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## NIOSH PCE forum

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### Case-control studies nested in a cohort of Nordic dry-cleaners

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The Dow Chemical Company.

### Case-control studies nested in a cohort of Nordic dry-cleaners

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- Several studies of dry-cleaners, primarily from the US, indicate that working as a dry-cleaner may entail an increased risk for cancer of the esophagus, of the cervix uteri and for non-Hodgkin's lymphoma. This has lead to questions about the role of exposure to perchloroethylene.
- These studies have several unsatisfying aspects which make their results less than definitive.

### Case-control studies nested in a cohort of Nordic dry-cleaners: design considerations

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- A new study, addressing limitations of previous studies, is not easy to set up.
- Exposure to PERC in general population is very low, end points of interest also are rare.
- Cohorts from workers in manufacturing of PERC are of limited size.
- Main use is in dry-cleaning, often small shops, no good registration systems.

### Case-control studies nested in a cohort of Nordic dry-cleaners: design considerations

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- Design of choice for studying a rare disease and a rare exposure is a case-control study in a population with high exposure prevalence.
- This allows for addressing confounding, e.g. by socio-economic status or personal habits, important for end points of interest to us.

Case-control studies nested in a cohort of  
Nordic dry-cleaners

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Cancer in Persons Working in Dry-Cleaning  
in the Nordic Countries.

Elsebeth Lyng, University of Copenhagen, Denmark  
Aage Anderson, Cancer Registry Norway  
Eero Pukkala, Cancer Registry Finland  
Lars Rylander, Lund University, Sweden  
Hakan Tinnerberg, Lund University, Sweden

Case-control studies nested in a cohort of  
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**Scientific Advisory Committee:**

- Hans-Olov Adami, Karolinska Institute, Sweden
- Aaron Blair, NCI, USA
- Paulo Boffetta, IARC, France
- John Cherry, University of Edinburgh, UK
- Jack Mandel, University of Minnesota.
- Gerard Swaen, University of Limburg, The Netherlands

## Case-control studies nested in a cohort of Nordic dry-cleaners

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### Study design:

- Case-control studies nested in cohort of laundry and dry-cleaning workers as identified by the 1970 census in Denmark, Finland, Norway, and Sweden.
- Cohort size: 29333, dry-cleaning workers: ~ 7333
- Incident cases from cancer registry.
- Identification of exposure status via census form or interview: dry-cleaning workers versus laundry workers.

## Case-control studies nested in a cohort of Nordic dry-cleaners

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### Diseases studied:

- oesophageal cancer
- cardia cancer
- liver cancer
- cervical cancer
- renal cell cancer
- non-Hodgkin's lymphoma
- bladder cancer
- pancreas cancer

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- Controls frequency matched on country, sex, 5 year age and calendar period at time of diagnosis of case.
- For oesophageal cancer, the disease with most interest, six controls, for other diseases three controls.
- Work history from previous and later census data, pension funds, yellow pages, telephone books.
- Data on smoking and alcohol consumption from data from other studies or personal interviews

### Case-control studies nested in a cohort of Nordic dry-cleaners

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#### Exposure information from many sources:

- data on introduction new machinery
- regulatory changes for dry-cleaning work
- surveys on working conditions
- air measurements
- biological monitoring data
- anecdotal information on work habits etc..
- extensive work done to make these data consistent over countries
- separate publication on exposure data

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- The analysis will have four layers with increasing detail on exposure:
  - employment as dry-cleaner in 1970
  - years of employment in dry-cleaning
  - years of employment in dry-cleaning with exposure to PERC.
  - years of employment in dry-cleaning multiplied by level of exposure

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### Planning:

- Study start: April 2001
- Case and control identification: May 2002.
- Collection exposure information complete: October 2002
- Merging data November 2002
- Draft paper March 2003

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### Weaknesses:

- No information on confounders for all cases and controls, however laundry workers are quite similar to dry-cleaners.
- Many cases and controls will be deceased.
- New privacy legislation made study more difficult

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### Strengths of study:

- excellent registration systems: census data, cancer registries, pension funds.
- Innovative use of census by adding workhistory information
- Focus on consistency
- Large effort to collect all exposure information available