



2,3,7,8-Tetrachlorodibenzo-para-dioxin
Environmental estimates (circa 2011): Supplemental data

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1. Data for lifetime excess cancer risk estimates

Overview

The summary data used to calculate lifetime excess cancer risk and the results for 2,3,7,8-Tetrachlorodibenzo-para-dioxin (TCDD) are provided in the tables below. For more detailed information on supporting data and sources, see below for each exposure pathway.

i. Environmental Concentrations

Exposure pathway	Units	Average	Maximum	Notes
Outdoor air	µg/m ³	0.000000001	0.000000002	
Indoor air	µg/m ³	Insufficient data		
Dust	µg/g	Insufficient data		
Drinking water	µg/L	Insufficient data		
Foods and beverages		Insufficient data		

ii. Calculated Lifetime Daily Intake

Exposure pathway	Average intake (mg/kg bodyweight per day)	Maximum intake (mg/kg bodyweight per day)
Outdoor air	--	--
Indoor air	Insufficient data	
Dust	Insufficient data	
Drinking water	Insufficient data	
Foods and beverages	Insufficient data	

iii. Cancer Potency Factors

Exposure route	Health Canada	US EPA	CA OEHHA
Inhalation	--	--	130,000
Ingestion	--	--	130,000

Sources for Cancer Potency Factors:

- Health Canada, 2010. Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment. Version 2.0.
- Health Canada, 2010. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors. Version 2.0.
- United States Environmental Protection Agency Integrated Risk Information System.
- California Office of Environmental Health Hazard Assessment, 2009. Air Toxics Hot Spots Risk Assessment Guidelines Part II: Technical Support Document for Cancer Potency Factors, Appendix A. (Updated 2011)

iv. Lifetime Excess Cancer Risk (per million people)

Exposure pathway	Average ¹			Maximum ²
	Health Canada	US EPA	CA OEHHA ³	
Outdoor air	--	--	0.0030	0.060
Indoor air	Insufficient data			
Dust	Insufficient data			
Drinking water	Insufficient data			
Food and beverages	Insufficient data			

¹Lifetime excess cancer risk based on average intake x cancer potency factor from each agency

²Lifetime excess cancer risk based on maximum intake x highest cancer potency factor

³California Office of Environmental Health Hazard Assessment

Supporting data by exposure pathway

i. Outdoor air

Outdoor air concentrations are from the National Air Pollution Surveillance monitoring network operated by Environment Canada, for the year 2009.

Source	Stations (n)	Min	Max	Mean	DF
NAPS 2009 (µg/m ³)	17	0.0000000004	0.000000002	0.000000001	1.0

DF = Detection frequency

We assume TCDD is present at these levels in all outdoor air, although concentrations may vary from one location to another.

ii. Indoor air

No recent data or studies were identified.

iii. Dust

No recent data or studies were identified.

iv. Drinking water

No recent data or studies were identified.

v. Food and Beverages

No recent data or studies were identified.

2. Data quality for lifetime excess cancer risk estimates

Only publicly available data were used to calculate these indicators. Data that are not publicly available may produce different results.

No systematic method for measuring data quality was possible, so we provide the following assessments of how well the data used may represent the actual Canadian average levels.

Quality is rated higher when there are data from a number of Canadian monitors, or from Canadian studies that show results similar to other comparable studies. Quality is rated lower when data from few monitors or studies were available, and lowest when estimates are based on non-Canadian data. Others may rate data quality differently.

Exposure Pathway	Data Quality	Notes
Outdoor air	Low	<ul style="list-style-type: none"> 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD) is measured in outdoor air at 17 monitoring stations across Canada using accepted protocols.
Indoor air	Gap	<ul style="list-style-type: none"> No recent data or studies were identified.
Indoor dust	Gap	<ul style="list-style-type: none"> No recent data or studies were identified.
Drinking water	Gap	<ul style="list-style-type: none"> No recent data or studies were identified.
Foods and beverages	Gap	<ul style="list-style-type: none"> No recent data or studies were identified.

3. Data for mapping concentrations

The maps use geographic coordinates at the census block level to represent residential locations. Concentration estimates are mapped at the health region level, which are created with aggregated census block data.

We used a model to predict annual average concentrations of 2,3,7,8-Tetrachlorodibenzo-para-dioxin in outdoor air at residential locations for 2011. These are predicted using levels measured from the National Air Pollution Surveillance (NAPS) monitors and estimated concentrations from known emitters. For more information on how these estimates were created, please see the Mapping Methods document on the [Environmental Approach](#) section of our website.

Estimates by health region

The table below shows predicted 2,3,7,8-Tetrachlorodibenzo-para-dioxin concentrations by province based on data at the health region level. The median concentration of 2,3,7,8-Tetrachlorodibenzo-para-dioxin measured in outdoor air in 2011 at the health region level was 0.00083 µg/m³, while the mean concentration was 0.00088 µg/m³. Concentrations of 2,3,7,8-Tetrachlorodibenzo-para-dioxin can be higher or lower than average in many locations.

i. Provincial averages of predicted 2,3,7,8-Tetrachlorodibenzo-para-dioxin concentrations ($\mu\text{g}/\text{m}^3$) in outdoor air in 2011 based on health regions

Province	Median	Mean
BC	0.00093	0.00093
AB	0.00084	0.00091
SK	0.00067	0.00069
MB	0.00074	0.00074
ON	0.00090	0.00099
QC	0.00088	0.00089
NB	0.00081	0.00077
PE	0.00080	0.00080
NS	0.00085	0.00084
NL	0.00070	0.00070
YK	0.00081	0.00081
NT	0.00071	0.00071
NU	0.00061	0.00061
Canada	0.00083	0.00088

Estimates by census block

The table below shows provincial populations by concentration levels (either annual average or number of times above/below the national average) based on the census block data and the associated potential lifetime excess risk given different cancer potency factors.

i. Provincial population distribution by estimated average concentration ($\mu\text{g}/\text{m}^3$) of 2,3,7,8-Tetrachlorodibenzo-para-dioxin in outdoor air in 2011 based on NAPS data at the census block

Estimated annual average concentration ($\mu\text{g}/\text{m}^3$)	Less than 0.0000000003	0.0000000003 to 0.0000000004	0.0000000004 to 0.0000000005	0.0000000005 to 0.0000000007	0.0000000007 to 0.000000001	0.000000001 to 0.0000000015	0.0000000015 to 0.000000002	0.000000002 to 0.0000000025	0.0000000025 to 0.000000003	More than 0.000000003
	> 3x lower	2.5 to 3x lower	2 to 2.5x lower	1.5 to 2x lower	1 to 1.5x lower	1 to 1.5x higher	1.5 to 2x higher	2 to 2.5x higher	2.5 to 3x higher	> 3.0x higher
Compared to national average (0.000000001 $\mu\text{g}/\text{m}^3$)*	Below Average					Above Average				
BC	--	--	--	--	545,918 (12.4%)	3,854,139 (87.6%)	--	--	--	--
AB	--	--	--	--	1,142,248 (31.3%)	2,503,009 (68.7%)	--	--	--	--
SK	--	--	--	--	404,403 (39.1%)	628,978 (60.9%)	--	--	--	--
MB	--	--	--	--	327,399 (27.1%)	880,869 (72.9%)	--	--	--	--
ON	--	--	6,717 (<0.1%)	127,388 (1.0%)	3,329,263 (25.9%)	9,388,453 (73.1%)	--	--	--	--
QC	--	--	--	--	1,323,783 (16.8%)	2,385,695 (30.2%)	4,193,523 (53.1%)	--	--	--
NB	--	--	--	--	292,476 (38.9%)	458,695 (61.1%)	--	--	--	--
NS	--	--	--	24,690 (2.7%)	297,034 (32.2%)	600,003 (65.1%)	--	--	--	--
PE	--	--	--	--	59,229 (42.2%)	80,975 (57.8%)	--	--	--	--
NL	--	--	--	--	292,974 (56.9%)	221,562 (43.1%)	--	--	--	--
NU	--	--	--	--	31,906 (100.0%)	--	--	--	--	--
NT	--	--	--	--	22,228 (53.6%)	19,234 (46.4%)	--	--	--	--
YT	--	--	--	--	7,869 (23.2%)	26,028 (76.8%)	--	--	--	--
CANADA % of pop.	--	--	6,717 (<0.01%)	152,078 (0.4%)	8,076,730 (24.1%)	21,047,640 (62.9%)	4,193,523 (12.5%)	--	--	--

ASSOCIATED LIFETIME EXCESS CANCER RISK (per million people):
 RED = POTENTIAL LIFETIME EXCESS RISK IS GREATER THAN 1 PER MILLION PEOPLE

Health Canada CPF: No CPF	<0.001	0.001 to <0.0012	0.0012 to <0.0015	0.0015 to <0.002	0.002 to <0.003	0.003 to <0.0045	0.0045 to <0.006	0.006 to <0.0075	0.0075 to <0.009	>0.009
California OEHHHA CPF: 130,000										
US EPA CPF: no CPF										

*measured at National Air Pollution Surveillance (NAPS) monitors in 2011
 CPF: Cancer Potency Factor