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**Wadsworth Center**

New York State Department of Health

**BLOOD LEAD**

**Proficiency Test Report**

**Event #3, 2006**

**December 20, 2006**

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# STATE OF NEW YORK DEPARTMENT OF HEALTH

Wadsworth Center The Governor Nelson A. Rockefeller Empire State Plaza P.O. Box 509 Albany, New York 12201-0509

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

Dennis P. Whalen  
*Executive Deputy Commissioner*

December 20, 2006

## **TOXICOLOGY – Blood Lead Event #3, 2006**

Dear Laboratory Director:

A statistical summary report for all proficiency test (PT) results evaluated in the third blood lead event of 2006 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. Summary reports for Trace Elements in Whole Blood (other than Blood Lead) will be distributed shortly.

### **PT Materials**

The blood-based test materials were obtained from lead-dosed goats prior to the test. On November 7th, 2006, 400-500 mL of blood were drawn from each animal into a blood bag containing 750 mg K<sub>2</sub>EDTA. The animals provided pools with lead concentrations ranging from 1 µg/dL to 32 µg/dL. Aliquots of whole blood were transferred into cryovials, and shipped to participating laboratories November 8th, 2006. PT samples for laboratories using the LeadCare<sup>®</sup> system were shipped by overnight express for delivery November 8th, 2006. Target values were established by a ≥90% consensus of 18 measurements performed by 16 reference 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.

**The next PT event for blood lead is scheduled to be mailed March 21st, 2007.** Please inform our laboratory staff at (518) 474-4484 if the test materials have not arrived within five days of the scheduled mailout date. The postmark deadline for reporting results is **April 12th, 2007.**

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, 2006 Event #3  
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results ( $\mu\text{g/dL}$ whole blood)					Normalized Mean	Info Only
		BE06-11	BE06-12	BE06-13	BE06-14	BE06-15		
Target Values:		28	32	20	18	1		
102	ICP-MS	28	32	20	18	1	1.00	
103	ETAAS-Z	28	32	20	18	1	1.00	
103	ASV-LeadCare	24	29	18	15	2	0.87	Info
104	ETAAS-Z	26	30	20	18	<2	0.97	
106	ETAAS-Z	30	32	19	17	1	0.99	
107	ASV-LeadCare	28	33	22	18	1	1.03	Info
107	ICP-MS	28	31	20	18	1	0.99	
108	ETAAS-Z	30	34	22	19	2	1.07	
109	ASV-LeadCare	29	36	22	18	1	1.07	Info
109	ETAAS-Z	30	35	22	20	2	1.09	
109	ICP-MS	28	32	20	18	2	1.00	
110	ASV-LeadCare	31	37 $\uparrow$	21	18	2	1.08	Info
110	ETAAS-Z	28	32	20	18	2	1.00	
110	ICP-MS	28	32	20	18	1	1.00	
112	ASV-3010	27	31	19	16	<2	0.94	
114	ETAAS-Z	31	33	22	19	2	1.07	
115	ETAAS-Z	29	33	20	19	<1	1.03	
116	ICP-MS	29	33	21	19	2	1.04	Info
121	ETAAS-Z	30	33	21	19	1	1.05	Info
123	ETAAS-Z	30	34	22	20	3	1.09	
126	ETAAS-Z	29	32	21	18	<3	1.02	
131	ETAAS-Z	30	33	22	19	<2	1.06	
132	ETAAS-Z	27	30	19	17	1	0.95	
143	ETAAS-Z	26	31	19	17	1	0.95	
144	ETAAS-Z	29	33	20	17	<2	1.00	
145	ASV-3010	25	29	17	15	2	0.87	
146	ETAAS-Z	27	31	19	17	2	0.96	
147	ICP-MS	28	32	19	18	1	0.99	
150	ASV-LeadCare	28	34	21	19	2	1.04	

**notes:**  $\uparrow$  reported value outside upper limit  
 $\downarrow$  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, 2006 Event #3  
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results ( $\mu\text{g/dL}$ whole blood)					Normalized Mean	Info Only
		BE06-11	BE06-12	BE06-13	BE06-14	BE06-15		
Target Values:		28	32	20	18	1		
156	ICP-MS	29	33	21	19	2	1.04	
158	ETAAS-Z	28	32	19	17	<3	0.97	
159	ICP-MS	29	33	20	18	1	1.02	
160	ETAAS-Z	30	35	22	20	1	1.09	
164	ICP-MS	19 ↓	25 ↓	18	12 ↓	<2	0.76	
166	ASV-3010	29	34	20	15	2	0.98	
168	ETAAS-Z	27	33	20	17	2	0.98	
170	ETAAS Other	30	32	21	18	2	1.03	
179	ICP-MS	28	32	20	18	1	1.00	
181	ETAAS-Z	30	34	21	18	1	1.05	
185	ASV-LeadCare	26	31	19	16	1	0.93	
197	ICP-MS	28	32	21	19	1	1.03	
198	ETAAS-Z	27	31	20	18	2	0.98	
199	ETAAS-Z	29	33	21	19	2	1.04	
200	ETAAS-Z	29	33	20	19	1	1.03	
204	ASV-3010	28	33	20	18	2	1.01	
206	ICP-MS	29	34	21	18	2	1.04	
208	ETAAS-Z	31	37 ↑	22	20	<3	1.12	
212	ASV-3010	27	32	19	18	1	0.98	
215	ETAAS-Z	28	31	21	18	2	1.00	
221	ETAAS-Z	26	29	19	17	2	0.93	
232	ASV-3010	24	27 ↓	17	15	0	0.85	
237	ETAAS-Z	28	32	20	18	1	1.00	
243	ASV-3010	26	30	19	17	2	0.94	
249	ASV-3010	28	33	19	17	1	0.98	
254	ETAAS Other	26	30	20	21	2	1.01	
255	ETAAS-Z	30	34	21	19	1	1.06	
261	ASV-LeadCare	27	30	20	17	2	0.96	
270	ETAAS-Z	30	34	20	18	<2	1.03	

**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, 2006 Event #3  
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results ( $\mu\text{g/dL}$ whole blood)					Normalized Mean	Info Only
		BE06-11	BE06-12	BE06-13	BE06-14	BE06-15		
Target Values:		28	32	20	18	1		
271	ASV-3010	27	23 ↓	20	16	2	0.89	
272	ETAAS-Z	28	32	20	17	1	0.99	
279	ETAAS-Z	31	36	21	17	1	1.06	
282	ASV-3010	25	31	19	18	3	0.95	
286	ASV-3010	27	32	18	16	<2	0.94	
290	ICP-MS	29	34	21	19	2	1.05	
291	ASV-3010	29	33	21	17	1	1.02	
293	ICP-MS	30	33	21	19	2	1.05	
295	ASV-3010	26	32	18	12 ↓	<1	0.87	
300	ASV-3010	26	30	18	15	<3	0.90	
301	ETAAS-Z	27	31	19	17	2	0.96	
305	ICP-MS	24	29	17	15	1	0.86	
308	ASV-3010	29	32	20	18	2	1.01	
309	ETAAS-Z	27	33	21	17	1	1.00	
310	ASV-3010	25	27 ↓	15 ↓	12 ↓	<2	0.79	
312	DRC/CC-ICP-MS	26	30	18	17	1	0.93	
314	ICP-MS	29	36	21	19	1	1.07	
317	ETAAS-Z	30	34	21	20	2	1.07	
324	ICP-MS	29	32	20	18	1	1.01	
325	ETAAS-Z	25	27 ↓	17	14	0	0.84	Info
333	ETAAS-Z	30	33	21	19	2	1.05	
339	HR-ICP-MS	28	32	20	18	1	1.00	Info
340	ETAAS-Z	28	31	19	17	2	0.97	
343	ASV-LeadCare	28	35	23	19	2	1.07	
345	ASV-LeadCare	28	31	22	18	2	1.02	
347	ETAAS-Z	29	33	21	18	1	1.03	Info
348	ETAAS-Z	29	34	20	19	<1	1.04	
349	ETAAS-Z	30	34	21	19	1	1.06	
350	ASV-3010	30	34	22	19	<2	1.07	

**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, 2006 Event #3  
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results ( $\mu\text{g/dL}$ whole blood)					Normalized Mean	Info Only
		BE06-11	BE06-12	BE06-13	BE06-14	BE06-15		
Target Values:		28	32	20	18	1		
352	ASV-3010	26	32	18	18	1	0.96	
353	ETAAS-Z	29	34	20	19	<2	1.04	
359	ICP-MS	29	33	20	20	1	1.04	
365	ETAAS-Z	28	30	20	17	<2	0.97	
368	ASV-3010	30	32	19	18	2	1.01	
369	ASV-LeadCare	28	30	21	16	2	0.97	
370	ASV-LeadCare	26	32	20	16	<2	0.95	
374	ASV-3010	26	32	20	17	2	0.97	
376	ASV-LeadCare	28	32	19	17	2	0.97	
377	ICP-MS	29	33	21	18	2	1.03	
383	ETAAS-Z	29	33	21	19	2	1.04	
384	ASV-3010	28	33	19	17	1	0.98	
385	ICP-MS	29	33	20	18	1	1.02	Info
387	ASV-3010	23 ↓	30	20	17	4	0.93	
388	ASV-LeadCare	23 ↓	26 ↓	18	14	1	0.83	
401	ETAAS-Z	29	32	21	19	1	1.04	Info
408	ICP-MS	26	30	19	17	<3	0.94	Info

Percent satisfactory results for all participants: 97.1 %

**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, 2006 Event #3  
STATISTICAL SUMMARY**

**TARGET VALUE ASSIGNMENT AND STATISTICS**

Lab Code	Method	Results ( $\mu\text{g/dL}$ whole blood)				
		BE06-11	BE06-12	BE06-13	BE06-14	BE06-15
102	ICP-MS	28	32	20	18	1
103	ETAAS-Z	28	32	20	18	1
104	ETAAS-Z	26	30	20	18	<2
107	ICP-MS	28	31	20	18	1
109	ETAAS-Z	30	35	22	20	2
109	ICP-MS	28	32	20	18	2
110	ETAAS-Z	28	32	20	18	2
110	ICP-MS	28	32	20	18	1
147	ICP-MS	28	32	19	18	1
179	ICP-MS	28	32	20	18	1
198	ETAAS-Z	27	31	20	18	2
199	ETAAS-Z	29	33	21	19	2
200	ETAAS-Z	29	33	20	19	1
212	ASV-3010	27	32	19	18	1
243	ASV-3010	26	30	19	17	2
293	ICP-MS	30	33	21	19	2
324	ICP-MS	29	32	20	18	1
350	ASV-3010	30	34	22	19	<2
Number of Sample Measurements:		18	18	18	18	16
<b>Mean:</b>		<b>28</b>	<b>32</b>	<b>20</b>	<b>18</b>	<b>1</b>
Standard Deviation:		1.2	1.2	0.9	0.7	0.5
RSD (%):		4.3	3.8	4.3	3.7	35.6
Acceptable Range:						
Upper Limit:		32	36	24	22	5
Lower Limit:		24	28	16	14	0

**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, 2006 Event #3  
STATISTICAL SUMMARY BY METHOD**

	Results ( $\mu\text{g/dL}$ whole blood)				
	BE06-11	BE06-12	BE06-13	BE06-14	BE06-15
<b>ASV-3010</b>					
Number of Sample Measurements:	22	22	22	22	16
Mean:	26.9	31.0	19.0	16.4	1.8
Standard Deviation:	1.9	2.6	1.5	1.8	0.9
RSD (%):	7.0	8.4	7.9	11.2	53.2
<b>ASV-LeadCare</b>					
Number of Sample Measurements:	13	13	13	13	12
Mean:	27.2	32.0	20.5	17.0	1.7
Standard Deviation:	2.1	3.0	1.6	1.5	0.5
RSD (%):	7.7	9.5	7.9	9.0	29.5
<b>DRC/CC-ICP-MS</b>					
Number of Sample Measurements:	1	1	1	1	1
Mean:	26.0	30.0	18.0	17.0	1.0
Standard Deviation:	?	?	?	?	?
RSD (%):	—	—	—	—	—
<b>ETAAS Other</b>					
Number of Sample Measurements:	2	2	2	2	2
Mean:	28.0	31.0	20.5	19.5	2.0
Standard Deviation:	2.8	1.4	0.7	2.1	0.0
RSD (%):	—	—	—	—	—
<b>ETAAS-Z</b>					
Number of Sample Measurements:	44	44	44	44	33
Mean:	28.7	32.6	20.4	18.1	1.5
Standard Deviation:	1.5	1.8	1.1	1.2	0.6
RSD (%):	5.2	5.6	5.4	6.7	41.7
<b>HR-ICP-MS</b>					
Number of Sample Measurements:	1	1	1	1	1
Mean:	28.0	32.0	20.0	18.0	1.0
Standard Deviation:	?	?	?	?	?
RSD (%):	—	—	—	—	—
<b>ICP-MS</b>					
Number of Sample Measurements:	21	21	21	21	19
Mean:	27.9	32.1	20.0	17.9	1.4
Standard Deviation:	2.4	2.2	1.1	1.7	0.5
RSD (%):	8.6	6.7	5.3	9.3	36.2
<b>All Laboratories</b>					
Number of Sample Measurements:	104	104	104	104	84
Mean:	27.9	32.0	20.0	17.6	1.5
Standard Deviation:	2.0	2.3	1.4	1.7	0.6
RSD (%):	7.1	7.1	6.8	9.4	42.2

**notes:** ? Insufficient data for SD calculation.

**New York State Department of Health  
Blood Lead Test Results, 2006 Event #3  
STATISTICAL SUMMARY BY CLASS**

	Results ( $\mu\text{g/dL}$ whole blood)				
	BE06-11	BE06-12	BE06-13	BE06-14	BE06-15
<b>Evaluated</b>					
Number of Sample Measurements:	74	74	74	74	57
Mean:	27.8	31.9	19.9	17.4	1.6
Standard Deviation:	2.1	2.4	1.4	1.8	0.7
RSD (%):	7.7	7.6	7.2	10.3	41.2
<b>Info</b>					
Number of Sample Measurements:	12	12	12	12	11
Mean:	28.1	32.3	20.3	17.6	1.2
Standard Deviation:	2.1	2.7	1.5	1.6	0.6
RSD (%):	7.4	8.5	7.6	8.9	51.0
<b>Reference</b>					
Number of Sample Measurements:	18	18	18	18	16
Mean:	28.2	32.1	20.2	18.3	1.4
Standard Deviation:	1.2	1.2	0.9	0.7	0.5
RSD (%):	4.3	3.8	4.3	3.7	35.6
<b>All Laboratories</b>					
Number of Sample Measurements:	104	104	104	104	84
Mean:	27.9	32.0	20.0	17.6	1.5
Standard Deviation:	2.0	2.3	1.4	1.7	0.6
RSD (%):	7.1	7.1	6.8	9.4	42.2

**notes:** ? Insufficient data for SD calculation.

**New York State Department of Health  
Blood Lead Test Results, 2006 Event #3  
METHOD NOTES**

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**ATOMIC SPECTROMETRY METHODS**

- A-1 ETAAS-Z (Electrothermal atomic absorption spectrometry with Zeeman background correction)
- A-2 ETAAS other (i.e., D<sub>2</sub>, S-H background correction)
- A-3 FAAS (Flame atomic absorption spectrometry)
- A-4 CV-AAS (Cold vapor atomic absorption spectrometry)
- A-5 HG-AAS (Hydride generation atomic absorption spectrometry)
- A-6 AFS (Atomic fluorescence spectrometry)
- A-7 Other

**INDUCTIVELY COUPLED PLASMA**

- P-1 ICP-MS (Inductively coupled plasma - mass spectrometry)
- P-2 DRC/CC-ICP-MS (ICP-MS used in the Dynamic Reaction Cell or Collision Cell mode)
- P-3 ICP-AES/OES (ICP atomic/optical emission spectrometry)
- P-4 HR-ICP-MS (High resolution ICP-MS)
- P-5 ETV-ICP-MS (Electrothermal vaporization ICP-MS)
- P-6 ID-ICP-MS (Isotope dilution ICP-MS)
- P-7 Other

**ELECTROCHEMICAL METHODS**

- E-1 ASV (Anodic stripping voltammetry without digestion)
- E-2 ASV-LeadCare<sup>®</sup> (Anodic stripping voltammetry using the ESA LeadCare<sup>®</sup> system)
- E-3 Fluoride specific electrode
- E-4 Other

**MOLECULAR FLUORIMETRY**

- F-1 EtOAc (Ethyl acetate-acetic acid extraction method for determination of erythrocyte protoporphyrin)
- F-2 Aviv hematofluorometry (for determination of EP at hematocrit 35)
- F-3 Helena ZPP (for determination of zinc protoporphyrin in  $\mu\text{mol ZPP/mol heme}$ )
- F-4 Other

**OTHER METHODS**

If your method is not listed in the above list, please describe it briefly.

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