

# High Dioxin Serum Concentrations in the French Dioxin and Incinerators Study

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## Introduction

The French Dioxin and Incinerators Study was launched to determine whether the emissions of the waste incinerators (MSWI) contribute to the body-burden of PCDDs, PCDFs, and PCBs in the surrounding population.

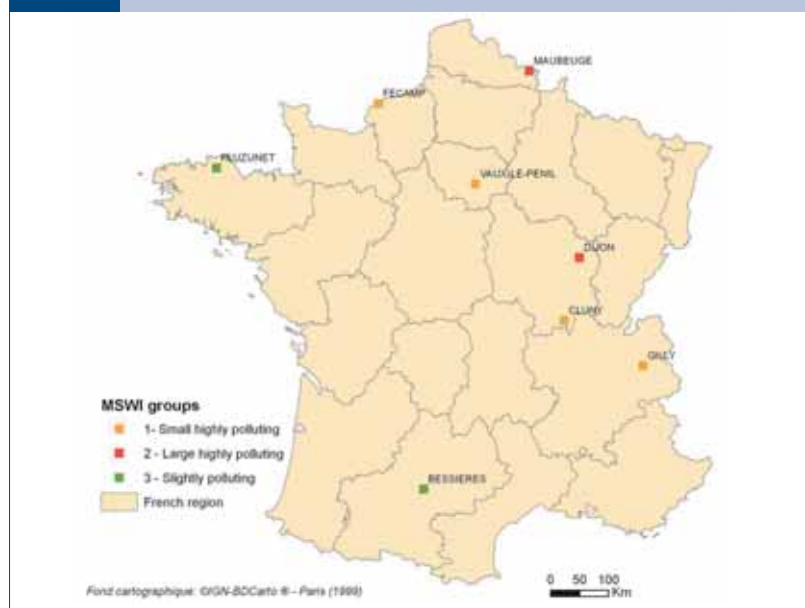
The study involved 8 areas surrounding 8 MSWI and included 1030 adults (30-65 years old) selected through a random sampling. The 8 areas were selected to represent different types of MSWI (Figure 1):

- small (<6 tons/hour) and highly polluting (>10 ngTEQ/Nm<sup>3</sup>)
- large (≥6 tons/hour) and known to have polluted in the past
- large and respecting the environmental regulations (<0.1 ngTEQ/Nm<sup>3</sup>)

The body burden was estimated through an analysis of PCDDs, PCDFs and PCBs levels in serum.

A descriptive analysis of participants with high serum levels was conducted to identify potential common characteristics.

FIGURE 1 LOCATION OF THE SITES



## Methods

### SAMPLE COLLECTION AND ANALYTICAL METHODS

1030 serums samples:

- 200 mL of blood
- 7 PCDDs, 10 PCDFs, 12 DL-PCBs, 3 indicators PCBs
- GC - HRMS method by CART laboratory
- blood lipids analysed by enzymatic method
- results expressed in WHO TEFs 1998.

### QUESTIONNAIRES

Individual information was collected by interview:

- Sociodemographic data
- Food diet
- Occupational exposure, leisure, tobacco status
- Living or not in the exposed area.

### INTERNAL QC

The concentrations of the QC (spiked fetal beef serum) were of:

- 157.3 pgTEQ/l for PCDD/Fs
- 122.0 pgTEQ/l for DL-PCBs

### DEFINITION OF HIGH LEVELS

Participants above the 99<sup>th</sup> percentiles of the distribution:

- PCDDs/Fs + DL-PCBs >100 pgTEQ/g lipids
- PCDDs/Fs > 50 pgTEQ/g lipids, DL-PCBs > 58 pgTEQ/g lipids
- Indicators PCBs > 1 115 ng/g lipids.

## Results

### DESCRIPTION OF PEOPLE WITH HIGH LEVELS

26 people were above at least one of these four thresholds.

The ranges of the values were:

- PCDDs/Fs + DL-PCBs: 100.9 - 178.4 pgTEQ/g lipids
- PCDDs/Fs: 50.8 - 79.4 pgTEQ/g lipids
- DL-PCBs = 58.6 - 99.0 pgTEQ/g lipids
- Indicators PCBs: 1 126 - 2 466 ng/g lipids

Only four participants were above all the thresholds simultaneously, 3 of them living in a coastal area (Fécamp), and one in an industrial area (Maubeuge). Levels were also higher in these two locations (Figure 2).

Living in the exposed area is not a particular characteristic of the participants with high levels.

Some usual risk factors are more frequently encountered in these high levels peoples compared to all the participants of the study (Table 1):

- sex, age (higher levels in older people)
- occupational exposure through farming
- overweight or recent loss weight
- fish and seafood consumption.

FIGURE 2 DISTRIBUTIONS OF PCDD/F CONCENTRATIONS IN pgTEQ<sub>OMS98</sub>/g LIPIDS FOR THE DIFFERENT AREAS (5-95TH PERCENTILE, 25-75TH PERCENTILE, MEDIANE, VALUES >95TH PERCENTILES)

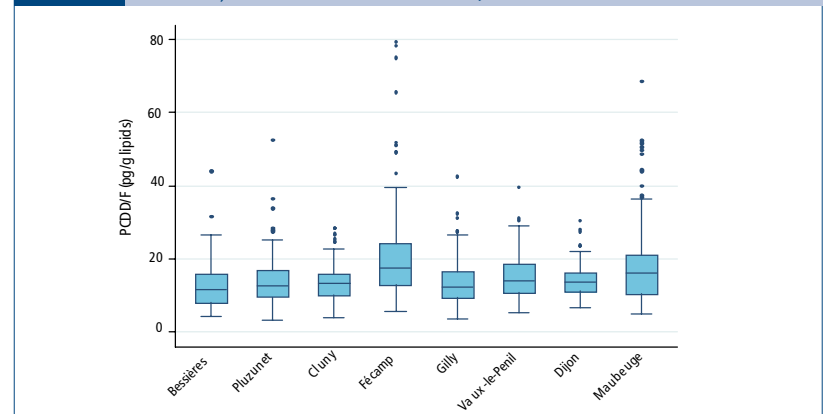


TABLE 1 DESCRIPTION OF THE PARTICIPANTS WITH HIGH SERUM LEVELS AMONG THE 1030 PARTICIPANTS

	PCDD/Fs + DL-PCBs > 100 pg TEQ98/g lipids	PCDD/Fs > 50 pg TEQ98/g lipids	DL-PCBs > 58 pg TEQ98/g lipids	PCB indicators > 1 115 ng/g lipids
Total number	11	12	13	11
Living in the area of Fécamp (coastal area)	7	7	8	6
Living in area of Maubeuge (industrial area)	1	4	2	2
Age > 57 yrs	8	8	11	9
Men	8	7	7	9
Overweight (Body Mass Index > 25)	10	8	11	10
Recent weight loss (< 10% of the total weight)	3	4	4	4
Consumption of fish and sea food > 61 g/day	7	4	5	6
Farmers	3	4	3	4

## Conclusions

One participant had the highest levels for PCDDs and PCDFs, DL-PCBs and indicators PCBs, with a total TEQ of 178.4 pgTEQ/g lipids.

Individual factors such as sex, age, body mass index, farming and sea food consumption are common characteristics to the high serum levels.

People living in the coastal area included in our study had the highest levels, which can be partly linked to a sea food diet. People living in the industrial area also had high levels.

High levels are not linked with the fact of living under the plume of the incinerator.

## References

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