

THE FRENCH DIOXIN AND INCINERATORS STUDY: PRESENTATION OF THE PARTICIPATION AND EXAMINATION OF THE NON RESPONSE.

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Abstract

In the French Dioxin and Incinerators Study, serum analyses of PCDDs, PCDFs and PCBs were performed in 1030 adults randomly selected to identify the determinants of the body-burden of these compounds in the population living around municipal solid waste incinerators. Subjects were recruited in two steps and data were collected through phone-call and face-to-face questionnaires. One of the challenges of the project was to convince the population to participate in the study. Participation and ways to increase participation in such a biomonitoring study is presented. Non-response, which is a crucial point to obtain a convenient sample, is examined. Comparison of participants / non-participants and exposed groups / non-exposed groups on socio-demographic and local food consumption characteristics showed no significant differences.

Introduction

The objective of the French Dioxin and Incinerators Study was to determine whether the emissions of the waste incinerators contribute to the body-burden of PCDDs, PCDFs, and PCBs in the neighbouring population. The body burden was estimated through an analysis of PCDDs, PCDFs and DL-PCBs levels in serum. The study involved 8 locations surrounding 8 incinerators and included 1030 adults¹ randomly sampled.

Without an acceptable level of cooperation and participation in all aspects of the research, the goal of the study could not be met. We proposed to participants take part in a large interview (including socio-demographics, environmental and nutritional questionnaires) and to give their blood (200 ml). One of the challenges of the project was to convince the population to participate in the study.

Subjects were recruited in two steps (see figure 1). In the first step, data concerning socio-demographics characteristics, eligibility criteria to the study and local food consumption were collected through a questionnaire called ‘short questionnaire’ to establish the random list. In the second step, after random sampling, people were proposed to participate. Data from the short questionnaire have been used to determine if participants and non participants (after the second step) differ regarding the parameters of interest.

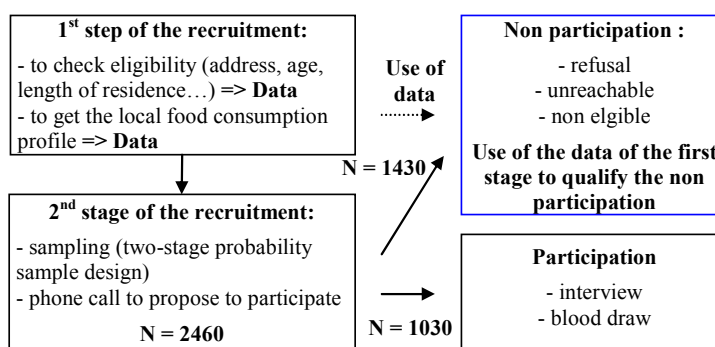
This paper presents the participation to the study and examines the non participation (refusals, unreachable, non eligible). This analysis takes into account the results for exposed groups (people living in the vicinity of the incinerator) and non exposed groups (people living beyond 20 km of the incinerator and not exposed to known dioxin sources).

Material and Methods

Sampling and recruitment

In order to be eligible for participation in the survey, people were first contacted by phone after obtaining their contact details from voter’s lists. People from each of the 8 sites were then sampled using a two-stage probability sample design, stratified by area (exposed or not) and by type of local food consumption (eating locally-produced food or not). In the first stage, households were

Figure 1 - Sample design and data collection to examine non response



sampled using probabilities proportional to the size of the household. In the second stage people were sampled people using a simple random sampling. The random sample included a single eligible adult in each household, aged from 30 to 65 years old, living for at least 10 years around the incinerator or in the referent zone, not occupationally exposed to dioxins and furans as for women only non breast-feeding ones. Stratification allowed over-representation of samples of certain consumer profiles in order to study them with a sufficient power. This over-representation is compensated in analyses using survey design weights.

Participation

Each subject who was sampled was asked to participate in a 60 to 90 minutes long face-to-face interview including socio-demographics, environmental and nutritional questionnaires. After a medical interview, a blood sample collection of 200 ml was obtained by the staff of the French National Agency for Blood (EFS). This blood volume is required to get satisfactory limit of detection and to assure quality assurance², but could prevent population from participating in the study.

In the study, a participant was defined as a person who fulfilled inclusion criteria, provided a blood sample for dioxin analysis and answered to all the questionnaires.

Efforts were made to promote the study at the local level and to enhance participation. Regional units of the National Institute for Public Health Surveillance (Cire), based in each region of France, with the central Institute, were in charge in the organization of local communication campaigns. The local communication campaign consisted in:

- informing the local administrations and explain the interest of the study
- informing local medical actors (pharmacists, general practitioners) using flyers and posters
- informing the local population using posters
- organizing a meeting to announce and explain to goals of the study to the population

Another important point to ensure a good participation was to conduct the field study in a place close to the participants' residence. Consequently, for each of the 8 locations surrounding 8 incinerators, 10 local EFS members of staff and the InVS team set themselves up in 4 to 6 different places to collect the blood and conduct interviews. Concerning the interview (60 to 90 minutes), we offered the possibility to conduct it at home.

Examination of the non response

The difference between estimates based on the participants only and estimates based on the full sample is called "non-response bias". It is a crucial point to minimize non-response rate in order to obtain a convenient sample.

The recruitment in this study has been realized in two-steps (figure 1). In the first step, household were contacted by phone in order to check that they were eligible to take part and to classify them according to their local food consumption (eating locally-produced food or not). In the second step, after random sampling, participation to the study was proposed. Socio-demographics and local food consumption data (supposed to be linked to dioxin intake) were available to compare participants and non participants in the second step. Non participants are divided in four different groups:

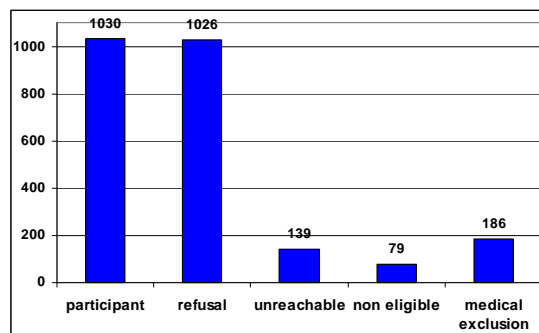
- The refusal group composed of people that definitely refused to participate.
- The unreachable group composed of households not reachable after 10 phone calls (different days and time)
- The non-eligible group with people that didn't respect our eligibility criteria: age, period of local residence (>10 years), localization, occupationally exposed, breastfeeding...
- The non eligible for medical reasons group composed of subjects who have medical contraindication to a 200 ml blood test.

Exposed and non-exposed groups have been compared too.

Results and discussion

Participation and non-participants

Figure 2 - Participation in the study



The ‘Non-eligible’ group included people occupationally exposed to dioxin (61%), people who are outside of the exposed area (16%) or a recent weight variation (6%).

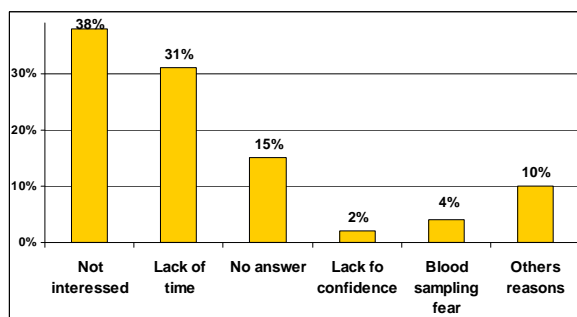
The most common reason for refusing was a lack of interest (38%), see figure 3. As we expected, a lack of time (31%) was an important factor in refusing that’s why we have tried to adapt our organization to save to participants’ time.

15% of the participants didn’t want to give any reason for refusal. Results are identical for the 8 different sites and for the exposed and non-exposed areas.

The participation rate was defined as the ratio between the number of participants and the number of people sampled who were eligible and reachable.

2460 people were asked to participate in the study. Finally, 1030 participants were included and 1026 refused to participate. **The participation rate was 50.1%** (1030 participants divided by 2056 people sampled who were eligible and reachable). The participation rate reached 55% in the exposed areas and fell to 42% in the non-exposed areas. Considering the 8 different sites the participation rate varies from 44% to 63 % (for exposed area).

Figure 3- Reasons of refusal



Comparison of participants and non-participants

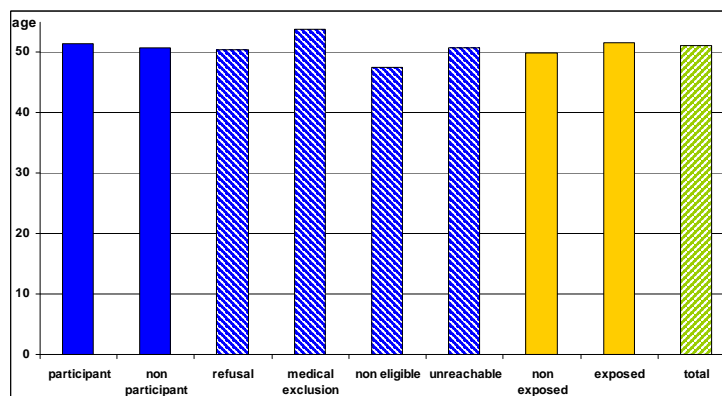
Socio-demographic characteristics

Age (figure 4)

Figure 4 shows no difference between average age of participants (51.4 yrs) and non participants (50.8 yrs). Age of non-exposed people (far from incinerators) was quite similar for participants and non-participants (50.4 yrs and 49.7 respectively). Age of exposed people was also quite similar (51.6 for participants and 51.3 for non participants).

The average age of people with medical exclusions (53.7 yrs old) was slightly higher than the age of the other groups. We find the same conclusion for exposed and non-exposed groups.

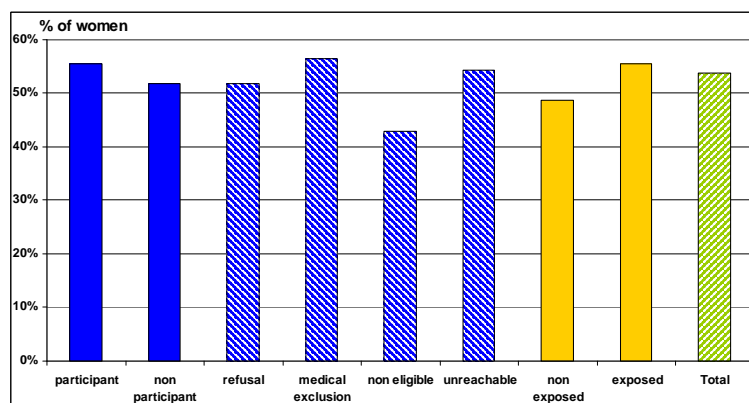
Figure 4 - Average age of participants and non-participants



Percentage of women (figure 5)

The sample was composed of 54% of women, 56% for participants and 52% for non participants. As usual, the participation rate of women was higher. The percentage of women among non eligible was only 43%, essentially

Figure 5 - Percentage of women in participants and non-participants



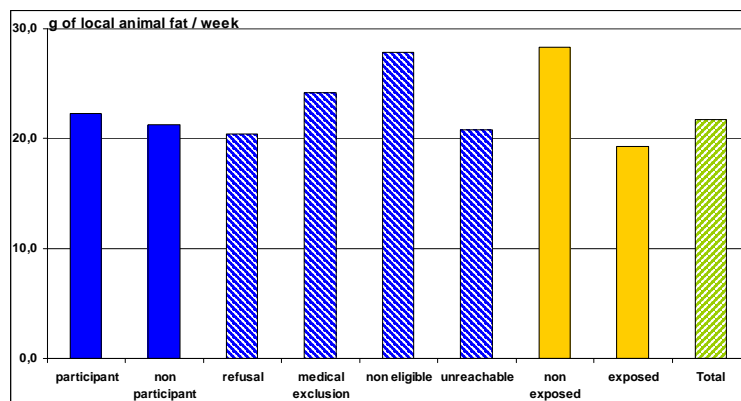
due to exclusions for occupational exposure to dioxins, (e.g. firemen, steelworker, house painter...) more frequent in men.

Local food consumption

There is no difference between participants and non-participants for local animal fat consumption (animal fat from meat, eggs and milk). Local animal fat consumption was slightly higher for 'non-eligible' and 'medical exclusion'. (Note that these two groups have a small size).

A significant difference in local animal fat consumption between exposed and non-exposed population was found. The fact that non exposed are localized in more rural area (to be sure there are no emission of dioxin) can explain this difference. Results for milk, eggs and meat were the same as for the total local animal fat consumption: no difference between participants and non-participants and higher consumption for the non-exposed group. Local fruits and vegetables consumption was slightly higher for participants than for non-participants. Concerning exposed and non-exposed population no difference could be shown.

Figure 6 -Average local animal fat consumption (g of local animal fat / week) for participants and non-participants



Conclusion

The participation rate of the French Dioxin and Incinerators Study was quite satisfactory (50.1%) if we consider that each subject who was sampled was asked to participate in a long face-to-face interview (60 to 90 minutes) and had to give a large blood sample (200ml). In this kind of study the participation rate is dependant on a good local communication campaign and a flexible organization (the interviewers and the medical team have to be able to adapt to the subject in terms of time and place). The comparison of participants and non-participants were similar for socio-demographic data and average local animal fat consumption.

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