

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:

- Table D2-1: 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
- Tables D2-4a and D2-4b: 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
- Figure D2-3: 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 Yard-Wide Average Soil-Lead Concentrations for Households, As Reported in the §403 Risk Analysis Versus the Interim NSLAH Data (imputed data omitted for the NSLAH)

Study	How Not-Detected and Negative Data were Handled	Yard-Wide Average Soil-Lead Concentration ($\mu\text{g/g}$) ¹								
		# Surveyed Units with Positive Averages	Arithmetic Mean	Geometric Mean ²	Geometric Std. Dev. ²	Minimum	25 th Percentile	Median	75 th Percentile	Maximum
§403 Risk Analysis (HUD Natl. Survey)		284	235	61.9	4.46	4.63	21.3	49.2	142	7030
Interim NSLAH	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
	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

¹ All statistics are calculated by weighting each household by its sampling weight.

² 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).

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.

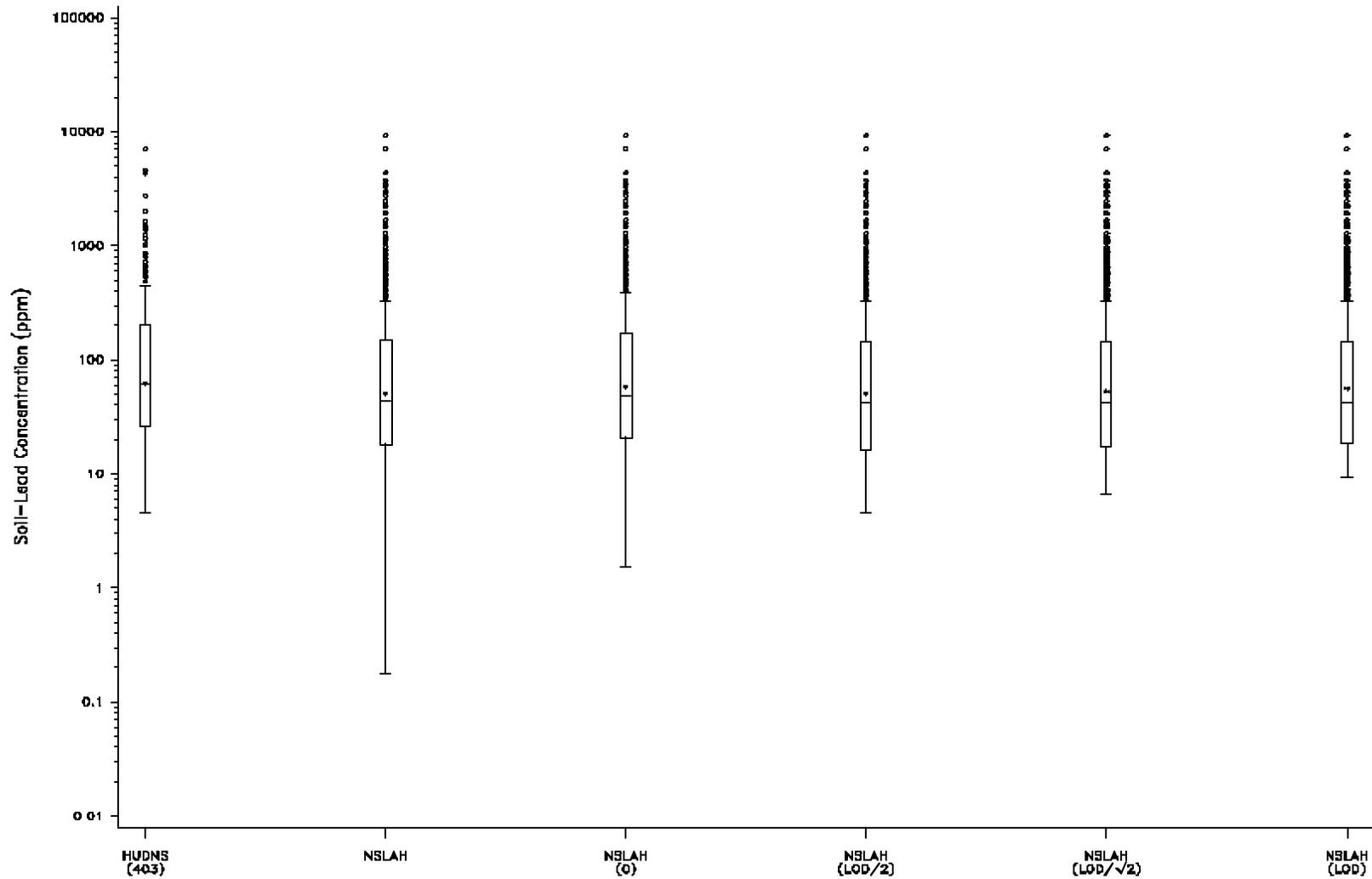


Figure D2-1. Boxplots of Yard-Wide Average Soil-Lead Concentrations ($\mu\text{g/g}$) As Observed in the §403 Risk Analysis (Using HUD National Survey Data) and in the NSLAH (under 5 approaches to handling not-detected values) (imputed data omitted for the NSLAH)

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

Study	How Not-Detected and Negative Data were Handled	Yard-Wide Average Soil-Lead Concentration ($\mu\text{g/g}$) ¹								
		# Units with Positive Averages	Arithmetic Mean	Geo-metric Mean ²	Geo-metric Std. Dev. ²	Minimum	25 th Percentile	Median	75 th Percentile	Maximum
Units Built Prior to 1940										
§403 Risk Analysis (HUD Natl. Survey)		77	761	463	3.09	17.4	259	569	1030	4620
Interim NSLAH	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
	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
Units Built from 1940 - 1959										
§403 Risk Analysis (HUD Natl. Survey)		87	287	92.6	3.15	5.40	44.3	77.3	162	7030
Interim NSLAH	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
	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 1960-1977 (1960 - 1979 for the §403 risk analysis)										
§403 Risk Analysis (HUD Natl. Survey)		120	55.0	32.8	2.56	4.63	19.7	29.7	61.6	996
Interim NSLAH	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
	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.)

Study	How Not-Detected and Negative Data were Handled	Yard-Wide Average Soil-Lead Concentration ($\mu\text{g/g}$) ¹								
		# Units with Positive Averages	Arithmetic Mean	Geometric Mean ²	Geometric Std. Dev. ²	Minimum	25 th Percentile	Median	75 th Percentile	Maximum
Units Built After 1977 (after 1979 for the §403 risk analysis)										
§403 Risk Analysis (HUD Natl. Survey)		28	31.3	22.4	2.31	5.35	13.6	21.2	45.0	97.4
Interim NSLAH	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
	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
NSLAH Units with Unspecified Year-Built Indicator										
Interim NSLAH	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
	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

¹ All statistics are calculated by weighting each household by its sampling weight.

² 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).

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.

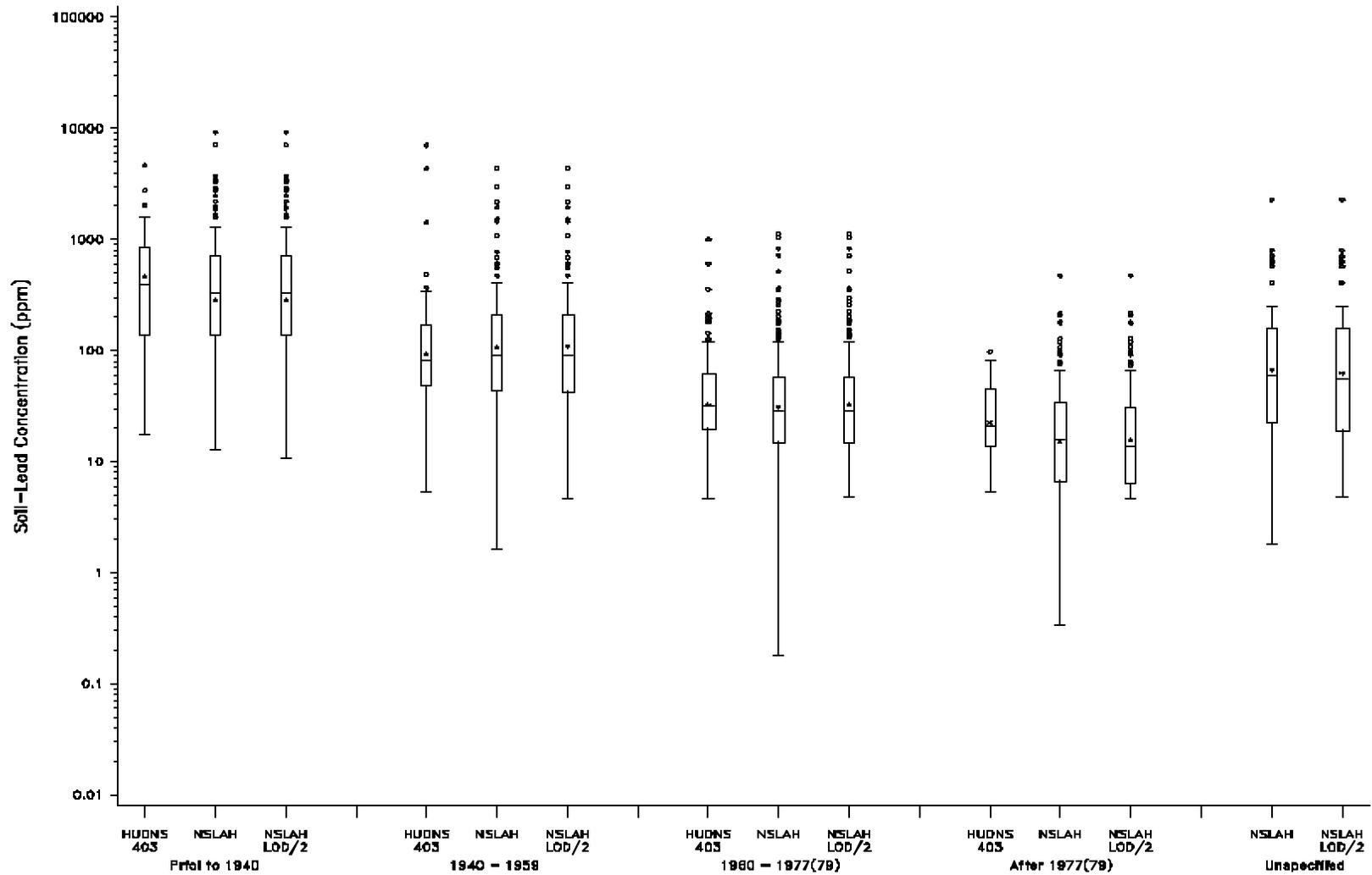


Figure D2-2. Boxplots of Yard-Wide Average Soil-Lead Concentration ($\mu\text{g/g}$), by Housing Age Category, As Observed in the §403 Risk Analysis (Using HUD National Survey Data) and in the NSLAH (under 2 approaches to handling not-detected values) (imputed data omitted for the NSLAH)

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

Study	How Not-Detected and Negative Data were Handled	Yard-Wide Average Soil-Lead Concentration ($\mu\text{g/g}$) ¹								
		# Surveyed Units with Positive Averages	Arithmetic Mean	Geometric Mean ²	Geometric Std. Dev. ²	Minimum	25 th Percentile	Median	75 th Percentile	Maximum
Northeast										
§403 Risk Analysis (HUD Natl. Survey)		53	437	206	3.58	14.8	60.1	279	569	4320
Interim NSLAH	No adjustment	95	435	160	4.29	3.92	56.1	176	396	3460
	Replaced by LOD/2	95	435	161	4.20	6.24	56.1	176	396	3460
Midwest										
§403 Risk Analysis (HUD Natl. Survey)		73	404	81.4	6.33	4.63	19.7	51.6	264	2750
Interim NSLAH	No adjustment	143	221	63.6	5.05	0.00	20.8	59.5	206	7070
	Replaced by LOD/2	144	221	63.8	4.77	4.90	20.6	59.5	206	7070
South										
§403 Risk Analysis (HUD Natl. Survey)		134	125	44.5	2.94	5.22	22.6	40.8	79.3	7030
Interim NSLAH	No adjustment	250	161	36.4	4.60	0.00	11.5	27.2	78.6	9270
	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 NSLAH	No adjustment	159	61.7	28.0	4.35	0.00	10.4	29.4	70.0	776
	Replaced by LOD/2	168	62.5	29.3	3.48	4.62	11.2	29.4	70.0	776

¹ All statistics are calculated by weighting each household by its sampling weight.

² 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).

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.

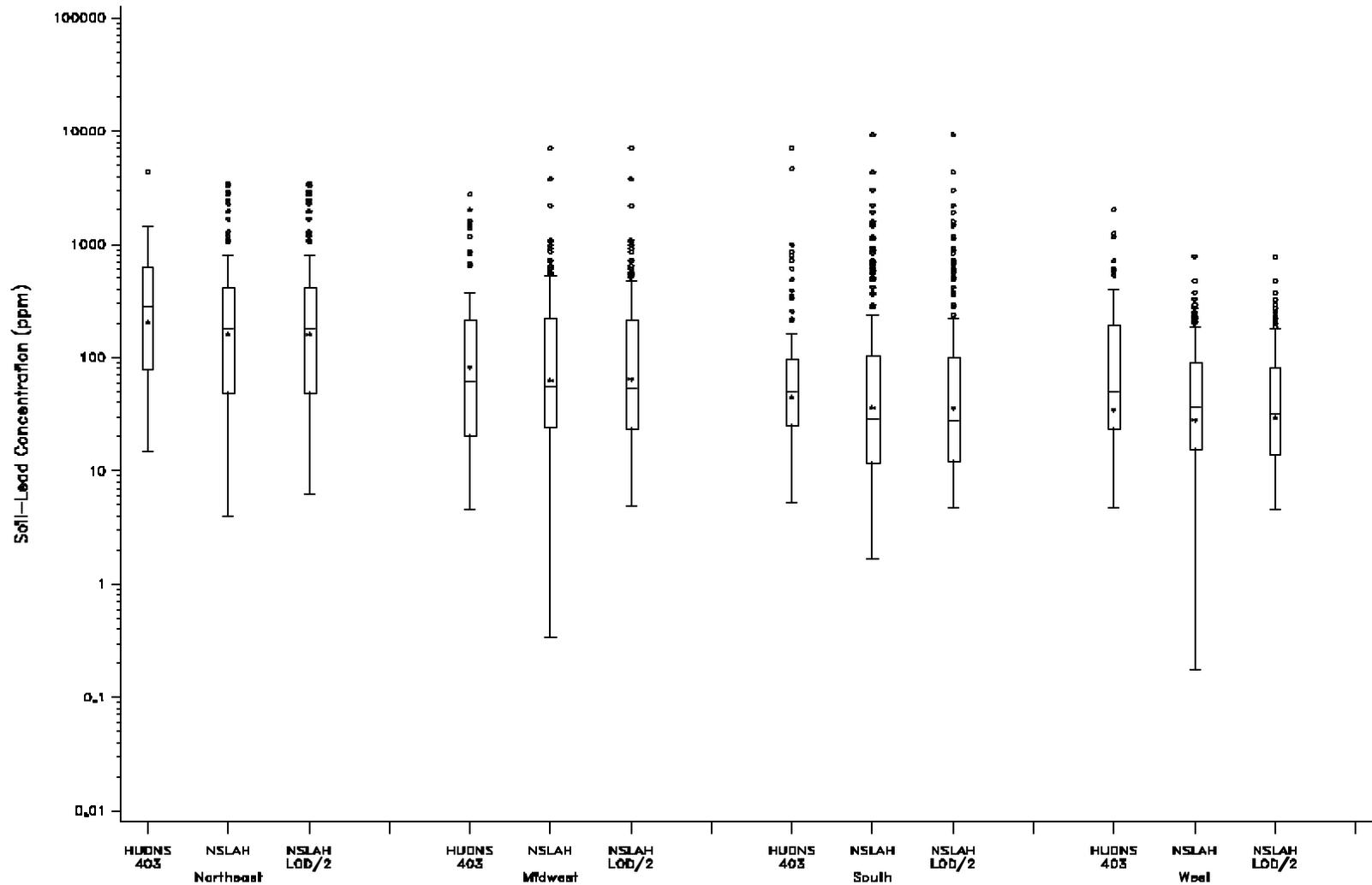


Figure D2-3. Boxplots of Yard-Wide Average Soil-Lead Concentration ($\mu\text{g/g}$), by Census Region, As Observed in the §403 Risk Analysis (Using HUD National Survey Data) and in the NSLAH (under 2 approaches to handling not-detected values) (imputed data omitted for the NSLAH)

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

Census Region	Study	Housing Age Category	Yard-Wide Average Soil-Lead Concentration ¹ (µg/g)				
			# Surveyed Units	Arithmetic Mean	Geometric Mean ³	Geometric Std. Dev. ³	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 (1960-79 for §403)	10	79.1	60.7	2.15	69.7
	Interim NSLAH		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		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 (1960-79 for §403)	29	42.7	27.1	2.32	23.4
	Interim NSLAH		35	95.5	37.8	3.42	32.0
	§403 Risk Anal.	After 1977 (1979 for §403)	4	13.0	11.5	1.66	12.4
	Interim NSLAH		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		47	366	95.2	4.43	64.5
	§403 Risk Anal.	1960 -1977 (1960-79 for §403)	64	54.6	36.5	2.30	34.7
	Interim NSLAH		78	68.9	26.8	3.61	26.1
	§403 Risk Anal.	After 1977 (1979 for §403)	18	38.5	29.7	2.11	25.0
	Interim NSLAH		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 (1960-79 for §403)	17	56.2	23.8	3.02	20.0
	Interim NSLAH		58	44.6	23.4	3.77	26.3
	§403 Risk Anal.	After 1977 (1979 for §403)	6	21.7	15.0	2.34	13.6
	Interim NSLAH		38	16.1	9.01	3.73	5.88

¹ All statistics are calculated by weighting each household by its sampling weight.

³ 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).

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.

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

Census Region	Study	Housing Age Category	Yard-Wide Average Soil-Lead Concentration ¹ (µg/g)				
			# Surveyed Units	Arithmetic Mean	Geometric Mean	Geometric Std. Dev.	Median
Northeast	§403 Risk Anal.	Prior to 1940	26	542	491	1.57	444
	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 §403)	10	79.1	60.7	2.15	69.7
	Interim NSLAH		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
	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 §403)	29	42.7	27.1	2.32	23.4
	Interim NSLAH		35	95.8	38.5	3.34	32.0
	§403 Risk Anal.	After 1977 (1979 for §403)	4	13.0	11.5	1.66	12.4
	Interim NSLAH		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 (1960-79 for §403)	64	54.6	36.5	2.30	34.7
	Interim NSLAH		80	69.5	27.7	3.25	26.1
	§403 Risk Anal.	After 1977 (1979 for §403)	18	38.5	29.7	2.11	25.0
	Interim NSLAH		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 §403)	17	56.2	23.8	3.02	20.0
	Interim NSLAH		59	45.2	26.4	2.85	26.3
	§403 Risk Anal.	After 1977 (1979 for §403)	6	21.7	15.0	2.34	13.6
	Interim NSLAH		46	17.9	10.8	2.44	7.68

¹ 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.