Supplemental Material

Human Health Effects of Trichloroethylene: Key Findings and Scientific Issues

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**Supplemental Material, Table S1.** Studies relevant to evaluation of TCE non-cancer endpoints.

<table>
<thead>
<tr>
<th>Tissue or organ system</th>
<th>Endpoint(s)</th>
<th>Relevant studies</th>
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</thead>
<tbody>
<tr>
<td>Central Nervous System</td>
<td>Changes in trigeminal nerve function or morphology.</td>
<td>Human studies: Barret et al. (1982); Barret et al. (1984); Barret et al. (1987); El Ghawabi et al. (1973); Feldman et al. (1988); Feldman et al. (1992); Kilburn and Warshaw (1993); Kilburn (2002a, b); Mhiri et al. (2004); K Rasmussen et al. (1993a); Ruijten et al. (1991); Triebig et al. (1982); Triebig et al. (1983) Experimental animal studies: Albee et al. (2006); Barret et al. (1991); Barret et al. (1992)</td>
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<tr>
<td>Impairment of vestibular function.</td>
<td></td>
<td>Human studies: Grandjean et al. (1955); Hirsch et al. (1996); Liu et al. (1988); Rasmussen and Sabroe (1986); Smith (1970); Stewart et al. (1970) Experimental animal studies: Niklasson et al. (1993); Tham et al. (1979); Tham et al. (1984); Umezur et al. (1997)</td>
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<td>Delayed motor function, including during neurodevelopment.</td>
<td></td>
<td>Human studies: Beppu (1968); Gamberale et al. (1976); Gash et al. (2008); Gun et al. (1978); Kilburn and Warshaw (1993); Kilburn and Thornton (1996); Kilburn (2002a, b); K Rasmussen et al. (1993a); Reif et al. (2003); White et al. (1997) Experimental animal studies: Albee et al. (2006); Blossom et al. (2008); Bushnell (1997); Bushnell and Oshiro (2000); Fredriksson et al. (1993); Kishi et al. (1993); Kulig (1987); Moser et al. (1995); Moser et al. (2003); Nunes et al. (2001); Savolainen et al. (1977); Shih et al. (2001); Taylor et al. (1985); Umezur et al. (1997); Waseem et al. (2001); Wolff and Siegmund (1978)</td>
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<td>Changes in auditory, visual, and cognitive function or performance.</td>
<td></td>
<td>Human studies: ATSDR (2002); Burg et al. (1995); Burg and Gist (1999); Chalupa et al. (1960); Gamberale et al. (1976); Kilburn (2002a, b); K Rasmussen et al. (1993c); Reif et al. (2003); Salvini et al. (1971); Stewart et al. (1970); Triebig et al. (1976); Triebig et al. (1977a); Triebig et al. (1977b); Tröster and Ruff (1990); Vernon and Ferguson (1969) Experimental animal studies: Albee et al. (2006); Blain et al. (1994); Boyes et al. (2000); Boyes et al. (2003); Boyes et al. (2005); Crofton et al. (1994); Crofton and Zhao (1997); Fechter et al. (1998); Isaacs and Taylor (1989); Isaacs and Taylor (1990); Jaspers et al. (1993); Kishi et al. (1993); Kjellstrand et al. (1980); Kulig (1987); Muijser et al. (2000); Ohta et al. (2001); Oshiro et al. (2004); Rebert et al. (1991); Rebert et al. (1993); Rebert et al. (1995); Umezur et al. (1997); Yamamura et al. (1983)</td>
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</table>
| **Kidney**             | Nephrotoxicity, particularly in the form of tubular toxicity. | Human studies: Bolt et al. (2004); Brüning et al. (1999a); Brüning et al. (1999b); Green et al. (2004); Jacob et al. (2007); Nagaya et al. (1989); Radican et al. (2006); K Rasmussen et al. (1993b); Selden et al. (1993)  
Experimental animal studies: Chakrabarti and Tuchweber (1988); Dow and Green (2000); Green et al. (1998); Green et al. (2003); Jaffe et al. (1984); NCI (1976); NTP (1988, 1990); Terracini and Parker (1965)  
Mechanistic studies: Cummings and Lash (2000); Cummings et al. (2000a); Cummings et al. (2000b) |
| **Liver**              | Hepatotoxicity. | Human studies: Davis et al. (2005); Driscoll et al. (1992); Kamijima et al. (2007); Leigh and Jiang (1993); Nagaya et al. (1993); Neghab et al. (1997); K. Rasmussen et al. (1993); Xu et al. (2009)  
Experimental animal studies: Bai et al. (1992); Berman et al. (1995); Buben and O'Flaherty (1985); Channel et al. (1998); Dees and Travis (1993); Elcombe et al. (1985); Goel et al. (1992); Goldsworthy and Popp (1987); Kaneko et al. (2000); Kjellstrand et al. (1981); Kjellstrand et al. (1983a); Kjellstrand et al. (1983b); Kumar et al. (2001a); Laughter et al. (2004); Melnick et al. (1987); Merrick et al. (1989); Mirsalis et al. (1989); Nakajima et al. (2000); Neghab et al. (1997); NTP (1990); Nunes et al. (2001); Okino et al. (1991); Ramdhan et al. (2008); Ramdhan et al. (2010); Tao et al. (2000); Tucker et al. (1982); Wang and Stacey (1990); Woolhisser et al. (2006) |
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<tr>
<td><strong>Immune System</strong></td>
<td>Autoimmune disease, including scleroderma.</td>
<td>Human studies: Aryal et al. (2001); Diot et al. (2002); Garabrant et al. (2003); Iavicoli et al. (2005); Lehmann et al. (2001); Lehmann et al. (2002); Maitre et al. (2004); Nietert et al. (1998) Experimental animal studies: Blossom et al. (2004); Blossom and Doss (2007); Blossom et al. (2007); Blossom et al. (2008); Cai et al. (2006); Cai et al. (2008); Gilkeson et al. (2004); Griffin et al. (2000a); Griffin et al. (2000b); Kaneko et al. (2000); Keil et al. (2009); Khan et al. (1995); Peden-Adams et al. (2006); Peden-Adams et al. (2008); White et al. (2000) Mechanistic studies: Wang et al. (2007); Wang et al. (2008)</td>
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<td><strong>A specific type of generalized hypersensitivity disorder.</strong></td>
<td>Human studies: Dai et al. (2004); Huang et al. (2002); Kamijima et al. (2007); Kamijima et al. (2008) Experimental animal studies: Peden-Adams et al. (2006); Tang et al. (2002); Tang et al. (2008)</td>
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<td><strong>Immunosuppression.</strong></td>
<td>Human studies: Lagakos et al. (1986) Experimental animal studies: Aranyi et al. (1986); Blossom and Doss (2007); Blossom et al. (2008); Hobara et al. (1984); Kauffmann et al. (1982); Peden-Adams et al. (2006); Peden-Adams et al. (2008); Sanders et al. (1982); Selgrade and Gilmour (2010); Woolhiser et al. (2006)</td>
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<td><strong>Respiratory tract</strong></td>
<td>Respiratory tract toxicity, primarily in Clara cells.</td>
<td>Human studies: Cakmak et al. (2004); Saygun et al. (2007) Experimental animal studies: Green et al. (1997); Kurasawa (1988); Le Mesurier et al. (1980); Lewis et al. (1984); Narotsky et al. (1995); NTP (1990); Odum et al. (1992); Prendergast et al. (1967); Scott et al. (1988); Stewart et al. (1979); Villaschi et al. (1991)</td>
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<td>Reproductive system</td>
<td>Male reproductive toxicity, through effects in the testes, epididymides, on sperm, or on hormone levels.</td>
<td>Human studies: ATSDR (2001); Bardodej and Vyskocil (1956); Chia et al. (1997); Chia et al. (1996); El Ghawabi et al. (1973); Forkert et al. (2003); Goh et al. (1998); Rasmussen et al. (1988); Saihan et al. (1978); Sallmen et al. (1998)</td>
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<td>Experimental animal studies: Cosby and Dukelow (1992); Forkert et al. (2002); George et al. (1985); George et al. (1986); Kan et al. (2007); Kumar et al. (2000a); Kumar et al. (2000b); Kumar et al. (2001b); Land et al. (1981); Veeramachaneni et al. (2001); Xu et al. (2004); Zenick et al. (1984)</td>
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<td>Mechanistic studies: DuTeaux et al. (2003); DuTeaux et al. (2004); Xu et al. (2004)</td>
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<td>Female reproductive toxicity.</td>
<td>Human studies: ATSDR (2001); Bardodej and Vyskocil (1956); Sagawa et al. (1973); Sallmén et al. (1995); Zielinski (1973)</td>
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<td></td>
<td>Experimental animal studies: Berger and Horner (2003); Cosby and Dukelow (1992); George et al. (1985); George et al. (1986); Manson et al. (1984); Wu and Berger (2007)</td>
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Supplemental Material, Table S1 (continued).

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<th>Tissue or organ system</th>
<th>Endpoint(s)</th>
<th>Relevant studies</th>
</tr>
</thead>
</table>
| Development            | Fetal cardiac malformations. | Human studies:
|                        |             | ATSDR (2001, 2006a, b, 2008); Bove et al. (1995); Bove (1996); Goldberg et al. (1990); Lagakos et al. (1986); Yauck et al. (2004) |
|                        |             | Experimental animal studies:
|                        |             | Carney et al. (2006); Cosby and Dukelow (1992); Dawson et al. (1990, 1993); Dorfmueller et al. (1979); Epstein et al. (1992); Fisher et al. (2001); Hardin et al. (1981); Healy et al. (1982); PD Johnson et al. (1998); P Johnson et al. (1998); Johnson et al. (2003, 2005); Narotsky and Kavlock (1995); Narotsky et al. (1995); Schwetz et al. (1975); Smith et al. (1989); Smith et al. (1992); Warren et al. (2006) |
|                        |             | Mechanistic studies:
|                        |             | Boyer et al. (2000); Bross et al. (1983); Drake et al. (2006a); Drake et al. (2006b); Loeber et al. (1988); Mishima et al. (2006); Ou et al. (2003); Rufer et al. (2008); Rufer et al. (2010) |
|                        | Prenatal losses and decreased growth or birth weight of offspring. | Human studies:
|                        |             | ATSDR (1998, 2001, 2006b, 2008); Bove et al. (1995); Bove (1996); Goldberg et al. (1990); Lagakos et al. (1986); Lindbohm et al. (1990); Rodenbeck et al. (2000); Taskinen et al. (1989); Taskinen et al. (1994); Windham et al. (1991) |
|                        |             | Experimental animal studies:
|                        |             | Carney et al. (2006); George et al. (1985); George et al. (1986); Hardin et al. (1981); Healy et al. (1982); Kumar et al. (2000b); Narotsky and Kavlock (1995); Narotsky et al. (1995); Schwetz et al. (1975) |
References


Dow J, Green T. 2000. Trichloroethylene induced vitamin b(12) and folate deficiency leads to increased formic acid excretion in the rat. Toxicology 146:123-136.


Kilburn K. 2002a. Is neurotoxicity associated with environmental trichloroethylene (TCE)? Arch Environ Health 57:113-120.


Shih CL, Chen HH, Chiu TH. 2001. Acute exposure to trichloroethylene differentially alters the susceptibility to chemoconvulsants in mice. Toxicology 162:35-42.


