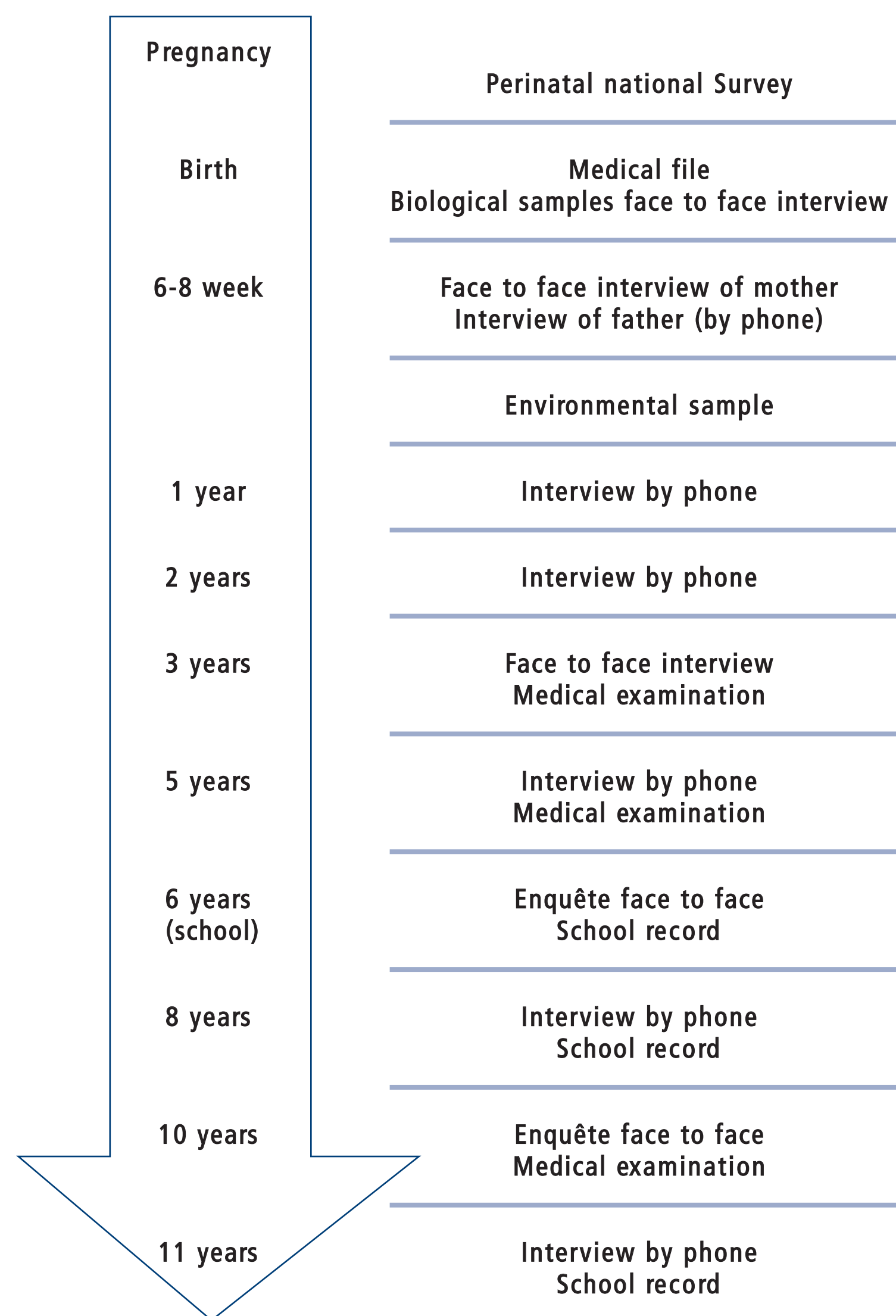
Analyses of effects

- Reproductive development:**
 - Medical file at birth (genital urinary birth defects),
 - Reproductive function (fertility and fecundity) by questionnaires.
- Neurobehavioral and cognitive development:**
 - Neurobehavioral and cognitive examination during infancy,
 - Questionnaires face to face,
 - School records.

Environmental analyses

- Dust samplers.
- Air pollution models.
- Geographic Information System (GIS)
 - Geographic coding of home and work address.
- Description of routine activities:
 - Time at home,
 - Transport to work,
 - Time at work ...

Follow-up



Time Table

- April-June 2007:**
 - Maternity survey in 2 French districts,
 - 6-8 weeks questionnaires at home.
- October-December 2007:**
 - Maternity survey in 2 other French districts,
 - Biological sampling: cord blood, mother's urine, mother's hair,
 - 6-8 weeks questionnaires at home,
 - Tube left for mother's milk collection (only on a subsample).
- 2008:** Analysis of pilots and preparation for the launch of the cohort.
- 2009:** Enrolments, maternity surveys, 6-8 weeks surveys.
- 2012:** Kindergarden Survey.
- 2015:** First Grade Survey.

Partnership


JOINT RESEARCH VENTURE JRV


CONTRACT SIGNED ON MARCH 8TH, 2006

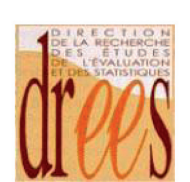
 **Ined**
Institut national d'études Démographiques

 **InVS**
Institut de veille sanitaire National
Institute of Public Health Surveillance


 **Inserm**
Institut national de la santé et de la recherche médicale

 **Insee**
Institut national de la statistique et des études économiques

 **Depp**
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 **Drees**
Direction de la recherche, des études, de l'évaluation et des statistiques

 **DGS**
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 **Cnaf**
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