
Wadsworth Center

New York State Department of Health

BLOOD LEAD

Proficiency Test Report

Event #3, 2003

November 26, 2003

Antonia C. Novello, M.D., M.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

November 26, 2003

TOXICOLOGY - BLOOD LEAD
Event #3, 2003

Dear Laboratory Director:

A statistical summary report for all proficiency test (PT) results evaluated in the third Blood Lead event of 2003 is enclosed. Participating laboratories are identified by a confidential three-digit code number assigned by the PT program. Each laboratory will receive an individual performance summary for the last three PT test events under separate cover. To pass the PT for Blood Lead, a laboratory must achieve a minimum score of 80% (4 out of 5 correct) on two consecutive testing events, or two out of three consecutive testing events.

PT Materials

The blood-based test materials were obtained from lead-dosed goats prior to the test. On October 28th, 2003, 400-500 mL of blood were drawn from each animal into a blood bag containing 750 mg K₂EDTA. The animals provided pools with lead concentrations ranging from 5 µg/dL to 49 µg/dL. Aliquots of whole blood were transferred into additive-free evacuated glass tubes, and shipped to participating laboratories October 29th, 2003. PT samples for laboratories using the LeadCare[®] system were shipped by overnight express for delivery October 29th, 2003. Target values were established by a ≥90% consensus of 14 referee laboratories.

Certification for CLIA '88 and OSHA Purposes

Laboratories outside of New York State can have their PT results from this program evaluated for federal regulatory purposes under CLIA '88. The laboratory director should notify the regional HCFA office, and should provide our program with the address to whom PT results should be sent. Participation in this program may also be used to obtain approval for blood lead testing from the Occupational Safety and Health Administration (OSHA), U.S. Dept. of Labor. For further information on OSHA approval, contact John Germ, OSHA SLC Analytical Laboratory, 1781 South, 300 West, Salt Lake City, UT 84114.

New Category for Trace Elements in Whole Blood, Urine and Serum

We have introduced a new permit category called "Trace Elements" which is supported with a PT in whole blood (Cd, Hg, As), urine (Pb, Cd, Hg, As) and serum (Al, Cu, Zn, Se) matrices. If your laboratory performs any of the tests listed, you must be in applied status to receive the next round of PT materials. Contact us at lead@wadsworth.org if you have any questions.

The next PT event for blood lead is scheduled to be mailed March 31st, 2004. Please inform our laboratory staff at (518) 473-0452 if the test materials have not arrived *within five days* of the scheduled mailout date. The postmark deadline for reporting results is **April 14th, 2004.**

Thank you for your participation.

Sincerely,

Patrick J. Parsons, Ph.D.
Section Head, Blood Lead Proficiency Testing Program

**New York State Department of Health
Blood Lead Test Results, 2003 Event #3
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results (µg/dL whole blood)					Normalized Mean	Info Only
		PB03-11	PB03-12	PB03-13	PB03-14	PB03-15		
Target Values:		15	49	20	5	32		
103	ETAAS-ZL	16	48	19	5	31	0.99	
103	ASV-LeadCare	12	38 ↓	15 ↓	3	26 ↓	0.78	Info
104	ETAAS-ZL	13	41 ↓	15 ↓	3	26 ↓	0.82	Info
106	ETAAS-ZL	14	45	15 ↓	5	25 ↓	0.85	Info
107	ICP-MS	16	51	20	5	32	1.03	
107	ASV-LeadCare	12	48	18	4	30	0.90	Info
108	ETAAS-ZL	17	49	22	5	34	1.07	
109	ETAAS-ZL	14	46	18	6	30	0.93	
110	ETAAS-ZL	16	50	20	6	33	1.03	
110	ASV-LeadCare	14	52	17	3	25 ↓	0.91	Info
110	ICP-MS	16	52	20	5	33	1.04	
112	ASV-ESA 3010	14	50	17	5	31	0.94	
114	ETAAS-Z	17	50	21	6	33	1.06	
115	ETAAS-Z	15	48	19	4	31	0.97	
121	ETAAS-ZL	15	52	19	6	30	0.99	Info
123	ETAAS-ZL	15	50	20	6	32	1.01	
125	ETAAS-ZL	15	46	18	5	32	0.96	
126	ETAAS-Z	14	50	21	5	32	1.00	
131	ETAAS-ZL	17	50	21	6	33	1.06	
132	ETAAS-ZL	16	49	20	5	33	1.02	
143	ETAAS-ZL	15	48	19	5	30	0.97	
144	ETAAS-ZL	15	50	20	4	32	1.01	
145	ASV-ESA 3010	12	50	18	4	31	0.92	
146	ETAAS-ZL	15	47	19	4	30	0.96	
147	ETAAS-ZL	16	49	19	5	32	1.00	
150	ASV-LeadCare	14	52	20	3	30	0.98	
156	ICP-MS	15	50	19	5	31	0.98	
158	ETAAS-ZL	15	48	19	5	30	0.97	
159	ETAAS-ZL	16	50	21	5	33	1.04	
160	ETAAS-ZL	15	51	22	7	34	1.05	
164	ETAAS-ZL	17	50	23	6	33	1.08	
166	ASV-ESA 3010	17	55 ↑	22	5	35	1.11	
168	ETAAS-ZL	15	50	20	4	31	1.00	
170	ETAAS-D2	17	49	21	4	33	1.05	
174	ASV-ESA 3010	15	47	18	4	26 ↓	0.92	
179	ICP-MS	16	50	20	5	31	1.01	

notes: ↑ reported value outside upper limit
↓ reported value outside lower limit

Normalized mean: The average of each reported result divided by the corresponding target value. It measures bias.
Info only: results included for informational purposes only.

**New York State Department of Health
Blood Lead Test Results, 2003 Event #3
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results (µg/dL whole blood)					Normalized Mean	Info Only
		PB03-11	PB03-12	PB03-13	PB03-14	PB03-15		
Target Values:		15	49	20	5	32		
181	ETAAS-ZL	16	50	20	6	31	1.01	
185	ASV-ESA 3010	15	49	20	4	33	1.01	
197	ICP-MS	16	50	20	5	31	1.01	
198	ETAAS-ZL	16	47	20	6	31	1.00	
199	ETAAS-ZL	15	47	19	5	30	0.96	
200	ETAAS-ZL	16	50	20	5	32	1.02	
204	ASV-ESA 3010	13	46	18	3	28	0.90	
206	ICP-MS	16	49	20	5	32	1.02	
208	ETAAS-ZL	18	52	20	5	34	1.08	
212	ASV-ESA 3010	12	48	18	3	30	0.90	
215	ETAAS-ZL	17	45	21	7	39 ↑	1.08	
221	ETAAS-D2	17	53	21	5	33	1.07	
232	ASV-ESA 3010	13	47	17	4	29	0.90	
235	ASV-ESA 3010	16	54	20	5	32	1.04	
237	ETAAS-ZL	15	50	19	4	32	0.99	
243	ASV-ESA 3010	15	53	20	5	33	1.03	
249	ASV-ESA 3010	13	51	20	5	31	0.97	
254	ETAAS-D2	17	49	20	8	30	1.02	
261	ASV-ESA 3010	15	54	21	5	33	1.05	
269	ETAAS-ZL	15	47	20	6	32	0.99	
270	ETAAS-ZL	15	48	19	5	31	0.97	
271	ASV-ESA 3010	14	52	18	4	31	0.97	
272	ETAAS-ZL	17	49	19	5	31	1.01	
273	ASV-ESA 3010	15	48	18	3	30	0.95	
274	ETAAS-ZL	15	51	20	4	32	1.01	
279	ETAAS-Z	16	48	20	5	32	1.01	
282	ASV-ESA 3010	13	42 ↓	20	7	27 ↓	0.89	
286	ASV-ESA 3010	14	52	19	5	31	0.98	
290	ETAAS-ZL	14	43 ↓	19	5	28	0.91	
291	ASV-ESA 3010	10 ↓	44	15 ↓	4	26 ↓	0.82	
293	ETAAS-D2	16	51	21	6	33	1.05	
295	ASV-ESA 3010	11	50	19	3	30	0.91	
298	ASV-ESA 3010	18	61 ↑	22	5	37 ↑	1.18	
300	ASV-ESA 3010	13	50	19	<3 ↓	30	0.94	
301	ETAAS-ZL	16	50	22	5	33	1.05	
305	ETAAS-ZL	16	47	20	6	31	1.00	

notes: ↑ reported value outside upper limit
↓ reported value outside lower limit

Normalized mean: The average of each reported result divided by the corresponding target value. It measures bias.
Info only: results included for informational purposes only.

**New York State Department of Health
Blood Lead Test Results, 2003 Event #3
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results (µg/dL whole blood)					Normalized Mean	Info Only
		PB03-11	PB03-12	PB03-13	PB03-14	PB03-15		
Target Values:		15	49	20	5	32		
308	ASV-ESA 3010	15	49	19	4	31	0.98	
309	ETAAS-ZL	16	48	19	5	30	0.98	
310	ASV-ESA 3010	12	47	16	2	28	0.86	
312	ICP-MS	17	54	21	5	35	1.09	
314	ICP-MS	13	45	17	4	28	0.88	
317	ETAAS-ZL	16	50	19	5	31	1.00	
323	ASV-ESA 3010	14	54	20	3	33	1.02	
325	ETAAS-ZL	15	46	20	5	29	0.96	Info
333	ETAAS-ZL	16	52	20	5	32	1.03	
337	ASV-LeadCare	15	49	19	5	32	0.99	
340	ETAAS-ZL	16	50	20	4	39 ↑	1.08	
343	ASV-LeadCare	14	53	20	4	31	1.00	Info
345	ASV-LeadCare	15	50	19	4	29	0.97	
347	ETAAS-ZL	15	49	19	4	31	0.98	Info
348	ETAAS-Z	17	51	21	5	31	1.05	
350	ASV-ESA 3010	15	49	19	6	31	0.98	
351	ETAAS-ZL	17	51	21	6	32	1.06	
352	ASV-ESA 3010	12	46	18	3	28	0.88	
353	ETAAS-ZL	15	51	19	4	34	1.01	
365	ASV-ESA 3010	16	52	21	5	32	1.04	
368	ASV-ESA 3010	15	49	20	3	32	1.00	
369	ASV-LeadCare	11	50	19	3	31	0.92	
370	ASV-LeadCare	10 ↓	41 ↓	22	3	26 ↓	0.92	
371	ETAAS-ZL	13	42 ↓	16	4	26 ↓	0.83	

Percent satisfactory results for all participants: 94.4 %

notes: ↑ reported value outside upper limit
↓ reported value outside lower limit

Normalized mean: The average of each reported result divided by the corresponding target value. It measures bias.
Info only: results included for informational purposes only.

**New York State Department of Health
Blood Lead Test Results, 2003 Event #3
STATISTICAL SUMMARY**

TARGET VALUE ASSIGNMENT AND STATISTICS

Lab Code	Method	Results (µg/dL whole blood)				
		PB03-11	PB03-12	PB03-13	PB03-14	PB03-15
103	ETAAS-ZL	16	48	19	5	31
107	ICP-MS	16	51	20	5	32
109	ETAAS-ZL	14	46	18	6	30
110	ETAAS-ZL	16	50	20	6	33
110	ICP-MS	16	52	20	5	33
147	ETAAS-ZL	16	49	19	5	32
179	ICP-MS	16	50	20	5	31
198	ETAAS-ZL	16	47	20	6	31
199	ETAAS-ZL	15	47	19	5	30
200	ETAAS-ZL	16	50	20	5	32
212	ASV-ESA 3010	12	48	18	3	30
243	ASV-ESA 3010	15	53	20	5	33
293	ETAAS-D2	16	51	21	6	33
350	ASV-ESA 3010	15	49	19	6	31
Number of Sample Measurements:		14	14	14	14	14
Mean (target value):		15	49	20	5	32
Standard Deviation:		1.2	2.0	0.9	0.8	1.2
RSD (%):		7.5	4.1	4.4	15.4	3.7
Acceptable Range:						
Upper Limit:		19	54	24	9	36
Lower Limit:		11	44	16	1	28

notes: Results reported as less than the detection limits are treated as zero for statistical and grading purposes.

**New York State Department of Health
Blood Lead Test Results, 2003 Event #3
STATISTICAL SUMMARY BY METHOD**

	Results ($\mu\text{g/dL}$ whole blood)				
	PB03-11	PB03-12	PB03-13	PB03-14	PB03-15
ASV-ESA 3010					
Number of Sample Measurements:	27	27	27	26	27
Mean:	14.0	50.0	19.0	4.2	30.7
Standard Deviation:	1.8	3.9	1.7	1.1	2.6
RSD (%):	13.1	7.7	8.8	27.0	8.3
ASV-LeadCare					
Number of Sample Measurements:	9	9	9	9	9
Mean:	13.0	48.1	18.8	3.6	28.9
Standard Deviation:	1.8	5.2	2.0	0.7	2.6
RSD (%):	13.9	10.8	10.6	20.4	8.9
ETAAS-D2					
Number of Sample Measurements:	4	4	4	4	4
Mean:	16.8	50.5	20.8	5.8	32.3
Standard Deviation:	0.5	1.9	0.5	1.7	1.5
RSD (%):	3.0	3.8	2.4	29.7	4.7
ETAAS-Z					
Number of Sample Measurements:	5	5	5	5	5
Mean:	15.8	49.4	20.4	5.0	31.8
Standard Deviation:	1.3	1.3	0.9	0.7	0.8
RSD (%):	8.3	2.7	4.4	14.1	2.6
ETAAS-ZL					
Number of Sample Measurements:	43	43	43	43	43
Mean:	15.5	48.5	19.5	5.1	31.5
Standard Deviation:	1.1	2.6	1.6	0.9	2.6
RSD (%):	6.8	5.3	8.1	17.0	8.4
ICP-MS					
Number of Sample Measurements:	8	8	8	8	8
Mean:	15.6	50.1	19.6	4.9	31.6
Standard Deviation:	1.2	2.6	1.2	0.4	2.0
RSD (%):	7.6	5.2	6.1	7.3	6.3
All Laboratories					
Number of Sample Measurements:	96	96	96	95	96
Mean:	14.9	49.1	19.4	4.7	31.1
Standard Deviation:	1.7	3.3	1.6	1.1	2.6
RSD (%):	11.3	6.6	8.3	23.0	8.2

notes: ? Insufficient data for SD calculation.

**New York State Department of Health
Blood Lead Test Results, 2003 Event #3
STATISTICAL SUMMARY BY CLASS**

	Results ($\mu\text{g/dL}$ whole blood)				
	PB03-11	PB03-12	PB03-13	PB03-14	PB03-15
Evaluated					
Number of Sample Measurements:	73	73	73	72	73
Mean:	15.0	49.3	19.6	4.7	31.4
Standard Deviation:	1.8	3.1	1.5	1.1	2.5
RSD (%):	11.9	6.3	7.7	23.5	8.0
Info					
Number of Sample Measurements:	9	9	9	9	9
Mean:	13.8	47.1	17.6	4.1	28.1
Standard Deviation:	1.2	5.2	2.1	1.1	2.6
RSD (%):	8.7	10.9	12.1	25.6	9.1
Reference					
Number of Sample Measurements:	14	14	14	14	14
Mean:	15.4	49.4	19.5	5.2	31.6
Standard Deviation:	1.2	2.0	0.9	0.8	1.2
RSD (%):	7.5	4.1	4.4	15.4	3.7
All Laboratories					
Number of Sample Measurements:	96	96	96	95	96
Mean:	14.9	49.1	19.4	4.7	31.1
Standard Deviation:	1.7	3.3	1.6	1.1	2.6
RSD (%):	11.3	6.6	8.3	23.0	8.2

notes: ? Insufficient data for SD calculation.

**New York State Department of Health
Blood Lead Test Results, 2003 Event #3
METHOD NOTES**

ASV-ESA 3010:

Anodic stripping voltammetry using the ESA 3010A or 3010B instrumentation without digestion.

MIBK-FAAS:

MIBK extraction with flame atomic absorption spectrometry.

ETAAS-ZL:

Electrothermal atomic absorption spectrometry with longitudinal Zeeman background correction, e.g., Perkin-Elmer (4100ZL, 4110ZL, 5100ZL, AAnalyst 600 or 800, SIMAA 6000 or 6100), etc.

ETAAS-Z:

Electrothermal atomic absorption spectrometry with transverse Zeeman background correction, e.g., Perkin-Elmer (Z5100), Varian (220Z, 300Z, 400Z, 880Z), Hitachi Z9000, etc.

ETAAS-D₂:

Electrothermal atomic absorption spectrometry with continuum (deuterium) background correction, e.g., Perkin-Elmer (3110, AAnalyst 700), Varian (200P, 300P, 400P), Hitachi 82000, etc.

ETAAS-Other:

Electrothermal atomic absorption spectrometry with S-H background correction, or unknown, e.g., TJA AtomSpec, etc.

ICP-MS:

Inductively-coupled plasma mass spectrometry.

ASV-LeadCare[®]:

Anodic stripping voltammetry using the ESA LeadCare[®] system.

Other:

Delves-cup microsampling flame atomic absorption spectrometry.
