



# 1,1,1-TRICHLOROETHANE AND FOUR OTHER INDUSTRIAL CHEMICALS

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**Table S1.6 Relationships between 1,1,1-trichloroethane and other substances assessed for exposure**

Study	Subject characterization	N <sub>cases</sub> /N <sub>controls</sub>	Correlation with 1,1,1-trichloroethane: only those with correlation > 0.30 identified	Definition of the metric evaluated if available and other correlations evaluated but found to be ≤ 0.30
Callahan et al. (2018)	Controls with exposure probability > 0% for any solvent	0/570	Methylene chloride (0.67), carbon tetrachloride (0.35)	Methylene chloride, carbon tetrachloride, trichloroethylene, perchloroethylene, chloroform.
LeCornet et al. (2017)	Maternal	1,1,1-trichloroethane: 81/266	Methylene chloride (0.53), perchloroethylene (0.55), trichloroethylene (0.73)	Yes/no to benzene, toluene, methylene chloride, trichloroethylene, perchloroethylene.
LeCornet et al. (2017)	Paternal	1,1,1-trichloroethane: 838/2559	Benzene (0.60), toluene (0.65), methylene chloride (0.73), trichloroethylene (0.56)	Yes/no to benzene, toluene, methylene chloride, trichloroethylene, perchloroethylene.
Videnros et al. (2020)	[all subjects]	1,1,1-trichloroethane: 10/24	“The correlation was low between the main chemical groups organic solvents, fumes, pesticides, and oil mist ( $r = 0.01-0.38$ ); the only reported relationship with 1,1,1-trichloroethylene was methylene chloride (0.87)	Benzene, benzo[a]pyrene, bitumen, perchloroethylene, toluene, and trichloroethylene, polycyclic aromatic hydrocarbons, gasoline exhaust, oil mist. Groups: aliphatic and alicyclic hydrocarbon solvents, aromatic hydrocarbon solvents, chlorinated hydrocarbon solvents, other organic solvents (including alcohols, ketones, esters, glycol ethers, etc.), fungicides, herbicides, insecticides.
Gold et al. (2011)	1,1,1-trichloroethane exposed controls	1,1,1-trichloroethane: 36/65	11% were exposed to 1,1,1-trichloroethane and 1,1,1-trichloroethane 11% were exposed to methylene chloride and 1,1,1-trichloroethane 6.7% were exposed to carbon tetrachloride and 1,1,1-trichloroethane	17% were exposed to trichloroethylene but not 1,1,1-trichloroethane; 2.1% were exposed to 1,1,1-trichloroethane but not trichloroethylene. 2.5% were exposed to 1,1,1-trichloroethane but not methylene chloride; 7.9% were exposed to methylene chloride but not 1,1,1-trichloroethane. 12% were exposed to carbon tetrachloride but not 1,1,1-trichloroethane; 6.9% were exposed to 1,1,1-trichloroethane but not carbon tetrachloride).
Purdue et al. (2017)	Controls with exposure probability > 0% for any solvent	0/753	Methylene chloride (0.61), carbon tetrachloride (0.43), perchloroethylene (0.38), chloroform (0.33)	Methylene chloride, carbon tetrachloride, trichloroethylene, perchloroethylene, chloroform.
Dosemeci et al. (1999)	All subjects	438/687	NA	Proportion exposed case/control 1,1,1-trichloroethane: 0.15/0.17; methylene chloride: 0.16/0.18; perchloroethylene: 0.11/0.11; trichloroethylene: 0.13/0.10; carbon tetrachloride: 0.12/0.14; chloroform: 0.03/0.02; 1,1,2-trichloroethane: 0.05/0.06; 1,2-dichloromethane: 0.09/0.07; methyl chloride: 0.06/0.07.
Pedersen et al. (2020)	All subjects	256/1302 exposed to 1,1,1-trichloroethane	Benzene (0.31), toluene (0.36)	Benzene, trichloroethylene, toluene.
Talibov et al. (2019)	Assume all subjects but unclear: “exposure agents”	181/904 exposed to 1,1,1-trichloroethane	Benzo[a]pyrene (0.49), chromium (0.59), trichloroethylene (0.62), iron (0.64), nickel (0.62), lead (0.53), welding fumes (0.61), extremely low frequency magnetic fields (0.31)	Benzene; asbestos; benzo[a]pyrene; chromium; formaldehyde; trichloroethylene; bitumen fumes; diesel exhaust; iron; gasoline; methylene chloride; nickel; lead; perchloroethylene; silica dust; sulfur dioxide; toluene; welding fumes; wood dust; ultraviolet radiation; night-shift work; physical workload; extremely low-frequency magnetic fields.

NA, not available.

## References

- Callahan CL, Stewart PA, Friesen MC, Locke S, De Roos AJ, Cerhan JR, et al. (2018). Case-control investigation of occupational exposure to chlorinated solvents and non-Hodgkin’s lymphoma. *Occup Environ Med.* 75(6):415–20. <https://doi.org/10.1136/oemed-2017-104890> PMID:29588333
- Dosemeci M, Cocco P, Chow WH (1999). Gender differences in risk of renal cell carcinoma and occupational exposures to chlorinated aliphatic hydrocarbons. *Am J Ind Med.* 36(1):54–9. [https://doi.org/10.1002/\(SICI\)1097-0274\(199907\)36:1<54::AID-AJIM8>3.0.CO;2-0](https://doi.org/10.1002/(SICI)1097-0274(199907)36:1<54::AID-AJIM8>3.0.CO;2-0) PMID:10361587
- Gold LS, Stewart PA, Milliken K, Purdue M, Severson R, Seixas N, et al. (2011). The relationship between multiple myeloma and occupational exposure to six chlorinated solvents. *Occup Environ Med.* 68(6):391–9. <https://doi.org/10.1136/oem.2009.054809> PMID:20833760
- Le Cornet C, Fervers B, Pukkala E, Tynes T, Feychting M, Hansen J, et al. (2017). Parental Occupational Exposure to Organic Solvents and Testicular Germ Cell Tumors in their Offspring: NORD-TEST Study. *Environ Health Perspect.* 125(6):067023. <https://doi.org/10.1289/EHP864> PMID:28893722
- Pedersen JE, Strandberg-Larsen K, Andersson M, Hansen J (2020). Occupational exposure to specific organic solvents and risk of subtypes of breast cancer in a large population of Danish women, 1964–2016. *Occup Environ Med.* 78(3):192–8. <https://doi.org/10.1136/oemed-2020-106865> PMID:33093237
- Purdue MP, Stewart PA, Friesen MC, Colt JS, Locke SJ, Hein MJ, et al. (2017). Occupational exposure to chlorinated solvents and kidney cancer: a case-control study. *Occup Environ Med.* 74(4):268–74. <https://doi.org/10.1136/oemed-2016-103849> PMID:27803178
- Talibov M, Hansen J, Heikkinen S, Martinsen JI, Sparen P, Tryggvadottir L, et al. (2019). Occupational exposures and male breast cancer: A nested case-control study in the Nordic countries. *Breast.* 48:65–72. <https://doi.org/10.1016/j.breast.2019.09.004> PMID:31539869
- Videnros C, Selander J, Wiebert P, Albin M, Plato N, Borgquist S, et al. (2020). Investigating the risk of breast cancer among women exposed to chemicals: a nested case-control study using improved exposure estimates. *Int Arch Occup Environ Health.* 93(2):261–9. <https://doi.org/10.1007/s00420-019-01479-4> PMID:31650237