

# National Survey of childhood lead poisoning 2008-2009

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SOCIÉTÉ FRANÇAISE DE PÉDIATRIE





# Context (1)

SATURN-INF, two associated studies among children,

- National study of childhood lead poisoning
- Study of seroprevalence of infectious diseases

And the creation of a serum bank

Environmental survey

## Context (2)

- No national data since the Inserm/ InVS study of 1995-1996 (Blood Lead Level (BLL) $\geq 100\mu\text{g/L}$  estimated prevalence :  $2.1 \% \pm 0.5 \%$ , 85 000 cases)
- Objective of the Law of Public Health, August 2004: « to have a 50 % decrease of the BLL  $> 100\mu\text{g/L}$  prevalence from 1996 to 2008» among the children aged 1 to 6 years old.
- Probable decrease of the BLL $\geq 100\mu\text{g/L}$  prevalence
  - Recent local studies : general population lead poisoning decrease
  - Screening activity : in 2004, 5 % of the first BL test  $\geq 100\mu\text{g/L}$  ( 25 % in 1995)
- Existence of areas with strong environmental exposure

# Context (3)

- Screening :
  - 1.2% children are tested at least once before 7 years old
  - Important geographical heterogeneity
  - Concentration of the new cases in Paris and suburb: 2005, 71 %
  - Great contrast between the estimated prevalence in 1996 (85000) and the incident cases (500/ year)
- Questions from the Public Health actors :
  - Should the screening be developed in the areas where it hasn't been yet ?
  - Should the screening be limited to certain populations ? How to locate them ?

# Context (4)

- Primary prevention related questions
  - Which actions should be taken in the future in order to prevent from the high level exposures ?
  - How to reduce the basic exposure of the population ?
    - Improvement of old housing ?
    - Removal of lead pipes ?
    - Location and decontamination of the polluted areas ?
- Therefore, the study shall bring answers to the actual known hierarchy of the exposure sources to lead
  - For the elevated exposures
  - For the moderate exposures



# Objectives of Lead Poisoning Study

- To estimate the national prevalence of elevated BLL ( $\geq 100 \mu\text{g/L}$ ) among children aged 6 months to 6 years old
- To measure the contribution of the various sources of exposure to BLL
- To determine the distribution of the BLL by area (including French overseas department)
- To validate geographical indicators to target potentially poisoned children



# Materials and methods (1)

- Cross sectional study
- Study population :
  - Children from the general population
- Sample size : 3800 hospitalized children in 140 public hospitals

(expected prevalence=1%, precision rate $\pm$ 0,4%, clustering effect=1,5)

# Materials and methods (2)

## Children recruitment

- In general population : ideal choice
  - Exhaustive and accessible sampling frames are not available
  - Risk of refusal is very high because of specific blood test
  - Logistic means are not available
- At hospital : reasoned choice
  - Seize the opportunity of a blood test collected for medical purposes : better acceptability
  - Consent of only one parent necessary
  - The results are comparable with the 1995-96 study





# Materials and methods (3)

## Sampling plan

- Two stage probability sample
  - 1<sup>st</sup> degree :
    - Random sampling of the hospitals
      - Regional stratification and overrepresentation of the French regions with a high density of industrial sites
      - Stratification by lead exposure in housing risk and overrepresentation of the hospitals in the stratum with patients “at risk”
    - Selection of the pediatric services (general/ ER/ surgery)
  - 2<sup>nd</sup> degree :
    - Inclusion of the children
    - No selection



# Materials and methods (4)

## Inclusion and exclusion criteria of the children

- Inclusion criteria :
  - Hospitalized (except consultations)
  - Age : 6 months-6 years old
  - Blood test required within the health care context
  - Residing in France
  - Written and signed parental consent
- Exclusion criteria :
  - Hospitalization for a treatment or a check-up for lead poisoning
  - Diseases with vital prognostic at stake
  - Transfusions/ gammaglobulines during the past 6 months
  - Immunodeficient children or children with chronicle disease affecting the immunity



# Materials and methods (5)

## Data collection

- Parents' consent
- Questionnaire :
  - **socio-demographic factors** : parents' occupation, parents' study level, child and mothers' birth country, housing status,
  - **housing** : address, date of construction, overcrowding, presence of lead pipes, presence of deteriorated paints, recent renovation works,
  - **child behaviour** : consumption of tap water, tendency to scrape, suck or nibble the paints, exposure to tobacco smoke
- Lead blood test
- Ecological data
  - Housing and socioeconomic characteristics at cadastral level
  - Lead dissolving capacity of tap water in the local drinking water network



# Saturn-Inf study 2007-2009

- Pilot survey : October - November 2007
- Final survey :
  - September 2008 - Mars 2009 : inclusion of children
  - April - November 2009 : data exploitation
  - September 2009 : first results of the prevalence of childhood lead poisoning



Thanks for your attention

For more information:

<http://www.invs.sante.f/surveillance/saturnisme/default.htm>