Epidemiological surveillance of lumbar disc surgery in 2007-2008 in the general population from the Pays de la Loire region, France

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Epidemiological surveillance of lumbar disc-related disorders in the general population

- Lumbar disc-related disorders are a major cause of work-related musculoskeletal morbidity
  - 30% of European employees reported suffering from back pain
  - 75% of European employees over age 55 reported suffering from back pain

- Sentinel event: lumbar disc surgery (LDS)
- LDS identified in the medical databases from public and private hospitals.
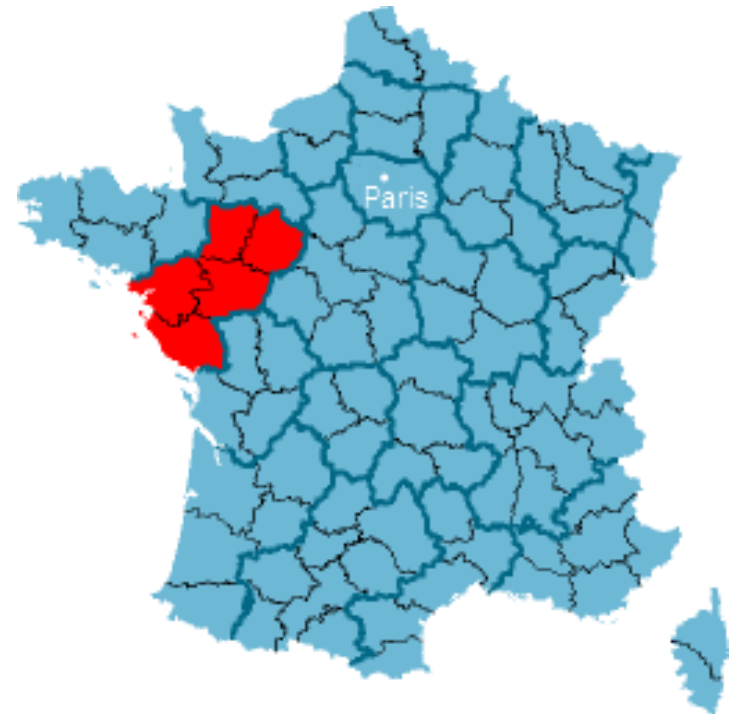
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Aims

- To describe the association between LDS and
  - industry sectors
  - occupational categories

- To evaluate the proportion of LDS cases attributable to work

Methods (1)

- The main centres for spinal surgery participating to surveillance

- Pays de la Loire region (West Central France)

- Using the 2007-2008 hospital databases

- Included inpatients:
  - aged from 20 to 64 years
  - living in this region
  - LDS in the participating centres
  - having an occupational activity or not

Methods (2)

- Medical and work histories obtained by postal questionnaire
- Work history during the whole occupational career
- 3,150 inpatients, without age limits
- Coding of employments:
  - Industry according to the French version of the European Community Activities Nomenclature (2008)
  - Occupations according to French classification of occupations (2003)
- Distribution of LDS cases according to the industry sector and occupation at the time of the surgery
- Reference population: French Census (INSEE, 2007)
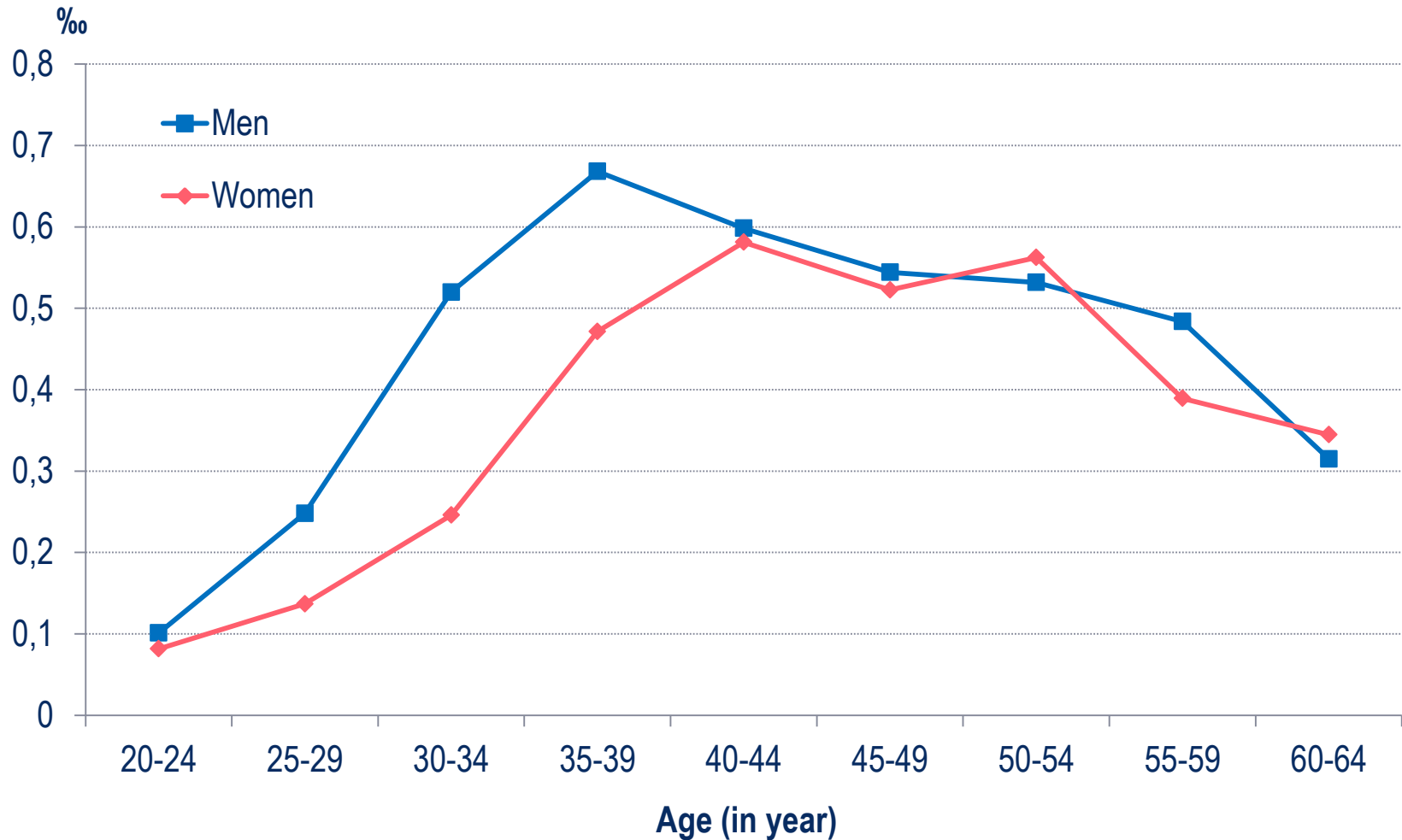
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Statistical methods

- Age-adjusted relative risks (RRa) of LDS according to industry and occupational categories:
    - Mantel-Haenszel method
    - Reference: the whole sample of subjects

- Risk fractions of risk of LDS:
    - Population attributable fraction of risk (PAF)
        - **PAF (%) =** $\dfrac{Pe\ (\mathbf{RRa{-}1})}{[Pe\ (\mathbf{RRa{-}1})+1]}$ *Pe*: proportion of workers in occupation or industry considered in the general population
    - Attributable risk fractions among exposed persons (AFE)
        - **AFE (%) =** $\dfrac{(\mathbf{RRa\ {-}1})}{\mathbf{RRa}}$
    - Computed for industries and occupations at high risk when at least five cases of LDS occurred

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Description of the sample

	Men	Women
Number of subjects in study (sex-ratio = 1.2)	909	761
Mean age (± standard deviation) (p<0.0001)	43.5 ± 10.2	45.5 ± 9.8
Mean BMI (in kg/m²) (p<0.0001)	25.9 ± 3.6	24.5 ± 4.5
Annual incidence / 1 000 employed persons	0.5	0.4
Annual incidence / 1 000 unemployed persons	0.3	0.3
Occupational activity at time of the surgery	85.8%	73.9%
Age-ajusted relative risk (RRa) employed vs unemployed persons at time of the surgery	1.6 [1.3-2.0]	1.2 [1.0-1.4]

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Incidence of LDS (‰) according to age and gender

Risk fractions of LDS attributable to work according to occupational categories among men

	n	RRa [95 % CI]	PAF(%) [range]	AFE(%) [range]
Farmers	24	0.7 [0.5-1.1]	-	-
Craftsmen, salesmen and managers	53	0.9 [0.7-1.2]	-	-
Company directors of 10 employees or more	11	2.6 [1.4-4.7]	1 [0-3]	61 [29-79]
Professionals	89	0.8 [0.6-0.9]	-	-
Technicians, associate professionals	169	1.0 [0.9-1.2]	1 [0-4]	4 [0-19]
Supervisors	35	1.5 [1.1-2.1]	1 [0-3]	33 [5-52]
Lower-grade white-collar workers	67	1.1 [0.8-1.3]	0 [0-2]	5 [0-26]
Police and armed forces	25	2.0 [1.3-3.0]	2 [1-3]	50 [25-66]
Blue-collar workers	**368**	**1.5 [1.4-1.8]**	**15 [10-19]**	**35 [26-44]**
Skilled industrial blue-collar workers	104	1.8 [1.4-2.2]	5 [3-7]	44 [31-54]
Skilled craft blue-collar workers	119	2.1 [1.7-2.6]	8 [5-11]	53 [42-61]
Material handlers and related equipment workers	29	1.5 [1.1-2.2]	1 [0-3]	35 [6-55]

n:number of persons. RRa:age-ajusted relative risk. 95% CI:95% Confidence interval. PAF:Population attributable fraction of risk . AFE:Attributable risk fractions among exposed persons. Range:This range was calculated using the upper and lower limits of RRa at 95%. * This table shows the industry sectors associated with a signicantly higher RRa than 1 and n≥5.

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Risk fractions of LDS attributable to work according to occupational categories among women

	n	RRa [95 % CI]	PAF(%) [range]	AFE(%) [range]
Farmers	11	1.2 [0.6-2.1]	0 [0-2]	14 [0-52]
Craftsmen, salesmen and managers	20	1.3 [0.8-2.0]	1 [0-2]	20 [0-49]
Professionals	34	0.7 [0.5-1.0]	-	-
Technicians, associate professionals	124	1.0 [0.8-1.2]	-	-
Administrative intermediate occupations of public companies	14	2.1 [1.2-3.6]	2 [0-4]	52 [18-72]
Lower-grade white-collar workers	**295**	**1.3 [1.1-1.5]**	**9 [4-15]**	**25 [13-35]**
Government and public service employees	103	1.3 [1.0-1.5]	3 [0-5]	20 [2-35]
Trade and commerce employees	41	1.4 [1.0-1.9]	2 [0-5]	29 [2-48]
Personal services employees	90	1.5 [1.2-1.8]	4 [1-6]	32 [15-45]
Blue-collar workers	67	0.9 [0.7-1.2]	-	-
Drivers	5	2.4 [1.0-5.9]	1 [0-2]	59 [0-83]

n:number of persons. RRa:age-ajusted relative risk. 95% CI:95% Confidence interval. PAF:Population attributable fraction of risk . AFE:Attributable risk fractions among exposed persons. Range:This range was calculated using the upper and lower limits of RRa at 95%. * This table shows the industry sectors associated with a signicantly higher RRa than 1 and n≥5.

Risk fractions of LDS attributable to work according to industry sectors

	n	RRa [95 % CI]	PAF(%) [range]	AFE(%) [range]
Men				
Construction	117	1.6 [1.3-1.9]	5 [3-8]	36 [22-47]
Women				
Transportation and storage	20	1.6 [1.0-2.6]	1 [0-3]	39 [4-61]
Accomodation and food service activities	24	1.8 [1.2-2.7]	2 [1-4]	45 [17-64]
Arts, entertainment and recreation	7	3.3 [1.6-7.0]	2 [0-4]	70 [36-86]
Activities of households as employers; Undifferentiated goods- and services-producing activities of households for own use	10	3.4 [1.8-6.4]	2 [1-5]	71 [45-84]

n:number of persons. RRa:age-ajusted relative risk. 95% CI:95% Confidence interval. PAF:Population attributable fraction of risk . AFE:Attributable risk fractions among exposed persons. Range:This range was calculated using the upper and lower limits of RRa at 95%. * This table shows the industry sectors associated with a signicantly higher RRa than 1 and n≥5.
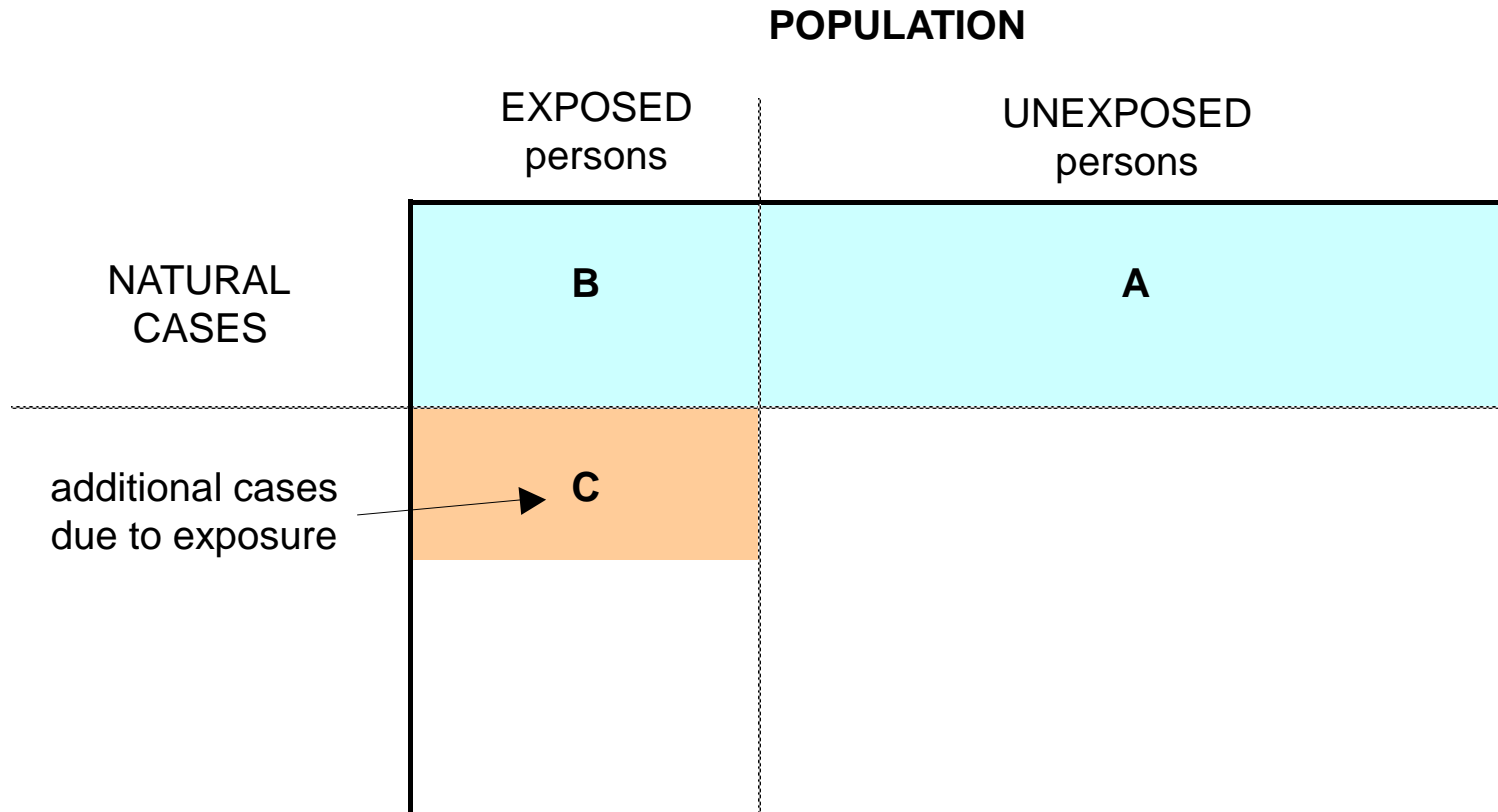
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Conclusion

- Occupations and industries at risk:
  - 1–15% of LDS cases might be, in theory, avoided in the whole population if totally effective intervention programs would implemented in the considered occupational categories or industry sectors.

- Limitations:
  - LDS is at once:
    - a marker for work-related lumbar disc-related disorders
    - an indicator of seeking care
  - Possible bias due to the differences in the surgical seeking care according to the occupational categories

Thank you for your attention

Principle of *Population attributable fraction of risk* and *Attributable risk fraction among exposed persons*

POPULATION

	EXPOSED persons	UNEXPOSED persons
NATURAL CASES	B	A
additional cases due to exposure →	C	

Population attributable fraction of risk: **PAF = C / (A+B+C)**

Attributable risk fraction among exposed persons: **AFE = C / (B+C)**

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