

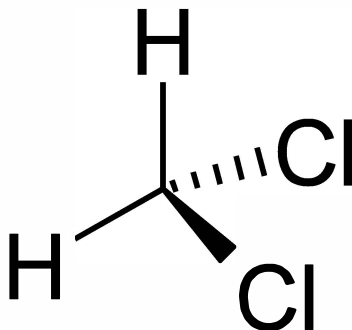


## Final Risk Evaluation for Methylene Chloride

### Systematic Review Supplemental File:

### Data Quality Evaluation for Data Sources on Consumer and Environmental Exposure

CASRN: 75-09-2



*June 2020*

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<b>HERO ID</b>	Data Type	Reference	
			<b>1</b>
<b>Monitoring</b>			<b>2</b>
<b>27974</b>	Monitoring	Chan, C. C.,Vainer, L.,Martin, J. W.,Williams, D. T.. 1990. Determination of organic contaminants in residential indoor air using an adsorption-thermal desorption technique. <i>Journal of the Air and Waste Management Association</i> 40	<b>2</b>
<b>28993</b>	Monitoring	Ferrario, J. B.,Lawler, G. C.,Deleon, I. R.,Laseter, J. L.. 1985. Volatile organic pollutants in biota and sediments of Lake Pontchartrain. <i>Bulletin of Environmental Contamination and Toxicology</i> 34	<b>4</b>
<b>29192</b>	Monitoring	Singh, H. B.,Salas, L. J.,Stiles, R. E.. 1983. Selected man-made halogenated chemicals in the air and oceanic environment. <i>Journal of Geophysical Research</i> 88	<b>5</b>
<b>31210</b>	Monitoring	M. R. Van Winkle, P. A. Scheff. 2001. Volatile organic compounds, polycyclic aromatic hydrocarbons and elements in the air of ten urban homes. <i>Indoor Air</i> 11	<b>6</b>
<b>49414</b>	Monitoring	Ryan, T. J.,Hart, E. M.,Kappler, L. L.. 2002. VOC exposures in a mixed-use university art building. <i>AIHA Journal</i> 63	<b>7</b>
<b>58599</b>	Monitoring	M. L. Phillips, N. A. Esmen, T. A. Hall, R. Lynch. 2005. Determinants of exposure to volatile organic compounds in four Oklahoma cities. <i>Journal of Exposure Analysis and Environmental Epidemiology</i> 15	<b>8</b>
<b>75004</b>	Monitoring	Otson, R.,Doyle, E. E.,Williams, D. T.,Bothwell, P. D.. 1983. Survey of selected organics in office air. <i>Bulletin of Environmental Contamination and Toxicology</i> 31	<b>9</b>
<b>78782</b>	Monitoring	Lindstrom, A. B.,Proffitt, D.,Fortune, C. R.. 1995. Effects of modified residential construction on indoor air quality. <i>Indoor Air</i> 5	<b>11</b>
<b>632310</b>	Monitoring	Adgate, J. L.,Church, T. R.,Ryan, A. D.,Ramachandran, G.,Fredrickson, A. L.,Stock, T. H.,Morandi, M. T.,Sexton, K.. 2004. Outdoor, indoor, and personal exposure to VOCs in children. <i>Environmental Health Perspectives</i> 112	<b>12</b>
<b>645789</b>	Monitoring	Yamamoto, K.,Fukushima, M.,Kakutani, N.,Kuroda, K.. 1997. Volatile organic compounds in urban rivers and their estuaries in Osaka, Japan. <i>Environmental Pollution</i> 95	<b>13</b>

<b>730121</b>	Monitoring	Sexton, K.,Mongin, S. J.,Adgate, J. L.,Pratt, G. C.,Ramachandran, G.,Stock, T. H.,Morandi, M. T.. 2007. Estimating volatile organic compound concentrations in selected microenvironments using time-activity and personal exposure data. <i>Journal of Toxicology and Environmental Health, Part A: Current Issues</i> 70	<b>14</b>
<b>758690</b>	Monitoring	Guo, H.,Lee, S. C.,Chan, L. Y.,Li, W. M.. 2004. Risk assessment of exposure to volatile organic compounds in different indoor environments. <i>Environmental Research</i> 94	<b>16</b>
<b>824555</b>	Monitoring	Chao, C. Y.,Chan, G. Y.. 2001. Quantification of indoor VOCs in twenty mechanically ventilated buildings in Hong Kong. <i>Atmospheric Environment</i> 35	<b>17</b>
<b>1062239</b>	Monitoring	X. M. Wu, M. G. Apte, R. Maddalena, D. H. Bennett. 2011. Volatile organic compounds in small- and medium-sized commercial buildings in California. <i>Environmental Science and Technology</i> 45	<b>18</b>
<b>1065844</b>	Monitoring	Dodson, R. E.,Levy, J. I.,Spengler, J. D.,Shine, J. P.,Bennett, D. H.. 2008. Influence of basements, garages, and common hallways on indoor residential volatile organic compound concentrations. <i>Atmospheric Environment</i> 42	<b>19</b>
<b>1066049</b>	Monitoring	S. N. Sax, D. H. Bennett, S. N. Chillrud, P. L. Kinney, J. D. Spengler. 2004. Differences in source emission rates of volatile organic compounds in inner-city residences of New York City and Los Angeles. <i>Journal of Exposure Analysis and Environmental Epidemiology</i> 14	<b>20</b>
<b>1441544</b>	Monitoring	van de Meent, D.,Den Hollander, H. A.,Pool, W. G.,Vredenburg, M. J.,van Oers, H. A. M.,de Greef, E.,Luijten, J. a. 1986. Organic micropollutants in Dutch coastal waters. <i>Water Science and Technology</i> 18	<b>22</b>
<b>1642248</b>	Monitoring	Lee, S. C.,Li, W. M.,Chan, L. Y.. 2001. Indoor air quality at restaurants with different styles of cooking in metropolitan Hong Kong. <i>Science of the Total Environment</i> 279	<b>23</b>
<b>1744157</b>	Monitoring	Bouhamra, W. S.,Elkilani, A. S.. 1999. Investigation and modeling of surface sorption-desorption behavior of volatile organic compounds for indoor air quality analysis. <i>Environmental Technology</i> 20	<b>24</b>
<b>1967347</b>	Monitoring	G. C. Pratt, C. Y. Wu, D. Bock, J. L. Adgate, G. Ramachandran, T. H. Stock, M. Morandi, K. Sexton. 2004. Comparing air dispersion model predictions with measured concentrations of VOCs in urban communities. <i>Environmental Science and Technology</i> 38	<b>25</b>
<b>1978790</b>	Monitoring	Chan, C.,Lee, S. C.,Chan, W.,Ho, K.,Tian, L.,Lai, S.,Li, Y.,Huang, Y. u. 2011. Characterisation of Volatile Organic Compounds at Hotels in Southern China. <i>Indoor and Built Environment</i> 20	<b>27</b>

<b>2442846</b>	Monitoring	Loh, M. M.,Houseman, E. A.,Gray, G. M.,Levy, J. I.,Spengler, J. D.,Bennett, D. H.. 2006. Measured concentrations of VOCs in several non-residential microenvironments in the United States. <i>Environmental Science and Technology</i> 40	<b>28</b>
<b>2443355</b>	Monitoring	Chin, J. Y.,Godwin, C.,Parker, E.,Robins, T.,Lewis, T.,Harbin, P.,Batterman, S.. 2014. Levels and sources of volatile organic compounds in homes of children with asthma. <i>Indoor Air</i> 24	<b>29</b>
<b>2667557</b>	Monitoring	Abtahi, M.,Naddafi, K.,Mesdaghinia, A.,Yaghmaeian, K.,Nabizadeh, R.,Jaafarzadeh, N.,Rastkari, N.,Saeedi, R.,Nazmara, S.. 2013. Dichloromethane emissions from automotive manufacturing industry in Iran: Case study of the SAIPA automotive manufacturing company. <i>Toxicological and Environmental Chemistry</i> 95	<b>30</b>
<b>3242836</b>	Monitoring	Christof, O.,Seifert, R.,Michaelis, W.. 2002. Volatile halogenated organic compounds in European estuaries. <i>Biogeochemistry</i> 59	<b>31</b>
<b>3283268</b>	Monitoring	Pratt, G. C.,Bock, D.,Stock, T. H.,Morandi, M.,Adgate, J. L.,Ramachandran, G.,Mongin, S. J.,Sexton, K.. 2005. A field comparison of volatile organic compound measurements using passive organic vapor monitors and stainless steel canisters. <i>Environmental Science and Technology</i> 39	<b>32</b>
<b>3449449</b>	Monitoring	Duan, H.,Liu, X.,Yan, M.,Wu, Y.,Liu, Z.. 2016. Characteristics of carbonyls and volatile organic compounds (VOCs) in residences in Beijing, China. 10	<b>34</b>
<b>3453092</b>	Monitoring	T. Hoang, R. Castorina, F. Gaspar, R. Maddalena, P. L. Jenkins, Q. Zhang, T. E. Mckone, E. Benfenati, A. Y. Shi, A. Bradman. 2016. VOC exposures in California early childhood education environments. <i>Indoor Air</i> 27	<b>35</b>
<b>3453725</b>	Monitoring	Dai, H.,Jing, S.,Wang, H.,Ma, Y.,Li, L.,Song, W.,Kan, H.. 2017. VOC characteristics and inhalation health risks in newly renovated residences in Shanghai, China. <i>Science of the Total Environment</i> 577	<b>36</b>
<b>3488897</b>	Monitoring	Ma, H.,Zhang, H.,Wang, L.,Wang, J.,Chen, J.. 2014. Comprehensive screening and priority ranking of volatile organic compounds in Daliao River, China. <i>Environmental Monitoring and Assessment</i> 186	<b>37</b>
<b>3489827</b>	Monitoring	Bianchi, E.,Lessing, G.,Brina, K. R.,Angeli, L.,Andrighetti, N. B.,Peruzzo, J. R.,Do Nascimento, C. A.,Spilki, F. R.,Ziulkoski, A. L.,da Silva, L. B.. 2017. Monitoring the Genotoxic and Cytotoxic Potential and the Presence of Pesticides and Hydrocarbons in Water of the Sinos River Basin, Southern Brazil. <i>Archives of Environmental Contamination and Toxicology</i> 72	<b>38</b>
<b>3490937</b>	Monitoring	Tobiszewski, M.,Namieśnik, J.. 2013. Distribution of volatile organohalogen compounds in petrochemical plant water streams. <i>Chemistry and Ecology</i> 29	<b>39</b>
<b>3545469</b>	Monitoring	Amagai, T.,Olansandan,,Matsushita, H.,Ono, M.,Nakai, S.,Tamura, K.,Maeda, K.. 1999. A survey of indoor pollution by volatile organohalogen compounds in Katsushika, Tokyo, Japan. <i>Indoor and Built Environment</i> 8	<b>40</b>

<b>3580141</b>	Monitoring	Lee, W.,Park, S. H.,Kim, J.,Jung, J. Y.. 2015. Occurrence and removal of hazardous chemicals and toxic metals in 27 industrial wastewater treatment plants in Korea. <i>Desalination and Water Treatment</i> 54	<b>41</b>
<b>3587944</b>	Monitoring	Duclos, Y.,Blanchard, M.,Chesterikoff, A.,Chevreuil, M.. 2000. Impact of paris waste upon the chlorinated solvent concentrations of the river Seine (France). <i>Water, Air, and Soil Pollution</i> 117	<b>42</b>
<b>3827236</b>	Monitoring	Cdc,. 2017. National report on human exposure to environmental chemicals.	<b>43</b>
<b>3975046</b>	Monitoring	Usgs,. 2003. A national survey of methyl tert-butyl ether and other volatile organic compounds in drinking-water sources: Results of the random survey.	<b>44</b>
<b>4140523</b>	Monitoring	Helz, G. R.,Hsu, R. Y.. 1978. Volatile chloro- and bromocarbons in coastal waters. <i>Limnology and Oceanography</i> 23	<b>45</b>
<b>4152056</b>	Monitoring	Turoski, V. E.,Woltman, D. L.,Vincent, B. E.. 1983. Determination of organic priority pollutants in the paper industry by GC/MS. <i>Tappi Journal</i> 66	<b>47</b>
<b>4727403</b>	Monitoring	Wallace, L., Nelson, W., Ziegenfus, R., Pellizzari, E., Michael, L., Whitmore, R., Zelon, H., Hartwell, T., Perritt, R., Westerdahl, D.. 1991. The Los Angeles TEAM Study: personal exposures, indoor-outdoor air concentrations, and breath concentrations of 25 volatile organic compounds. <i>Journal of Exposure Analysis and Environmental Epidemiology</i> 1	<b>49</b>
<b>Experimental</b>			<b>51</b>
<b>28339</b>	Experimental	Sack, T. M.,Steele, D. H.,Hammerstrom, K.,Remmers, J.. 1992. A survey of household products for volatile organic compounds. <i>Atmospheric Environment</i> 26	<b>51</b>
<b>73853</b>	Experimental	C. P. Weisel, J. Zhang, B. J. Turpin, M. T. Morandi, S. Colome, T. H. Stock, D. M. Spektor, L. Korn, A. Winer, S. Alimokhtari, J. Kwon, K. Mohan, R. Harrington, R. Giovanetti, W. Cui, M. Afshar, S. Maberti, D. Shendell. 2005. Relationship of indoor, outdoor and personal air (RIOPA) study: study design, methods and quality assurance/control results. <i>Journal of Exposure Analysis and Environmental Epidemiology</i> 15	<b>52</b>
<b>708344</b>	Experimental	Wallace, L.,Nelson, W.,Pellizzari, E.,Raymer, J.. 1997. Uptake and decay of volatile organic compounds at environmental concentrations: application of a four-compartment model to a chamber study of five human subjects. <i>Journal of Exposure Analysis and Environmental Epidemiology</i> 7	<b>54</b>
<b>1023088</b>	Experimental	C. W. Chung, M. T. Morandi, T. H. Stock, M. Afshar. 1999. Evaluation of a passive sampler for volatile organic compounds at ppb concentrations, varying temperatures, and humidities with 24-h exposures. 1. Description and characterization of exposure chamber system. <i>Environmental Science and Technology</i> 33	<b>55</b>

<b>3023273</b>	Experimental	Steinemann, A.. 2015. Volatile emissions from common consumer products. <i>Air Quality, Atmosphere and Health</i> 8	<b>57</b>
<b>3032678</b>	Experimental	Cheng, W.,Lai, C. H.,Tzeng, W.,Her, C.,Hsu, Y.. 2015. Gaseous Products of Incense Coil Combustion Extracted by Passive Solid Phase Microextraction Samplers. <i>Atmosphere</i> 6	<b>58</b>
<b>3449477</b>	Experimental	C. W. Chung, M. T. Morandi, T. H. Stock, M. Afshar. 1999. Evaluation of a passive sampler for volatile organic compounds at ppb concentrations, varying temperatures, and humidities with 24-h exposures. 2. Sampler performance. <i>Environmental Science and Technology</i> 33	<b>59</b>
<b>3540771</b>	Experimental	Ursin, C.,Hansen, C. M.,Van Dyk, J. W.,Jensen, P. O.,Christensen, I. J.,Ebbehoj, J.. 1995. Permeability of commercial solvents through living human skin. <i>American Industrial Hygiene Association Journal</i> 56	<b>61</b>
<b>3587655</b>	Experimental	Cheng, W. enHsi,Tsai, D. Y.,Lu, J. iaYu, Lee, J. enWei. 2016. Extracting Emissions from Air Fresheners Using Solid Phase Microextraction Devices. <i>Aerosol and Air Quality Research</i> 16	<b>62</b>
<b>4532343</b>	Experimental	C. B. Keil, M. Nicas. 2003. Predicting room vapor concentrations due to spills of organic solvents. <i>AIHA Journal</i> 64	<b>63</b>
<b>4663242</b>	Experimental	Won, D. Yang W.. 2012. Material emission information from: 105 building materials and consumer products.	<b>64</b>
<b>4683360</b>	Experimental	A. T. Hodgson. 2001. Predicted concentrations in new relocatable classrooms of volatile organic compounds emitted from standard and alternate interior finish materials.	<b>65</b>
<b>4683366</b>	Experimental	A. C. Ortiz. 2010. Identifying sources of volatile organic compounds and aldehydes in a high performance building.	<b>66</b>
<b>4940676</b>	Experimental	L. Schenk, M. Rauma, M. N. Fransson, G. Johanson. 2018. Percutaneous absorption of thirty-eight organic solvents in vitro using pig skin. <i>PLoS ONE</i> 13	<b>67</b>
<b>Databases Not Unique to a Chemical</b>			<b>68</b>
<b>1359400</b>	Databases Not Unique to a Chemical	Staples, C. A.,Werner, A. F.,Hoogheem, T. J.. 1985. Assessment of priority pollutant concentrations in the United States using STORET database. <i>Environmental Toxicology and Chemistry</i> 4	<b>68</b>
<b>3970047</b>	Databases Not Unique to a Chemical	U.S, E. P. A.. 2017. STORET: Methylene chloride.	<b>69</b>
<b>3970233</b>	Databases Not Unique to a Chemical	Oppt Monitoring Database. 2017. Methylene Chloride.	<b>70</b>

<b>3970265</b>	Databases Not Unique to a Chemical	Household Products, Database. 2017. Household products database: Chemical information: Methylene chloride.	<b>71</b>
<b>3970848</b>	Databases Not Unique to a Chemical	Oecd Existing Chemical Database. 2011. SIDS initial assessment profile: Dichloromethane.	<b>72</b>
<b>3981160</b>	Databases Not Unique to a Chemical	Consumer Product Information, Database. 2017. What's in it? methylene chloride.	<b>73</b>
<b>4663145</b>	Databases Not Unique to a Chemical	Bartzis, J.. 2018. Prioritization of building materials as indoor pollution sources (BUMA).	<b>74</b>
<b>Completed Exposure Assessments</b>			<b>75</b>
<b>17595</b>	Completed Exposure Assessment	U.S, E. P. A.. 1985. Health assessment document for dichloromethane (methylene chloride): Final report.	<b>75</b>
<b>18169</b>	Completed Exposure Assessment	Page, G. W.. 1981. Comparison of groundwater and surface water for patterns and levels of contamination by toxic substances. Environmental Science and Technology 15	<b>76</b>
<b>95570</b>	Completed Exposure Assessment	Shah, J. J.,Singh, H. B.. 1988. Distribution of volatile organic chemicals in outdoor and indoor air: a national VOCs data base. Environmental Science and Technology 22	<b>77</b>
<b>694628</b>	Completed Exposure Assessment	Destailats, H.,Maddalena, R. L.,Singer, B. C.,Hodgson, A. T.,McKone, T. E.. 2008. Indoor pollutants emitted by office equipment: A review of reported data and information needs. Atmospheric Environment 42	<b>78</b>
<b>695495</b>	Completed Exposure Assessment	C. J. Weschler. 2009. Changes in indoor pollutants since the 1950s. Atmospheric Environment 43	<b>79</b>
<b>735303</b>	Completed Exposure Assessment	Dawson, H. E.,McAlary, T.. 2009. A compilation of statistics for VOCs from post-1990 indoor air concentration studies in North American residences unaffected by subsurface vapor intrusion. Ground Water Monitoring and Remediation 29	<b>80</b>
<b>808655</b>	Completed Exposure Assessment	U.S, E. P. A.. 2011. Toxicological review of dichloromethane (methylene chloride) (CASRN 75-09-2): In support of summary information on the Integrated Risk Information System (IRIS).	<b>81</b>
<b>864159</b>	Completed Exposure Assessment	J. M. Logue, T. E. McKone, M. H. Sherman, B. C. Singer. 2011. Hazard assessment of chemical air contaminants measured in residences. Indoor Air 21	<b>82</b>
<b>1265174</b>	Completed Exposure Assessment	. 1988. Toxic Air Pollutant Emission Factors Compilation For Selected Air Toxic Compounds and Sources.	<b>83</b>
<b>2531129</b>	Completed Exposure Assessment	Health, Canada. 1993. Canadian Environmental Protection Act priority substances list assessment report: Dichloromethane.	<b>84</b>

<b>2537636</b>	Completed Exposure Assessment	L. Golsteijn, D. Huizer, M. Hauck, R. van Zelm, M. A. Huijbregts. 2014. Including exposure variability in the life cycle impact assessment of indoor chemical emissions: the case of metal degreasing. <i>Environment International</i> 71	<b>85</b>
<b>3586663</b>	Completed Exposure Assessment	Long, G.,Meek, M. E.,Caldwell, I.,Bartlett, S.,Savard, S.. 1994. Dichloromethane - evaluation of risks to health from environmental exposure in Canada. <i>Journal of environmental Science and Health, Part C: Environmental Carcinogenesis &amp; Ecotoxicology Reviews</i> 12	<b>86</b>
<b>3587217</b>	Completed Exposure Assessment	De Rooij, C.,Thompson, R. S.,Garny, V.,Lecloux, A.,van Wijk, D.. 2004. Dichloromethane marine risk assessment with special reference to the OSPAR-COM region: North Sea. <i>Environmental Monitoring and Assessment</i> 97	<b>87</b>
<b>3827379</b>	Completed Exposure Assessment	Usepa, O. O. W.. 2009. Contaminant occurrence support document for category 1 contaminants for the second six-year review of national primary drinking water regulations.	<b>88</b>
<b>3827392</b>	Completed Exposure Assessment	U.S, E. P. A.. 2011. Background indoor air concentrations of volatile organic compounds in North American residences (1990-2005): A compilation of statistics for assessment vapor intrusion.	<b>89</b>
<b>3827786</b>	Completed Exposure Assessment	Iarc,. 2016. Dichloromethane. <i>IARC Monographs on the Evaluation of Carcinogenic Risks to Humans</i> 110	<b>90</b>
<b>3970852</b>	Completed Exposure Assessment	Iarc,. 2016. ARC Monographs on the evaluation of carcinogenic risks to humans: Dichloromethane. 110	<b>91</b>
<b>3982130</b>	Completed Exposure Assessment	European Chlorinated Solvents, Association. 1999. Euro chlor risk assessment for the marine environment, OSPARCOM region - Norht sea: Dichloromethane.	<b>92</b>
<b>3982295</b>	Completed Exposure Assessment	Oehha,. 2000. Public health goals for chemicals in drinking water dichloromethane (methylene chloride, DCM).	<b>93</b>
<b>3982330</b>	Completed Exposure Assessment	Nih,. 2016. Report on carcinogens: Dichloromethane.	<b>94</b>
<b>3982337</b>	Completed Exposure Assessment	Atsdr,. 2000. Toxicological profile for methylene chloride.	<b>95</b>
<b>4152304</b>	Completed Exposure Assessment	Herbert, P.,Charbonnier, P.,Rivolta, L.,Servais, M.,Van Mensch, F.,Campbell, I.. 1986. The occurrence of chlorinated solvents in the environment. Prepared by a workshop of the European Chemical Industry Federation (CEFIC). <i>Chemistry and Industry</i> 24	<b>96</b>
<b>4663189</b>	Completed Exposure Assessment	Delmaar, J. E.. Emission of chemical substances from solid matrices: a method for consumer exposure assessment.	<b>97</b>
<b>Survey</b>			<b>98</b>
<b>1005969</b>	Survey	U.S, E. P. A.. 1987. Household solvent products: A national usage survey.	<b>98</b>



<b>1065590</b>	Survey	Abt. 1992. Methylene chloride consumer use study survey findings.	<b>99</b>
<b>2443306</b>	Survey	Farrow, A.,Taylor, H.,Northstone, K.,Golding, J.,Avon Longitudinal, Study. 2003. Symptoms of mothers and infants related to total volatile organic compounds in household products. Archives of Environmental Health 58	<b>100</b>
<b>Modeling</b>			<b>104</b>
<b>1967347</b>	Modeling	G. C. Pratt, C. Y. Wu, D. Bock, J. L. Adgate, G. Ramachandran, T. H. Stock, M. Morandi, K. Sexton. 2004. Comparing air dispersion model predictions with measured concentrations of VOCs in urban communities. Environmental Science and Technology 38	<b>104</b>
<b>3230538</b>	Modeling	H. F. Frasch, A. L. Bunge. 2015. The transient dermal exposure II: post-exposure absorption and evaporation of volatile compounds. Journal of Pharmaceutical Sciences 104	<b>105</b>
<b>3588614</b>	Modeling	Keil, C.,Murphy, R.. 2006. An application of exposure modeling in exposure assessments for a university chemistry teaching laboratory. Journal of Occupational and Environmental Hygiene 3	<b>106</b>

Refer to Appendix E of '*Application of Systematic Review in TSCA Risk Evaluations*' at <https://www.epa.gov> for more information of evaluation procedures and parameters.

Study Citation:	Chan, C. C., Vainer, L., Martin, J. W., Williams, D. T.. 1990. Determination of organic contaminants in residential indoor air using an adsorption-thermal desorption technique. Journal of the Air and Waste Management Association.				
Data Type	Monitoring				
Hero ID	27974				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	Sampling methodology discussed. At each of 12 homes the following samples were collected in November or December 1986: four indoor air samples, of varying volumes, using single sorbent tube and one indoor air sample using two sorbent tubes connected in series. Repeat samplings were carried out at six of these homes in February or March, 1987. The indoor air samples were collected on the main floor of the home, usually in the living or family room, where no obvious sources of contamination were present. Indoor air samples were collected at the same time, usually in the evening or late afternoon where a uniform 90-minute sampling time was used and pump flow rates were adjusted to sample the required volume of air. Air volumes sampled varied from 5 to 50 L. After sample collection the sorbent tubes were sealed in individual screw cap glass tubes and then stored in a tightly sealed container until analyzed.	
	Metric 2: Analytical Methodology	Medium	2	Analytical methodology discussed. Samples were analyzed using adsorption/Thermal Desorption coupled with Gas Chromatography/Mass Spectrometry (ATD/GS/MS). Method Detection Limit (ng/tube) provided in Table I; 6.0 ng/tube for DCM, TCE and PERC. Analysis was carried out within two days of sampling.	
	Metric 3: Biomarker Selection	N/A	N/A	Biomarker is not used.	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	Canada	
	Metric 5: Currency	Low	3	>15 years (1986,, 1987)	
	Metric 6: Spatial and Temporal Variability	Medium	2	large sample (60 indoor air samples collected 1986: 4 samples using single sorbent tube and 1 sample using two sorbent tubes connected in a series and 12 homes, so 5x12=60 and 30 indoor air samples collected 1987 at 6 homes: 5x6=30).	
	Metric 7: Exposure Scenario	Medium	2	Some discussion of exposure scenario, samples collected on main floor of the home usually in living room or family room where no source of contamination was present.	
Domain 3: Accessibility/Clarity					
Continued on next page					

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Data Type	Monitoring				
Hero ID	27974				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
	Metric 8: Reporting of Results	Medium	2	No supplemental or raw data. Tables II and III report indoor air concentrations (range and mean) for 12 homes during 1986 and 6 homes during 1987, respectively.	
	Metric 9: Quality Assurance	Medium	2	A blank sorbent tube was carried to and from each home and handled and analyzed as a sample, except that no air was sampled through the tube. Each week, three tubes fortified at a low level (approx 70-80 ng) and three tubes fortified at a medium level (approx 700- 800 ng) with a standard mixture of target compounds, together with a blank tube, were transported to and from one sampling site and analyzed by ATD/GC/MS. To assess the stability of the organic target compounds during storage of the sampling tube, triplicate sorbent tubes fortified with the target compounds at low and medium levels (approx 70-80 and 700-800 ng, respectively), together with a blank tube, were stored for 0,1,3 and 7 days under normal storage conditions and then analyzed by ATD/GC/MS.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Since concentrations of contaminants can vary greatly, effective use of the technique requires that several air samples of different volumes be collected at each location.	
Overall Quality Determination *		Medium	2.0		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Ferrario, J. B., Lawler, G. C., Deleon, I. R., Laseter, J. L.. 1985. Volatile organic pollutants in biota and sediments of Lake Pontchartrain. Bulletin of Environmental Contamination and Toxicology.				
Data Type	Monitoring				
Hero ID	28993				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	sampling method is described well. calibration is not referred.	
	Metric 2: Analytical Methodology	Medium	2	Analysis method is based on National Bureau of Standards procedure though, modified ver. Older method (1976).	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>15 yrs old	
	Metric 6: Spatial and Temporal Variability	Low	3	sample size is quite small.	
	Metric 7: Exposure Scenario	Low	3	study of oysters/clams is off PECO.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data.	
	Metric 9: Quality Assurance	Medium	2	Blanks and calibration standards used, in addition internal standards, however results not reported.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Low	3	No discussion for variability/uncertainty.	
Overall Quality Determination *		Low	2.3		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $= \geq 1.7$  to  $< 2.3$ ; Low:  $= \geq 2.3$  to  $\leq 3$ .

Study Citation:	Singh, H. B.,Salas, L. J.,Stiles, R. E.. 1983. Selected man-made halogenated chemicals in the air and oceanic environment. Journal of Geophysical Research.				
Data Type	Monitoring				
Hero ID	29192				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	Low	3	sampling method, equipments are discribed. But there is time lag(3 - 6weeks) between sampling and analysis. experimental protocol is provided in another reference(singh 1982).	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>15 yrs old	
	Metric 6: Spatial and Temporal Variability	Medium	2	Sufficient sample size(About 40). These samples are collected in various dates, sites, and depth. But no replicate samples.	
	Metric 7: Exposure Scenario	High	1		
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Dataset is well summarized. But no raw data is showed(just average value). The meaning of hyphen is not explained.	
	Metric 9: Quality Assurance	Medium	2	QA is described a bit like calibration, standards though, discussion is quite limited.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Low	3	Comparison of measured values and predicted values is described though, limited discussion.	
Overall Quality Determination *		Medium	2.0		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $=\geq 1.7$  to  $< 2.3$ ; Low:  $=\geq 2.3$  to  $\leq 3$ .

Study Citation:	M. R. Van Winkle, P. A. Scheff. 2001. Volatile organic compounds, polycyclic aromatic hydrocarbons and elements in the air of ten urban homes. Indoor Air.				
Data Type	Monitoring				
Hero ID	31210				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	N/A	N/A	Biomarker is not used.	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	U.S., Southeast Chicago, IL	
	Metric 5: Currency	Low	3	>15 yrs old	
	Metric 6: Spatial and Temporal Variability	Medium	2	large sample size. But no discription of replicates.	
	Metric 7: Exposure Scenario	Medium	2	The emission factors of each exposure scenario are discribed. But no discussion of exposure controls.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	The summary of data is discribed statistically. But no raw data.	
	Metric 9: Quality Assurance	High	1		
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	The uncertainty of data is discribed to a certain extent like a discussion of correlations.	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Ryan, T. J., Hart, E. M., Kappler, L. L.. 2002. VOC exposures in a mixed-use university art building. AIHA Journal.				
Data Type	Monitoring				
Hero ID	49414				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	Gave sampling details. Samples refrigerated and analyzed within 2 weeks.	
	Metric 2: Analytical Methodology	Medium	2	Methods well described, but info such as calibration, blanks, and recoveries were not provided.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>15 yrs	
	Metric 6: Spatial and Temporal Variability	High	1	18 to 90 samples	
	Metric 7: Exposure Scenario	High	1	personal monitoring in printing studio at university (relevant to high-end hobbyist)	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data. Missing the range, but has average, median and AD.	
	Metric 9: Quality Assurance	Low	3	Used the Qedit function for accuracy and precision, but was not described. Blanks not discussed.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	High	1	Discussion different locations of building, compared to other studies, provided SD.	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	M. L. Phillips, N. A. Esmen, T. A. Hall, R. Lynch. 2005. Determinants of exposure to volatile organic compounds in four Oklahoma cities. Journal of Exposure Analysis and Environmental Epidemiology.				
Data Type	Monitoring				
Hero ID	58599				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	High	1	EPA method T0-1 using an HP 6890/5973 gas chromatograph/mass spectrometer equipped with a TDS thermal desorption apparatus	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	Oklahoma City, Tulsa, Ponca City, Stillwater	
	Metric 5: Currency	Low	3	Paper was published in this journal in 2005 but submitted in 2003 (>15 yrs old)	
	Metric 6: Spatial and Temporal Variability	High	1	82 personal samples, 90 indoor samples, four cities with varied temporal and personal factors	
	Metric 7: Exposure Scenario	Medium	2	Likely represent the relevant exposure scenario in Oklahoma	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	High	1	No DCM data	
	Metric 9: Quality Assurance	Medium	2	Field blanks and spike samples also analyzed, consideration of how households are cleaned	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Variability in the population studied, but uncertainties not discussed	
Overall Quality Determination *		High	1.6		
Extracted		No			

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\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Otson, R., Doyle, E. E., Williams, D. T., Bothwell, P. D.. 1983. Survey of selected organics in office air. Bulletin of Environmental Contamination and Toxicology.				
Data Type	Monitoring				
Hero ID	75004				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	Adequately discussed sampling methodology; date and duration of sampling given; more description of offices needed	
	Metric 2: Analytical Methodology	Medium	2	Adequately discussed analytical methodology; gas chromatography	
	Metric 3: Biomarker Selection	N/A	N/A	Biomarker is not used	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	Canada, Ottawa offices	
	Metric 5: Currency	Low	3	>15 years (1982)	
	Metric 6: Spatial and Temporal Variability	Medium	2	The air quality in Ottawa offices was monitored over a 6 to 8 h period during business hours in February, 1982. A variety of businesses and buildings were selected and described. One area and two personal exposure measurements were made by means of dosimeters in each of 30 offices. Also, Pro-Tek badge measurements were obtained side-by-side with the dosimeters in 7 offices. Blank measurements (unexposed element) were obtained for dosimeters at 7 offices and for badges at one office.	
	Metric 7: Exposure Scenario	Medium	2	Scenario of interest - indoor air	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Mean concentrations from three determinations (devices) reported in Table II. Supplemental or raw data not reported.	
	Metric 9: Quality Assurance	Low	3	Minimal discussion; Blank measurements (unexposed element) were obtained for dosimeters at 7 offices and for badges at one office.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Low	3	Since the sparse data (TABLE III) generally included values near the detection limits, statistical comparison (HICKEY & BISHOP 1981) of the survey results was not considered meaningful.	
Overall Quality Determination *		Medium	2.2		
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Study Citation:	Otson, R.,Doyle, E. E.,Williams, D. T.,Bothwell, P. D.. 1983. Survey of selected organics in office air. Bulletin of Environmental Contamination and Toxicology.			
Data Type	Monitoring			
Hero ID	75004			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Lindstrom, A. B.,Proffitt, D.,Fortune, C. R.. 1995. Effects of modified residential construction on indoor air quality. Indoor Air.				
Data Type	Monitoring				
Hero ID	78782				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	Medium	2	tenax, stated followed epa guidelines. Described sampled homes.	
Metric 2:	Analytical Methodology	Low	3	HPLC and provided MDLs, but did not describe the HPLC.	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
Metric 4:	Geographic Area	High	1		
Metric 5:	Currency	Low	3	>15 yrs	
Metric 6:	Spatial and Temporal Variability	Medium	2	10 homes	
Metric 7:	Exposure Scenario	Medium	2	testing conditions well described (housing characteristics). Only one geographic location.	
Domain 3: Accessibility/Clarity					
Metric 8:	Reporting of Results	Low	3	only geometric means provided. No SD, range.	
Metric 9:	Quality Assurance	Low	3		
Domain 4: Variability and Uncertainty					
Metric 10:	Variability and Uncertainty	Medium	2	No SD or CV. described differences between conventional and experimental homes. no discussion of uncertainty.	
Overall Quality Determination *		Low	2.3		
Extracted		Yes			

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<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Adgate, J. L., Church, T. R., Ryan, A. D., Ramachandran, G., Fredrickson, A. L., Stock, T. H., Morandi, M. T., Sexton, K.. 2004. Outdoor, indoor, and personal exposure to VOCs in children. Environmental Health Perspectives.				
Data Type	Monitoring				
Hero ID	632310				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	storage conditions and durations not provided	
	Metric 2: Analytical Methodology	Low	3	Did not actually provide the detection limit, although the did discuss how they handled LOD values.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>15 years old	
	Metric 6: Spatial and Temporal Variability	High	1		
	Metric 7: Exposure Scenario	High	1		
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	High	1		
	Metric 9: Quality Assurance	Medium	2	no recoveries	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	No CV	
Overall Quality Determination <sup>*</sup>		Medium	1.8		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Yamamoto, K.,Fukushima, M.,Kakutani, N.,Kuroda, K.. 1997. Volatile organic compounds in urban rivers and their estuaries in Osaka, Japan. Environmental Pollution.				
Data Type	Monitoring				
Hero ID	645789				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	Sampling method discussed, but does not indicate if it is a standard method. Samples stored refrigerated until analysis.	
	Metric 2: Analytical Methodology	High	1	GC/MS. EPA Method 524.2 Mean accuracy, the precision & method detection limits	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>20 years (1993-1995)	
	Metric 6: Spatial and Temporal Variability	High	1	Large sample size; 30 water samples collected from 30 sites; sampled different months & years	
	Metric 7: Exposure Scenario	High	1	Site description and sampling sites provided	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Low	3	No supplemental or raw data reported; levels are reported in Figure 1	
	Metric 9: Quality Assurance	Medium	2	Mean accuracy, precision and method detection limits cited. No control samples?	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Discussion on reasons for distribution patterns of DCM. TCE and PERC have similar distribution patterns.	
Overall Quality Determination *		Medium	1.8		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Sexton, K.,Mongin, S. J.,Adgate, J. L.,Pratt, G. C.,Ramachandran, G.,Stock, T. H.,Morandi, M. T.. 2007. Estimating volatile organic compound concentrations in selected microenvironments using time-activity and personal exposure data. Journal of Toxicology and Environmental Health, Part A: Current Issues.				
Data Type	Monitoring				
Hero ID	730121				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	High	1	3M model 3500 organic vapor monitors (3500 OVMs), which are charcoal-based passive air samplers.A more detailed description of the study design and results was published previously (Sexton et al., 2004a, 2004b; Pratt et al., 2004, 2005).	
Metric 2:	Analytical Methodology	Medium	2	GC with an HP 5972 MS detector, Analytical and internal standards were prepared, and VOC concentrations were calculated as described previously	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
Metric 4:	Geographic Area	High	1		
Metric 5:	Currency	Low	3	1999	
Metric 6:	Spatial and Temporal Variability	High	1	333 samples, some dups	
Metric 7:	Exposure Scenario	Medium	2	Inddor air, but not consumer specific	
Domain 3: Accessibility/Clarity					
Metric 8:	Reporting of Results	Medium	2	Good summary statistics; however, no raw/supplementary data available.	
Metric 9:	Quality Assurance	Medium	2	Duplicate O, I, and P badges were collected periodically during the study (total n = 80), and correlation coefficients were >.94 for all individual VOC.	
Domain 4: Variability and Uncertainty					
Metric 10:	Variability and Uncertainty	High	1	Not random sample, one area, are has known low VOC outdoors	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			
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Study Citation:	Sexton, K.,Mongin, S. J.,Adgate, J. L.,Pratt, G. C.,Ramachandran, G.,Stock, T. H.,Morandi, M. T.. 2007. Estimating volatile organic compound concentrations in selected microenvironments using time-activity and personal exposure data. Journal of Toxicology and Environmental Health, Part A: Current Issues.
Data Type	Monitoring
Hero ID	730121

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Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Guo, H.,Lee, S. C.,Chan, L. Y.,Li, W. M.. 2004. Risk assessment of exposure to volatile organic compounds in different indoor environments. Environmental Research.				
Data Type	Monitoring				
Hero ID	758690				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Low	3	provided only minimal information on sampling methodology, with no reference to further supplemental information	
	Metric 2: Analytical Methodology	Unacceptable	4	The analytical method used was not mentioned (neither equipment or method number).	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	Prior to 2002.	
	Metric 6: Spatial and Temporal Variability	Low	3	4 samples	
	Metric 7: Exposure Scenario	Medium	2	Indoor air in a residence, but not scenario specific	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	High	1		
	Metric 9: Quality Assurance	Low	3	quality control not discussed.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Low	3	The uncertainty section discusses definitions of uncertainty and generic examples of variation and uncertainty in risk assessment. Only the final paragraph mentions the study itself, and then without any statistical analysis of the study data.	
Overall Quality Determination*		Unacceptable	4.0	Metric mean score**: 2.6.	
Extracted		No			

\*\* Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

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Study Citation:	Chao, C. Y., Chan, G. Y.. 2001. Quantification of indoor VOCs in twenty mechanically ventilated buildings in Hong Kong. Atmospheric Environment.				
Data Type	Monitoring				
Hero ID	824555				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	Medium	2	no recoveries, EPA method	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>15 yrs	
	Metric 6: Spatial and Temporal Variability	Medium	2	10 samples, 4 hr samples	
	Metric 7: Exposure Scenario	Medium	2	foreign country, not directly linked to consumer products	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data	
	Metric 9: Quality Assurance	Low	3	Didn't discuss QC, but used standard methods	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	SD provided, compared results between locations	
Overall Quality Determination *		Medium	2.0		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	X. M. Wu, M. G. Apte, R. Maddalena, D. H. Bennett. 2011. Volatile organic compounds in small- and medium-sized commercial buildings in California. Environmental Science and Technology.				
Data Type	Monitoring				
Hero ID	1062239				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	High	1	EPA method TO-17; GC-MS Concentrations below MDL were replaced with 1/2 MDL, while for samples between the MDL and the analytical limit of quantification (LOQ), determined as 10 times the standard deviation of low-level spikes, were reported as the value determined in the laboratory.	
	Metric 3: Biomarker Selection	N/A	N/A	Biomarker is not used.	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	>5yrs old (2011 pub)	
	Metric 6: Spatial and Temporal Variability	High	1		
	Metric 7: Exposure Scenario	Medium	2	indoor air study. but not consumer products.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	the result of concentration for each chemicals is summarized. But no raw data.	
	Metric 9: Quality Assurance	High	1		
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	discussion of variability is limited.	
Overall Quality Determination *		High	1.4		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Dodson, R. E.,Levy, J. I.,Spengler, J. D.,Shine, J. P.,Bennett, D. H.. 2008. Influence of basements, garages, and common hallways on indoor residential volatile organic compound concentrations. Atmospheric Environment.				
Data Type	Monitoring				
Hero ID	1065844				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	Storage conditions and calibration not discussed, but did use a published method. BEAM study.	
	Metric 2: Analytical Methodology	High	1	Standard TO 17 method was used.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	2005	
	Metric 6: Spatial and Temporal Variability	High	1	Large sample size.	
	Metric 7: Exposure Scenario	Medium	2	Indoor air, but not ties to a specific consumer product.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data. Mean and SD in the main report. Other stats may be in supplemental.	
	Metric 9: Quality Assurance	Medium	2	Average recovery of 65 percent. Additional info in supp materials.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	High	1		
Overall Quality Determination *		High	1.6		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	S. N. Sax, D. H. Bennett, S. N. Chillrud, P. L. Kinney, J. D. Spengler. 2004. Differences in source emission rates of volatile organic compounds in inner-city residences of New York City and Los Angeles. <i>Journal of Exposure Analysis and Environmental Epidemiology</i> .				
Data Type	Monitoring				
Hero ID	1066049				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	High	1	The sampling and analytical methods are described in US EPA's Compendium Method TO-17. Sampling methodology discussed. See Study Design.	
Metric 2:	Analytical Methodology	High	1	The sampling and analytical methods are described in US EPA's Compendium Method TO-17. GC-MSD. LODs reported.	
Metric 3:	Biomarker Selection	N/A	N/A	Biomarker is not used.	
Domain 2: Representativeness					
Metric 4:	Geographic Area	High	1	NYC , NY (Harlem) and Los Angeles, CA (South Central, LA)	
Metric 5:	Currency	Low	3	>15 years ( NYC: winterand summer 1999 and Los Angeles: fall and winter 2000)	
Metric 6:	Spatial and Temporal Variability	High	1	large sample size (36 samples); duplicate samples	
Metric 7:	Exposure Scenario	Medium	2	Measurements were conducted in about 40 homes in each of the two cities across two seasons.	
Domain 3: Accessibility/Clarity					
Metric 8:	Reporting of Results	Medium	2	No supplemental or raw data. Summary stats for indoor air provided in Table 3.	
Metric 9:	Quality Assurance	Medium	2	Field and laboratory blanks were collected, with each totaling at least 10 percent of the number of samples. Field blanks were transported and handled like regular samples, but were not attached to pumps . Field blanks were used to determine background contamination and for calculation of method limits of detection (LODs).	
Domain 4: Variability and Uncertainty					
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Study Citation:	S. N. Sax, D. H. Bennett, S. N. Chillrud, P. L. Kinney, J. D. Spengler. 2004. Differences in source emission rates of volatile organic compounds in inner-city residences of New York City and Los Angeles. <i>Journal of Exposure Analysis and Environmental Epidemiology</i> .			
Data Type	Monitoring			
Hero ID	1066049			

Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
	Metric 10: Variability and Uncertainty	High	1	Indoor <sup>o</sup> outdoor relationships as well as SERs were calculated for each home and sources of variability in the data were examined. Between homes, variability may be due to differences in housing characteristics, building materials, use and storage of household products, and AERs. Between cities, variability can be associated with differences in ambient emission sources and meteorological patterns. Also, seasonal variability within each city can be due to different meteorological patterns in different seasons, which in turn affect AER, environmental chemistry, emission rates, and environmental dispersion rates. By determining the variability in both indoor <sup>o</sup> outdoor relationships and SERs, we can gain a better understanding of indoor contributions to human exposures. The degree of uncertainty associated with measurement error was also calculated for the estimated emission rates and this uncertainty was compared to the inherent variability. We discuss the implication of this uncertainty on predicting emission rates of VOCs in homes.

Overall Quality Determination *	High	1.6		
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Extracted	Yes			
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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	van de Meent, D., Den Hollander, H. A., Pool, W. G., Vredenburg, M. J., van Oers, H. A. M., de Greef, E., Luijten, J. a. 1986. Organic micropollutants in Dutch coastal waters. Water Science and Technology.				
Data Type	Monitoring				
Hero ID	1441544				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	calibration, storage conditions are missed.	
	Metric 2: Analytical Methodology	Unacceptable	4	The analytical method for PERC and TCE is not provided.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	1986, >15 yrs old	
	Metric 6: Spatial and Temporal Variability	High	1		
	Metric 7: Exposure Scenario	Medium	2	study of Dutch coastal water. not US.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	no raw data, detection frequency not reported.	
	Metric 9: Quality Assurance	Low	3	QA/QC is not discussed.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	uncertainty is few discussed.	
Overall Quality Determination *		Unacceptable	4.0	Metric mean score <sup>**</sup> : 2.2.	
Extracted		No			

<sup>\*\*</sup> Consistent with our *Application of Systematic Review in TSCA Risk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Lee, S. C., Li, W. M., Chan, L. Y.. 2001. Indoor air quality at restaurants with different styles of cooking in metropolitan Hong Kong. Science of the Total Environment.				
Data Type	Monitoring				
Hero ID	1642248				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	Medium	2	GC/MS; MDL; no recovery samples	
	Metric 3: Biomarker Selection	N/A	N/A	indoor air samples	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	Hong Kong location, may not be as relevant	
	Metric 5: Currency	Low	3	Received 2000 (>15 yrs)	
	Metric 6: Spatial and Temporal Variability	Low	3	total of 16 samples at 4 restaurants; duplicate samples	
	Metric 7: Exposure Scenario	Medium	2	Doesn't tie back to any identified use, but implies act of cooking is releasing chemical. Not clear where the DCM is coming from.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data reported.	
	Metric 9: Quality Assurance	Low	3	QA/QC methods are not described, but implied	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Low	3	Uncertainties not identified.	
Overall Quality Determination *		Medium	2.2		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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Study Citation:	Bouhamra, W. S.,Elkilani, A. S.. 1999. Investigation and modeling of surface sorption-desorption behavior of volatile organic compounds for indoor air quality analysis. Environmental Technology.				
Data Type	Monitoring				
Hero ID	1744157				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	Samples assumed to have been collected prior to 1999 (date of publication)	
	Metric 6: Spatial and Temporal Variability	Medium	2	12 samples taken per house (20 houses sampled); it doesn't seem that replicates were used.	
	Metric 7: Exposure Scenario	Medium	2	Indoor concentrations not associated with a specific consumer product	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Low	3	No raw data; only minimum values and percent frequency reported in tables. Mean conc presented in graphical form (not extractable)	
	Metric 9: Quality Assurance	Low	3	Minimal discussion of QC/QA measures; only the use of standards before and after each set of samples is mentioned.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Limited discussion of variability in indoor concentrations	
Overall Quality Determination *		Medium	2.0		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

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High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	G. C. Pratt, C. Y. Wu, D. Bock, J. L. Adgate, G. Ramachandran, T. H. Stock, M. Morandi, K. Sexton. 2004. Comparing air dispersion model predictions with measured concentrations of VOCs in urban communities. Environmental Science and Technology.				
Data Type	Monitoring				
Hero ID	1967347				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	High	1	Sampling methods described, convenience sample for monitoring locations, samples collected with canister VOC stations (TO-14A method) and personal OVMs (3500)	
Metric 2:	Analytical Methodology	Medium	2	Canister analysis done with Varian Saturn model 2000 gas chromatograph/mass spectrometer, ADLs captured	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
Metric 4:	Geographic Area	High	1	Three communities, Phillips (PHI), East St. Paul (ESP), and Battle Creek (BCK) in Minneapolis area	
Metric 5:	Currency	Low	3	Paper is from 2004 (>15 years old)	
Metric 6:	Spatial and Temporal Variability	High	1	Sampling locations = 6, 7, and 10 for BCK, ESP, and PH, and specific sample size ranges for each location (18 to 55 per monitoring instrument), 48hr sampling period	
Metric 7:	Exposure Scenario	Medium	2	Likely represents average homes in metropolitan area	
Domain 3: Accessibility/Clarity					
Metric 8:	Reporting of Results	Medium	2	ADLs reported for DCM by sample type, mean reported by sample type and city	
Metric 9:	Quality Assurance	Medium	2	Duplicate canister and OVMs were run and showed generally good precision, sampling days based on previous larger exposure study	
Domain 4: Variability and Uncertainty					
Metric 10:	Variability and Uncertainty	High	1	Variability is characterized in communities and sampling methods, uncertainties and source of error discussed	
Overall Quality Determination *		Medium	1.7		
Extracted		No			
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Study Citation:	G. C. Pratt, C. Y. Wu, D. Bock, J. L. Adgate, G. Ramachandran, T. H. Stock, M. Morandi, K. Sexton. 2004. Comparing air dispersion model predictions with measured concentrations of VOCs in urban communities. Environmental Science and Technology.
Data Type	Monitoring
Hero ID	1967347

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Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

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High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Chan, C.,Lee, S. C.,Chan, W.,Ho, K.,Tian, L.,Lai, S.,Li, Y.,Huang, Y. u. 2011. Characterisation of Volatile Organic Compounds at Hotels in Southern China. Indoor and Built Environment.				
Data Type	Monitoring				
Hero ID	1978790				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	Medium	2	Analytical methodology is described and discussed.	
	Metric 3: Biomarker Selection	N/A	N/A	indoor air samples	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	>10 yrs	
	Metric 6: Spatial and Temporal Variability	High	1		
	Metric 7: Exposure Scenario	Medium	2	indoor air samples	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Results reported in summary/chart form, not raw data	
	Metric 9: Quality Assurance	High	1		
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Low	3	No variability or discussion on uncertainties.	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

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Study Citation:	Loh, M. M.,Houseman, E. A.,Gray, G. M.,Levy, J. I.,Spengler, J. D.,Bennett, D. H.. 2006. Measured concentrations of VOCs in several non-residential microenvironments in the United States. Environmental Science and Technology.				
Data Type	Monitoring				
Hero ID	2442846				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	Personal samplers, VOC sorbent. Sample volume of 10L or 2.5L Samples stored 1 week in refrigerator..	
	Metric 2: Analytical Methodology	High	1	EPA Method TO17	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	2003-2005	
	Metric 6: Spatial and Temporal Variability	High	1	3 to 17 stores per store type, 5 to 28 samples per store type. Table 1	
	Metric 7: Exposure Scenario	Medium	2	Indoor air, but not for a particular product.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data. Range, mean, CV reported in supp and summaries match the limited stats in main text.	
	Metric 9: Quality Assurance	High	1	Pilot testing, storage stability, 15 percent duplicate samples, field blanks on 11 percent of samples, correction for blanks if significantly above the mean,	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	High	1	Considered in sample collection and analysis. Range of store types.	
Overall Quality Determination *		High	1.3		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Chin, J. Y., Godwin, C., Parker, E., Robins, T., Lewis, T., Harbin, P., Batterman, S.. 2014. Levels and sources of volatile organic compounds in homes of children with asthma. Indoor Air.				
Data Type	Monitoring				
Hero ID	2443355				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	2010	
	Metric 6: Spatial and Temporal Variability	High	1	7 day samples, large sample size	
	Metric 7: Exposure Scenario	High	1	Source identification using factor analysis	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data	
	Metric 9: Quality Assurance	High	1		
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	High	1		
Overall Quality Determination *		High	1.2		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Abtahi, M.,Naddafi, K.,Mesdaghinia, A.,Yaghmaeian, K.,Nabizadeh, R.,Jaafarzadeh, N.,Rastkari, N.,Saeedi, R.,Nazmara, S., 2013. Dichloromethane emissions from automotive manufacturing industry in Iran: Case study of the SAIPA automotive manufacturing company. Toxicological and Environmental Chemistry.				
Data Type	Monitoring				
Hero ID	2667557				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	Low	3	Brief discussion. No performance/calibration or study site characteristics described.	
Metric 2:	Analytical Methodology	Low	3	GC/FID; LOD not reported but can be derived from the graph?; no details on calibration or recovery samples	
Metric 3:	Biomarker Selection	N/A	N/A	wastewater effluent samples	
Domain 2: Representativeness					
Metric 4:	Geographic Area	High	1		
Metric 5:	Currency	Medium	2	>5 years	
Metric 6:	Spatial and Temporal Variability	Medium	2	15 samples; no replicates mentioned	
Metric 7:	Exposure Scenario	Medium	2	no mention of controls	
Domain 3: Accessibility/Clarity					
Metric 8:	Reporting of Results	Low	3	wastewater effluent was reported as ND	
Metric 9:	Quality Assurance	Low	3	QA/QC methods are not described, but implied	
Domain 4: Variability and Uncertainty					
Metric 10:	Variability and Uncertainty	Low	3	Variability is n/a; Uncertainties not identified.	
Overall Quality Determination <sup>*</sup>		Low	2.4		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Christof, O., Seifert, R., Michaelis, W.. 2002. Volatile halogenated organic compounds in European estuaries. Biogeochemistry.				
Data Type	Monitoring				
Hero ID	3242836				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	niskam sampler, glass bottles, stored cool and dark, until purging, purged with 12 hours.	
	Metric 2: Analytical Methodology	Medium	2	purge and trap with gc-ms. Detailed operating conditions provided.. No authoritative method used.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	1997-1999	
	Metric 6: Spatial and Temporal Variability	High	1	14-15 samples per data set	
	Metric 7: Exposure Scenario	Medium	2	surface water, but not US.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Only range. No mean, median, sd.	
	Metric 9: Quality Assurance	High	1	Duplicate sample analysis in general. Purge efficiency = 90-93 percent	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Mentioned that other studies said water traps can cause GC problems, but they said that diverse tests showed that their water traps worked.	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Pratt, G. C.,Bock, D.,Stock, T. H.,Morandi, M.,Adgate, J. L.,Ramachandran, G.,Mongin, S. J.,Sexton, K.. 2005. A field comparison of volatile organic compound measurements using passive organic vapor monitors and stainless steel canisters. Environmental Science and Technology.				
Data Type	Monitoring				
Hero ID	3283268				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	VOC concentrations at each site were measured concurrently using two methods, the U.S. Environmental Protection Agency (EPA) Federal Reference Method consisting of stainless steel canisters, and charcoal-based diffusive samplers referred to as organic vapor monitors	
	Metric 2: Analytical Methodology	Medium	2	MDL and ADL differentiated, method described in detail but not cited. Sample analysis was done using a Varian Saturn model 2000 gas chromatograph/mass spectrometer.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	Three communities, Phillips (PHI), East St. Paul (ESP), and Battle Creek (BCK) in Minneapolis area	
	Metric 5: Currency	Low	3	Paper is from 2005 (>15 years old) and sampling done in 1999	
	Metric 6: Spatial and Temporal Variability	Medium	2	Large sample size, variability in meteorological conditions, location, and seasons during sampling	
	Metric 7: Exposure Scenario	Medium	2	Likely represents average homes in metropolitan area	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	ADL, MDL and some summary statistics but no raw concentration data for DCM	
	Metric 9: Quality Assurance	Medium	2	Duplicate laboratory analyses (n =60) and OVMS (n=13)were highly comparable	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Uncertainty and bias addressed	
Overall Quality Determination *		Medium	1.9		
Extracted		No			
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Study Citation:	Pratt, G. C.,Bock, D.,Stock, T. H.,Morandi, M.,Adgate, J. L.,Ramachandran, G.,Mongin, S. J.,Sexton, K.. 2005. A field comparison of volatile organic compound measurements using passive organic vapor monitors and stainless steel canisters. Environmental Science and Technology.			
Data Type	Monitoring			
Hero ID	3283268			

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Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Duan, H.,Liu, X.,Yan, M.,Wu, Y.,Liu, Z.. 2016. Characteristics of carbonyls and volatile organic compounds (VOCs) in residences in Beijing, China.				
Data Type	Monitoring				
Hero ID	3449449				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	Detailed sampling info provided including storage duration,	
	Metric 2: Analytical Methodology	Medium	2	Detailed info provided. Only range of LOD for all VOCs provided. Internal standards used.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	China	
	Metric 5: Currency	Medium	2	6 yrs	
	Metric 6: Spatial and Temporal Variability	High	1	100 samples. 24 hr sample.	
	Metric 7: Exposure Scenario	Medium	2	sources of exposure not defined. For DCM, do provide some possible sources including painting and aerosol propellant.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No range or Frequency of detection. Provides average +/- SD and median for VOCs.	
	Metric 9: Quality Assurance	Medium	2	Calibration discussed. No field recoveries or controls mentioned.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Minimal discussion of DCM variability, some discussion of conditions of highest concentrations and some uncertainty surround interaction between influence of outdoor concentrations on indoor air concentrations.	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	T. Hoang, R. Castorina, F. Gaspar, R. Maddalena, P. L. Jenkins, Q. Zhang, T. E. Mckone, E. Benfenati, A. Y. Shi, A. Bradman. 2016. VOC exposures in California early childhood education environments. Indoor Air.				
Data Type	Monitoring				
Hero ID	3453092				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	Sampling methodology discussed though, calibration of sampler for indoor air is not described.	
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	N/A	N/A	Biomarker is not used.	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	>5 to 15 yrs old	
	Metric 6: Spatial and Temporal Variability	High	1		
	Metric 7: Exposure Scenario	Medium	2	lack of the information of emission source	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	the summary of results are well described. But no raw data.	
	Metric 9: Quality Assurance	High	1		
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	uncertainty for sampling is discussed simply.	
Overall Quality Determination <sup>*</sup>		High	1.6		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Dai, H.,Jing, S.,Wang, H.,Ma, Y.,Li, L.,Song, W.,Kan, H.. 2017. VOC characteristics and inhalation health risks in newly renovated residences in Shanghai, China. Science of the Total Environment.				
Data Type	Monitoring				
Hero ID	3453725				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1:	Sampling Methodology	High	1	
	Metric 2:	Analytical Methodology	Medium	2	Analytical methodology is described and discussed; MDL for DCM not listed.
	Metric 3:	Biomarker Selection	N/A	N/A	indoor air samples
Domain 2: Representativeness					
	Metric 4:	Geographic Area	High	1	
	Metric 5:	Currency	High	1	
	Metric 6:	Spatial and Temporal Variability	Medium	2	8 residences; three sampling sites at each residence: living room, bedroom, and study. No mention of replicate sampling.
	Metric 7:	Exposure Scenario	Medium	2	Indoor air samples; not specifically associated with a consumer product
Domain 3: Accessibility/Clarity					
	Metric 8:	Reporting of Results	Medium	2	Results reported in summary/chart form, not raw data. However, raw data may be provided in Supplementary Info.
	Metric 9:	Quality Assurance	Low	3	QA is implied.
Domain 4: Variability and Uncertainty					
	Metric 10:	Variability and Uncertainty	High	1	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Ma, H.,Zhang, H.,Wang, L.,Wang, J.,Chen, J.. 2014. Comprehensive screening and priority ranking of volatile organic compounds in Daliao River, China. Environmental Monitoring and Assessment.				
Data Type	Monitoring				
Hero ID	3488897				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	Sampling methods and storage are described.	
	Metric 2: Analytical Methodology	Medium	2	Analytical methods and instrumentation are given. Detection limits mentioned, but calibration not described.	
	Metric 3: Biomarker Selection	N/A	N/A	No biomarker	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	Map with sampling locations along Daliao River (China)	
	Metric 5: Currency	Medium	2	Samples collected in 2011 (5-15 years ago)	
	Metric 6: Spatial and Temporal Variability	High	1	Duplicate and triplicate samples taken from 20 locations.	
	Metric 7: Exposure Scenario	High	1	Surface water concentration for VOCs including PERC	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Summary results only.	
	Metric 9: Quality Assurance	High	1	Quality assurance described in sampling/analytical procedures	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Variability assessed with replicate samples	
Overall Quality Determination <sup>*</sup>		High	1.4		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Bianchi, E., Lessing, G., Brina, K. R., Angeli, L., Andrigueti, N. B., Peruzzo, J. R., Do Nascimento, C. A., Spilki, F. R., Ziulkoski, A. L., da Silva, L. B.. 2017. Monitoring the Genotoxic and Cytotoxic Potential and the Presence of Pesticides and Hydrocarbons in Water of the Sinos River Basin, Southern Brazil. Archives of Environmental Contamination and Toxicology.				
Data Type	Monitoring				
Hero ID	3489827				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	N/A	N/A	sw samples	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	>5 yrs.	
	Metric 6: Spatial and Temporal Variability	Medium	2	"60 samples during 9 collections"; no mention of replicate sampling.	
	Metric 7: Exposure Scenario	Medium	2	sw samples, not in the US.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Raw data not provided; summary of PERC and DCM concentration data on page 325 (Table 1).	
	Metric 9: Quality Assurance	Low	3	QA is implied.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Study provided some discussion on uncertainties; no variability.	
Overall Quality Determination *		Medium	1.8		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Tobiszewski, M., Namieśnik, J.. 2013. Distribution of volatile organohalogen compounds in petrochemical plant water streams. Chemistry and Ecology.			
Data Type	Monitoring			
Hero ID	3490937			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability				
	Metric 1: Sampling Methodology	High	1	
	Metric 2: Analytical Methodology	Medium	2	GC/ECD; LOD/LOQs?; no recovery samples
	Metric 3: Biomarker Selection	N/A	N/A	
Domain 2: Representativeness				
	Metric 4: Geographic Area	Unacceptable	4	petrochemical plant
	Metric 5: Currency	Medium	2	2010 (>5 years)
	Metric 6: Spatial and Temporal Variability	High	1	
	Metric 7: Exposure Scenario	High	1	
Domain 3: Accessibility/Clarity				
	Metric 8: Reporting of Results	Low	3	Missing many parameters.
	Metric 9: Quality Assurance	Low	3	QA/QC methods are not described, but implied
Domain 4: Variability and Uncertainty				
	Metric 10: Variability and Uncertainty	Low	3	No discussion on variability or limitations.
Overall Quality Determination *		Unacceptable	4.0	Metric mean score <sup>**</sup> : 2.2.
Extracted		No		

<sup>\*\*</sup> Consistent with our *Application of Systematic Review in TSCA Risk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Amagai, T.,Olansandan,,Matsushita, H.,Ono, M.,Nakai, S.,Tamura, K.,Maeda, K.. 1999. A survey of indoor pollution by volatile organohalogen compounds in Katsushika, Tokyo, Japan. Indoor and Built Environment.				
Data Type	Monitoring				
Hero ID	3545469				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	calibration, flow rates	
	Metric 2: Analytical Methodology	Low	3	LOQ not reported.	
	Metric 3: Biomarker Selection	N/A	N/A	No biomonitoring.	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>15 yrs ago	
	Metric 6: Spatial and Temporal Variability	High	1	>50 samples	
	Metric 7: Exposure Scenario	Medium	2	Indoor air, but no direct link to consumer product.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No raw data.	
	Metric 9: Quality Assurance	Medium	2	Used field blanks. Recoveries not mentioned.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	High	1		
Overall Quality Determination *		Medium	1.8		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Lee, W.,Park, S. H.,Kim, J.,Jung, J. Y.. 2015. Occurrence and removal of hazardous chemicals and toxic metals in 27 industrial wastewater treatment plants in Korea. Desalination and Water Treatment.				
Data Type	Monitoring				
Hero ID	3580141				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	Low	3	No discussion , but assumed to be in the standard analytical method used.	
Metric 2:	Analytical Methodology	High	1	Purge and trap with GC. Standard Korean method.	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
Metric 4:	Geographic Area	High	1		
Metric 5:	Currency	High	1		
Metric 6:	Spatial and Temporal Variability	High	1	27 facilities	
Metric 7:	Exposure Scenario	Medium	2	waste water effluent, but not in the US	
Domain 3: Accessibility/Clarity					
Metric 8:	Reporting of Results	Low	3	No raw data, no SD. No detection frequency.	
Metric 9:	Quality Assurance	Low	3	No discussion, but assumed because used standard Korean method.	
Domain 4: Variability and Uncertainty					
Metric 10:	Variability and Uncertainty	Low	3	No SD	
Overall Quality Determination *		Medium	2.0		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Duclos, Y.,Blanchard, M.,Chesterikoff, A.,Chevreuil, M.. 2000. Impact of paris waste upon the chlorinated solvent concentrations of the river Seine (France). Water, Air, and Soil Pollution.				
Data Type	Monitoring				
Hero ID	3587944				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	Sampling methodology is described and discussed.	
	Metric 2: Analytical Methodology	Medium	2	Analytical methodology is described and discussed.	
	Metric 3: Biomarker Selection	N/A	N/A	sw samples	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Low	3	>15 yrs	
	Metric 6: Spatial and Temporal Variability	Medium	2	3 sampling sessions; 14 stations	
	Metric 7: Exposure Scenario	Medium	2	sw samples collected, but not in the US.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Data seems to be raw data.	
	Metric 9: Quality Assurance	Low	3	QA is implied.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Limited discussion on uncertainty; no variability.	
Overall Quality Determination *		Medium	2.1		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Cdc,. 2017. National report on human exposure to environmental chemicals.				
Data Type	Monitoring				
Hero ID	3827236				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1	Biomonitoring data for US population from NHANES; information on sampling methodology readily available.	
	Metric 2: Analytical Methodology	High	1	Biomonitoring data for US population from NHANES; information on analytical methodology readily available.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1		
	Metric 5: Currency	Medium	2	Blood concentrations for the period 2001-2008	
	Metric 6: Spatial and Temporal Variability	High	1		
	Metric 7: Exposure Scenario	Medium	2	Blood concentrations for general population	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Raw data, measures of variation not reported.	
	Metric 9: Quality Assurance	High	1	Biomonitoring data for US population from NHANES; information on QA/QC methodology readily available.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	High	1	Biomonitoring data for US population from NHANES; information on variability/uncertainty readily available.	
Overall Quality Determination <sup>*</sup>		High	1.3		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Usgs,. 2003. A national survey of methyl tert-butyl ether and other volatile organic compounds in drinking-water sources: Results of the random survey.				
Data Type	Monitoring				
Hero ID	3975046				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Medium	2	Sampling equipment and procedures described; sampling performed by different community water systems personnel across country	
	Metric 2: Analytical Methodology	High	1	Analytical methods and equipment discussed including detection limits	
	Metric 3: Biomarker Selection	N/A	N/A	No biomarker used	
Domain 2: Representativeness					
	Metric 4: Geographic Area	High	1	United States	
	Metric 5: Currency	Low	3	Data collected between 1999-2000 (15+ years ago)	
	Metric 6: Spatial and Temporal Variability	Medium	2	954 samples submitted from across the US, with field blanks included	
	Metric 7: Exposure Scenario	Medium	2	Data collected on many different chemicals in drinking water sources; only PERC in surface water is of interest	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	Summary only; PERC is in Appendix 2 on pg 76	
	Metric 9: Quality Assurance	High	1	Quality control samples	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	High	1	Uncertainty discussed extensively	
Overall Quality Determination *		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Study Citation: Helz, G. R., Hsu, R. Y.. 1978. Volatile chloro- and bromocarbons in coastal waters. <i>Limnology and Oceanography</i> .				
Data Type: Monitoring				
Hero ID: 4140523				
Domain 1: Reliability				
Metric 1:	Sampling Methodology	Medium	2	Sampling methodology discussed. To obtain data on the character of volatile halocarbons in waste discharges, we collected a series of samples from Back River, Maryland (Fig. 1B). This is a shallow, 12 km long tributary estuary to the Chesapeake Bay, with a salinity range of about 04 g* kg-l. Its mean depth is about 1 m and it is well mixed vertically. Near its upper end, Back River receives 1.5- 1.9 x 10 <sup>8</sup> liter. d-r of wastewater from Baltimore's main sewage treatment plant; the waste discharges often exceed the freshwater flow from the watershed by a factor of two (Helz et al. 1975). The plant provides 100 percent secondary treatment, mostly by the trickling filter process, to wastes of both domestic and commercial origin. The effluent is chlorinated before discharge. The first series of samples from Back River (No. 8-12) was collected in early February 1977, after northern Chesapeake Bay had been covered with ice for more than a month. The only uncovered area was a 0.2-km-diameter patch of water immediately above the underwater diffusers at the discharge point in midriver. The second set of samples (No. 13-23) was collected in early May 1977, well after the spring thaw.
Metric 2:	Analytical Methodology	Medium	2	Analytical methodology discussed. GC equipped with a Hall electrolytic conductivity detector (TRACOR). In early stages of the work, some identifications were checked by mass spectrometry, but the high selectivity of the method for only volatile chloro- and bromocarbons minimizes the danger of misidentification when only GC retention time is used. Limit of detection not specified.
Metric 3:	Biomarker Selection	N/A	N/A	Biomarker not used.
Domain 2: Representativeness				
Metric 4:	Geographic Area	High	1	Maryland (Back River estuary)
Metric 5:	Currency	Low	3	>15 years (February and May 1977)
Metric 6:	Spatial and Temporal Variability	Low	3	The first series of samples from Back River (No. 8-12; 5 samples) was collected in early February 1977, after northern Chesapeake Bay had been covered with ice for more than a month. The second set of samples (No. 13-23; 11 samples) was collected in early May 1977, well after the spring thaw (open water).

Continued on next page

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Study Citation:	Helz, G. R., Hsu, R. Y.. 1978. Volatile chloro- and bromocarbons in coastal waters. Limnology and Oceanography.				
Data Type	Monitoring				
Hero ID	4140523				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
	Metric 7: Exposure Scenario	Medium	2	Back River: This is a shallow, 12 km long tributary estuary to the Chesapeake Bay, with a salinity range of about 04 g* kg-l. Its mean depth is about 1 m and it is well mixed vertically. Near its upper end, Back River receives 1.5-1.9 x 10 <sup>8</sup> liter. d-r of wastewater from Baltimore's main sewage treatment plant; the waste discharges often exceed the freshwater flow from the watershed by a factor of two (Helz et al. 1975). The plant provides 100 percent secondary treatment, mostly by the trickling filter process, to wastes of both domestic and commercial origin. The effluent is chlorinated before discharge.	
Domain 3: Accessibility/Clarity					
	Metric 8: Reporting of Results	Medium	2	No supplemental or raw data. Table 3 lists DCM, TCE, and PERC concentrations in NM for Back River samples collected in February 1977 (ice cover) and May 1977 (open water). Some values are ND, but LOD is not reported.	
	Metric 9: Quality Assurance	Low	3	QA/QC procedures not directly discussed.	
Domain 4: Variability and Uncertainty					
	Metric 10: Variability and Uncertainty	Medium	2	Some discussion of variability due to sampling times, February (ice cover) and May (open water), and concentration decrease seaward due to tidal mixing of the effluent. Some uncertainty regarding the factors causing volatilization and its influence on May samples.	
Overall Quality Determination*		Medium	2.2		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Turoski, V. E.,Woltman, D. L.,Vincent, B. E.. 1983. Determination of organic priority pollutants in the paper industry by GC/MS. Tappi Journal.
Data Type	Monitoring
Hero ID	4152056

Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability				
Metric 1:	Sampling Methodology	Medium	2	Sampling methodology discussed. The program, involving 5 different facilities throughout the United States and Canada, examined both influent and effluent streams. Both 24-hr composite and 40-ml grab samples were obtained in glass containers at the mill sites, packed in ice, and shipped by air to our Research Center in Wisconsin. After unpacking, each container was refrigerated at 4°C until analysis. Preservatives were not added to the sample at any time.
Metric 2:	Analytical Methodology	Medium	2	Analytical methodology discussed. Two different 1-liter aliquots of the 24-hr composite samples were extracted with methylene chloride. One aliquot was used to monitor for base/neutral compounds and the other to monitor for acid/PCB/pesticide compounds. The aliquots were adjusted either to pH 12 with 5 percent NaOH for base/neutral extractions or to pH 3 with 5 percent HCl for acid/PCB/pesticide extractions. They were quantitatively transferred to a 2-liter separatory funnel and extracted three times (250, 100, 100 ml) with methylene chloride. The combined extracts were concentrated to 1 ml in Kuderna-Danish evaporators prior to analysis. Limit of detection for most chemicals was 10 ppb.
Metric 3:	Biomarker Selection	N/A	N/A	Biomarker is not used.
Domain 2: Representativeness				
Metric 4:	Geographic Area	High	1	United States and Canada, but exact locations are not provided.
Metric 5:	Currency	Low	3	>15 years (1982 pub date)
Metric 6:	Spatial and Temporal Variability	Low	3	Both 24-hr composite and 40-ml grab samples were obtained in glass containers at the mill sites. The program, involving 5 different facilities throughout the United States and Canada, examined both influent and effluent streams. The facilities studied included paper mills, lignin chemical plants, and drinking facilities.
Metric 7:	Exposure Scenario	Medium	2	The program, involving 5 different facilities throughout the United States and Canada, examined both influent and effluent streams. The facilities studied included paper mills, lignin chemical plants, and drinking facilities.

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Study Citation:	Turoski, V. E.,Woltman, D. L.,Vincent, B. E.. 1983. Determination of organic priority pollutants in the paper industry by GC/MS. Tappi Journal.			
Data Type	Monitoring			
Hero ID	4152056			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 3: Accessibility/Clarity				
	Metric 8: Reporting of Results	Medium	2	No supplemental or raw data. Compounds identified in influent and effluent of each mill is listed in Table I. in ppb.
	Metric 9: Quality Assurance	Medium	2	The efficiency of each extraction was monitored by adding a recovery indicator compound at 100 ppb to each 1-liter aliquot.
Domain 4: Variability and Uncertainty				
	Metric 10: Variability and Uncertainty	Medium	2	Methylene chloride was found in both influent and effluent purgeable volatile organic samples at low ppb levels. They are not solely assignable to the pulping and papermaking process since the same levels were present in the influent as well as the effluent.
Overall Quality Determination <sup>*</sup>		Medium	2.1	
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Wallace, L., Nelson, W., Ziegenfus, R., Pellizzari, E., Michael, L., Whitmore, R., Zelon, H., Hartwell, T., Perritt, R., Westerdahl, D. 1991. The Los Angeles TEAM Study: personal exposures, indoor-outdoor air concentrations, and breath concentrations of 25 volatile organic compounds. Journal of Exposure Analysis and Environmental Epidemiology.			
Data Type	Monitoring			
Hero ID	4727403			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability				
	Metric 1: Sampling Methodology	Medium	2	Although MC was not originally listed in the analytical protocol, mentions that MC required a new sampling analysis; overall the methodology appears to be robust according to our sampling methodology criteria.
	Metric 2: Analytical Methodology	Low	3	No limits of detection or other QC measures shown for MC despite showing for other chemicals
	Metric 3: Biomarker Selection	N/A	N/A	
Domain 2: Representativeness				
	Metric 4: Geographic Area	High	1	Los Angeles, CA households and outdoor settings
	Metric 5: Currency	Low	3	Data was collected in 1987
	Metric 6: Spatial and Temporal Variability	Medium	2	N=8 homes
	Metric 7: Exposure Scenario	Medium	2	Lacked information on amount of chemical used, especially according to conditions of use
Domain 3: Accessibility/Clarity				
	Metric 8: Reporting of Results	Medium	2	Gives mean values, SE, and maximum for both indoor and outdoor samples, but lacked measures of variation like standard deviation and coefficient of variation
	Metric 9: Quality Assurance	Medium	2	Winter season samples for MC were not usable; doesn't show same degree of QC as for other chemicals
Domain 4: Variability and Uncertainty				
	Metric 10: Variability and Uncertainty	Medium	2	Lacked discussion on limitations or other data gaps
Overall Quality Determination*		Medium	2.1	
Extracted		Yes		
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Study Citation:	Wallace, L., Nelson, W., Ziegenfus, R., Pellizzari, E., Michael, L., Whitmore, R., Zelon, H., Hartwell, T., Perritt, R., Westerdahl, D.. 1991. The Los Angeles TEAM Study: personal exposures, indoor-outdoor air concentrations, and breath concentrations of 25 volatile organic compounds. Journal of Exposure Analysis and Environmental Epidemiology.
Data Type	Monitoring
Hero ID	4727403

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Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Sack, T. M., Steele, D. H., Hammerstrom, K., Remmers, J.. 1992. A survey of household products for volatile organic compounds. Atmospheric Environment.				
Data Type	Experimental				
Hero ID	28339				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	High	1		
	Metric 2: Analytical Methodology	Low	3	detection limits, recovery samples are not discribed.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representative					
	Metric 4: Testing Scenario	Medium	2	exposure control is not discussed.	
	Metric 5: Sample Size and Variability	Medium	2	number of products per category varied. Replicates tests for some products, but not all.	
	Metric 6: Temporality	Low	3	>15 yrs old	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Medium	2	no raw data. Only average is reported.	
	Metric 8: Quality Assurance	N/A	N/A		
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Low	3	uncertainties, limitations are not discussed.	
Overall Quality Determination*		Low	2.3		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	C. P. Weisel, J. Zhang, B. J. Turpin, M. T. Morandi, S. Colome, T. H. Stock, D. M. Spektor, L. Korn, A. Winer, S. Alimokhtari, J. Kwon, K. Mohan, R. Harrington, R. Giovanetti, W. Cui, M. Afshar, S. Maberti, D. Shendell. 2005. Relationship of indoor, outdoor and personal air (RIOPA) study: study design, methods and quality assurance/control results. Journal of Exposure Analysis and Environmental Epidemiology.				
Data Type	Experimental				
Hero ID	73853				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology and Conditions	High	1	Sampling methodology clearly described, use of OVM3500 for passive VOC s including DCM	
Metric 2:	Analytical Methodology	Medium	2	Methodology is discussed in detail, citing sample locations and nearby laboratories	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representative					
Metric 4:	Testing Scenario	Medium	2	Data likely represent the relevant exposure scenario in generic homes for the regions identified (NJ, TX, CA) throughout the year	
Metric 5:	Sample Size and Variability	High	1	Very large sample size (>100), regionally and seasonally varied, replicate tests performed	
Metric 6:	Temporality	Medium	2	Paper from 2005 (15 yrs old)	
Domain 3: Accessibility/Clarity					
Metric 7:	Reporting of Results	Medium	2	Detection limits for DCM given for each lab (expressed at nominal 48hr sample), precision/variation data provided for sample types, interlaboratory comparison statistics	
Metric 8:	Quality Assurance	N/A	N/A	QA/QC measures described, blanks and calibration samples taken, interlaboratory comparisons conducted, recoveries analyzed	
Domain 4: Variability and Uncertainty					
Metric 9:	Variability and Uncertainty	Medium	2	Variability in location and homes, uncertainties identified and minimal for VOCs	
Overall Quality Determination*		Medium	1.7		
Extracted		Yes			
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Study Citation:	C. P. Weisel, J. Zhang, B. J. Turpin, M. T. Morandi, S. Colome, T. H. Stock, D. M. Spektor, L. Korn, A. Winer, S. Alimokhtari, J. Kwon, K. Mohan, R. Harrington, R. Giovanetti, W. Cui, M. Afshar, S. Maberti, D. Shendell. 2005. Relationship of indoor, outdoor and personal air (RIOPA) study: study design, methods and quality assurance/control results. Journal of Exposure Analysis and Environmental Epidemiology.
Data Type	Experimental
Hero ID	73853

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Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Wallace, L.,Nelson, W.,Pellizzari, E.,Raymer, J.. 1997. Uptake and decay of volatile organic compounds at environmental concentrations: application of a four-compartment model to a chamber study of five human subjects. Journal of Exposure Analysis and Environmental Epidemiology.				
Data Type	Experimental				
Hero ID	708344				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	High	1		
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	High	1		
Domain 2: Representative					
	Metric 4: Testing Scenario	High	1		
	Metric 5: Sample Size and Variability	Medium	2	only 5 subjects	
	Metric 6: Temporality	N/A	N/A	lab study, date not applicable	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Medium	2	no raw data.	
	Metric 8: Quality Assurance	N/A	N/A	no discussion, but field blanks and controls used.	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Low	3	no discussion.	
Overall Quality Determination <sup>*</sup>		High	1.6		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	C. W. Chung, M. T. Morandi, T. H. Stock, M. Afshar. 1999. Evaluation of a passive sampler for volatile organic compounds at ppb concentrations, varying temperatures, and humidities with 24-h exposures. 1. Description and characterization of exposure chamber system. Environmental Science and Technology.				
Data Type	Experimental				
Hero ID	1023088				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology and Conditions	Low	3	Samples collected through permeation tubes given ease of use and commercial availability, but sampling methodology not clearly defined	
Metric 2:	Analytical Methodology	Low	3	Sources for permeation tube of DCM are cited (laboratories) and weighing methodology referenced (analytical balance) but not explained in detail	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representative					
Metric 4:	Testing Scenario	Medium	2	Temperatures and relative humidities generally represent indoor and outdoor conditions, but one or more key pieces of information not be described	
Metric 5:	Sample Size and Variability	Medium	2	Sample size (measurements) is large but not explicitly reported, and no replicate tests were performed	
Metric 6:	Temporality	Medium	2	Paper is >15 yrs old, but the environment in the chamber study may still be applicable	
Domain 3: Accessibility/Clarity					
Metric 7:	Reporting of Results	Low	3	No raw data reported, some data displayed in a graph but not tabulated. A single permeation rate provided for DCM	
Metric 8:	Quality Assurance	N/A	N/A	Quality assurance/quality control techniques and results were not directly discussed, but can be implied through the study's use of standard field and laboratory protocols	
Domain 4: Variability and Uncertainty					
Metric 9:	Variability and Uncertainty	Medium	2	Variability considered in conditions (temperature, humidity, concentration) but uncertainties not discussed	
Overall Quality Determination *		Low	2.4		
Extracted		No			
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Study Citation:	C. W. Chung, M. T. Morandi, T. H. Stock, M. Afshar. 1999. Evaluation of a passive sampler for volatile organic compounds at ppb concentrations, varying temperatures, and humidities with 24-h exposures. 1. Description and characterization of exposure chamber system. Environmental Science and Technology.
Data Type	Experimental
Hero ID	1023088

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Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Steinemann, A.. 2015. Volatile emissions from common consumer products. Air Quality, Atmosphere and Health.				
Data Type	Experimental				
Hero ID	3023273				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology and Conditions	High	1	Products were selected that are commonly used in the USA. Analyzed headspace using standard EPA method.	
Metric 2:	Analytical Methodology	Medium	2	Analyzed using headspace GC/MS, following US EPA Compendium Method TO-15. Did not provide details, such as calibration, lab recoveries, blanks, etc.	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representative					
Metric 4:	Testing Scenario	Medium	2	Products are generally representative. Multiple conditions not applicable to headspace.	
Metric 5:	Sample Size and Variability	Medium	2	37 products, representing four types and four categories. No replicate analysis of each product.	
Metric 6:	Temporality	High	1		
Domain 3: Accessibility/Clarity					
Metric 7:	Reporting of Results	Medium	2	No raw data. Concentrations in each product in the supplementary material. No summary of concentrations across product types.	
Metric 8:	Quality Assurance	N/A	N/A	Followed standard analytical method, so assumed QA conducted, but no details provided.	
Domain 4: Variability and Uncertainty					
Metric 9:	Variability and Uncertainty	Medium	2	Discussed differences between products. Small limitation section.	
Overall Quality Determination*		Medium	1.7		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Cheng, W.,Lai, C. H.,Tzeng, W.,Her, C.,Hsu, Y.. 2015. Gaseous Products of Incense Coil Combustion Extracted by Passive Solid Phase Microextraction Samplers. Atmosphere.				
Data Type	Experimental				
Hero ID	3032678				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	Medium	2	Sampling methodology is described and discussed.	
	Metric 2: Analytical Methodology	Medium	2	Analytical methodology is described and discussed.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representative					
	Metric 4: Testing Scenario	Low	3	Done within a testing chamber.	
	Metric 5: Sample Size and Variability	Low	3	Sampling size is unclear; could be 4 and 5 separate sets	
	Metric 6: Temporality	High	1		
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Low	3	Summary statistics provided.	
	Metric 8: Quality Assurance	N/A	N/A	Precision measurements. No specific discussion of quality assurance/control	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Low	3	No specific discussions of variability/uncertainty	
Overall Quality Determination*		Low	2.4		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	C. W. Chung, M. T. Morandi, T. H. Stock, M. Afshar. 1999. Evaluation of a passive sampler for volatile organic compounds at ppb concentrations, varying temperatures, and humidities with 24-h exposures. 2. Sampler performance. Environmental Science and Technology.				
Data Type	Experimental				
Hero ID	3449477				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology and Conditions	Low	3	Briefly discusses use of 3520 organic vapor monitor (OVM), charcoal-based passive air samplers for 24 hr sampling	
Metric 2:	Analytical Methodology	High	1	The experimental design was based on NIOSH protocol and criteria for evaluating the reliability of diffusion samplers, all extracts were analyzed by GC/MS	
Metric 3:	Biomarker Selection	N/A	N/A		
Domain 2: Representative					
Metric 4:	Testing Scenario	Medium	2	Temperatures and relative humidities generally represent indoor and outdoor conditions, but one or more key pieces of information not be described	
Metric 5:	Sample Size and Variability	High	1	Sample size is large (n>10) for all conditions, n=9 reported MDL, recovery tests performed and variability across tests is characterized	
Metric 6:	Temporality	Medium	2	Paper is >15 yrs old, but the environment in the chamber study may still be applicable	
Domain 3: Accessibility/Clarity					
Metric 7:	Reporting of Results	High	1	DCM MDLs reported at each temperature and humidity combination, and recovery summary statistics reported at each temperature, humidity, concentration combination	
Metric 8:	Quality Assurance	N/A	N/A	Recovery tests evaluated against NIOSH criterion, included one invalid sample for DCM, other QA/QC can be implied through the study's use of standard field and laboratory protocols	
Domain 4: Variability and Uncertainty					
Metric 9:	Variability and Uncertainty	Medium	2	Variability considered in conditions (temperature, humidity, concentration) with limited discussion of key uncertainties, limitations, and data gaps	
Overall Quality Determination*		Medium	1.7		
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Study Citation: C. W. Chung, M. T. Morandi, T. H. Stock, M. Afshar. 1999. Evaluation of a passive sampler for volatile organic compounds at ppb concentrations, varying temperatures, and humidities with 24-h exposures. 2. Sampler performance. Environmental Science and Technology.

Data Type Experimental

Hero ID 3449477

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Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Extracted		Yes		

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<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Ursin, C.,Hansen, C. M.,Van Dyk, J. W.,Jensen, P. O.,Christensen, I. J.,Ebbehoej, J.. 1995. Permeability of commercial solvents through living human skin. American Industrial Hygiene Association Journal.				
Data Type	Experimental				
Hero ID	3540771				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	High	1	No standard method mentioned, but sampling well described.	
	Metric 2: Analytical Methodology	Low	3	GC method; no details provided.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representative					
	Metric 4: Testing Scenario	Medium	2	permeability of the solvent, not a consumer product.	
	Metric 5: Sample Size and Variability	Low	3	appears to be <5 samples	
	Metric 6: Temporality	High	1	1995 study, but temporality is not key to a lab study.	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Medium	2	No raw data	
	Metric 8: Quality Assurance	N/A	N/A	limited discussion	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Medium	2	The study has limited discussion of key uncertainties and limitations.	
Overall Quality Determination*		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Cheng, W. enHsi,Tsai, D. Y.,Lu, J. iaYu, Lee, J. enWei. 2016. Extracting Emissions from Air Fresheners Using Solid Phase Microextraction Devices. Aerosol and Air Quality Research.				
Data Type	Experimental				
Hero ID	3587655				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	Medium	2	new sampling method	
	Metric 2: Analytical Methodology	Medium	2	Missing some details, method SOP not reported.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representative					
	Metric 4: Testing Scenario	Low	3	One test condition. No detailed description of product.	
	Metric 5: Sample Size and Variability	Low	3	No replicate. Single smaples of three products.	
	Metric 6: Temporality	High	1	current	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Medium	2	No raw data. No summary across fresheners, although not as applicable.	
	Metric 8: Quality Assurance	N/A	N/A	Minimal QC. RSD in supp files.	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Medium	2	some discussion of variability between emissions.	
Overall Quality Determination*		Medium	2.1		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $=\geq 1.7$  to  $< 2.3$ ; Low:  $=\geq 2.3$  to  $\leq 3$ .

Study Citation:	C. B. Keil, M. Nicas. 2003. Predicting room vapor concentrations due to spills of organic solvents. AIHA Journal.				
Data Type	Experimental				
Hero ID	4532343				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	High	1	Sampling method well described.	
	Metric 2: Analytical Methodology	Medium	2	chemical not analyzed. evaporation determined by mass, as logged by a computer. No calibration was discussed.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representative					
	Metric 4: Testing Scenario	Low	3	Spill of chemical, not of formulated product. One set of conditions however the article states that other studies show that evap rates don't vary much with different conditions.	
	Metric 5: Sample Size and Variability	Low	3	range and avg provided, but could not find the number of samples.	
	Metric 6: Temporality	Low	3	2003, > 15 yrs old, but tested using a chemical so not as relevant.	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Low	3	no raw data and no number of samples.	
	Metric 8: Quality Assurance	N/A	N/A	Did not discuss QC measures.	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Low	3	Conducted a study in a test house with one chemical (not DCM) to compare lab results.	
Overall Quality Determination*		Low	2.6		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Won, D. Yang W.. 2012. Material emission information from: 105 building materials and consumer products.				
Data Type	Experimental				
Hero ID	4663242				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	High	1		
	Metric 2: Analytical Methodology	Medium	2	analytical method is well described. but no recovery samples.	
	Metric 3: Biomarker Selection	N/A	N/A		
Domain 2: Representative					
	Metric 4: Testing Scenario	Low	3	Consumer uses(subcategory in table 2) don't match for use of interest of EPA very much.	
	Metric 5: Sample Size and Variability	Low	3	only one sample collected per test	
	Metric 6: Temporality	Medium	2	2010 and 2011(>5 yrs old)	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	High	1		
	Metric 8: Quality Assurance	N/A	N/A	calibration, comparison to past data are described. but recoveries is not discussed.	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	High	1		
Overall Quality Determination *		Medium	1.9		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	A. T. Hodgson. 2001. Predicted concentrations in new relocatable classrooms of volatile organic compounds emitted from standard and alternate interior finish materials.				
Data Type	Experimental				
Hero ID	4683360				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	High	1		
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	N/A	N/A	no biomarkers	
Domain 2: Representative					
	Metric 4: Testing Scenario	Medium	2	kind of products, test substance, testing methods are described. But exposure control is not discussed, and temperature/pressure are assumed value for estimation of concentration.	
	Metric 5: Sample Size and Variability	Low	3	2 - 4 products samples per product type.	
	Metric 6: Temporality	Low	3	>15 yrs old	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Medium	2	Each results are summarized in each tables. The value in each tables are not raw data though, raw values of concentration are possibly calculated by equation(1). Statistical discussion is missed.	
	Metric 8: Quality Assurance	N/A	N/A	QC discussion is quite limited.	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Low	3	Variability/Uncertainty discussion is quite limited.	
Overall Quality Determination*		Medium	2.1		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	A. C. Ortiz. 2010. Identifying sources of volatile organic compounds and aldehydes in a high performance building.				
Data Type	Experimental				
Hero ID	4683366				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology and Conditions	High	1	testing generally followed California Specification 01350 [15] and ASTM Standard Guide D-6007-02 [16] using small emission chambers.	
Metric 2:	Analytical Methodology	Medium	2	USEPA Method TO-17. standard method and LOQ provided, but not details on recovery or calibration.	
Metric 3:	Biomarker Selection	N/A	N/A	no biomarker	
Domain 2: Representative					
Metric 4:	Testing Scenario	Medium	2	only one testing condition. did not vary temp, airflow, etc.	
Metric 5:	Sample Size and Variability	Low	3	one test per product.	
Metric 6:	Temporality	Medium	2	8 years old	
Domain 3: Accessibility/Clarity					
Metric 7:	Reporting of Results	Medium	2		
Metric 8:	Quality Assurance	N/A	N/A	quality assurance implied but not discussed.	
Domain 4: Variability and Uncertainty					
Metric 9:	Variability and Uncertainty	Low	3	no discussion of limitations	
Overall Quality Determination*		Medium	2.1		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	L. Schenk, M. Rauma, M. N. Fransson, G. Johanson. 2018. Percutaneous absorption of thirty-eight organic solvents in vitro using pig skin. PLoS ONE.				
Data Type	Experimental				
Hero ID	4940676				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology and Conditions	High	1		
	Metric 2: Analytical Methodology	High	1		
	Metric 3: Biomarker Selection	N/A	N/A	Biomarkers were not used.	
Domain 2: Representative					
	Metric 4: Testing Scenario	High	1		
	Metric 5: Sample Size and Variability	Medium	2	Sample size <10 (n=6).	
	Metric 6: Temporality	Medium	2	>5 years (2011)	
Domain 3: Accessibility/Clarity					
	Metric 7: Reporting of Results	Medium	2	Summary statistics are reported in Table 1, but individual data points are not reported	
	Metric 8: Quality Assurance	N/A	N/A	QA/QC techniques and results were not directly discussed, but can be implied through the study's use of standard field and laboratory protocols	
Domain 4: Variability and Uncertainty					
	Metric 9: Variability and Uncertainty	Medium	2	The study purposely minimized variability within the study by using the same type of skin & methodology and therefore has limited characterization of variability.	
Overall Quality Determination <sup>*</sup>		High	1.6		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Staples, C. A., Werner, A. F., Hoogheem, T. J.. 1985. Assessment of priority pollutant concentrations in the United States using STORET database. Environmental Toxicology and Chemistry.			
Data Type	Databases Not Unique to a Chemical			
Hero ID	1359400			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability				
Metric 1:	Sampling Methodology	High	1	STORET refers overall to "STORage and RETrieval", an electronic data system for water quality monitoring data; developed and approved source by EPA
Metric 2:	Analytical Methodology	High	1	STORET refers overall to "STORage and RETrieval", an electronic data system for water quality monitoring data; developed and approved source by EPA
Domain 2: Representative				
Metric 3:	Geographic Area	High	1	
Metric 4:	Temporal	Low	3	>15 yrs
Metric 5:	Exposure Scenario	High	1	STORET refers overall to "STORage and RETrieval", an electronic data system for water quality monitoring data; developed and approved source by EPA
Domain 3: Accessibility/Clarity				
Metric 6:	Availability of DB and Supporting Documents	High	1	
Metric 7:	Reporting Results	Medium	2	only median and number of samples
Domain 4: Variability and Uncertainty				
Metric 8:	Variability and Uncertainty	N/A	N/A	
Overall Quality Determination *		High	1.4	
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	U.S, E. P. A.. 2017. STORET: Methylene chloride.				
Data Type	Databases Not Unique to a Chemical				
Hero ID	3970047				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	High	1		
Domain 2: Representative					
	Metric 3: Geographic Area	High	1		
	Metric 4: Temporal	High	1		
	Metric 5: Exposure Scenario	Medium	2	STORET does not separate TSCA uses, Superfund sites, groundwater intrusion or legacy contamination which is important when assessing TSCA uses for work plan chemicals.	
Domain 3: Accessibility/Clarity					
	Metric 6: Availability of DB and Supporting Documents	High	1		
	Metric 7: Reporting Results	Medium	2	Different Limits of Quantification and different reporting characteristics between states and federal agencies	
Domain 4: Variability and Uncertainty					
	Metric 8: Variability and Uncertainty	N/A	N/A		
Overall Quality Determination <sup>*</sup>		High	1.3		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Oppt Monitoring Database. 2017. Methylene Chloride.				
Data Type	Databases Not Unique to a Chemical				
Hero ID	3970233				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	Medium	2	Methods are considered reasonable and consistent with sound scientific theory by this trusted source.	
Metric 2:	Analytical Methodology	Medium	2	Methods are considered reasonable and consistent with sound scientific theory by this trusted source.	
Domain 2: Representative					
Metric 3:	Geographic Area	High	1		
Metric 4:	Temporal	Medium	2	Sample year provided.	
Metric 5:	Exposure Scenario	Low	3	The data lack key pieces of information (scenario/population).	
Domain 3: Accessibility/Clarity					
Metric 6:	Availability of DB and Supporting Documents	Medium	2	Database provides references accessible online.	
Metric 7:	Reporting Results	Medium	2	Summary statistics are missing one or more parameters; no raw data.	
Domain 4: Variability and Uncertainty					
Metric 8:	Variability and Uncertainty	N/A	N/A	Variability information is not consistently reported in the database.	
Overall Quality Determination *		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Household Products, Database. 2017. Household products database: Chemical information: Methylene chloride.				
Data Type	Databases Not Unique to a Chemical				
Hero ID	3970265				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Sampling Methodology	Low	3	Webpage provides very limited information on how they found products. Info provided from a variety of publicly available sources.	
Metric 2:	Analytical Methodology	N/A	N/A	The database is a list of "products that contain this ingredient" and no analytical methodology is applicable.	
Domain 2: Representative					
Metric 3:	Geographic Area	High	1	USA	
Metric 4:	Temporal	Low	3	Range of dates, with one <10 years old.	
Metric 5:	Exposure Scenario	High	1	Weight fractions of consumer products.	
Domain 3: Accessibility/Clarity					
Metric 6:	Availability of DB and Supporting Documents	Low	3	No info on how data was compiled or level of QC provided.	
Metric 7:	Reporting Results	High	1	Data is organized. No summary provided, so summary stats n/a.	
Domain 4: Variability and Uncertainty					
Metric 8:	Variability and Uncertainty	N/A	N/A	Not discussed, but nature of database and discussion is not applicable.	
Overall Quality Determination *		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Oecd Existing Chemical Database. 2011. SIDS initial assessment profile: Dichloromethane.				
Data Type	Databases Not Unique to a Chemical				
Hero ID	3970848				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	High	1		
	Metric 2: Analytical Methodology	N/A	N/A	No samples were analyzed.	
Domain 2: Representative					
	Metric 3: Geographic Area	High	1		
	Metric 4: Temporal	Unacceptable	4	Sampling of inhalation concentration not discussed.	
	Metric 5: Exposure Scenario	High	1		
Domain 3: Accessibility/Clarity					
	Metric 6: Availability of DB and Supporting Documents	Low	3	No info on how data was compiled or level of QC provided.	
	Metric 7: Reporting Results	Low	3	Range of mean concentration provided only.	
Domain 4: Variability and Uncertainty					
	Metric 8: Variability and Uncertainty	N/A	N/A	Not discussed.	
Overall Quality Determination <sup>*</sup>		Unacceptable	4.0	Metric mean score <sup>**</sup> : 2.2.	
Extracted		No			

<sup>\*\*</sup> Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Consumer Product Information, Database. 2017. What's in it? methylene chloride.				
Data Type	Databases Not Unique to a Chemical				
Hero ID	3981160				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Sampling Methodology	Low	3	Sampling information not reported in data source	
	Metric 2: Analytical Methodology	N/A	N/A		
Domain 2: Representative					
	Metric 3: Geographic Area	High	1	US and Canada	
	Metric 4: Temporal	Medium	2	Various dates, some recent, some old, range of dates	
	Metric 5: Exposure Scenario	High	1	MSDS for each product	
Domain 3: Accessibility/Clarity					
	Metric 6: Availability of DB and Supporting Documents	Low	3	Lacks information to characterize exposure scenario	
	Metric 7: Reporting Results	High	1		
Domain 4: Variability and Uncertainty					
	Metric 8: Variability and Uncertainty	N/A	N/A		
Overall Quality Determination <sup>*</sup>		Medium	1.8		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

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<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Bartzis, J.. 2018. Prioritization of building materials as indoor pollution sources (BUMA).			
Data Type	Databases Not Unique to a Chemical			
Hero ID	4663145			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability				
	Metric 1: Sampling Methodology	N/A	N/A	
	Metric 2: Analytical Methodology	N/A	N/A	
Domain 2: Representative				
	Metric 3: Geographic Area	High	1	
	Metric 4: Temporal	Medium	2	
	Metric 5: Exposure Scenario	Medium	2	
Domain 3: Accessibility/Clarity				
	Metric 6: Availability of DB and Supporting Documents	High	1	
	Metric 7: Reporting Results	High	1	
Domain 4: Variability and Uncertainty				
	Metric 8: Variability and Uncertainty	N/A	N/A	
Overall Quality Determination*		High	1.4	
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	U.S, E. P. A.. 1985. Health assessment document for dichloromethane (methylene chloride): Final report.				
Data Type	Completed Exposure Assessment				
Hero ID	17595				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Medium	2	sampling and analytical method are described. concentration of some rivers are shown. Risk characterization is not described.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	media interest and US study. but it's old (> 15yrs old).	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	no discussion	
Overall Quality Determination *		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Page, G. W.. 1981. Comparison of groundwater and surface water for patterns and levels of contamination by toxic substances. Environmental Science and Technology.				
Data Type	Completed Exposure Assessment				
Hero ID	18169				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Medium	2	measurements, approaches are described briefly. But not in detail.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	surface water study. geography of area is described. but it's quite old study.(data collected in 1979)	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	variability/uncertainty is not discussed.	
Overall Quality Determination *		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Shah, J. J.,Singh, H. B.. 1988. Distribution of volatile organic chemicals in outdoor and indoor air: a national VOCs data base. Environmental Science and Technology.				
Data Type	Completed Exposure Assessment				
Hero ID	95570				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Medium	2	data source and collection method is briefly described. but details are not served(just quote from references).	
Domain 2: Representative	Metric 2: Exposure Scenario	Low	3	Indoor and outdoor air study. but it's quite old (1988) and indoor/outdoor is not identified because graphs and table are not visible.	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	Low	3	References provided, but not sure if they are for the data presented or not.	
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	No discussion	
Overall Quality Determination <sup>*</sup>		Low	2.8		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Destailats, H.,Maddalena, R. L.,Singer, B. C.,Hodgson, A. T.,McKone, T. E.. 2008. Indoor pollutants emitted by office equipment: A review of reported data and information needs. Atmospheric Environment.				
Data Type	Completed Exposure Assessment				
Hero ID	694628				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Methodology	Unacceptable	4	just Literature review.	
Domain 2: Representative					
	Metric 2: Exposure Scenario	Medium	2	The release of PERC from office equipments is described. US study. HBCD is not mentioned in document. published In 2008.	
Domain 3: Accessibility/Clarity					
	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty					
	Metric 4: Variability and Uncertainty	N/A	N/A	no discussion - all secondary data.	
Overall Quality Determination *		Unacceptable	4.0	Metric mean score <sup>**</sup> : 2.3.	
Extracted		No			

<sup>\*\*</sup> Consistent with our *Application of Systematic Review in TSCARisk Evaluations* document, if a metric for a data source receives a score of Unacceptable (score = 4), EPA will determine the study to be unacceptable. In this case, one of the metrics were rated as unacceptable. As such, the study is considered unacceptable and the score is presented solely to increase transparency.

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	C. J. Weschler. 2009. Changes in indoor pollutants since the 1950s. Atmospheric Environment.				
Data Type	Completed Exposure Assessment				
Hero ID	695495				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Low	3	Little discussion on methodology. Table 1 provides a sense of how and why an indoor environment in 2008 is so different from its counterpart in the early 1950s.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	Article discusses trends in indoor pollutants. Table 2 reports selected pollutants (includes DCM, Carbon Tet, TCE, and PERC) and trends in their indoor concentrations since the 1950s. There are no concentration measurement; trends are broadly summarized by up and down arrows. Figure 4(a) reports median indoor concentrations of Carbon Tet, PERC, and TCE, but these data are derived from 1981-1984 TEAM Study and the 1999-2001 RIOPA study (secondary studies will not be extracted)	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	Medium	2	References are listed	
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Medium	2	The study has limited discussion of key uncertainties and limitations.	
Overall Quality Determination *		Medium	2.2		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Dawson, H. E.,McAlary, T.. 2009. A compilation of statistics for VOCs from post-1990 indoor air concentration studies in North American residences unaffected by subsurface vapor intrusion. Ground Water Monitoring and Remediation.			
Data Type	Completed Exposure Assessment			
Hero ID	735303			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability	Metric 1: Methodology	High	1	Detailed description of literature evaluated and statistical analysis.
Domain 2: Representative	Metric 2: Exposure Scenario	Low	3	Most studies are >15 yrs old, and not directly tied to consumer products.
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1	
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	High	1	robust discussion, discussed variability
Overall Quality Determination *		High	1.5	
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	U.S, E. P. A.. 2011. Toxicological review of dichloromethane (methylene chloride) (CASRN 75-09-2): In support of summary information on the Integrated Risk Information System (IRIS).				
Data Type	Completed Exposure Assessment				
Hero ID	808655				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Medium	2	assessment methodology or model of toxicity is well described. but no description of exposure.	
Domain 2: Representative	Metric 2: Exposure Scenario	N/A	N/A	Tox focus, not exposure.	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	High	1		
Overall Quality Determination <sup>*</sup>		High	1.3		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	J. M. Logue, T. E. McKone, M. H. Sherman, B. C. Singer. 2011. Hazard assessment of chemical air contaminants measured in residences. Indoor Air.				
Data Type	Completed Exposure Assessment				
Hero ID	864159				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	High	1	Described lit search method. Compared concentrations to hazard levels.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	Indoor air, but not consumer specific.	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	High	1	Provided mid range and upper range stats.	
Overall Quality Determination <sup>*</sup>		High	1.2		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	. 1988. Toxic Air Pollutant Emission Factors Compilation For Selected Air Toxic Compounds and Sources.				
Data Type	Completed Exposure Assessment				
Hero ID	1265174				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Low	3	mathematical approach is described very simply. But the discussion of the approach like validity is missed.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	there are tables of emission factors of TCE and perc for industrial process. But data is quite old (>15yrs).	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	Low	3	input data is missed. some of un-peer reviewed sources are cited.	
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	variability/uncertainty is a bit discussed.	
Overall Quality Determination *		Low	2.8		
Extracted		Yes			

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<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Health, Canada. 1993. Canadian Environmental Protection Act priority substances list assessment report: Dichloromethane.				
Data Type	Completed Exposure Assessment				
Hero ID	2531129				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Methodology	Medium	2	Govt report. No discussion of lit search methods.	
Domain 2: Representative					
	Metric 2: Exposure Scenario	Low	3	Older data.	
Domain 3: Accessibility/Clarity					
	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty					
	Metric 4: Variability and Uncertainty	Low	3	Key uncertainties, limitations, and data gaps are not discussed.	
Overall Quality Determination *		Medium	2.2		
Extracted		No			

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<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	L. Golsteijn, D. Huizer, M. Hauck, R. van Zelm, M. A. Huijbregts. 2014. Including exposure variability in the life cycle impact assessment of indoor chemical emissions: the case of metal degreasing. Environment International.			
Data Type	Completed Exposure Assessment			
Hero ID	2537636			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability				
	Metric 1: Methodology	High	1	
Domain 2: Representative				
	Metric 2: Exposure Scenario	High	1	
Domain 3: Accessibility/Clarity				
	Metric 3: Documentation of References	High	1	
Domain 4: Variability and Uncertainty				
	Metric 4: Variability and Uncertainty	High	1	
Overall Quality Determination *		High	1.0	
Extracted		Yes		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Long, G.,Meek, M. E.,Caldwell, I.,Bartlett, S.,Savard, S.. 1994. Dichloromethane - evaluation of risks to health from environmental exposure in Canada. Journal of environmental Science and Health, Part C: Environmental Carcinogenesis & Ecotoxicology Reviews.				
Data Type	Completed Exposure Assessment				
Hero ID	3586663				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Methodology	Medium	2	Data reviewed by experts and approved by a committee.	
Domain 2: Representative					
	Metric 2: Exposure Scenario	Low	3	Canadian study with sources >15 years.	
Domain 3: Accessibility/Clarity					
	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty					
	Metric 4: Variability and Uncertainty	Medium	2	757 homes; a statement on limitations	
Overall Quality Determination *		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	De Rooij, C.,Thompson, R. S.,Garny, V.,Lecloux, A.,van Wijk, D.. 2004. Dichloromethane marine risk assessment with special reference to the OSPARCOM region: North Sea. Environmental Monitoring and Assessment.				
Data Type	Completed Exposure Assessment				
Hero ID	3587217				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Medium	2	description of assessment method is too simple.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	Media of interest. but European study and old.(> 5yrs old)	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	Only mean values presented. no discussion of variability/uncertainty.	
Overall Quality Determination <sup>*</sup>		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Usepa, O. O. W.. 2009. Contaminant occurrence support document for category 1 contaminants for the second six-year review of national primary drinking water regulations.			
Data Type	Completed Exposure Assessment			
Hero ID	3827379			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability	Metric 1: Methodology	High	1	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	drinking water if focus of report, but some surface water data is available
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1	
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	High	1	
Overall Quality Determination <sup>*</sup>		High	1.2	
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	U.S, E. P. A.. 2011. Background indoor air concentrations of volatile organic compounds in North American residences (1990-2005): A compilation of statistics for assessment vapor intrusion.			
Data Type	Completed Exposure Assessment			
Hero ID	3827392			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability	Metric 1: Methodology	Medium	2	The assessment methods , assumptions are discribed simply for each studies which are collected by EPA.
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	>10 yrs old
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	Medium	2	References are peer reviewed sources and compiled data are summarized. But no raw data.
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	High	1	
Overall Quality Determination *		Medium	1.8	
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Iarc., 2016. Dichloromethane. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans.				
Data Type	Completed Exposure Assessment				
Hero ID	3827786				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Medium	2	use, scenarios, toxiciry are well described. But no discussion of lit search methods for concentration data.	
Domain 2: Representative	Metric 2: Exposure Scenario	Low	3	media, scenario interest. but not US and old study (>15 years old).	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Medium	2	range of values is shown. No discussion of uncertainty.	
Overall Quality Determination *		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Iarc., 2016. ARC Monographs on the evaluation of carcinogenic risks to humans: Dichloromethane.				
Data Type	Completed Exposure Assessment				
Hero ID	3970852				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Low	3	No discussion on methodology.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	China and Canada studies >10 years.	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	757 homes; no discussion on data gaps	
Overall Quality Determination *		Medium	2.2		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	European Chlorinated Solvents, Association. 1999. Euro chlor risk assessment for the marine environment, OSPARCOM region - Norht sea: Dichloromethane.				
Data Type	Completed Exposure Assessment				
Hero ID	3982130				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Methodology	High	1		
Domain 2: Representative					
	Metric 2: Exposure Scenario	Low	3	scenario and chemical interest. but not US (EU) and quite old report (1999).	
Domain 3: Accessibility/Clarity					
	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty					
	Metric 4: Variability and Uncertainty	Medium	2	no discussion of uncertainty.	
Overall Quality Determination <sup>*</sup>		Medium	1.8		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Oehha,. 2000. Public health goals for chemicals in drinking water dichloromethane (methylene chloride, DCM).				
Data Type	Completed Exposure Assessment				
Hero ID	3982295				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Medium	2	exposure/hazard assessment is described. No description of lit search method.	
Domain 2: Representative	Metric 2: Exposure Scenario	Medium	2	US study and media interest. but quite old study (>15 yrs old)	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	no variability and uncertainty of surface water are discussed.	
Overall Quality Determination *		Medium	2.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:

High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Nih,. 2016. Report on carcinogens: Dichloromethane.				
Data Type	Completed Exposure Assessment				
Hero ID	3982330				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Methodology	Medium	2	just data is shown. Lit search method not described.	
Domain 2: Representative					
Metric 2:	Exposure Scenario	High	1		
Domain 3: Accessibility/Clarity					
Metric 3:	Documentation of References	High	1		
Domain 4: Variability and Uncertainty					
Metric 4:	Variability and Uncertainty	Low	3	No discussion of uncertainty, only few data sources summarized.	
Overall Quality Determination*		Medium	1.8		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Atsdr,. 2000. Toxicological profile for methylene chloride.				
Data Type	Completed Exposure Assessment				
Hero ID	3982337				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Methodology	High	1		
Domain 2: Representative					
	Metric 2: Exposure Scenario	Medium	2	US study, and media interest. but old study (> 15 yrs old).	
Domain 3: Accessibility/Clarity					
	Metric 3: Documentation of References	High	1		
Domain 4: Variability and Uncertainty					
	Metric 4: Variability and Uncertainty	High	1		
Overall Quality Determination *		High	1.2		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
 High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	Herbert, P.,Charbonnier, P.,Rivolta, L.,Servais, M.,Van Mensch, F.,Campbell, I.. 1986. The occurrence of chlorinated solvents in the environment. Prepared by a workshop of the European Chemical Industry Federation (CEFIC). Chemistry and Industry.				
Data Type	Completed Exposure Assessment				
Hero ID	4152304				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
Metric 1:	Methodology	Low	3	There is no actual description of assessment.	
Domain 2: Representative					
Metric 2:	Exposure Scenario	Low	3	The data of surface water is shown. but not US (Europe), and quite old (> 15 yrs)	
Domain 3: Accessibility/Clarity					
Metric 3:	Documentation of References	High	1		
Domain 4: Variability and Uncertainty					
Metric 4:	Variability and Uncertainty	Medium	2	several scenarios are shown. no discussion for uncertainty.	
Overall Quality Determination <sup>*</sup>		Medium	2.2		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Delmaar, J. E.. Emission of chemical substances from solid matrices: a method for consumer exposure assessment.				
Data Type	Completed Exposure Assessment				
Hero ID	4663189				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability	Metric 1: Methodology	Low	3	The report discusses the literature review, assumptions, and limitations of the model. The discussion on data and extrapolations from the model are limited due to data availability and lack of tested data.	
Domain 2: Representative	Metric 2: Exposure Scenario	Low	3	The study models volatile substances using summarized data and does not specifically model 1-BP. Sample and surrogate data used may be similar, but the emphasis on building materials is not in alignment with 1BP uses.	
Domain 3: Accessibility/Clarity	Metric 3: Documentation of References	Low	3	Numerous studies are referenced, but their use is not always clear or directly related to the text and/or data.	
Domain 4: Variability and Uncertainty	Metric 4: Variability and Uncertainty	Low	3	Variabilities and uncertainties are addressed, but not as they apply to 1-BP or its specific exposure environments. Models are built on surrogate parameter values which introduces large degrees of uncertainty.	
Overall Quality Determination <sup>*</sup>		Low	3.0		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	U.S, E. P. A.. 1987. Household solvent products: A national usage survey.				
Data Type	Survey				
Hero ID	1005969				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1:	Data Collection Methodology	High	1	
	Metric 2:	Data Analysis Methodology	High	1	
Domain 2: Representative					
	Metric 3:	Geographic Area	High	1	Nationwide (U.S.A.) survey with outreach via random dialing and willingness to provide address and respond to survey.
	Metric 4:	Sampling / Sampling Size	High	1	
	Metric 5:	Response Rate	Medium	2	The survey response rate is documented and the response rate is >40-70 percent, indicating that the survey results will likely represent the target population.
Domain 3: Accessibility/Clarity					
	Metric 6:	Reporting of Results	High	1	
	Metric 7:	Quality Assurance	Medium	2	No quality control issues were identified that would impact the results.
Domain 4: Variability and Uncertainty					
	Metric 8:	Variability and Uncertainty	N/A	N/A	Variability of population studies through survey questions, but limited discussion of survey uncertainties discussed.
Overall Quality Determination *			High	1.3	
Extracted			Yes		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $=\geq 1.7$  to  $< 2.3$ ; Low:  $=\geq 2.3$  to  $\leq 3$ .

Study Citation:	Abt. 1992. Methylene chloride consumer use study survey findings.				
Data Type	Survey				
Hero ID	1065590				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Data Collection Methodology	Medium	2	Data collection instrument was described. The protocols for field personnel was not.	
	Metric 2: Data Analysis Methodology	Medium	2	Weighted summary stats provided, and unweighted counts provided in appendix. Could not find a discussion on sampling and non sampling errors.	
Domain 2: Representative					
	Metric 3: Geographic Area	High	1		
	Metric 4: Sampling / Sampling Size	High	1		
	Metric 5: Response Rate	Medium	2	for the questionnaire, response rate was about 40 percent.	
Domain 3: Accessibility/Clarity					
	Metric 6: Reporting of Results	High	1		
	Metric 7: Quality Assurance	Low	3	No discussion of QC	
Domain 4: Variability and Uncertainty					
	Metric 8: Variability and Uncertainty	N/A	N/A	limited discussion	
Overall Quality Determination*		Medium	1.7		
Extracted		Yes			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Farrow, A., Taylor, H., Northstone, K., Golding, J., Avon Longitudinal, Study. 2003. Symptoms of mothers and infants related to total volatile organic compounds in household products. Archives of Environmental Health.				
Data Type	Survey				
Hero ID	2443306				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Data Collection Methodology	Medium	2	<p>Data collection methodology discussed. The Avon Longitudinal Study of Parents and Children (ALSPAC) is a population-based study of children born to women who resided in Avon (United Kingdom) during their pregnancy and who had an expected delivery date between April 1, 1991, and December 31, 1992. There were 14,541 pregnant women enrolled in this study, and a cohort of 13,971 of their children was still being followed at age 12 mo. The goal of the ALSPAC is to evaluate environmental, genetic, and social factors that can influence the health of infants and their mothers. Information was collected from mothers through self-report questionnaires at different times during their pregnancy, as well as after the infant's birth, to ascertain family and household characteristics, parental occupations, and other socioeconomic factors. The purpose of this study within the ALSPAC was (a) to determine indoor levels of VOCs relative to the use of specific household products and (b) to identify households in which total VOC (TVOC) levels were high. Investigation of the entire cohort of children and their parents further identified common health effects at different points of data collection. We asked subjects to complete a questionnaire that had questions about the frequency of use of 9 common household products that contain high proportions of VOCs. A total of 13,164 women completed the 1st questionnaire when they were 8 wk pregnant. Of these women, 10,976 completed a 2nd questionnaire 8 mo after birth, and 10,119 completed a 3rd questionnaire when their child was 21 mo of age. We assumed that information about household product use during early pregnancy reflected routine use of these products" rather than later uses which might include cleaning that occurred because the infant was now a member of the household (e.g., use of products to ensure special cleanliness in the infant's environment). The types of household products examined were window cleaners, carpet cleaners, dry-cleaning fluids, turpentine or white spirit, paint stripper, house paints or varnishes, pesticides, other aerosols or sprays, and air fresheners. The categories of use were (a) never or less than once per week, (b) once per week, and (c) daily on most days.</p>	
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Study Citation:	Farrow, A., Taylor, H., Northstone, K., Golding, J., Avon Longitudinal Study. 2003. Symptoms of mothers and infants related to total volatile organic compounds in household products. Archives of Environmental Health.			
Data Type	Survey			
Hero ID	2443306			

Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
	Metric 2: Data Analysis Methodology	Medium	2	Statistical analyses. Mean TVOC levels were calculated on the basis of the monthly values from the living rooms and main bedrooms of the homes monitored in the BRE indoor air study (N = 170). Households with less than 5 TVOC readings for the year were excluded from the analysis. TVOC levels were dichotomized into 2 percentiles: < 75th percentile and > 75th percentile. Use of each of the 9 household products during early pregnancy was dichotomized to < 1/wk and > 1/wk. We used Pearson's chi-square and Fisher's Exact test (crosstabs) to evaluate the relationships between VOC levels in the homes and product use during early pregnancy. We then used products that were statistically significantly associated with higher TVOC levels in the analysis of the entire cohort to determine if use of these products was associated with reporting of symptoms for infants or mothers. For the total cohort, we applied logistic-regression analysis to obtain adjusted odds ratios (ORs) for each symptom with use of a specific product for different frequencies of use, to determine if the odds of experiencing a symptom increased as use of the product increased. Adjustments were made for education, mother's age, housing tenure, number of children in the home, number of smokers in the home, paid job subsequent to birth of the child, dampness or condensation in the home, mold in the home, type of winter heating fuel, and month the questionnaire was completed. The first 6 variables controlled for socioeconomic status; the latter 4 controlled for seasonal ventilation differences that might have influenced the build-up of VOCs (from indoor sources).

Domain 2: Representative				
	Metric 3: Geographic Area	High	1	United Kingdom

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Data Type	Survey				
Hero ID	2443306				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
	Metric 4: Sampling / Sampling Size	Medium	2	The Avon Longitudinal Study of Parents and Children (ALSPAC) is a population-based study of children born to women who resided in Avon (United Kingdom) during their pregnancy and who had an expected delivery date between April 1, 1991, and December 31, 1992. There were 14,541 pregnant women enrolled in this study, and a cohort of 13,971 of their children was still being followed at age 12 mo. The goal of the ALSPAC is to evaluate environmental, genetic, and social factors that can influence the health of infants and their mothers. Information was collected from mothers through self-report questionnaires at different times during their pregnancy, as well as after the infant's birth, to ascertain family and household characteristics, parental occupations, and other socioeconomic factors. We asked subjects to complete a questionnaire that had questions about the frequency of use of 9 common household products that contain high proportions of VOCs.	
	Metric 5: Response Rate	Medium	2	We asked subjects to complete a questionnaire that had questions about the frequency of use of 9 common household products that contain high proportions of VOCs. A total of 13,164 women completed the 1st questionnaire when they were 8 wk pregnant. Of these women, 10,976 completed a 2nd questionnaire 8 mo after birth, and 10,119 completed a 3rd questionnaire when their child was 21 mo of age. Of the 170 total homes included in this focused study, at least 10 samples were returned from each of 109 households, and at least 5 samples were returned from each of 148 households. The 3,339 total samples represented 73 percent of the number of potential samples. The highest and lowest TVOC concentrations from individual samples were 11.4 mg/m <sup>3</sup> (in a living room) and 0.02 mg/m <sup>3</sup> (in a main bedroom), respectively. The highest and lowest geometric mean concentrations of TVOCs in the living room and bedroom, from a total of 12 samples from any house, were 1.559 mg/m <sup>3</sup> and 0.063 mg/m <sup>3</sup> , respectively. The percentiles of mean TVOC concentrations in the living rooms and bedrooms are contained in the Notes in Table 1.	
Domain 3: Accessibility/Clarity	Metric 6: Reporting of Results	Medium	2	No supporting information or raw data available. Table 1 reports products used during pregnancy that were associated significantly with greater than/equal to 75th percentile geometric mean of measured Total Volatile Organic Compounds (TVOCs). No data reported specifically for TCE.	

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Data Type	Survey			
Hero ID	2443306			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
	Metric 7: Quality Assurance	Medium	2	No quality control issues were identified
Domain 4: Variability and Uncertainty	Metric 8: Variability and Uncertainty	N/A	N/A	For example, in 33 homes all readings in both the living room and the main bedroom were less than 0.4 mg/m <sup>3</sup> . In 5 homes, the TVOC concentrations for both rooms always exceeded the stated value. Caution is required when our data are compared with results reported by others and with recommended guidelines, which may be based on a different definition of TVOC.
Overall Quality Determination <sup>*</sup>		Medium	1.9	
Extracted		Yes		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .



Study Citation:	G. C. Pratt, C. Y. Wu, D. Bock, J. L. Adgate, G. Ramachandran, T. H. Stock, M. Morandi, K. Sexton. 2004. Comparing air dispersion model predictions with measured concentrations of VOCs in urban communities. Environmental Science and Technology.			
Data Type	Modeling			
Hero ID	1967347			
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>
Domain 1: Reliability				
	Metric 1: Mathematical Equations	High	1	An EPA regulatory air dispersion model was used. The model is scientifically sound and widely accepted.
	Metric 2: Model Evaluation	High	1	EPA regulatory models undergo evaluation and validation processes involving the comparison of predicted concentrations with measured data.
Domain 2: Representative				
	Metric 3: Exposure Scenario	High	1	The modeled scenario closely represents general population exposure scenarios in urban communities.
Domain 3: Accessibility/Clarity				
	Metric 4: Model and Model Documentation Availability	High	1	Model documentation should be publicly available.
	Metric 5: Model Inputs and Defaults	Medium	2	Data quality acceptance criteria are mentioned by the author. Model inputs are discussed within the text though it is uncertain if all key input values are mentioned.
Domain 4: Variability and Uncertainty				
	Metric 6: Variability and Uncertainty	High	1	Model variability and uncertainties were discussed.
Overall Quality Determination <sup>*</sup>		High	1.2	
Extracted		No		

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale: High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	H. F. Frasch, A. L. Bunge. 2015. The transient dermal exposure II: post-exposure absorption and evaporation of volatile compounds. Journal of Pharmaceutical Sciences.				
Data Type	Modeling				
Hero ID	3230538				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Mathematical Equations	High	1	Key mathematical equations to calculate fractional absorption & evaporation are clearly defined.	
	Metric 2: Model Evaluation	Medium	2	It is not certain if this model has undergone extensive evaluation. The authors state that the theory should be tested by controlled in vitro experiments using skin or artificial membranes.	
Domain 2: Representative					
	Metric 3: Exposure Scenario	High	1		
Domain 3: Accessibility/Clarity					
	Metric 4: Model and Model Documentation Availability	High	1		
	Metric 5: Model Inputs and Defaults	Medium	2	Data quality acceptance criteria specified by the author are not discussed, but inputs appear appropriate.	
Domain 4: Variability and Uncertainty					
	Metric 6: Variability and Uncertainty	Low	3	Key uncertainties, limitations, and data gaps are not discussed.	
Overall Quality Determination <sup>*</sup>		Medium	1.7		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

<sup>\*</sup> If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .

Study Citation:	Keil, C.,Murphy, R.. 2006. An application of exposure modeling in exposure assessments for a university chemistry teaching laboratory. Journal of Occupational and Environmental Hygiene.				
Data Type	Modeling				
Hero ID	3588614				
Domain	Metric	Rating <sup>†</sup>	Score	Comments <sup>‡</sup>	
Domain 1: Reliability					
	Metric 1: Mathematical Equations	High	1		
	Metric 2: Model Evaluation	High	1	monitoring of two individuals available	
Domain 2: Representative					
	Metric 3: Exposure Scenario	Low	3	would be considered a surrogate scenario	
Domain 3: Accessibility/Clarity					
	Metric 4: Model and Model Documentation Availability	High	1		
	Metric 5: Model Inputs and Defaults	High	1		
Domain 4: Variability and Uncertainty					
	Metric 6: Variability and Uncertainty	High	1		
Overall Quality Determination*		High	1.3		
Extracted		No			

<sup>†</sup> High = 1; Medium = 2; Low = 3; Unacceptable = 4; N/A has no value.

<sup>‡</sup> The overall rating is calculated as necessary. EPA may not always provide a comment for a metric that has been categorized as High.

\* If any individual metrics are deemed Unacceptable, then the overall rating is also unacceptable. Otherwise, the overall rating is based on the following scale:  
High:  $\geq 1$  to  $< 1.7$ ; Medium:  $\geq 1.7$  to  $< 2.3$ ; Low:  $\geq 2.3$  to  $\leq 3$ .