
Technical Correction to the “Approach for Estimating Exposures and Incremental Health Effects from Lead due to Renovation, Repair, and Painting Activities in Public and Commercial Buildings”

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EPA Office of Pollution Prevention and Toxics
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

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Technical Correction for Classification of Time Spent in P&CBs for 5-Year-Olds

EPA has identified an error in the classification of the amount of time children (specifically 5-year-olds) spend in Public and Commercial Buildings (P&CBs). This error is estimated to have a small impact on the overall magnitude and distribution of results presented for the interior analysis in the Approach.

Because Child-Occupied Facilities (COFs) as defined in 40 CFR 745.83, which specifies patterns of time spent by children under age 6, are already regulated by the 2008 Renovation, Repair, and Painting (RRP) rule, the current analysis excludes consideration of COFs. Therefore, while the analysis considers exposures under a variety of patterns of time spent in P&CBs, it excludes those patterns where the time spent would result in classification of a facility as a COF. EPA correctly capped the time-spent-in-P&CBs values so that COF-level exposures would be excluded for 0, 1, 2, 3, and 4-year-olds but failed to cap these time-spent values for 5-year-olds, resulting in some exposures being incorrectly included even though they were reflective of scenarios which are already regulated. More information on how EPA estimated time spent can be found in Appendix L of the Approach.

EPA conducted a sensitivity analysis with corrected time spent values (i.e., time spent correctly capped for children aged 5 years old) for five scenarios and compared the results for those scenarios with the uncorrected results presented in the Approach. Because time spent is linked to building type, the effect of this error varies by building type. One scenario was selected for each building type and 10,000 iterations were modeled. A total of ten model outputs were compared (1, 5, 10, 15, 20, 25, 30, 40, and 50 months post-renovation and lifetime average) for each of the five test scenarios.

Below are a series of charts that show the difference in the time spent fractions in the Approach and those that EPA plans to use for children under 6 in the future.

Table 1a: Fraction of the Week under 5 year olds, presented in Approach in Table L-7

PnCB Category	Fraction of the week Under 5 years old, Percentiles							
	5th	10th	25th	50th	75th	90th	95th	99th
1i	0.01	0.01	0.01	0.02	0.04	0.07	0.12	0.12
2i	0.01	0.01	0.02	0.05	0.1	0.12	0.12	0.12
3i	0.01	0.01	0.02	0.04	0.07	0.12	0.12	0.12
4i	0.01	0.04	0.11	0.12	0.12	0.12	0.12	0.12
5i	0.01	0.02	0.02	0.04	0.07	0.12	0.12	0.12

Table 1b: Fraction of the Week under 6 year olds, corrected table

PnCB Category	Fraction of the week Under 6 years old, Percentiles							
	5th	10th	25th	50th	75th	90th	95th	99th
1i	0.01	0.01	0.01	0.02	0.04	0.07	0.12	0.12
2i	0.01	0.01	0.02	0.05	0.10	0.12	0.12	0.12
3i	0.01	0.01	0.03	0.04	0.08	0.12	0.12	0.12
4i	0.03	0.08	0.12	0.12	0.12	0.12	0.12	0.12
5i	0.01	0.02	0.02	0.04	0.07	0.12	0.12	0.12

Table 2a: Fraction of the Week 5-17 year olds, presented in Approach in Table L-7

PnCB Category	Fraction of the week 5-17 years old, Percentiles							
	5th	10th	25th	50th	75th	90th	95th	99th
1i	0.01	0.01	0.01	0.03	0.08	0.18	0.35	0.42
2i	0.01	0.01	0.04	0.08	0.13	0.19	0.23	0.34
3i	0.01	0.01	0.02	0.05	0.09	0.16	0.21	0.32
4i	0.08	0.13	0.21	0.27	0.3	0.33	0.38	0.43
5i	0.01	0.02	0.03	0.06	0.21	0.36	0.42	0.56

Table 2b: Fraction of the Week 6-17 year olds, corrected table

PnCB Category	Fraction of the week 6-17 years old, Percentiles							
	5th	10th	25th	50th	75th	90th	95th	99th
1i	0.01	0.01	0.01	0.03	0.09	0.22	0.35	0.42
2i	0.01	0.02	0.04	0.08	0.14	0.19	0.24	0.35
3i	0.01	0.01	0.02	0.05	0.10	0.16	0.22	0.32
4i	0.07	0.13	0.22	0.27	0.30	0.33	0.36	0.43
5i	0.01	0.02	0.03	0.07	0.27	0.36	0.42	0.56

Of the eighty unique time spent estimates, eighteen of them changed. When a change did occur, it was small. The absolute difference for time-spent values that changed is shown in the table below.

Table 3: Comparison of updated time spent values

Fraction of Week (old)	Fraction of Week (new)	Difference
0.01	0.03	0.02
0.04	0.08	0.04
0.02	0.03	0.01
0.11	0.12	0.01
0.07	0.08	0.01
0.08	0.07	-0.01
0.01	0.02	0.01
0.21	0.22	0.01
0.06	0.07	0.01
0.08	0.09	0.01
0.13	0.14	0.01
0.09	0.10	0.01
0.21	0.27	0.06
0.18	0.22	0.04
0.23	0.24	0.01
0.21	0.22	0.01
0.38	0.36	-0.02
0.34	0.35	0.01

Any difference in results is driven by three factors. The first is that time spent for 5-year-olds is now capped at 0.12 of the week along with other younger children. The second is that, while the values for the fraction-of-the-week distribution for children under 6 increase for some percentiles (but never decrease) due to the inclusion of 5-year-olds in this group, the values for the fraction-of-the-week distribution for children 6 to 17 can either increase or decrease due to the removal of the 5-year-olds from this group. The third factor affecting the results is the natural model variation. The model resolution, for 10,000 iterations, is approximately 0.10 IQ points, so fluctuations in results at this magnitude are to be expected even when there is no difference due to the correction of the error.

Results indicate that the overall magnitude and distribution of the corrected results for the renovation-related IQ change of children 0-10 were very similar to the uncorrected results presented in the Approach. The difference in mean IQ change due to this correction was very small (an average decrease of <0.01 points at the mean and ranging from a 0.03 point decrease to a 0.13 point increase in renovation-related IQ change), and the difference in 95th percentile IQ change was also very small (a decrease of 0.01 points at the mean and ranging from a 0.20 point decrease to a 0.13 point increase in renovation-related IQ change). These differences in the results are very close to the model resolution limit.

EPA will correct this error in any future versions of the Approach and in any estimation of results.