

Occupational exposure and new-onset asthma - a population based study in northern Europe

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Aims of the study

- Estimate hazard risks for new-onset asthma and occupational exposures between 1980-2000.
- Develop a Nordic Job exposure matrix (N-JEM)
- Estimate hazard risks for occupations associated with high asthma risk.

Study population

- 21 800 subjects from seven centres in northern Europe (RHINE) answered a questionnaire in ECHRS I in 1989-1992.
- All subjects randomly selected born 1945-73.
- Follow-up questionnaire 1999-2001 answered by 74%.

The seven centres in the RHINE group



Definitions

New-onset asthma needed a positive answer to the questions:

1. Do you have or have you ever had asthma after the age of 16?
2. Have you ever had asthma diagnosed by a physician?

Atopy: Do you have hay fever or any other nasal allergy?

Occupational exposure

- All occupations or jobs >6 months were classified according to ISCO-88
 - Nordic job exposure matrix (N-JEM).
 - Occupations associated with high asthma risk
- Person-years were calculated for every year with a reported job together with exposure group associated with the job code.

Nordic job exposure matrix (N-JEM)

1. HMW agents Animal derived antigens Plant associated antigens Arthropods, mites, bio-aerosols enzymes Latex protein Pharmaceutical products	2. LMW agents Reactive chemicals Acrylates Epoxy compounds Diisocyanates	3. Irritating agents Cleaning agents Wood paper dust Inorganic dust & fumes Metal working fluids Textile dust Vehicle/motor exhaust Environmental tobacco smoke
4. Accidental peak exposure		
5. Uncertain or low exposed		
6. Reference		

Background data of the study population

	Men	Women
Number of subjects (%)	6 251 (47)	7 033 (53)
Age year 2000, mean (SD)	42 (7)	42 (7)
Never smokers (%)	2 840 (45)	3 196 (46)
Ever smokers (%)	3 264 (53)	3 669 (52)
Unknown smoking habits (%)	146 (2)	168 (2)
Exposed	59,5 %	46,3 %
Not exposed	35,9 %	48,0 %
Uncertain exposure	4,7 %	5,7 %
New-onset asthma (%)	153 (2.5)	311 (4.4)

Hazard ratios (HR and 95% CI) of new-onset asthma in men according to the N-JEM

Job exposure group	All exposed ¹ HR (95% CI)	Atopics ² HR (95% CI)	Non-atopics ² HR (95% CI)
Any exposure (not uncertain)	1.4 (0.96-1.9)	1.3 (0.8-2.2)	1.4 (0.9-2.3)
HMW agents	1.5 (0.9-2.7)	1.4 (0.6-3.1)	1.7 (0.8-3.6)
Plant assoc. antigen, cereal tobacco	3.6 (1.4-8.9)	Not applicable	3.9 (1.2-12.7)
Latex Protein	1.7 (0.7-4.2)	1.9 (0.6-6.1)	Not applicable
LMW agents	1.3 (0.8-2.3)	0.7 (0.3-2.1)	1.9 (0.96-3.7)
Acrylates	1.7 (0.8-3.6)	Not applicable	3.1 (1.3-7.0)
Epoxy compounds	2.4 (1.2-4.5)	1.4 (0.4-4.4)	3.3 (1.5-7.3)
Diisocyanates	2.1 (1.1-3.7)	1.5 (0.6-3.9)	2.6 (1.2-2.5)
Irritating agents	1.4 (0.99-2.1)³	1.4 (0.8-2.3)	1.5 (0.9-2.5)
Cleaning agents	2.6 (1.1-6.1)³	Not applicable	4.0 (1.4-11.6)
Inorganic dust and fumes	1.6 (0.99-2.4)	1.4 (0.7-2.7)	1.7 (0.9-3.2)
Environmental tobacco smoke	2.0 (0.9-5.0)	1.9 (0.6-6.1)	Not applicable
Peak exposure to irritants	2.6 (1.8-5.0)	2.1 (0.8-5.3)	2.8 (1.2-6.7)

¹Adjusted for age and atopy. ²Adjusted for atopy. ³Not sign. if also adjusted for smoking. Groups with < 3 asthma cases not presented.

Hazard ratios (HR and 95% CI) of new-onset asthma in women according to the N-JEM

Job exposure group	All exposed ¹ HR (95% CI)	Atopics ² HR (95% CI)	Non-atopics ² HR (95% CI)
Any exposure (not uncertain)	1.2 (0.97-1.6)	1.3 (0.9-1.7)	1.2 (0.8-1.8)
HMW agents	1.2 (0.9-1.6)	1.3 (0.9-1.9)	1.0 (0.6-1.6)
Latex Protein	1.2 (0.9-1.7)	1.4 (0.97-2.0)	1.0 (0.6-1.6)
Pharmaceutical products	1.4 (0.8-2.4)	1.9 (1.0-3.6)	Not applicable
LMW agents	1.1 (0.6-2.1)	0.7 (0.3-1.9)	1.7 (0.8-4.0)
Reactive chemicals	1.6 (0.9-3.0)	1.0 (0.4-2.7)	2.7 (1.2-6.2)³
Irritating agents	1.4 (0.97-2.0)	1.2 (0.8-1.9)	1.6 (0.97-2.8)
Cleaning agents	2.2 (1.4-3.3)	1.7 (0.9-3.1)	2.9 (1.6-5.3)
Textile dust	1.1 (0.4-3.5)	Not applicable	Not applicable
Environmental tobacco smoke	1.6 (0.8-3.1)	1.4 (0.6-3.6)	1.9 (0.7-5.2)
Uncertain or low exposed	1.0 (0.6-1.7)	1.0 (0.5-2.0)	1.0 (0.4-2.3)

¹Adjusted for age and atopy. ²Adjusted for atopy. ³Not significant if also adjusted for smoking. Groups with < 3 asthma cases not presented.

Hazard ratios (HR and 95% CI) of new-onset asthma in men in high risk occupational groups

Occupational group	All exposed ¹ HR (95% CI)	Atopics ² HR (95% CI)	Non-atopics ² HR (95% CI)
Cleaners, building caretaker	2.5 (1.1-5.8)³	Not applicable	3.7 (1.3-10.8)
Child & other personal care work	2.5 (1.0-6.2)	2.7 (0.8-8.9)	Not applicable
Building workers (not carpenters)	1.5 (0.8-2.9)	2.0 (0.9-4.4)	1.1 (0.4-3.1)
Plumbers	3.9 (1.6-9.7)	Not applicable	5.6 (2.0-15.7)
Food and tobacco processing	2.6 (0.96-7.2)	4.1 (1.3-14.1)	Not applicable
Spray painters	7.2 (2.3-22.9)	Not applicable	Not applicable

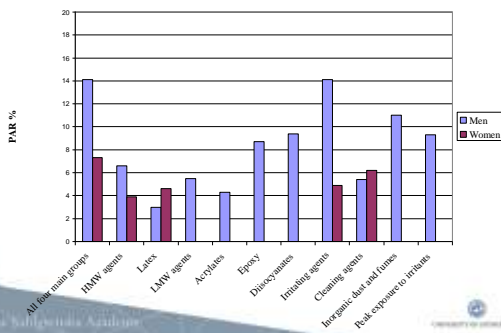
¹Adjusted for age and atopy. ²Adjusted for atopy. ³Not significant if also adjusted for smoking. Groups with < 3 asthma cases not presented.

Hazard ratios (HR and 95% CI) of new-onset asthma in women in high risk occupational groups

Occupational group	All exposed ¹ HR (95% CI)	Atopics ² HR (95% CI)	Non-atopics ² HR (95% CI)
Cleaning, building caretaker	2.2 (1.4-3.3)	1.6 (0.9-3.0)	3.1 (1.7-5.7)
Nurses	1.4 (0.9-2.1)	1.6 (0.97-2.8)	1.0 (0.4-2.2)
Child & other personal care work	1.3 (0.9-1.8)	1.3 (0.9-2.0)	1.1 (0.6-2.0)
Hairdressers, beauticians	2.0 (0.98-4.1)³	1.1 (0.3-3.4)	4.2 (1.7-10.4)
Drivers	3.7 (1.2-11.7)	Not applicable	Not applicable
Environmental tobacco smoke	1.6 (0.7-3.9)	1.5 (0.5-4.7)	Not applicable

¹Adjusted for age and atopy. ²Adjusted for atopy. ³Not significant if also adjusted for smoking. Groups with < 3 asthma cases not presented.

Population attributable risk (PAR %) for asthma in all exposed and in specific exposure groups



Conclusions

Increased risk of new-onset asthma was seen in:

- Men exposed to epoxy, diisocyanates and acrylates
- Men exposed to accidental high peaks of irritants
- Men and women exposed to cleaning agents
- Male plumbers and spray painters as well as female hairdressers and drivers.

Conclusions cont.

- Non-atopics seem to be at higher asthma risk when exposed to LMW and irritating agents.
- Population attributable risk was 14% for men and 7% for women.
- Highest PAR% for men exposed to inorganic dust and fumes, diisocyanates, epoxy and peak exposure to irritants (8-11).

Co-authors in this RHINE study

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