

Risk of mesothelioma among people living near asbestos-related factories: a France based case control study



INSTITUT DE
VEILLE SANITAIRE

Stéphanie Vandentorren
12, rue du Val d'Osne - 94415 Saint-Maurice cedex
Tél. : 33(0) 1 41 79 67 00 - Fax : 33(0) 1 41 79 67 67
s.vandentorren@invs.sante.fr

S Vandentorren¹, D Lauzeille¹, S Gorla¹, S Leng¹, P De Crouy Chanel¹, C Daniau¹, J Cosson¹,
A Gilg Soit Ilg², S Ducamp³, P Rolland², P Brochard³, M Goldberg², M Ledrans¹

¹Département santé environnement – Institut de veille sanitaire ; ²Département santé travail – Institut de veille sanitaire ;
³Laboratoire santé travail environnement – Institut de santé publique et de développement

Background

- High environmental (household and neighbourhood) exposure levels to asbestos are known to be at risk for mesothelioma
- What about much lower environmental exposures (neighbourhood)?

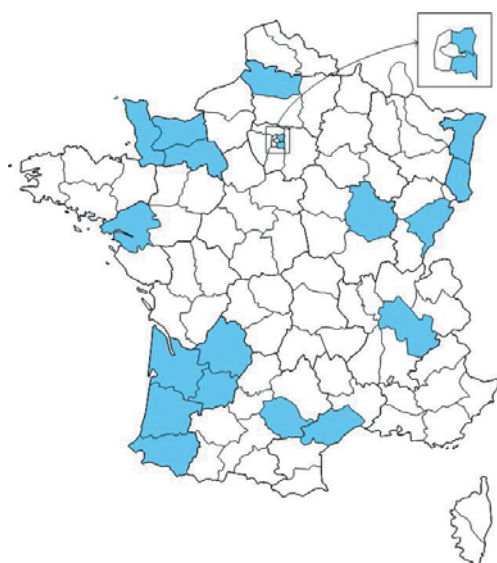
Objective of the study

- Estimate the risk of mesothelioma among people who lived near asbestos-related factories.

Methods

►► Case control study of the association between environmental exposure to asbestos and mesothelioma

- Sample size : 111 cases and 468 controls
- Cases from the French National Mesothelioma Surveillance Program (PNSM)
 - included between 1998 and 2002 in 19 French districts
 - pleural mesothelioma histologically or clinically confirmed
 - without any occupational asbestos exposure



Districts with PNSM included in this study

- Controls from the PNSM
 - without any occupational asbestos exposure
- Information about cases and controls taken from PNSM:
 - Work, residential and school histories (address and duration) were obtained by self administered questionnaires
 - The probability, intensity, frequency and duration to other exposures to asbestos (household, para-occupational, do-it-yourself activities) were assessed by industrial and environmental hygienists
- Information about now-abandoned asbestos-related factories
 - Factories have been listed and localized
 - Expert judgement was used to define important criteria that should be taken into account to define the exposure such as duration of activity, production of asbestos, type of fiber and industrial process
 - These characteristics have been searched on basias (french databases of ministry of environment)

►► Factors studied

- Neighbourhood exposure to now-abandoned asbestos-related factories.

The exposure score was defined as:

$$E = \sum[(I/d)*D]$$

I = intensity of exposure
D = duration of exposure
d = distance between home, school and work location and any now-abandoned asbestos factories

where the sum is taken over all factories in a 2km radius around an address and then over all addresses.

For this

- a geographic information system was used to select the n factories in a 2km radius around each address;
- thirty years was taken as the latency period of mesothelioma ;
- In this report, the intensity of exposure was assessed according to the list of now-abandoned asbestos-related factories of the ministry of labour ;
- a space-time budget was defined for each case and control.

- Confounding variables: the other exposures to asbestos-household, para-occupational, do-it-yourself activities. They were grouped into an exposed/unexposed variable called “other non occupational exposure”.

►► Statistical analysis

- Analysis separately by gender
- Logistic regression used to estimate odds ratio (ORs) and 95% confidence intervals (CIs) by comparison of the 95th percentile of the score distribution with the 5th (highly versus slightly exposed)

Results

►► Population characteristics

- Age

The age of the subjects ranged between 41 and 92 years (mean=69; median=70). There is no difference between cases and controls.

- Gender

	Cases (%)	Controls (%)	Total (%)
Males	36 (32)	323 (69)	359 (62)
Females	75 (68)	145 (31)	220 (38)
Total	111 (100)	468 (100)	579 (100)

- Neighbourhood exposure:

The score ranges between 0 and 45220 with a mean of 534 and a median of 65. It has a skew distribution with 35% of the subjects with an exposure score equal to zero- that is they are supposed not exposed to now-abandoned asbestos-related factories. There are 26 missing values (4.5% of the subjects).

In particular, for males: 24 cases (69%) and 193 controls (64%) have an exposure score different than 0, and for females: 48 cases (66%) and 94 controls (66%).

- Other non occupational exposure

Males			
	Exposed	Unexposed	Total
Cases (%)	24 (67)	12 (33)	36 (100)
Controls (%)	190 (59)	133 (41)	323 (100)
Total (%)	214 (60)	145 (40)	359 (100)

Females			
	Exposed	Unexposed	Total
Cases (%)	42 (56)	33 (44)	75 (100)
Controls (%)	50 (34)	95 (65)	145 (100)
Total (%)	92 (42)	128 (58)	220 (100)

►► Risk of mesothelioma associated to neighbourhood exposure

	Males		Females	
	OR ¹	95% CI ²	OR ¹	95% CI ²
Neighbourhood exposure	0.8	0.3-2.0	1.2	0.9-1.7

¹ OR, odds ratio adjusted by other non occupational exposure ; ² CI, confidence interval

Discussion

Among women, we observed an increased risk of mesothelioma with neighbourhood exposure, but not statistically significant probably due to the lack of power (12% to detect an OR of 1.2). We would need more than 1500 cases and 6000 controls to detect such a small risk with higher power (>80%).

In addition, it was difficult to assess exposure for several reasons:

- data quality and geocoding;
- missing values: missing addresses, missing periods;
- lack of information about characteristics of factories.

In spite of these limits, this study is interesting as it has permitted to use geographic information system, individuals' space-time budget and intensity to define an exposure score.

Now, it is necessary to continue surveillance to increase the power of the study and to improve the definition of exposure.