



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

VOLUME 130

This publication represents the views and expert opinions of an IARC Working Group on the Identification of Carcinogenic Hazards to Humans, which met remotely, 7–22 October 2021

LYON, FRANCE - 2022

**IARC MONOGRAPHS
ON THE IDENTIFICATION
OF CARCINOGENIC HAZARDS
TO HUMANS**

Table 1.6 Exposure assessment review and critique for epidemiological studies on cancer and exposure to isophorone

Reference and outcome	What was the study design? (<i>n</i>)	What methods were used for the exposure assessment? (incl. data source, environmental and biological measurements etc.)	What was the exposure definition and was it well defined?	Was exposure assessment qualitative, semiquantitative or quantitative?	Were sampling and collection protocols for chemical measurements appropriate?	What routes of exposure were assessed?	How was the intensity of exposure assessed?	How was the duration of exposure assessed?	Was cumulative exposure assessed?	Was exposure assessed before outcome being ascertained?	What was the timing of exposure relative to the outcome?	Was there known exposure to any other carcinogens?	Could the 'unexposed' group have included exposed?
Rodrigues et al. (2020) Brain and other central nervous system cancers Exposure assessment methods described in Rodrigues et al. (2019)	Nested case-control (120 cases; 1028 controls)	Exposure assigned by group-exposure matrices and time period using division, department, and job title coupled with samples taken from the 3 facilities (from which a mean exposure was derived)	Cumulative exposure in tertiles of mg/m ³ -years – yes, clearly stated. Tertiles are > 5.09; 1.7–5.09; > 0- < 1.69 mg/m ³ -years isophorone exposure	Semiquantitative (no individual measures but measurement data was used in the assessment). Site visits were conducted and over 700 000 documents were captured with site and process information, along with the hygiene measurements	Unclear, but the database is large (10 504 samples for all 31 chemicals; number for isophorone not reported) and worksite-specific	Not specified (presumed inhalation)	Using an industrial hygiene database to estimate mean exposure (mg/m ³) for each of the 31 chemicals assessed	Work history files for each member of the cohort (start and end dates of all jobs at the 3 facilities)	Yes	Yes (assessors were blinded to case status)	Study dates are from 1965 to 1999. A latency analysis excluded the 5 years before diagnosis or death from the work history	Yes, 30 other exposures of which some are known or suspected carcinogens, including arsenic, asbestos, benzene, beryllium, carbon tetrachloride, silica, formaldehyde, etc.	Yes, but unlikely based on robustness of the considerations in the exposure assessment

References

Rodrigues EG, Herrick RF, Stewart J, Palacios H, Laden F, Clark W, et al. (2020). Case-control study of brain and other central nervous system cancer among workers at semiconductor and storage device manufacturing facilities. *Occup Environ Med.* 77(4):238–48. <https://doi.org/10.1136/oemed-2019-106120> PMID:32019845

Rodrigues EG, Stewart J, Herrick R, Palacios H, Laden F, Clark W, et al. (2019). Retrospective exposure assessment for semiconductor and storage device manufacturing facilities. *J Occup Environ Med.* 61(4):e132–8. <https://doi.org/10.1097/JOM.0000000000001544> PMID:30946698

DRAFT