



Occupational  
Cancer  
Research  
Centre

# Wood Dust Exposure and the Risk of Cancer

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Conference

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# IARC Evaluations of Wood Dust



## IARC Monograph Volume 25, 1981

- Furniture and cabinet making: Group 1
- Carpentry and joinery: Group 2B
- Lumber and sawmill industries: Group 3
- Pulp and paper industry: Group 3

## IARC Monograph Volume 62, 1994

- Wood Dust: Group 1

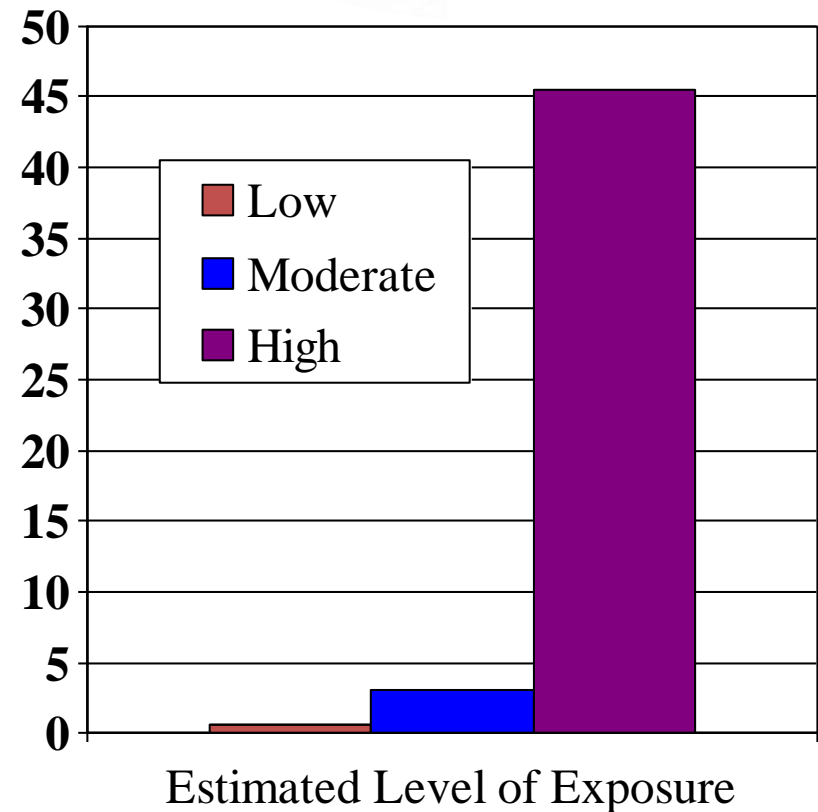
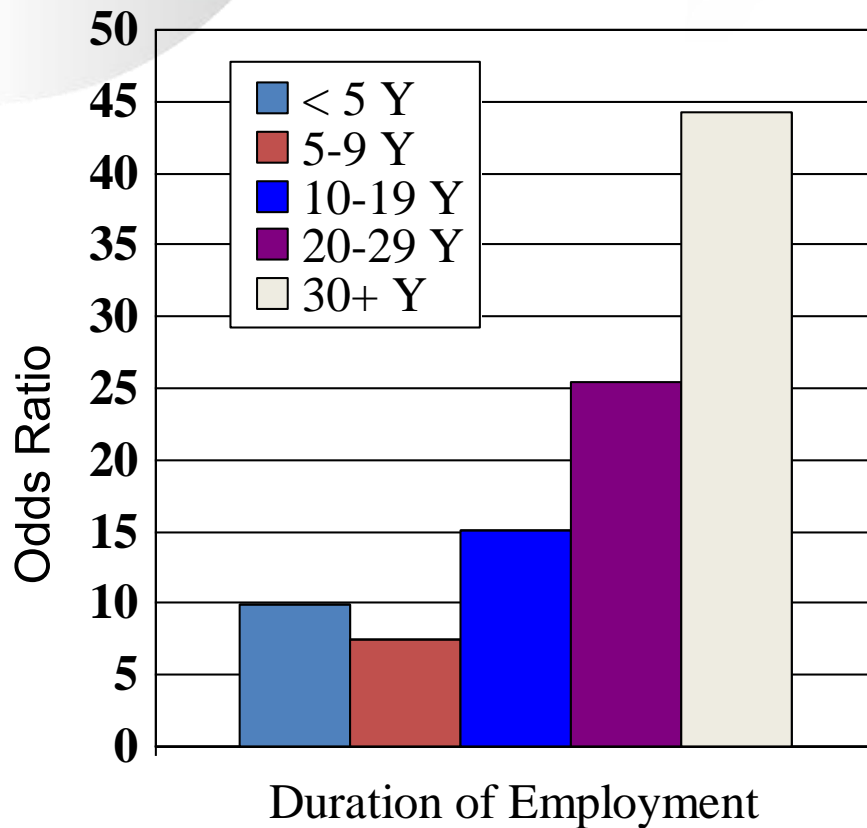
## IARC Monograph Volume 100c, 2009

- Wood Dust: Group 1 for sinonasal & nasopharyngeal cancer



# Sinonasal Adenocarcinoma & Wood Dust

## IARC Pooled Case-Control Study\*



\* Demers et al. Am J Indust Med 1995;28:151-166.

# Respiratory Cancer among Woodworkers

## IARC Pooled Cohort Analysis\*



<u>Cause of Death (Obs/Exp)</u>	<u>SMR</u>	<u>(95% CI)</u>
Buccal Cavity/Pharynx (36/54.1)	0.67	(0.47-0.92)
Pharynx Cancer (20/24.1)	0.83	(0.51-1.28)
Nasopharynx Cancer (9/4.0)	2.37	(1.09-4.51)
Sino-Nasal Cancer (11/3.5)	3.12	(1.56-5.58)
Larynx Cancer (18/27.2)	0.66	(0.39-1.04)
Lung Cancer (575/721)	0.80	(0.73-0.87)

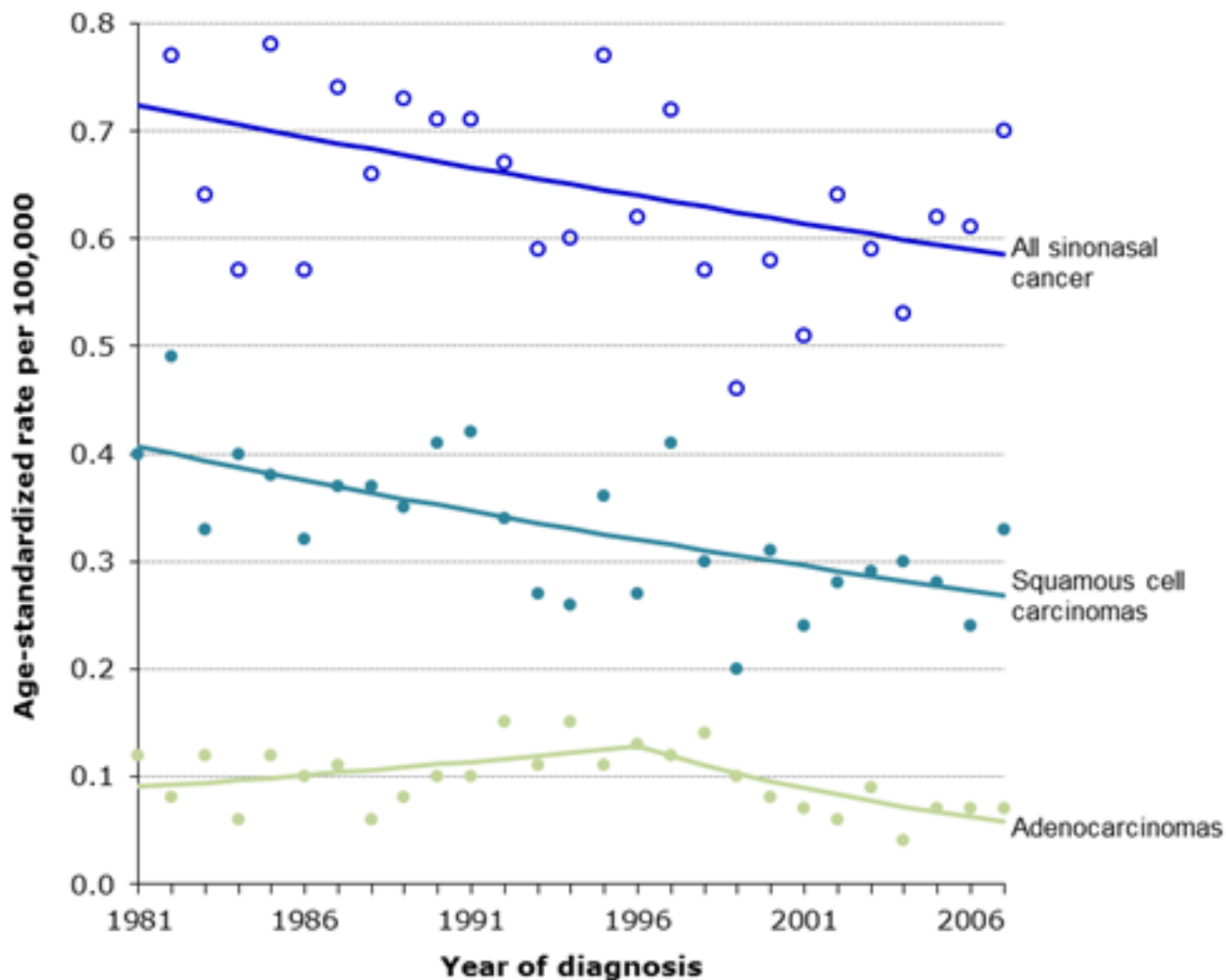
\*Demers et al. Scand J Work Environ Health 1995;21:179-190.

# Unresolved Issues



- What is the risk in North American
- What is the role of tree species?
  - Few studies are available to assess hardwood versus softwood issue
  - Experimental studies?
- What level of exposure is necessary?
  - Very few studies have assessed level of exposure and those have had low exposure, and therefore low risk and power to assess dose-response

### Sinonasal cancer incidence rates, Ontario, 1981-2007, both sexes combined



Source: Cancer Care Ontario (Ontario Cancer Registry, 2011)  
Rates are adjusted to the age distribution of the 1991 Canadian population

# BC Sawmill Workers: Cancer Incidence 1969-95\*



<u>Disease Category</u>	<u>Cancers</u>	<u>SIR (95% CI)*</u>
All Cancers	2603	1.02 (0.98-1.06)
Naso-pharynx	4	0.42 (0.11-1.08)
Stomach	106	1.07 (0.88-1.29)
Colon	193	0.98 (0.85-1.13)
Rectum	160	1.10 (0.94-1.29)
Sino-nasal	6	1.06 (0.39-2.31)
Larynx	40	0.88 (0.63-1.20)
Lung	529	1.05 (0.96-1.15)
Non-Hodgkin's lymphoma	97	0.99 (0.81-1.21)
Hodgkin's disease	18	0.94 (0.56-1.49)
Multiple myeloma	25	0.80 (0.52-1.18)

\* Demers et al. Cancer Causes Controls 2006;17:749-758.



# More Recent Sinonasal Case Series



Study & Country	Wood Dust Exposed Cases
Svane-Knudsen et al, 1998 Denmark	12/22 adenocarcinomas 3/41 epidermoid
Stoll et al, 2001 France	62/76 adenocarcinomas
Roux et al 2002 France	134/139 adenocarcinomas
Barbieri et al, 2005 Italy	17/100 adenocarcinomas
Lietin et al, 2006 France	45/60 adenocarcinomas
Fontana et al, 2008 France	46/76 men-all sinonasal
Llorente et al, 2008 Spain	62/79 all sinonasal
Bornholdt et al, 2008 Denmark	33/58 adenocarcinomas 7/109 squamous cell
Choussy et al, 2008 France	353/418 adenocarcinomas

# Nordic Occupational Cancer (NOCCA) Study: 1961-2005\*



- Sinonasal Cancer
  - Sweden, Denmark, Norway, Finland, Iceland
  - Men: SIR=1.8, 95% CI=1.7-2.0, 355 cases
  - Women: SIR=1.9, 95% CI=0.9-3.5, 10 cases
- Sinonasal adenocarcinoma
  - Sweden, Norway, Finland, Iceland
  - Men: SIR=5.5, 95% CI=4.6-6.6, 122 cases
  - Women: SIR=0 (0 cases vs 0.3 expected cases)

\*Pukkala et al. Acta Oncologica 2009;48: 646-790.

# 1991 Long-Form Census Linkage with National Tumour Registry Data

- 51,700 workers in wood-related industries or occupations
- Analysis using Cox proportional hazards modelling, adjusting for sex, age, province and year of follow-up (through 2006)
- Sinonasal cancer: IRR=0.85, 95% CI=0.37-1.94, based on 6 cases

# Nested Case-control Study of Sinonasal Adenocarcinoma in German Wood Industry

## Average level of exposure

- $<3.5 \text{ mg/m}^3$  reference
- $3.5\text{-}<5 \text{ mg/m}^3$  OR=10.5, 95% CI 3.3-33.3
- $5+ \text{ mg/m}^3$  OR=48.5, 95% CI 13.3-176

## Cumulative exposure

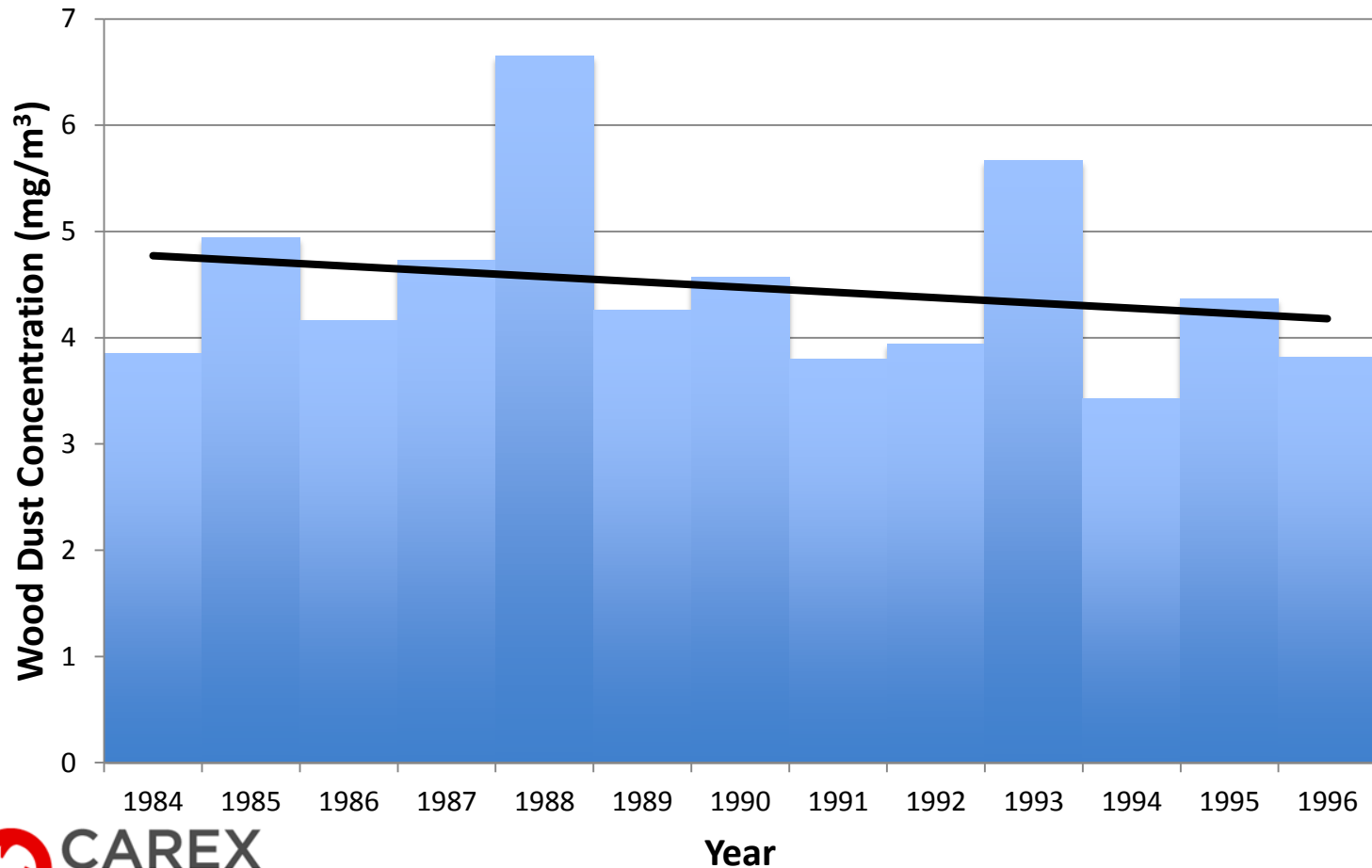
- $<140 \text{ mg/m}^3\text{-yrs}$  reference
- $140\text{-}200 \text{ mg/m}^3\text{-yrs}$  OR=1.7, 95% CI 0.7-3.9
- $200+ \text{ mg/m}^3\text{-yrs}$  OR=4.2, 95% CI 1.7-10.4

\*Pesch et al. Occup Environ Med 200;65: 191-196.

# Are Exposures Lower in Canada?

## Wood Dust in Ontario: Regulatory Data

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# Tree Species used for Commercial Purposes in North America

- 54 North American Hardwoods (broadleaf)
- 51 North American Softwoods (conifers)
- Approximately 400 Tropical Woods
- \* Wood Products Laboratory, US Forest Service
- Wood Production (FAO, 2001)
- Canada: 169,000,000 m<sup>3</sup> (88% conifers)
- U.S.A.: 243,000,000 m<sup>3</sup> (72% conifers)

# Conflict of Interest Disclosures Relevant to Presentation



None



# Thank you!

**Towards** a cancer free workplace

<http://occupationalcancer.ca>