

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

Annex 3. Margins of Exposure (MOE) for 1,2 Dichloroethane, Benzo(a)pyrene and hexavalent Chromium

1,2 Dichloroethane					
		Exposure Estimate ng/kg bw/d	BMDL ₁₀ mg/kg bw/d Lowest Value	BMDL ₁₀ range mg/kg bw/d	MOE^a Based on lowest BMDL ₁₀
MOE calculations based on exposure estimates of 1,2 Dichloroethane in drinking water					
1,2 dichloroethane Oral gavage male	Stomach Squamous cell carcinoma	1 - 3	37.23	37.23-49.28	12,000,000 - 37,000,000
	Stomach Squamous cell fibromas	1 - 3	38.35	38.35-62.85	13,000,000 - 38,000,000
1,2 dichloroethane Oral gavage female	Mammary adenomas	1 - 3	60.47	60.47-61.38	20,000,000 - 60,000,000
1,2 dichloroethane Oral gavage male	Alveolar/bronchiolar adenomas	1 - 3	108.51	108.51-110.48	36,000,000 - 109,000,000
1,2 dichloroethane Oral gavage female	Alveolar/bronchiolar adenomas	1 - 3	57.66	57.66-105.03	19,000,000 - 58,000,000
	Mammary gland adenocarcinoma	1 - 3	69.16	69.16-107.55	23,000,000 - 69,100,000
	uterus endometrial stomal polyp	1 - 3	191.99	191.99-211.32	64,000,000 - 192,000,000
	uterus endometrial stomal sarcoma	1 - 3	191.23	191.23-192.17	64,000,000 - 191,000,000
1,2 dichloroethane inhalation male	Subcutaneous fibroma,	1 - 3	7.11	7.11-12.57	2,300,000 - 7,100,000
	Mammary gland fibroadenoma,	1 - 3	20.41	20.41-26.63	7,000,000 - 20,000,000
	Peritoneal mesothelioma	1 - 3	21.42	21.42-26.80	7,000,000 -21,000,000
1,2 dichloroethane Inhalation female	Subcutaneous fibroma,	1 - 3	29.86	29.86-37.97	10,000,000 -30,000,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

	Mammary gland adenoma,	1 - 3	15.77	15.77-23.29	5,000,000 - 16,000,000
	Mammary gland Fibroadenoma,	1 - 3	12.84	12.84-22.52	4,000,000 - 13,000,000
	Mammary gland adenocarcinoma	1 - 3	33.45	33.45-38.70	11,000,000 - 33,000,000
1,2 dichloroethane Inhalation female	Bronchiolo-alveolar adenoma	1 - 3	58.07	58.07-73.22	19,000,000 - 58,000,000
	Bronchiolo-alveolar carcinoma	1 - 3	100.22	100.22-114.33	33,000,000 - 100,000,000
	Endometrial stromal polyp	1 - 3	82.34	82.34-86.48	27,000,000 - 82,000,000
	Mammary gland adenocarcinoma	1 - 3	73.47	73.47-85.04	24,000,000 - 73,000,000
	Hepatocellular adenoma	1 - 3	66.05	66.05-86.03	22,000,000 - 66,000,000
MOE calculations based on exposure estimates of 1,2 Dichloroethane from indoor air					
1,2 dichloroethane Oral gavage male	Stomach Squamous cell carcinoma	<30 – 100	37.23	37.23-49.28	372,000 - 1,200,000
	Stomach Squamous cell fibromas	<30 – 100	38.35	38.35-62.85	380,000 – 1,280,000
1,2 dichloroethane Oral gavage female	Mammary adenomas	<30 – 100	60.47	60.47-61.38	605,000 - 2,000,000
1,2 dichloroethane Oral gavage male	Alveolar/bronchiolar adenomas	<30 – 100	108.51	108.51-110.48	1,100,000 - 3,600,000
1,2 dichloroethane Oral gavage female	Alveolar/bronchiolar adenomas	<30 – 100	57.66	57.66-105.03	577,000 - 1,900,000
	Mammary gland adenocarcinoma	<30 – 100	69.16	69.16-107.55	690,000 - 2,300,000
	uterus endometrial stomal polyp	<30 – 100	191.99	191.99-211.32	1,900,000 - 6,400,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

	uterus endometrial stromal sarcoma	<30 – 100	191.23	191.23-192.17	1,900,000 - 6,400,000
1,2 dichloroethane inhalation male	Subcutaneous fibroma,	<30 – 100	7.11	7.11-12.57	71,000 - 240,000
	Mammary gland fibroadenoma,	<30 – 100	20.41	20.41-26.63	200,000 - 680,000
	Peritoneal mesothelioma	<30 – 100	21.42	21.42-26.80	214,000 - 714,000
1,2 dichloroethane Inhalation female	Subcutaneous fibroma	<30 – 100	29.86	29.86-37.97	299,000 - 995,000
	Mammary gland adenoma	<30 – 100	15.77	15.77-23.29	160,000 - 500,000
	Mammary gland Fibroadenoma	<30 – 100	12.84	12.84-22.52	128,400 - 428,000
	Mammary gland adenocarcinoma	<30 – 100	33.45	33.45-38.70	330,000 - 1,000,000
1,2 dichloroethane Inhalation female	Bronchiolo-alveolar adenoma	<30 – 100	58.07	58.07-73.22	580,000 - 1,900,000
	Bronchiolo-alveolar carcinoma	<30 – 100	100.22	100.22-114.33	1,000,000 - 3,300,000
	Endometrial stromal polyp	<30 – 100	82.34	82.34-86.48	800,000 - 2,700,000
	Mammary gland adenocarcinoma	<30 – 100	73.47	73.47-85.04	700,000 - 2,500,000
	Hepatocellular adenoma	<30 – 100	66.05	66.05-86.03	660,000 - 2,200,000
MOE calculations based on exposure estimates of 1,2 Dichloroethane from ambient air					
1,2 dichloroethane Oral gavage male	Stomach Squamous cell carcinoma	4 – 20	37.23	37.23-49.28	1,900,000 - 9,300,000
	Stomach Squamous cell fibromas	4 – 20	38.35	38.35-62.85	1,900,000 - 9,600,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

1,2 dichloroethane Oral gavage female	Mammary adenomas	4 – 20	60.47	60.47-61.38	3,000,000 - 15,000,000
1,2 dichloroethane Oral gavage male	Alveolar/bronchiolar adenomas	4 – 20	108.51	108.51-110.48	5,400,000 - 27,100,000
1,2 dichloroethane Oral gavage female	Alveolar/bronchiolar adenomas	4 – 20	57.66	57.66-105.03	2,900,000 - 14,000,000
	Mammary gland adenocarcinoma	4 – 20	69.16	69.16-107.55	3,500,000 - 17,300,000
	uterus endometrial stomal polyp	4 – 20	191.99	191.99-211.32	9,600,000 - 48,000,000
	uterus endometrial stomal sarcoma	4 – 20	191.23	191.23-192.17	9,600,000 - 48,000,000
1,2 dichloroethane inhalation male	Subcutaneous fibroma	4 – 20	7.11	7.11-12.57	355,000 - 1,800,000
	Mammary gland fibroadenoma	4 – 20	20.41	20.41-26.63	1,000,000 - 5,100,000
	Peritoneal mesothelioma	4 – 20	21.42	21.42-26.80	1,100,000 - 5,400,000
1,2 dichloroethane Inhalation female	Subcutaneous fibroma	4 – 20	29.86	29.86-37.97	1,500,000 - 7,500,000
	Mammary gland adenoma	4 – 20	15.77	15.77-23.29	788,000 - 3,900,000
	Mammary gland Fibroadenoma	4 – 20	12.84	12.84-22.52	642,000 - 3,200,000
	Mammary gland adenocarcinoma	4 – 20	33.45	33.45-38.70	1,700,000 - 8,400,000
1,2 dichloroethane Inhalation female	Bronchiolo-alveolar adenoma	4 – 20	58.07	58.07-73.22	2,900,000 - 14,500,000
	Bronchiolo-alveolar carcinoma	4 – 20	100.22	100.22-114.33	5,000,000 - 25,000,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

	Endometrial stromal polyp	4 – 20	82.34	82.34-86.48	4,000,000 - 20,600,000
	Mammary gland adenocarcinoma	4 – 20	73.47	73.47-85.04	3,600,000 - 18,000,000
	Hepatocellular adenoma	4 – 20	66.05	66.05-86.03	3,300,000 - 17,000,000
Hexavalent Chromium					
		Exposure Estimate ng/kg bw/d	BMDL10 mg/kg bw/d Based on AIC	BMDL10 range mg/kg bw/d	MOE
MOE calculations based on exposure estimates of Total Chromium in food					
Hexavalent Chromium Male	SI/Duodenum adenoma	3457 – 4843	60.84	60.84-124.11	12,600 - 17,600
	SI/Duodenum/jejunum/ileum adenoma	3457 – 4843	55.9	55.90-120.66	11,500 - 16,100
	SI/Duodenum/jejunum/ileum carcinoma	3457 – 4843	121.53	121.53-188.76	25,000 - 35,200
Hexavalent Chromium Female	SI/Duodenum carcinoma	3457 – 4843	311.11	311.11-327.85	64,000 - 90,000
	SI/jejunum adenoma	3457 – 4843	298.65	298.65-392.47	61,700 - 86,400
	SI/Duodenum/jejunum or ileum adenoma	3457 – 4843	60.43	n/a	12,500 - 17,500
	SI/Duodenum/jejunum or ileum carcinoma	3457 – 4843	233.37	233.37-351.86	48,200 - 67,500
	SI/Duodenum/jejunum or ileum carcinoma/ adenoma	3457 – 4843	43.916	43.916-58.87	9,100 - 12,700
MOE calculations based on exposure estimates of Total Chromium from ambient and indoor air					
Hexavalent Chromium	SI/Duodenum adenoma	0.28 – 4.86	60.84	60.84-124.11	12,000,000 - 217,000,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

Male					
	SI/Duodenum/jejunum/ileum adenoma	0.28 –4.86	55.9	55.90-120.66	11,500,000 - 200,000,000
	SI/Duodenum/jejunum/ileum carcinoma	0.28 –4.86	121.53	121.53-188.76	25,000,000 - 434,000,000
Hexavalent Chromium Female	SI/Duodenum carcinoma	0.28 –4.86	311.11	311.11-327.85	64,000,000 - 1,000,000,000
	SI/jejunum adenoma	0.28 –4.86	298.65	298.65-392.47	61,000,000 - 1,000,000,000
	SI/Duodenum/jejunum or ileum adenoma	0.28 –4.86	60.43	n/a	12,000,000 -216,000,000
	SI/Duodenum/jejunum or ileum carcinoma	0.28 –4.86	233.37	233.37-351.86	48,000,000 - 833,000,000
	SI/Duodenum/jejunum or ileum carcinoma/adenoma	0.28 –4.86	43.916	43.916-58.87	9,000,000 - 157,000,000
MOE calculations based on exposure estimates of hexavalent Chromium from ambient and indoor air					
Hexavalent Chromium Male	SI/Duodenum adenoma	0.007 -0.42	60.84	60.84-124.11	145,000,000 - 8,700,000,000
	SI/Duodenum/jejunum/ileum adenoma	0.007 -0.42	55.9	55.90-120.66	133,000,000 -7,990,000,000
	SI/Duodenum/jejunum/ileum carcinoma	0.007 -0.42	121.53	121.53-188.76	289,000,000 - 17,000,000,000
Female	SI/Duodenum carcinoma	0.007 -0.42	311.11	311.11-327.85	741,000,000 - 44,000,000,000
	SI/jejunum adenoma	0.007 -0.42	298.65	298.65-392.47	711,000,000 - 43,000,000,000
	SI/Duodenum/jejunum or ileum adenoma	0.007 -0.42	60.43	n/a	143,000,000 - 8,600,000,000
	SI/Duodenum/jejunum or ileum carcinoma	0.007 -0.42	233.37	233.37-351.86	556,000,000 -33,000,000,000
	SI/Duodenum/jejunum or	0.007 -0.42	43.916	43.916-58.87	105,000,000 -6,200,000,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

	ileum carcinoma/adenoma				
MOE calculations based on exposure estimates of Total Chromium in drinking water					
Hexavalent Chromium Male	SI/Duodenum adenoma	57	60.84	60.84-124.11	1,100,000
	SI/Duodenum/jejunum/ileum adenoma	57	55.9	55.90-120.66	981,000
	SI/Duodenum/jejunum/ileum carcinoma	57	121.53	121.53-188.76	2,100,000
Hexavalent Chromium Female	SI/Duodenum carcinoma	57	311.11	311.11-327.85	5,500,000
	SI/jejunum adenoma	57	298.65	298.65-392.47	5,200,000
	SI/Duodenum/jejunum or ileum adenoma	57	60.43	na	1,000,000
	SI/Duodenum/jejunum or ileum carcinoma	57	233.37	233.37-351.86	4,100,000
	SI/Duodenum/jejunum or ileum carcinoma/adenoma	57	43.916	43.916-58.87	770,000
Benzo(a)pyrene					
		Exposure Estimate ng/kg bw/d	BMDL10 mg/kg bw/d Based on AIC	BMDL10 range mg/kg bw/d	MOE
MOE calculations based on exposure estimates of Benzo(a)pyrene in food					
Benzo(a)pyrene Oral gavage male	Hepatocellular tumours	0.7-4.14	2.42	2.42-2.45	585,000 - 3,500,000
Benzo(a)pyrene Oral gavage female	Hepatocellular tumours	0.7-4.14	2.82	2.82-2.92	680,000 - 4,000,000
Benzo(a)pyrene Oral gavage female	Forestomach tumours	0.7-4.14	0.52	0.52 – 0.54	130,000 - 740,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

Benzo(a)pyrene Oral gavage female	Esophagus tumours	0.7-4.14	3.31	3.31 – 6.43	800,000 - 4,700,000
Benzo(a)pyrene Oral gavage female	Tongue tumours	0.7-4.14	3.54	3.54 – 7.07	855,000 - 5,000,000
Benzo(a)pyrene Oral gavage female	Larynx tumours	0.7-4.14	4.82	4.82 -10.17	1,200,000 - 6,900,000
MOE calculations based on exposure estimates of Benzo(a)pyrene from indoor air					
Benzo(a)pyrene Oral gavage male	Hepatocellular tumours	0.14 – 0.71	2.45	2.42-2.45	3,400,000 - 17,000,000
Benzo(a)pyrene Oral gavage female	Hepatocellular tumours	0.14 – 0.71	2.92	2.82-2.92	4,000,000 -20,000,000
Benzo(a)pyrene Oral gavage female	Forestomach tumours	0.14 – 0.71	0.54	0.52 – 0.54	700,000 - 4,000,000
Benzo(a)pyrene Oral gavage female	Esophagus tumours	0.14 – 0.71	3.31	3.31 – 6.43	5,000,000 - 24,000,000
Benzo(a)pyrene Oral gavage female	Tongue tumours	0.14 – 0.71	3.70	3.54 – 7.07	5,000,000 - 25,000,000
Benzo(a)pyrene Oral gavage female	Larynx tumours	0.14 – 0.71	4.82	4.82 -10.17	7,000,000 - 34,000,000
MOE calculations based on exposure estimates of Benzo(a)pyrene from ambient air					
Benzo(a)pyrene Oral gavage male	Hepatocellular tumours	0.06 -0.62	2.45	2.42-2.45	3,900,000 - 40,000,000
Benzo(a)pyrene Oral gavage female	Hepatocellular tumours	0.06 -0.62	2.92	2.82-2.92	5,000,000 - 47,000,000
Benzo(a)pyrene Oral gavage female	Forestomach tumours	0.06 -0.62	0.54	0.52 – 0.54	840,000 - 8,700,000
Benzo(a)pyrene Oral gavage female	Esophagus tumours	0.06 -0.62	3.31	3.31 – 6.43	5,000,000 - 55,000,000
Benzo(a)pyrene Oral gavage female	Tongue tumours	0.06 -0.62	3.70	3.54 – 7.07	6,000,000 - 59,000,000
Benzo(a)pyrene	Larynx tumours	0.06 -0.62	4.82	4.82 -10.17	8,000,000 - 80,000,000

This is a draft paper for discussion. It should not be quoted, cited or reproduced.

Oral gavage female					
MOE calculations based on exposure estimates of Benzo(a)pyrene in drinking water					
Benzo(a)pyrene Oral gavage male	Hepatocellular tumours	0.003- 0.03	2.45	2.42-2.45	80,000,000 - 800,000,000
Benzo(a)pyrene Oral gavage female	Hepatocellular tumours	0.003- 0.03	2.92	2.82-2.92	94,000,000 - 940,000,000
Benzo(a)pyrene Oral gavage female	Forestomach tumours	0.003- 0.03	0.54	0.52 – 0.54	17,000,000 - 170,000,000
Benzo(a)pyrene Oral gavage female	Esophagus tumours	0.003- 0.03	3.31	3.31 – 6.43	110,000,000 - 1,100,000,000
Benzo(a)pyrene Oral gavage female	Tongue tumours	0.003- 0.03	3.70	3.54 – 7.07	118,000,000 - 1,180,000,000
Benzo(a)pyrene Oral gavage female	Larynx tumours	0.003- 0.03	4.82	4.82 -10.17	160,000,000 - 1,600,000,000

^a The lowest BMDL₁₀ value from each cancer dataset and the upper and lower bound human exposure estimate were used to calculate the MOE range