

Renal Cell Cancer Risk and Occupational Exposure to Trichloroethylene

Results from German Studies

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Classification of TCE Carcinogenicity

- IARC Group 2A (1995)
probably carcinogenic to humans
limited epidemiological evidence
- German MAK Group III A1 (1996)
carcinogenic to humans
based on effects on the tubular
system of the human kidney

TCE Exposure & Renal Cell Cancer Risk



Quotation from IARC Summary Evaluation

...a study of German workers exposed to trichloroethylene revealed five cases of renal cancer whereas no case was found in an unexposed comparison group. The study may, however, have been initiated after the observation of a cluster.

TCE Studies in Arnsberg Region



Arnsberg

→ Henschler et al. (1995)

→ Vamvakas et al. (1998)

→ Bruening et al. (2003)

Winterberg

Study Designs

Henschler et al. 1995	Vamvakas et al. 1998	Brüning et al. 2003
Cohort on cluster	Case-control study	Case-control study
5 cases* 1956-1992	58 RCC cases 1987-1992	134 RCC cases 1992-2000
169 cardboard workers 1956-1975	84 controls unmatched hospital	401 controls hospital & nursing homes

4 renal cell cancers (RCC) + 1 urothelial cancer of renal pelvis

Exposure Assessment

Henschler et al. 1995	Vamvakas et al. 1998	Brüning et al. 2003
Solvents use: Company documentation	Questionnaire: Self assessed	Questionnaire: Self assessed
Walk-through survey	Expert rating	Industries: CAREX (FIOH)
No air or biological monitoring	Compensation reports	Job titles: JEM (Pannett et al.)

Risk Estimates

Henschler et al. 1995	Vamvakas et al. 1998	Brüning et al. 2003
<p>SIR</p> <p>8.0 (2.6-18.6)</p> <p>O: 5 cases</p> <p>E: Danmark</p>	<p>OR</p> <p>Ever TCE*</p> <p>9.0 (2.9-27.8)</p>	<p>OR</p> <p>Ever TCE*</p> <p>2.5 (1.4-4.5)</p>
<p>SMR</p> <p>3.3 (0.4-11.8)</p> <p>O: 2 deaths</p> <p>E: Fed. State</p>	<p>OR</p> <p>Long-term TCE *</p> <p>10.8 (3.4-34.8)</p>	<p>OR</p> <p>≥20 yrs TCE*</p> <p>2.7 (0.8-8.9)</p>

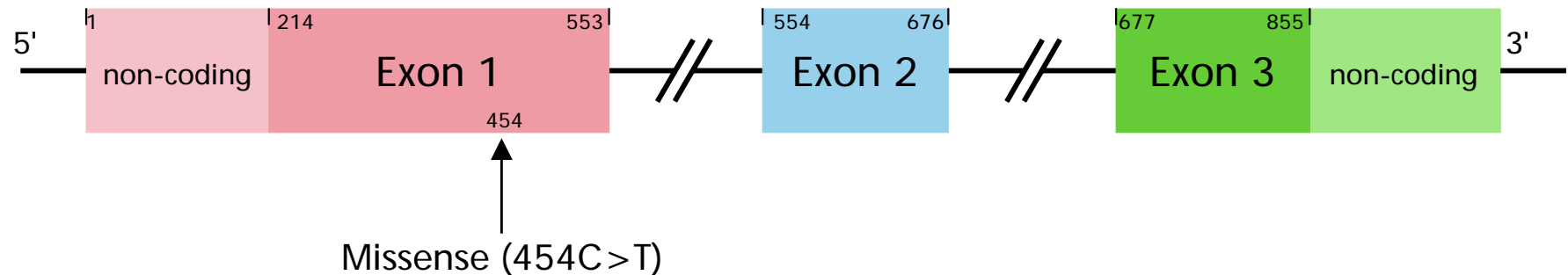
* self-assessed

Risk Estimates (continued)

Brüning et al. 2003

High exposure	Cases N=134	Controls N=401	OR 95% CI
JEM Degreasing agents	7	20	1.0 0.4-2.5
CAREX Industries with potential exposure to TCE/PER	117	316	1.8 1.0-3.2

Somatic VHL Mutations in Tumor Tissue (Brauch et al. 1999)



Carriers of VHL 454 T allele

- 13 /44 cases with TCE exposure
9 /17 cases with TCE exposure from Vamvakas study
- 0/107 non-exposed cases

Multi-center Urothelial and Renal Cell Cancer (MURC) Study (Pesch et al. 2000)

Germany	West East	Berlin (West), Bremen Leverkusen Halle, Jena
Recruitment		1991-1995
RCC cases		935 570 men, 365 women
Population controls		4298 2650 men, 1648 women

MURC Study: TCE Exposure Assessment

Job titles	Job tasks
Duration	Duration
Job-Exposure-Matrix (JEM)	Job Task-Exposure Matrix (JTEM)

MURC TCE Risk Estimates

		Medium	High	Substantial
JEM	Men	1.1 0.9-1.4	1.1 0.9-1.4	1.3 0.9-1.8
	Women	1.2 0.8-1.8	1.3 0.8-2.0	0.8 0.3-1.9
JTEM	Men	1.3 1.0-1.8	1.1 0.8-1.5	1.3 0.6-5.0
	Women	1.3 0.7-2.6	0.8 0.4-1.9	1.8 0.6-5.0

cutoffs: percentiles (P30, P60, P90) of distribution of exposure index

Metal Degreasing in Men

Brüning et al. 2003	Ever	5.6 (2.3-13.3)
MURC	Long*	1.1 (0.8- 1.6)
Pesch et al. 2000	Very long*	1.3 (0.7- 2.3)

* cutoffs: percentiles (P60, P90) of the distribution of the duration

Conclusions from German Studies on a TCE-related Renal Cell Cancer Risk

- Arnsberg studies:
high risk estimates but
methodological shortcomings
- MURC study:
no clear evidence for a TCE-related
renal cell cancer risk