

Canada's comments on draft OESG report

Submitted 5 June 2026

Line number	Comment
General comment	The executive summary could be more plain language and avoid usage of technical terms, concentrations and acronyms. It would be helpful to pull out key messages and have a targeted list in the executive summary.
General comment	A table of contents could be useful for navigation and a list of acronyms would be helpful.
General comment	A recommendation on whether to continue to include each media and each question in future EEs would be helpful. Some are data-poor or have many confounding factors and there should be consideration on whether these make good indicators for the EE. Which of these are considered baseline data for future reports and which won't be useful in the future? Are there recommendations for maintaining monitoring of key species important for analysis in each region?
General comment	Gaps in data collection and standardization constituted primary limiting factors during the effectiveness evaluation. Additional discussion is needed to develop recommendations on how to strategically fill these gaps, particularly within under-represented geographic regions. Recommendations will be helpful to facilitate resource allocation for data management, analysis, and synthesis that will be needed for the next assessment.
General comment	For questions that aren't able to be completed, it would be better to delete the outline under each and explain why it can't be answered with currently available data/resources.
General comment	Only some sections of the report have done estimates based on the data available while others have not. We would support the approach taken in the air section <i>"The lack of data in some regions brings up the question of 'what can be said about mercury deposition in gap areas?'. Since we do not have direct measurements, estimates must be made from the data that we do have"</i>
General comment	The biota section includes a key findings/messages part. We found this useful and think it should be included for all sections.
46-74	Were there any areas where the implementation stage had to diverge from the initial plans? For example it seems that the emissions and releases analysis was based on a more limited source data set than what was outlined in the original plan. Also, did the OESG find this two-stage approach was useful? Would they recommend it be used in future EEs as well or should it be modified to avoid putting unrealistic expectations on the group's analysis? Footnote 2 - this footnote links to the executive summary of the monitoring guidance, rather than the full document in footnote 3. Consider if both links are needed.
72	For harmonized data reporting formats - has this issue been addressed to a certain extent through forms developed by the OESG under this EE process?

90	Though 2022 was higher than 2010, later in the para it says they peaked in 2018, so this statement is a bit misleading.
94	For consistency across the document, suggest using one or two units of measure like kg and tonnes. This would make it easier for the reader to compare data in different sections.
101	Choose a year either 2008 or 2010. 2010 seems to be used more frequently in other paragraphs.
102	Are these statistically significant? How have they changed since 2017 or 2018?
105-106	It would be useful if these timeframes included a measure from the entry into force of the Convention.
106-107	Coal combustion is covered in the next para. Are extraction activities significant enough to warrant a mention here? Also it's not really relevant to Article 5 so it seems a little out of place here.
109-110	Transition to cleaner energy and emissions controls appear to be working for coal, but why the increase for metals and cement? Increased demand/development projects or are controls not working? Are new facilities being made with BAT/BEP?
111	Since 2010? Suggest moving this sentence up to group discussion on ASGM together.
111-112	Re chlor alkali – this seems repetitive of lines 105-106
112-113	Suggest grouping this with para 105-107. Also suggest indicating the percentage increase as done for the other sources - moderately is vague. Have all other manufacturing processes shown increases or just select ones?
115	Suggest deleting text between brackets for flow and simplicity.
116-117	How can these be addressed? Did any Parties identify significant sources of releases and if so, what were these?
123	Is the assumption that where there is high ASGM activity there will be high volumes of releases to water? Are there any estimates of the amount or percent of mercury lost/released to water from ASGM practices?
125	What are the inputs to wastewater plants though since they are not a source of mercury themselves but simply reflect upstream inputs?
124-127	Any estimates for releases to land? If not, indicate these are too uncertain, rather than mentioning both water and land but not including any info on land releases.
131-132	are the values in parentheses referring to the min and max? Please clarify by adding the following, e.g. (min-max: 0.49-12.2)
134/footnote 4	Re outliers - were these not background sites or was there a problem with the sampling? Is it worth mentioning these sites with high values in the text? Also wonder if for consistency with other media and because of the seemingly large variability in measurements if it should be presented as median rather than average or together with the average?
135	(0.94-2.62)-2.56). Please confirm which value should be reported 2.62 or 2.56.
130-135	It would be helpful to specify which years of data these average concentrations are based on.

139-140	Why is the southern hemisphere average so low then if these numbers are high?
145-147	There appears to be a conflicting explanation here vs that given in the last sentence of the following paragraph. Do wet conditions increase or lower mercury concentrations?
168-169	Line 166 says 80%. Are these different analyses? If so, it's not clear why there is a difference in the percentage of sites that show no trend.
175	May wish to clarify that this is for air not precipitation.
228-234	What were the TRVs and what was the proportion that exceeded the TRVs?
250-254	What are the EC levels here and how are they different from the TRVs?
277-285	What is the general population? Is it the global average? Local? It would be useful to mention the reference values for the general population for comparison. What is the percentage of various populations above human health guidelines?
290-291	Are the fish in these areas higher in Hg or do they just eat more fish? Do the waters around them contain higher Hg being carried through from upstream sources?
321	Are there available guidelines that could be used for reference?
342	What about comparing levels to guideline values?
403-412	Much of this is noted in the bullets below. Suggest streamlining text.
689	There are some words missing/sentence doesn't make sense as written.
695-701	It appears that for this question only EDGAR was used except for data for China? What is the rationale for using China's emissions data but no other party's submitted emissions data particularly if Party data was also prepared in accordance with CLRTAP methodology and similar to EMEP/EEA?
748	May wish to expand on the last sentence to link the updated NAPs to future EE cycles.
749	Is there any consideration or analysis of emissions from Parties to the Convention vs the contribution of non-Parties?
769-775	Why would EDGAR and CLRTAP data show significantly different values and trends if they were prepared using similar methodologies? What makes EDGAR more valid than data from CLRTAP?
784-785	What is the difference of this and line 782 at the start of the paragraph (324 t vs 369 t)? Is this CLRTAP data vs EDGAR?
787-789	So PRTR data were used? It's unclear when certain data sets were used compared to others (i.e. EDGAR vs Party data). Typo in line 788 decreased should be decreased. Maybe add in a visual for where data were available or not available and used/not used
787-788	Where are paper and wood processing covered in the convention? If this is referring to chloralkali facilities there are other uses for chlorine so it's unclear how it applies to paper and wood processing.

804-805	What factor? Gold prices?
809-810	What about trends for other source categories? Would it make sense to combine sections 2.1.2 and 2.1.3 to show both the current levels and the trends?
857	Any data available from Parties who reported under Article 9 that they have relevant sources of mercury releases?
884-886	Are there more up to date data that could be used e.g. Parties PRTRs? The 2018 GMA uses older data (i.e. data before 2018), it would be good to have an update so we could compare to the estimates of the GMA. Why couldn't the methodology used to develop the 2018 GMA be used with updated data?
891, 902-903	Are these sources expected to be significant?
911-912	So is there value in breaking out freshwater vs coastal areas for the report analysis?
924-925	Is the analysis then ongoing and will be included in the next version?
933-934	Are these sectors likely to be significant sources?
944	Is there no information available from NAPs or MIAs? Or even estimates from academic literature that could be applied?
953	Why were party inventories that are outside of MIAs excluded from this analysis?
1002-1011	What about non-ASGM activities? The section is supposed to be about both but seems to only be focused on ASGM
1004-1005	Is there no information available from NAPs or MIAs? Or even estimates from academic literature that could be applied?
1008-1009	There are risks to cyanide use though as well and Hg plus cyanide is not a good combination
1024	What about the NAPs or MIAs for parties to the Convention? Presumably at least some of these would include data on ASGM levels and mercury use.
1025-1026	There is a lot of GEF funding for ASGM however. Could this not be used? There is also a lot of academic literature published on this subject.
1082	This should be releases to land, not emissions to land.
1085-1097	So since the EE is to be based on available data according to article 22, is there a point in evaluating releases to land and water for future EEs (unless the data availability significantly improves)? What about data available from parties' inventories and PRTRs? Was data not requested or submitted?
1094-1095	It would seem like PRTRs and inventories or the UNEP toolkit would have a lot of this information. Given the evaluation is done at a global level, the specific mitigation measures would be those of the Convention. So for example phasing out products - what would be the estimated reductions of mercury released to land or water during the manufacturing process? Data from national reports could even make this more precise by using the number of parties who have taken action to phase out products.
1117	Would emissions from melting permafrost be included in these "natural sources"?

1176-1190	What would be the value of this for the purposes of the Minamata Convention? It would likely need to be coordinated on the basis of monitoring these volcanoes for other purposes (safety, eruption prediction) with inexpensive mercury monitoring tagged on if possible.
1207	Check section numbering
1391	“Dry deposition of all mercury forms occurs to vegetation...” Dry deposition can occur on all surfaces. Should this be to vegetation, soil, and water?
1414	Consider if background map colour should be lightened for better visual perception of the geographic areas
1419-1420	Will there be time to include additional sites in the analysis though?
1433-1435	Need to explain if bracket numbers are min-max range.
1446	Is there a reason the same scale can't be used for average concentration in each figure? This might help to provide a better global picture of relative concentrations, given the lack of active monitors in the south.
1453	Oceana should be Oceania (the countries around Australia)
Pg 42 footnote 12	Page 42, footnote 12: sampling rate should be in units of $\text{m}^3 \text{day}^{-1}$ instead of $\text{m}^2 \text{day}^{-1}$
1493	Figure Air 5 caption: Concentration should be “Concentration”
1580-1581	Because it wasn't provided at all? Or not within the time frame needed to carry out the analysis?
1591	How much will be provided by the GEF GCMP program? Will additional investments still be required?
1602	What additional information could provided by this information for future cycles?
1607-1608	Maybe mention the specific regions that are higher? Or re-word sentence to “The TGM and GEM data in Figures Air 2, 3 and 4, show that that there are higher levels of mercury in key regions.”
1620	Consider moving the table to below the chart to make the chart legend easier to read. Also it is currently hard to differentiate some of the blue and green shades so they may need to be adjusted
1704-1706	Are the trends somewhat linear or are there peaks and declines?
1781-1782	Would the more in-depth analysis be done in this EE cycle or a future one?
1790	Suggest listing the TRVs selected from Ciani et al 2024 and the rationale for their selection.
1797-1798	It is important to note that these benchmarks reported from the Ciani et al 2024 paper cover a wide range of values intended for different purposes, with differing derivation methodologies and levels of risk. Specifically, some values are intended for the general population (for chronic, intermediate and acute exposures including rare, once-in-a lifetime emergency exposures) while others are intended for occupational exposures (where training, PPE, and other safety measures and equipment are expected). It is important to ensure that the

	correct type of benchmark is used to assess exposures. As well, for exposures such as those associated with ASGM, occupational exposure levels (such as NIOSH, OSHA, ACGIH) would not be appropriate to assess risk in workers owing to vast differences in occupational health and safety (OSH) measures and regulation relative to large-scale mining. This generally applies to other areas of work lacking OSH as well.
1805-1806	Note that TRVs for air are not usually interpreted as being a “sustained” concentration over a specific time period. Rather, they represent an average concentration over that time. For example, this means that a very high concentration in air lasting 2 hours may still exceed an 8-hr average health benchmark. Suggest confirming that the assessments of concentrations in air presented here have been carried out correctly.
1839-1840	Support using these benchmarks to assess concentrations in air. Like the TRVs selected to for birds and fish, I suggest adding in rationales for the selection of these guidelines. I do notice that the WHO air standard (1.0 µg/m ³ , annual average) was not cited.
1847	Which TRVs are being used to assess acute exposure? Note that certain “acute” TRVs in Ciani et al., 2024 (i.e. AEGLs, IDLH) are intended for rare, once-in-a-lifetime exposures which should not be used to assess intermittent acute exposures. These emergency exposure levels are very high and are associated with health impacts. Suggest confirming that these benchmarks were not used to assess acute exposures. (The California EPA 1-hr and 8-hr values look to be the only applicable benchmarks.)
2057	A 10-year period is an interesting definition of “current”. It would have been useful to know this timeframe during the data submission call out.
2157	May be worth mentioning that none were above the commercial limit. Are there TDVs that could be applied here? Or is it intended that they serve as monitors of trends over time with this report being the baseline?
2177-2184	Can this go in an annex? It’s long and is already captured in figure 4
2205-2211	Is figure 5 necessary? What is the value added between Fig 4 and Fig 5?
2322/Table 3	Can these tables go into an annex?
2335	Figure 7 - It may be more useful if this is organized by region or longitude rather than by increasing quantity. It’s unclear if there are any spatial patterns here as organized. Another option could be a map with circles of different sizes representing medians.
2341	Figure 8 – are these necessary given the box plots in Fig 7?
2562	Table 5 – can this go in an annex?
2564	Table 6 – can this go in an annex given the figures above?
2648	Is a 40% reduction in data points an acceptable trade-off?
2674-2675	Did this time restriction eliminate data entirely from some regions?

2744	Can this be combined with question 1 for each biota type? Or can it be reorganized by biota type to answer all the questions for one type then for the next? It would help with the flow and comprehension of the document and reduce duplication.
2817	How do TRVs for fish help to evaluate human health risks? It didn't seem that the concentrations in fish were compared with consumption guidelines in this section. This comment applies also to other edible biota.
2822-2824	Are freshwater and marine species combined here? If so, should they be?
2836-2837	Is the same TRV used for freshwater and saline water?
2846	Table 6 – can this be moved to an annex?
2935-2939	Are analyses of feathers worth while to continue doing for future EEs?
2959	Can this table be in an annex or otherwise in the descriptive text for fig 17?
3015-3019	Why wasn't this approach done for other biota?
3051	Figure 18 – this figure isn't legible
3069	This is unfortunate given the important role of marine mammals for Indigenous Peoples.
3192-3194	This needs to be checked for consistency across chapters
3485-3489	It's unclear whether birds are a good global indicator to use for this assessment given the uncertainty in geographical/ecological influences
3546	Integrated biota case studies – Should these be in the main report or separated as annexes? Are these studies undertaken by the expert group or did EG members submit these as more or less prepared packages? Some make recommendations and some don't so it would be good to distinguish whether these recommendations are coming from the OESG or from the case study authors (if different).
4358	Data collections for the national HBM programs were also obtained from different sources: 1) reports (United States), 2) publications (France, Republic of Korea, Spain), 3) Canadian Biomonitoring Dashboard (Canada)....” ○ Cite Canadian Biomonitoring Dashboard. Include the following suggested citation: “Health Canada. 2026. Canadian Biomonitoring Dashboard. Ottawa, ON. Available: https://health-infobase.canada.ca/biomonitoring/”
4422	Figure 3 - The general population distribution shown in the figure is based on n=272 studies which presumably includes both national and regional (or smaller) datasets collected at varying timeframes. It is assumed that the studies and surveys summarized into making a bar graph or box plot distribution are detailed in an appendix so that the reader can appreciate the nature and source of data (specific studies) summarized across various figures.

4500	Figure 8 (<i>most recent national data from HBM surveys</i>): The most recent national HBM data for mercury from the Canadian Health Measures Survey Cycle 7 (2023 to 2024) currently available through the Canadian biomonitoring dashboard should replace data from CHMS cycle 6 (2018 to 2019) shown in the figure. Note that the 2023-2024 median (50 th percentile) blood total mercury levels along with their 95% confidence intervals, in children (1-19 years) and adults (20-79 years), were 0.20 (<LOD-0.35) and 0.53 (0.42-0.63) µg/L, respectively. The 2023-2024 CHMS included first-time nationally representative total mercury measurements in blood from toddlers 1-2 years of age.
4526	Figure 9 (<i>comparison of pooled median blood or blood-equivalent levels</i>): use Canadian National Biomonitoring data from CHMS cycle 7 (as indicated above).
4563-4566	These highlight trends in total mercury based on our published mercury fact sheet that includes data from CHMS cycles 1 (2007 to 2009) through 6 (2018 to 2019). We have recently updated the fact sheet to include more recent national data from CHMS cycle 7 (2023-2024) and recalculated time trends (which now shows an overall declining trend when including data through cycle 7). The updated fact sheet is planned to be published in June 2026. Please see below for a <i>pared down</i> version of the fact sheet including only time trends (CHMS cycles 1-7) and age and sex comparisons using geometric mean concentrations (cycle 7).
4617-4618	See related comment in Section 2.6.7 (line 4813-4814). This comment specifically applies to dietary MeHg exposure and the most biomarker matrices (blood, hair) and analytes (total mercury or THg) The Health Canada's Bureau of Chemical Safety (BCS) recognizes there are differences in guidance values (GVs) for MeHg exposure currently used by different risk assessment groups and that there could be value in seeking international consensus on GV. Staff from the Health Canada BCS (S.Blechinger) will be contributing to an upcoming WHO meeting discussing different BM GV for mercury (Bonn, Germany from July 7-8, 2026). The current Health Canada BCS has an oral point-of-departure or oral POD of 1.0 µg/kg bw/day for dietary MeHg as an approximate threshold for neurodevelopmental effects of prenatal MeHg exposure, which was used to derive an oral TDI of 2 µg/kg bw/day for vulnerable subpopulations (pregnant women, women of childbearing age, breastfeeding infants, and children). The basis for the POD and TDI as well as corresponding blood and hair equivalents are discussed and compared to values from other risk assessment groups in a review publication by staff from BCS: Vulnerable subpopulations (see Table 4 of Blechinger et al. 2026: https://link.springer.com/article/10.1007/s00204-026-04345-8/tables/4). Adult General Population Supplemental File S1 of Blechinger et al. 2026: https://static-content.springer.com/esm/art%3A10.1007%2Fs00204-026-04345-8/MediaObjects/204_2026_4345_MOESM1_ESM.docx
4627	The last part of this question is locally, regionally and globally. There should be data and guidelines or benchmarks available to answer this question at least on the regional level or a few case studies. It is suggested that consideration be

	given to inclusion of available health based guidance values as they can be a useful tool for interpretation biomonitoring data (e.g., blood and hair Hg levels).
4639	If there's no consensus on a global guidance level why not present a range of values?
Sections 2.6.5 and 2.6.6	Blood mercury guidance has been developed for methylmercury (20 µg/L for general population and 8 µg/L for the susceptible subpopulations - children, pregnant women, and women of childbearing age) (Canadian mercury Science Assessment - summary of key results). The average (geometric mean and median) biomonitoring concentrations in the general Canadian population are well below these levels (Canadian biomonitoring dashboard). Canada can submit some Canada-specific input if requested by the OESG.
4691	Health Canada's consumption advice is an example of a trusted source of dietary risk communication, it is not targeted to dietary interventions for Arctic populations and is therefore not appropriate for this section. Recommend deleting reference.
4793-4794	Are there different reference for each region or is all of this information contained in the 2021 AMAP report?
4813-4814	Health Canada's recent review of HBGVs (termed toxicological reference values or TRVs) for neuro-developmental effects of prenatal MeHg exposure in women of childbearing age (WCBA) reported a similar but slightly different hair HBGV/TRV range of 0.9 to 2.2 ug/g hair THg which were derived from a lower effect level or point-of-departure (POD) or hair POD range from 5.6 to 14 ug/g hair THg after applying uncertainty factors between 3 to 10 (see Table 4 of Blechinger et al. 2026: https://link.springer.com/article/10.1007/s00204-026-04345-8/tables/4). Given there is uncertainty and conservatism around the selection of the PODs themselves, it is recommended to use both the HBGVs/TRVs AND their corresponding PODs when making comparisons to population BM concentrations to provide appropriate risk context (e.g. in this figure Spanish and Portuguese general populations have some percent exceeding the HBGVs/TRVs (depending on which GV used) but are generally far below the corresponding hair PODs, which may temper potential concerns of risk given the potential health/nutritional benefits of fish consumption). (e.g. populations that rely on subsistence fishing and/or marine mammal consumption may have dramatically elevated hair THg concentrations with larger % exceeding HBGVs/TRVs and even some % exceeding the PODs - which may indicate greater potential health risk but should also be weighed against potential benefits (i.e. nutritional and cultural benefits of fish/marine mammals in the diet of these populations, degree of food insecurity, cost of substitution, etc.)
Section 2.6 General comment	There are several comparisons made between different population groups in the text of section 2.6 (e.g., Fish consumers vs Indigenous Arctic vs Indigenous other, etc.) and in Figures 3, 5, 7, and 9, and it would be helpful if there was an appendix table included in the report that could list the different biomonitoring datasets / references used to create each of the population categories, so that the data sources are more identifiable.

4650-4651	It's unclear how these case studies show the effects/influence of the Convention specifically. • The first study indicates that the decline of amalgam use in Slovenian children occurred before the implementation of the Convention and that nearly all values were already well below the reference value of 7 ng/mL in 2007. This may instead be useful in section 2.6.3 discussing trends in levels over time, particularly if there are some further analyses done to look at the declines since 2013. • The information on the Arctic is more of a cautionary tale about dietary recommendations and reduced consumption of country foods • Information about the HB4MU doesn't explain impacts of the Convention on THg levels observed, but does note it relative to Health Guidance values which would be useful in section 2.6.6 While these are all interesting and useful studies, they perhaps do not belong in this section.
5106-5112	Given these challenges and limitations, is soil a good indicator to be used for future EEs?
5233	Figure 21 – <i>sediment cores from impacted (red squares)</i> the figure appears to have only circles. It may be more clear if consistent colours/shapes are used since each graph is already clearly labelled with the media. Further it may not be necessary to display this information in charts. At first glance these appear to be levels of mercury in each media not the number of records.
5648	<i>EF: ~0.28 in N.W. South America > ~0.34 in N.W. North America and > ~0.81 in E. North America.</i> Shouldn't the greater than symbols be less than symbols?
6001-6002	Canada submitted much more data than what is reflected in the report. We have long-term mercury monitoring from across the country in fresh water. Please follow up to receive the full dataset.
7232-7233	This needs to be more clear, where is the 2% coming from? Is this the decline after the peak in 2018?
8429	The scales on these graphs are all different, it's a little misleading when looking across regions.
8419-8420	Are emissions from landfills including incineration? It's unclear why landfill emissions would be so high in comparison to other industrial processes in North America. Or should landfills be more broadly labelled incineration and waste? For context according to latest inventory estimates crematoriums account for 687 kg (23%) of Hg emitted vs 67 kg (2%) from landfills out of 2987 kg of total emissions across sectors.
Annex 2-4 Air	Table 1 – the continent for Canadian sites should be N. America instead of Europe. There should be no end date for the CAPMoN sites since monitoring is ongoing, unless it is referring to the period of data analyzed in the report
Annex 2-4 Air	There should be no end date for the CAPMoN sites since monitoring is ongoing, unless it is referring to the period of data analyzed in the report.

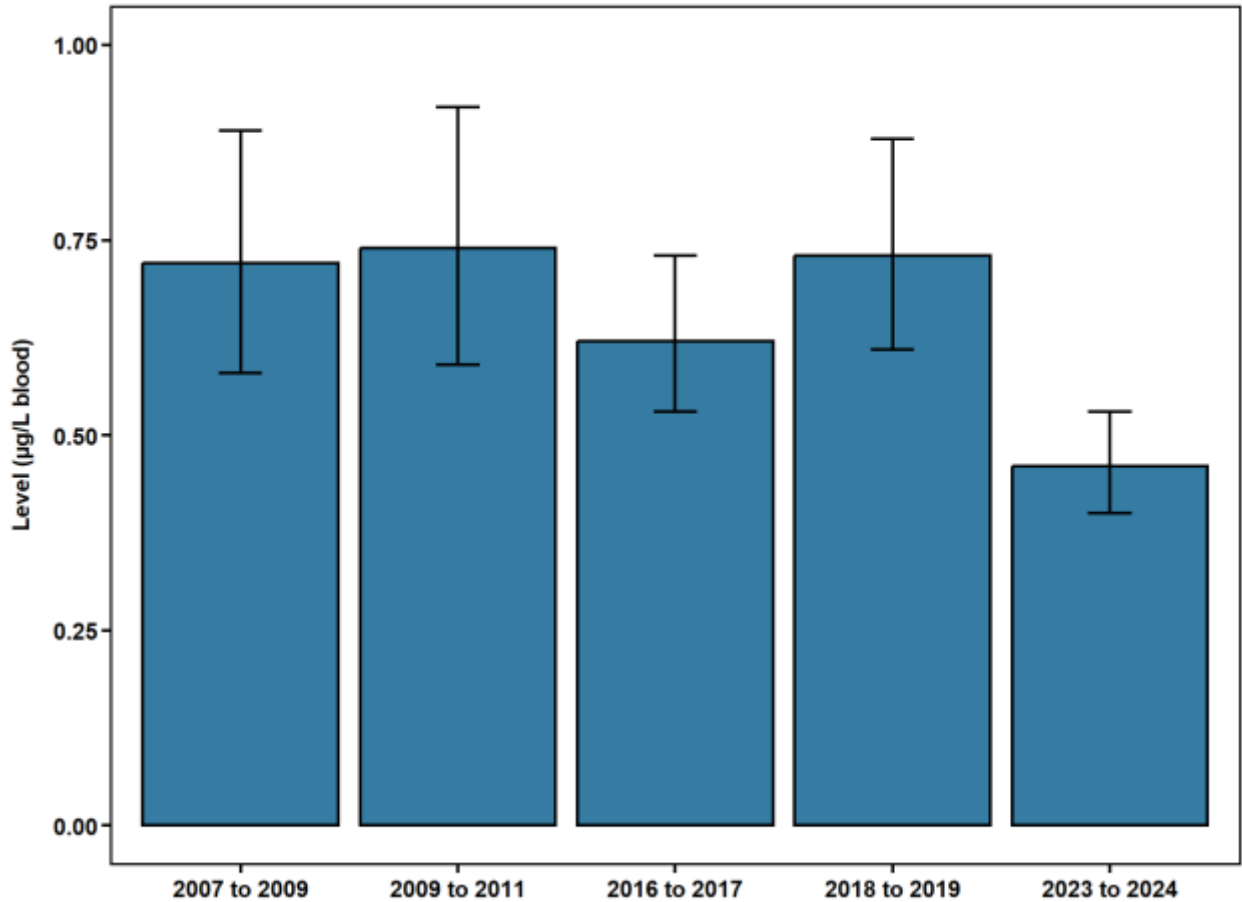
Annex 2-4 Air	There are two Annex Air Table 4. The second table should be Table 5.
Annex 2-4 Air	Table 4 – units are missing for the magnitude of the trends for mean wet deposition (dep_mean), mean precipitation (mm_mean) and precipitation weighted concentration (PWC) for sites

Mercury in people living in Canada

Results of mercury biomonitoring

Levels in the general Canadian population

From 2007 to 2024, average mercury levels decreased by 36% in people aged 6 to 79.

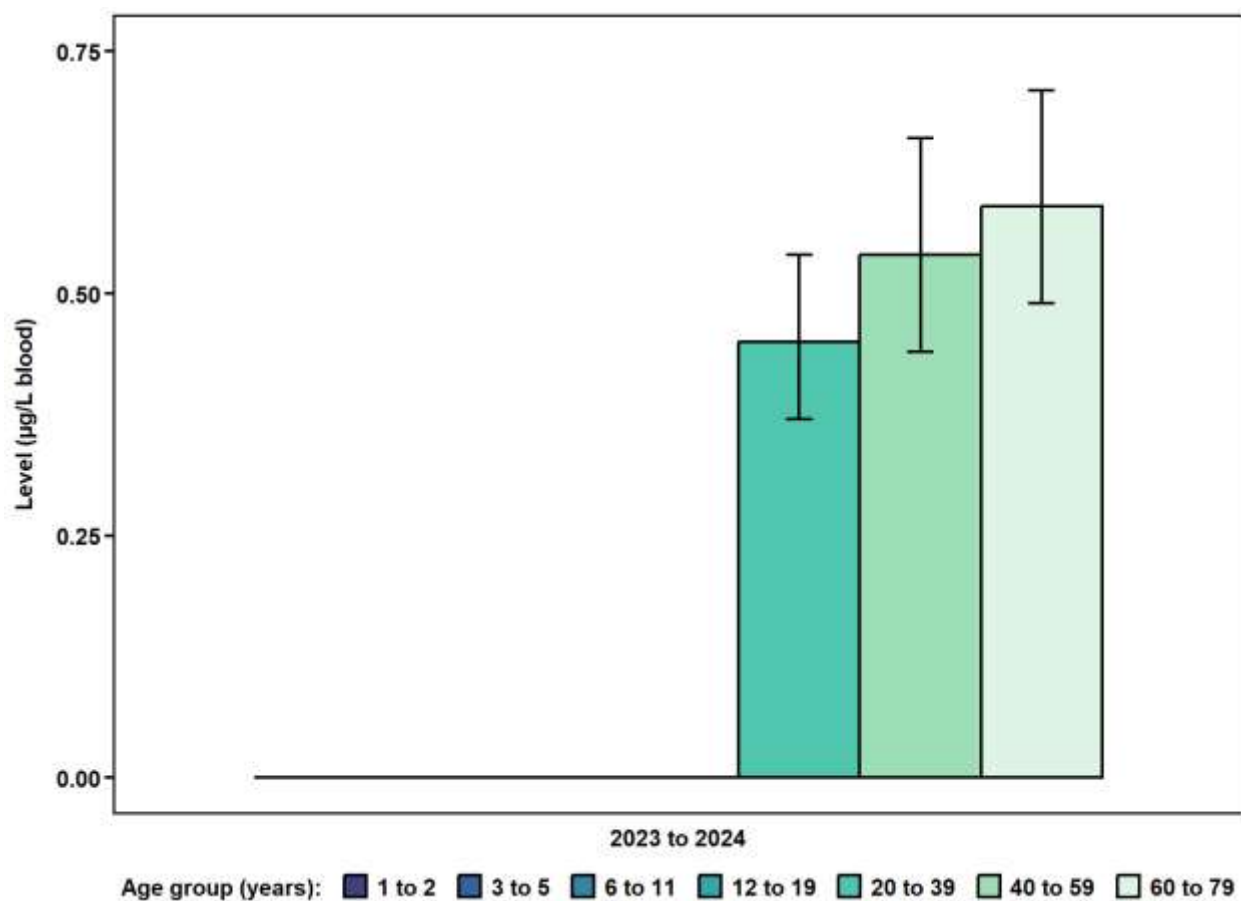


Text description

Collection period	Geometric mean level (µg/L)	95% confidence interval (µg/L)
2007 to 2009	0.72	0.58–0.89
2009 to 2011	0.74	0.59–0.92
2016 to 2017	0.62	0.53–0.73
2018 to 2019	0.73	0.61–0.88
2023 to 2024	0.46	0.40–0.53

Levels in the general Canadian population, by age group

Adults had higher average mercury levels than children and adolescents.



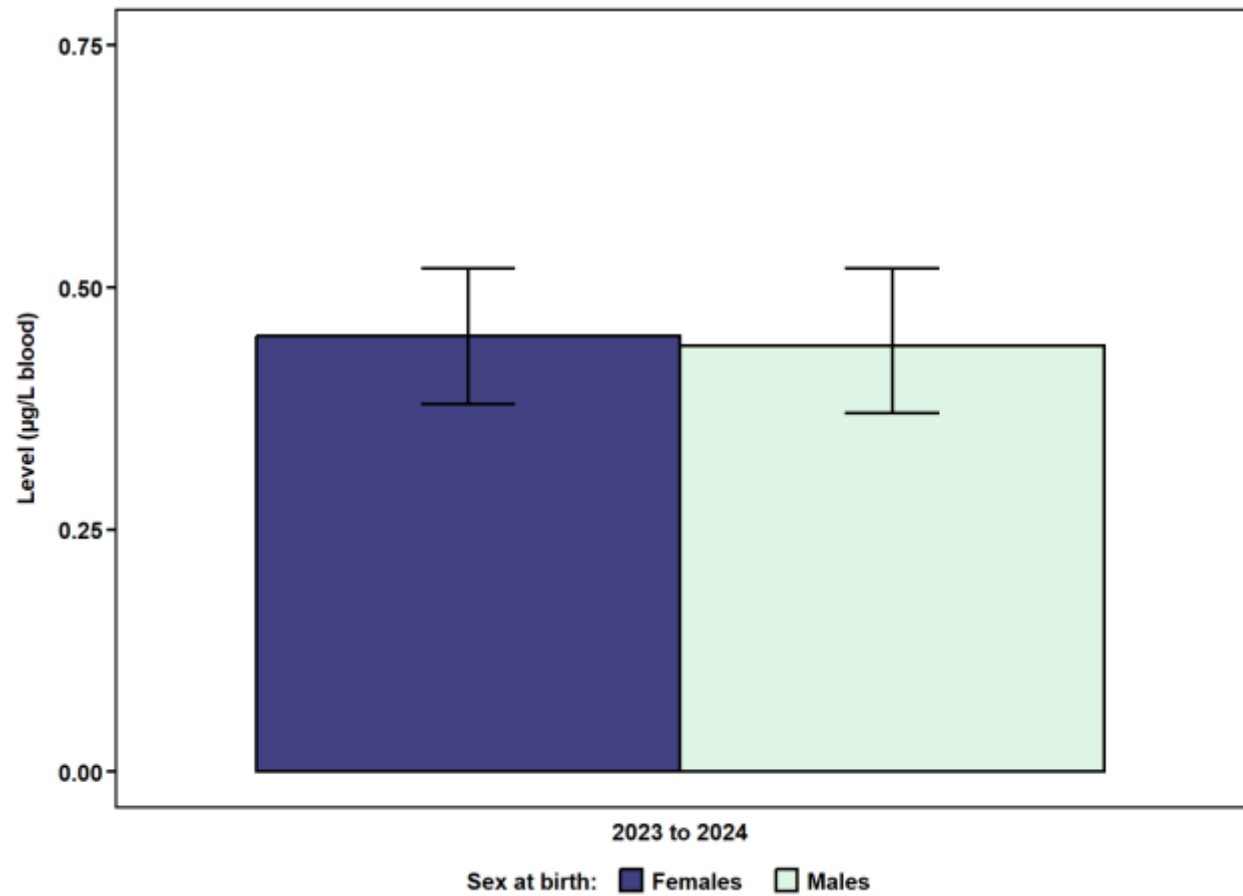
Text description

Collection period	Age group (years)	Geometric mean level (µg/L)	95% confidence interval (µg/L)
2023 to 2024	1 to 2	not available	not available
	3 to 5	not available	not available
	6 to 11	not available	not available
	12 to 19	not available	not available
	20 to 39	0.45	0.37–0.54
	40 to 59	0.54	0.44–0.66
	60 to 79	0.59	0.49–0.71

Levels for some age groups are not available because too many results were below the detection limit.

Levels in the general Canadian population, by sex at birth

Average mercury levels were similar between females and males.



Text description

Collection period	Sex at birth	Geometric mean level (µg/L)	95% confidence interval (µg/L)
2023 to 2024	Females	0.45	0.38–0.52
	Males	0.44	0.37–0.52