## APPENDIX D2

SUMMARIES OF INTERIM YARD-WIDE AVERAGE SOIL-LEAD CONCENTRATION DATA FROM THE NATIONAL SURVEY OF LEAD AND ALLERGENS IN HOUSING (NSLAH), WHERE IMPUTED DATA ARE EXCLUDED

## Summaries of Interim Yard-Wide Average Soil-Lead Concentration Data from the National Survey of Lead and Allergens in Housing (NSLAH), Where Imputed Data Are Excluded

This appendix presents descriptive statistics of yard-wide average soil-lead concentration from the §403 risk analysis and from the interim NSLAH dust-lead loading data where imputed data values calculated based on the methods presented in Appendix C are omitted. These summaries complement the summary tables and boxplots presented in Tables 3-18 through 3-21b and Figures 3-12 through 3-14 in the main body of this report, which included imputed household averages for housing units having no soil-lead concentration data from anywhere in the yard.

As in Appendix D1, the statistics on the interim NSLAH data are provided in this appendix under the following five different approaches to handling sample results that fall below the instrument's detection limit.

- No adjustment (i.e., using data as reported in the database)
- Replacing the value with zero
- Replacing the value with the detection limit (LOD) divided by two
- Replacing the value with the detection limit divided by the square root of two
- Replacing the value with the detection limit

(See Appendix D1 for details.) Results are presented under these different approaches to illustrate the impact that any one approach has on the characterized distribution.

The following tables appearing in this appendix are associated with the specified tables in Chapter 3 of the report:

- <u>Table D2-1</u>: national estimates complementing Table 3-18
- Table D2-2: estimates by housing age category, complementing Table 3-19
- Table D2-3: estimates by Census region, complementing Table 3-20
- <u>Tables D2-4a and D2-4b</u>: estimates by combinations of Census region and housing age category, complementing Tables 3-21a and 3-21b.

The following boxplots appearing in this appendix are associated with the specified boxplots in Chapter 3 of the report:

- Figure D2-1: national estimates complementing Figure 3-12
- Figure D2-2: estimates by housing age category, complementing Figure 3-13
- <u>Figure D2-3</u>: estimates by Census region, complementing Figure 3-14.

While Tables D2-1 and D2-2 and Figure D2-1 contain interim NSLAH data summaries under all five approaches to handling not-detected values, the remaining tables and figures in this appendix present

interim NSLAH data summaries only for the two approaches (no adjustment; replace by one-half of the level of detection) most likely to be used in the supplemental risk analysis and considered in the interim NSLAH data summaries presented in Chapter 3.

Table D2-1. Descriptive Statistics of <u>Yard-Wide Average Soil-Lead Concentrations</u> for Households, As Reported in the §403 Risk Analysis Versus the Interim NSLAH Data (imputed data omitted for the NSLAH)

Study	How Not- Detected	Yard-Wide Average Soil-Lead Concentration (μg/g) <sup>1</sup>									
	and Negative Data were Handled	# Surveyed Units with Positive Averages	Arith- metic Mean	Geo- metric Mean <sup>2</sup>	Geo- metric Std. Dev. <sup>2</sup>	Minimum	25 <sup>th</sup> Percen- tile	Median	75 <sup>th</sup> Percen- tile	Maximu m	
§403 Risk Analysis (HUD Natl. Survey)		284	235	61.9	4.46	4.63	21.3	49.2	142	7030	
	No adjustment	647	198	50.5	5.13	0.00	16.1	40.6	145	9270	
	Replaced by 0	608	197	58.2	4.72	0.00	14.3	39.2	145	9270	
Interim NSLAH	Replaced by LOD/2	664	198	50.1	4.74	4.62	15.6	40.6	145	9270	
	Replaced by LOD/%2	664	199	52.7	4.45	6.53	16.4	40.6	145	9270	
	Replaced by LOD	664	199	55.8	4.17	9.23	17.0	40.6	145	9270	

<sup>&</sup>lt;sup>1</sup> All statistics are calculated by weighting each household by its sampling weight.

<sup>&</sup>lt;sup>2</sup> Only household averages greater than zero are used to calculate this value (data for all units with soil-lead data are used to calculate the remaining statistics).



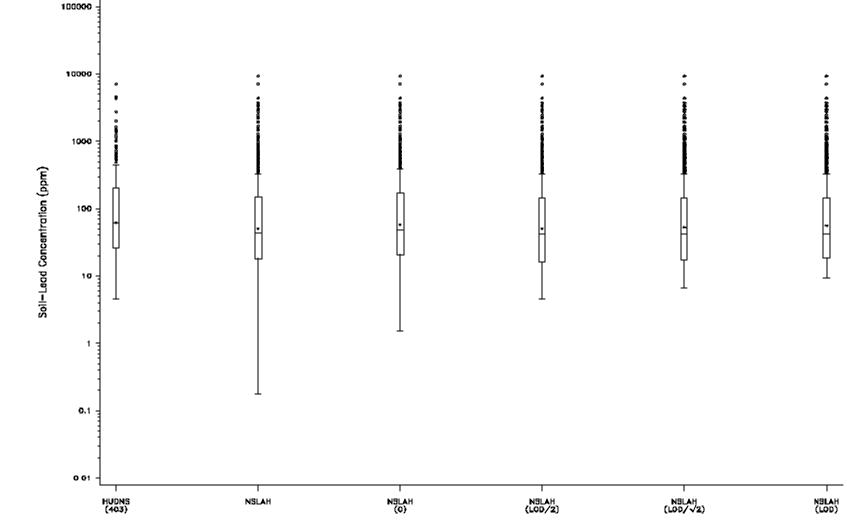


Figure D2-1. Boxplots of Yard-Wide Average Soil-Lead Concentrations (μg/g) As Observed in the §403 Risk Analysis (Using HUD National Survey Data) and in the NSLAH (under 5 approaches to handling not-detected values) (imputed data omitted for the NSLAH)

Table D2-2. Descriptive Statistics of <u>Yard-Wide Average Soil-Lead Concentration</u> for Households, Presented <u>by Housing Age Category</u>, As Reported in the §403 Risk Analysis Versus the Interim NSLAH Data (imputed data omitted for the NSLAH)

omitted for the NOEATI)												
	How Not- Detected			Yard-Wide Average Soil-Lead Concentration (μg/g) <sup>1</sup>								
Study	and Negative Data were Handled	# Units with Positive Averages	Arith- metic Mean	Geo- metric Mean <sup>2</sup>	Geo- metric Std. Dev. <sup>2</sup>	Minimum	25 <sup>th</sup> Percen- tile	Median	75 <sup>th</sup> Percen- tile	Maximum		
	Units Built Prior to 1940											
	isk Analysis atl. Survey)	77	761	463	3.09	17.4	259	569	1030	4620		
	No adjustment	104	651	284	3.66	12.8	132	279	571	9270		
	Replaced by 0	104	651	283	3.71	8.33	132	277	571	9270		
Interim NSLAH	Replaced by LOD/2	104	651	284	3.67	10.8	132	279	571	9270		
	Replaced by LOD/%2	104	651	284	3.66	11.9	132	280	571	9270		
	Replaced by LOD	104	651	285	3.65	13.3	132	281	571	9270		
			ι	Jnits Built	from 1940	- 1959						
	sk Analysis atl. Survey)	87	287	92.6	3.15	5.40	44.3	77.3	162	7030		
	No adjustment	138	264	107	3.49	1.65	43.1	91.9	223	4340		
	Replaced by 0	137	264	109	3.36	0.00	43.1	91.9	223	4340		
Interim NSLAH	Replaced by LOD/2	138	264	108	3.39	4.62	43.1	91.9	223	4340		
	Replaced by LOD/%2	138	264	109	3.35	6.53	43.1	91.9	223	4340		
	Replaced by LOD	138	264	109	3.31	9.23	43.1	91.9	223	4340		
		Units Built	from 196	0-1977 (19	960 - 197	9 for the §	403 risk a	nalysis)				
	sk Analysis atl. Survey)	120	55.0	32.8	2.56	4.63	19.7	29.7	61.6	996		
	No adjustment	190	76.7	31.1	3.69	0.00	13.7	27.7	59.3	1120		
	Replaced by 0	182	76.0	33.9	3.45	0.00	12.1	27.2	59.3	1120		
Interim NSLAH	Replaced by LOD/2	193	77.2	32.6	3.27	4.83	14.7	28.3	59.3	1120		
	Replaced by LOD/%2	193	77.7	34.2	3.08	6.83	15.3	28.4	59.3	1120		
	Replaced by LOD	193	78.4	36.2	2.91	9.66	16.3	28.6	59.3	1120		

Table D2-2. (cont.)

	How Not- Detected	Yard-wide Average Soil-Lead Concentration (#g/g)								
Study	and Negative Data were Handled	# Units with Positive Averages	Arith- metic Mean	Geo- metric Mean <sup>2</sup>	Geo- metric Std. Dev. <sup>2</sup>	Minimum	25 <sup>th</sup> Percen- tile	Median	75 <sup>th</sup> Percen- tile	Maximum
		Units I	Built After	1977 (afte	r 1979 fo	r the §403	risk analy:	sis)		
	sk Analysis atl. Survey)	28	31.3	22.4	2.31	5.35	13.6	21.2	45.0	97.4
	No adjustment	160	27.6	15.2	3.29	0.00	5.67	14.3	32.9	474
	Replaced by 0	131	26.1	18.6	2.98	0.00	1.89	12.0	32.9	472
Interim NSLAH	Replaced by LOD/2	172	28.3	15.7	2.71	4.65	6.24	14.5	32.9	475
	Replaced by LOD/%2	172	29.3	17.7	2.43	6.57	7.87	15.2	32.9	476
	Replaced by LOD	172	30.6	20.2	2.18	9.30	10.3	16.0	32.9	477
		ľ	NSLAH Uni	ts with Un	specified \	∕ear-Built I	ndicator			
	No adjustment	55	169	66.6	4.26	0.00	19.4	49.6	158	2290
	Replaced by 0	54	168	70.3	3.99	0.00	17.9	49.6	158	2290
Interim NSLAH	Replaced by LOD/2	57	169	62.7	4.21	4.74	19.4	49.6	158	2290
	Replaced by LOD/%2	57	169	64.8	4.02	6.70	19.4	49.6	158	2290
	Replaced by LOD	57	170	67.2	3.84	9.47	19.4	49.6	158	2290

 $<sup>^{\</sup>rm 1}\,$  All statistics are calculated by weighting each household by its sampling weight.

<sup>&</sup>lt;sup>2</sup> Only household averages greater than zero are used to calculate this value (data for all units with soil-lead data are used to calculate the remaining statistics).

100000

Priol to 1940

Figure D2-2. Boxplots of Yard-Wide Average Soil-Lead Concentration (μg/g), by Housing Age Category, As Observed in the §403 Risk Analysis (Using HUD National Survey Data) and in the NSLAH (under 2 approaches to handling not-detected values) (imputed data omitted for the NSLAH)

1940 - 1959

1960 - 1977(79)

After 1977(79)

Unapechilled

Table D2-3. Descriptive Statistics of <u>Yard-Wide Average Soil-Lead Concentration</u> for Households, Presented <u>by Census Region</u>, As Reported in the §403 Risk Analysis Versus the Interim NSLAH Data (imputed data omitted for the NSLAH)

	How Not- Detected	Yard-Wide Average Soil-Lead Concentration (μg/g) <sup>1</sup>								
Study	and Negative Data were Handled	# Surveyed Units with Positive Averages	Arith- metic Mean	Geo- metric Mean <sup>2</sup>	Geo- metric Std. Dev. <sup>2</sup>	Minimum	25 <sup>th</sup> Percen- tile	Median	75 <sup>th</sup> Percen- tile	Maximu m
				No	ortheast					
	sk Analysis atl. Survey)	53	437	206	3.58	14.8	60.1	279	569	4320
Interim	No adjustment	95	435	160	4.29	3.92	56.1	176	396	3460
NSLAH	Replaced by LOD/2	95	435	161	4.20	6.24	56.1	176	396	3460
				IV	lidwest					
	sk Analysis atl. Survey)	73	404	81.4	6.33	4.63	19.7	51.6	264	2750
Interim	No adjustment	143	221	63.6	5.05	0.00	20.8	59.5	206	7070
NSLAH	Replaced by LOD/2	144	221	63.8	4.77	4.90	20.6	59.5	206	7070
					South					
	sk Analysis atl. Survey)	134	125	44.5	2.94	5.22	22.6	40.8	79.3	7030
Interim	No adjustment	250	161	36.4	4.60	0.00	11.5	27.2	78.6	9270
NSLAH	Replaced by LOD/2	257	161	35.5	4.36	4.65	12.6	27.2	78.6	9270
	West									
§403 Risk Analysis (HUD Natl. Survey)		52	112	34.4	3.92	4.79	14.2	27.2	61.6	2020
Interim	No adjustment	159	61.7	28.0	4.35	0.00	10.4	29.4	70.0	776
NSLAH	Replaced by LOD/2	168	62.5	29.3	3.48	4.62	11.2	29.4	70.0	776

<sup>&</sup>lt;sup>1</sup> All statistics are calculated by weighting each household by its sampling weight.

<sup>&</sup>lt;sup>2</sup> Only household averages greater than zero are used to calculate this value (data for all units with soil-lead data are used to calculate the remaining statistics).

100000

Figure D2-3. Boxplots of Yard-Wide Average Soil-Lead Concentration (μg/g), by Census Region, As Observed in the §403 Risk Analysis (Using HUD National Survey Data) and in the NSLAH (under 2 approaches to handling not-detected values) (imputed data omitted for the NSLAH)

HUONS 403 NSLAH

South

NSLAH LOD/2

HUONS 403 NSLAH LOD/2

NSLAH

Weel

NSLAH LOD/2

NSLAH LOD/2

NSLAH

Northeast

HUONS 403

Midwest

Table D2-4a. Descriptive Statistics of <u>Yard-Wide Average Soil-Lead Concentrations</u> for Households, Presented <u>by Housing Age and Census Region</u>, As Reported in the §403 Risk Analysis Versus the Interim NSLAH Data Where <u>No Adjustments Were Made to Not-Detected Results</u> (imputed data omitted for the NSLAH)

Census	Study	Housing Age	Yard-Wide Average Soil-Lead Concentration <sup>1</sup> (µg/g)						
Region		Category	# Surveyed Units	Arithmetic Mean	Geometric Mean <sup>3</sup>	Geometric Std. Dev. <sup>3</sup>	Median		
Northeast	§403 Risk Anal.	Prior to 1940	26	542	491	1.57	444		
	Interim NSLAH		35	903	471	3.49	461		
	§403 Risk Anal.	1940 - 1959	17	573	136	4.40	60.1		
	Interim NSLAH		20	292	193	2.31	194		
	§403 Risk Anal.	1960 -1977	10	79.1	60.7	2.15	69.7		
	Interim NSLAH	(1960-79 for §403)	19	138	66.3	3.07	50.9		
	Interim NSLAH	After 1977	15	62.6	42.9	2.76	43.1		
Midwest	§403 Risk Anal.	Prior to 1940	19	1310	941	2.68	1390		
	Interim NSLAH	1	35	505	225	3.39	273		
	§403 Risk Anal.	1940 - 1959	21	127	92.6	2.41	123		
	Interim NSLAH		35	233	102	3.18	75.7		
	§403 Risk Anal.	1960 -1977	29	42.7	27.1	2.32	23.4		
	Interim NSLAH	(1960-79 for §403)	35	95.5	37.8	3.42	32.0		
	§403 Risk Anal.	After 1977	4	13.0	11.5	1.66	12.4		
	Interim NSLAH	(1979 for §403)	28	34.3	12.8	3.97	9.36		
South	§403 Risk Anal.	Prior to 1940	19	417	174	3.68	159		
	Interim NSLAH		24	694	270	3.84	186		
	§403 Risk Anal.	1940 - 1959	33	327	83.1	3.27	81.0		
	Interim NSLAH	1	47	366	95.2	4.43	64.5		
	§403 Risk Anal.	1960 -1977	64	54.6	36.5	2.30	34.7		
	Interim NSLAH	(1960-79 for §403)	78	68.9	26.8	3.61	26.1		
	§403 Risk Anal.	After 1977	18	38.5	29.7	2.11	25.0		
	Interim NSLAH	(1979 for §403)	79	22.2	15.6	2.47	15.0		
West	§403 Risk Anal.	Prior to 1940	13	594	295	3.76	394		
	Interim NSLAH		10	153	119	2.27	158		
	§403 Risk Anal.	1940 - 1959	16	96.8	72.1	2.19	60.4		
	Interim NSLAH		36	136	81.6	3.08	89.5		
	§403 Risk Anal.	1960 -1977	17	56.2	23.8	3.02	20.0		
	Interim NSLAH	(1960-79 for §403)	58	44.6	23.4	3.77	26.3		
	§403 Risk Anal.	After 1977	6	21.7	15.0	2.34	13.6		
	Interim NSLAH	(1979 for §403)	38	16.1	9.01	3.73	5.88		

<sup>&</sup>lt;sup>1</sup> All statistics are calculated by weighting each household by its sampling weight.

<sup>&</sup>lt;sup>3</sup> Only household averages greater than zero are used to calculate this value (data for all units with soil-lead data are used to calculate the remaining statistics).

Table D2-4b. Descriptive Statistics of <u>Yard-Wide Average Soil-Lead Concentrations</u> for Households, Presented <u>by Housing Age and Census Region</u>, As Reported in the §403 Risk Analysis Versus the Interim NSLAH Data Where <u>Not-Detected Results Were Replaced by LOD/2</u> (imputed data omitted for the NSLAH)

Census	Study	Housing Age	Yard-Wide Average Soil-Lead Concentration <sup>1</sup> (µg/g)						
Region		Category	# Surveyed Units	Arithmetic Mean	Geometric Mean	Geometric Std. Dev.	Median		
Northeast	§403 Risk Anal.	Prior to 1940	26	542	491	1.57	444		
Northeast	Interim NSLAH		35	903	469	3.53	461		
	§403 Risk Anal.	1940 - 1959	17	573	136	4.40	60.1		
	Interim NSLAH		20	292	193	2.31	194		
	§403 Risk Anal.	1960 -1977 (1960-79 for	10	79.1	60.7	2.15	69.7		
	Interim NSLAH	§403)	19	138	66.1	3.08	50.9		
	Interim NSLAH	After 1977	15	62.8	45.1	2.45	43.1		
Midwest	§403 Risk Anal.	Prior to 1940	19	1310	941	2.68	1390		
Midwest	Interim NSLAH		35	505	225	3.38	273		
	§403 Risk Anal.	1940 - 1959	21	127	92.6	2.41	123		
	Interim NSLAH		35	233	103	3.15	75.7		
	§403 Risk Anal.	1960 -1977 (1960-79 for	29	42.7	27.1	2.32	23.4		
	Interim NSLAH	§403)	35	95.8	38.5	3.34	32.0		
	§403 Risk Anal.	After 1977	4	13.0	11.5	1.66	12.4		
	Interim NSLAH	(1979 for §403)	29	34.9	13.8	3.09	9.67		
South	§403 Risk Anal.	Prior to 1940	19	417	174	3.68	159		
	Interim NSLAH		24	694	270	3.84	186		
	§403 Risk Anal.	1940 - 1959	33	327	83.1	3.27	81.0		
	Interim NSLAH		47	366	96.3	4.37	64.5		
	§403 Risk Anal.	1960 -1977	64	54.6	36.5	2.30	34.7		
	Interim NSLAH	(1960-79 for §403)	80	69.5	27.7	3.25	26.1		
	§403 Risk Anal.	After 1977	18	38.5	29.7	2.11	25.0		
	Interim NSLAH	(1979 for §403)	82	22.7	15.3	2.30	14.7		
West	§403 Risk Anal.	Prior to 1940	13	594	295	3.76	394		
	Interim NSLAH		10	154	120	2.25	158		
	§403 Risk Anal.	1940 - 1959	16	96.8	72.1	2.19	60.4		
	Interim NSLAH		36	136	84.5	2.76	89.5		
	§403 Risk Anal.	1960 -1977 (1960-79 for	17	56.2	23.8	3.02	20.0		
	Interim NSLAH	§403)	59	45.2	26.4	2.85	26.3		
	§403 Risk Anal.	After 1977	6	21.7	15.0	2.34	13.6		
	Interim NSLAH	(1979 for §403)	46	17.9	10.8	2.44	7.68		

<sup>&</sup>lt;sup>1</sup> All statistics are calculated by weighting each household by its sampling weight. Note: The yard-wide average for a household is the average of the following two statistics: 1) the average of the mid-yard sample results, and 2) the average of results for the dripline and entryway samples.