

Supplementary materials

Validation of blood arsenic and manganese assessment from archived clotted erythrocyte fraction in an urban cohort of mother-child dyads

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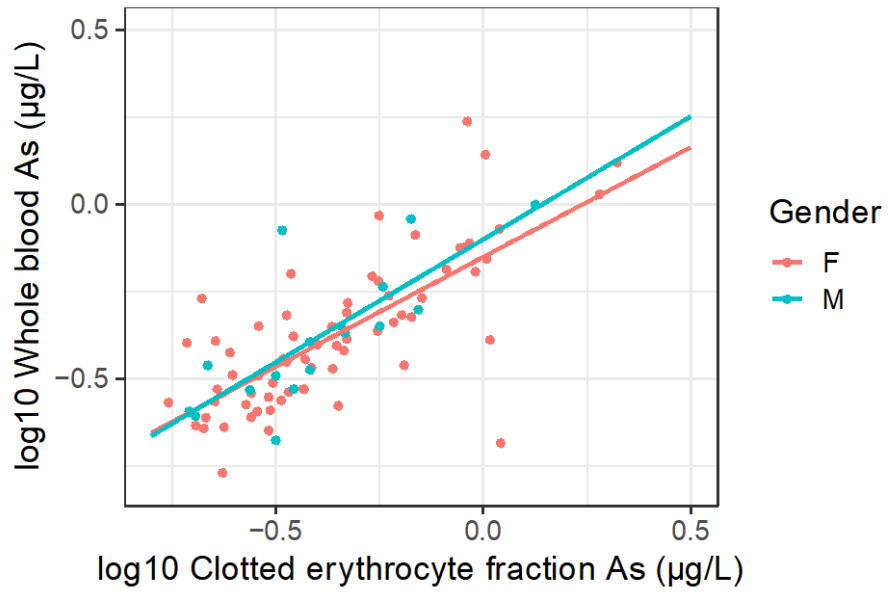
<https://orcid.org/0000-0002-5045-0929>

Table S1. Percent recovery results from analysis of certified samples from the Quebec Multielement External Quality Assessment Scheme (QMEQAS) from The Centre de Toxicologie du Québec (Samples labeled as Q1518, Q1801, Q1821) for As, and the CDC's Lead and Multielement Proficiency Program (LAMP) for Mn. Run 1 and Run 2 represent analyses from different days. All units are expressed as µg/L.

Element	Sample ID	Run 1	Run 2	Average	Target	% Recovery
As	Q1518	21.9	20.0	20.9	24.5	85%
	Q1801	3.0	2.5	2.8	3.2	85%
	Q1821	10.7	8.1	9.4	10.4	90%
Mn	LAMP 1904	8.9	7.6	8.2	7.4	111%
	LAMP 1905	14.2	12.7	13.4	12.8	105%
	LAMP 1906	9.0	7.8	8.4	7.8	107%
	LAMP 1907	13.9	16.7	15.3	13.2	116%
	LAMP 1908	9.3	12.2	10.7	8.3	129%
	LAMP 1909	10.4	12.0	11.2	9.6	116%
	LAMP 1910	22.0	22.5	22.2	23.1	96%
	LAMP 1911	12.9	13.3	13.1	12.7	103%
	LAMP 1912	6.2	6.0	6.1	5.4	113%
	LAMP 2001	9.3	9.2	9.3	9.1	102%
	LAMP 2002	5.5	6.1	5.8	6.2	94%
	LAMP 2003	3.3	3.6	3.4	3.5	97%

Figure S1. Relationship between concentrations of arsenic in clotted erythrocyte fraction and whole blood stratified by a) gender and b) age.

a)



b)

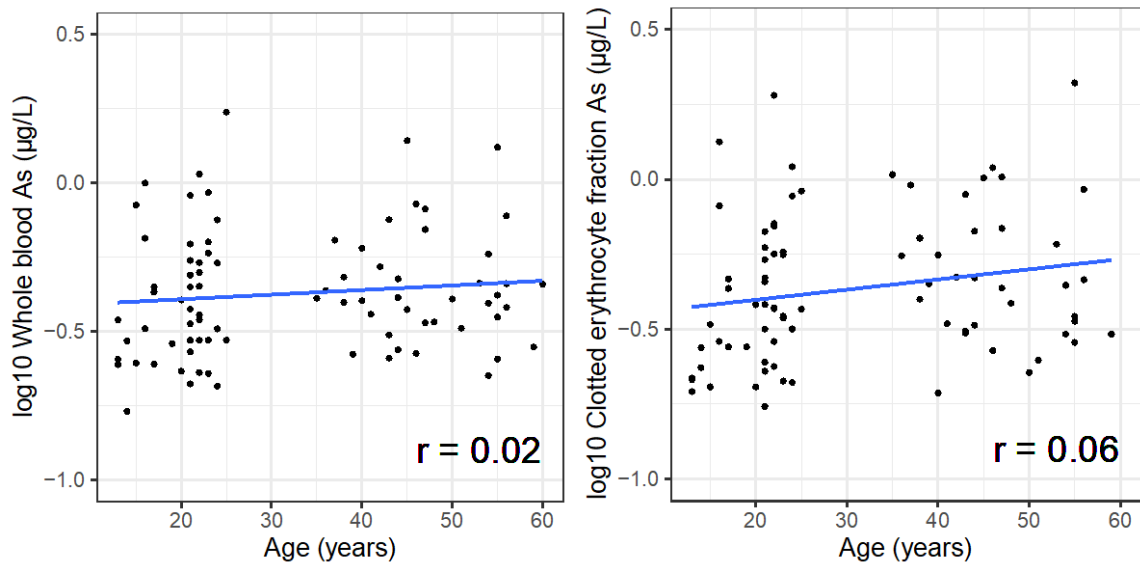


Figure S2. Relationship between concentrations of manganese in clotted erythrocyte fraction and whole blood stratified by a) gender and b) age.

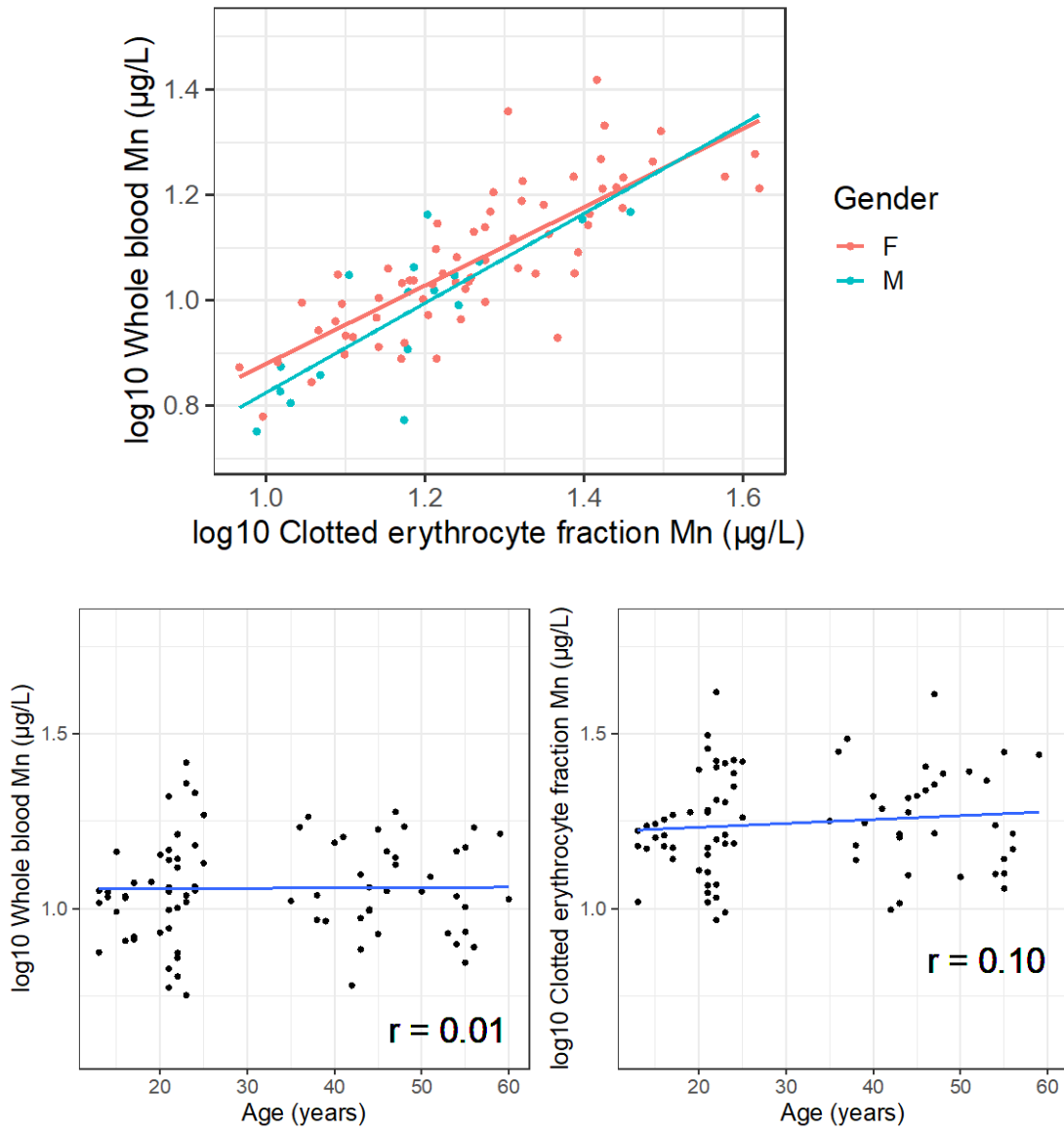
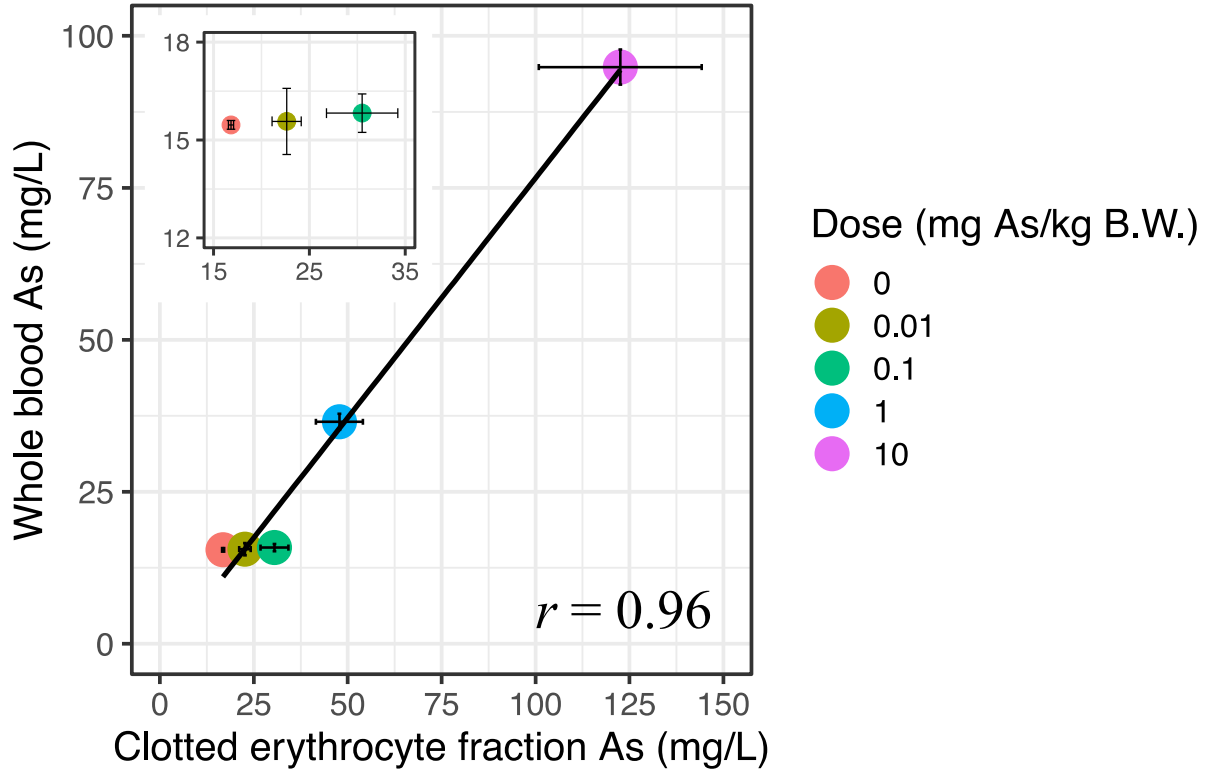


Figure S3. a) Relationship between concentrations of arsenic in clotted erythrocyte fraction and whole blood of Sprague Dawley rats collected 24 hours post-exposure to sodium arsenite via oral gavage at varying doses. Solid line represents linear regression with error bars represent ± 1 standard deviation of triplicate analytical measurements. The nested plot shows the lower three points on an expanded scale.



b) Partitioning of arsenic expressed as the ratio of clotted erythrocyte fraction to measured whole blood concentration for human subjects from the AESOP cohort and Sprague-Dawley rats exposed to arsenic. Arsenic partitioning in rats was found to fall within the range of those observed in humans.

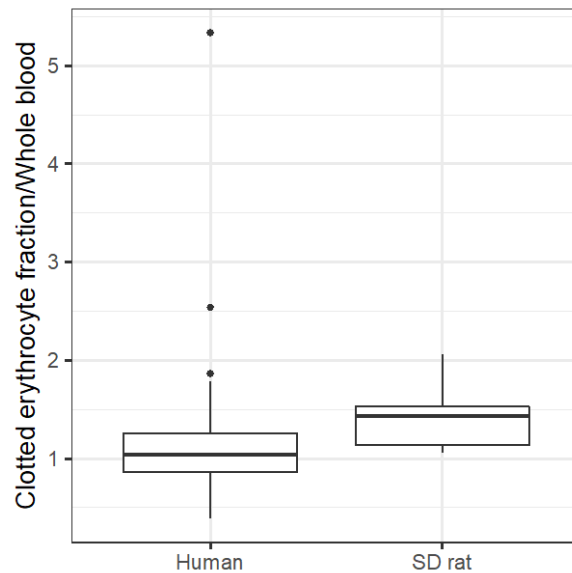


Figure S4. Bland-Altman plot showing the difference between measured whole blood and modeled whole blood for As (a), and Mn (b) predicted using clotted erythrocyte fraction. The dashed lines represent the standard deviation multiplied by 1.96, and solid lines represent the mean method difference.

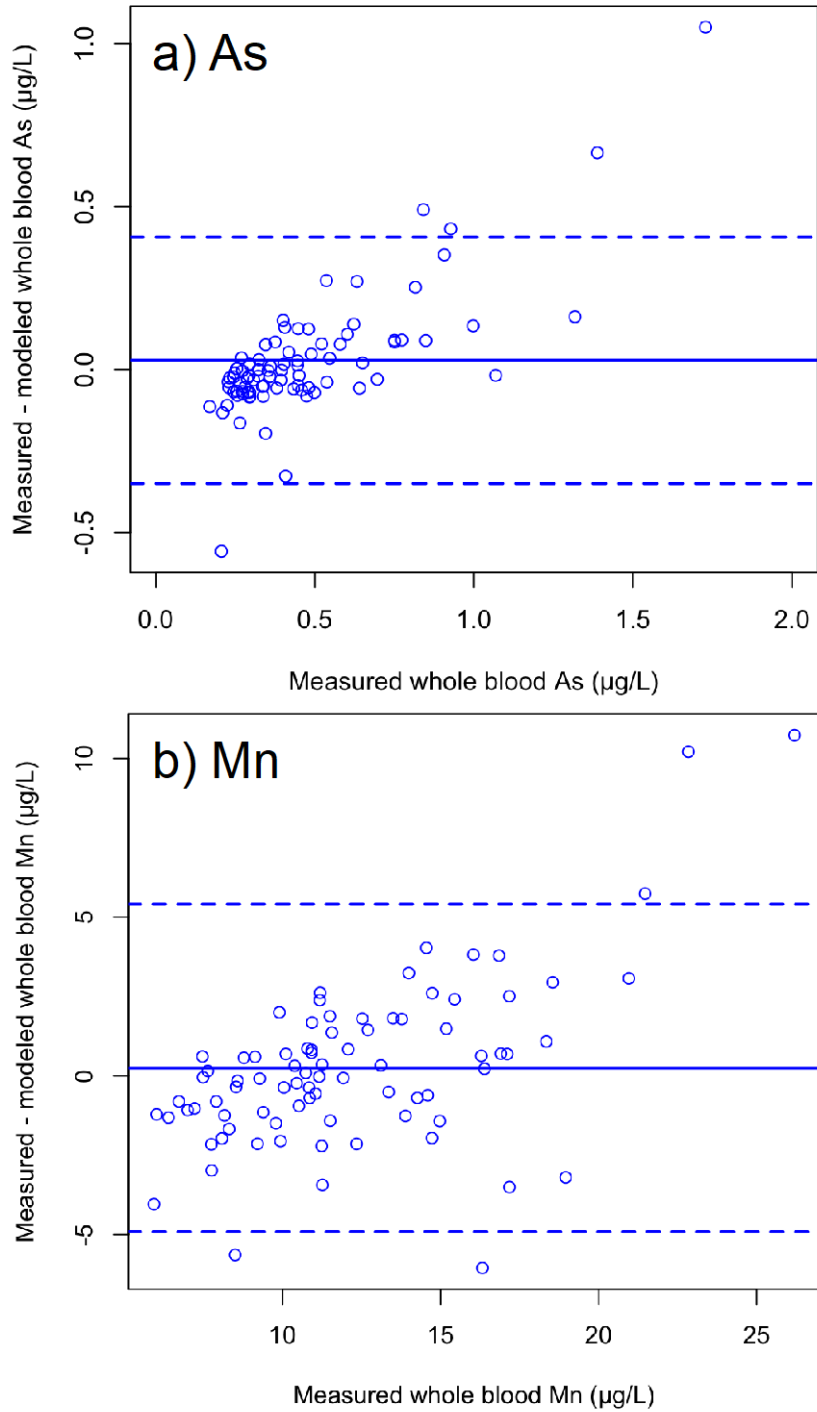


Table S2. Summary results of the receiver operating characteristic (ROC) analysis which provides measures of true positive rate (TPR, sensitivity) and false positive rate (FPR, 1-specificity). The clotted erythrocyte fraction predicted whole blood values were compared against the measured whole blood values as the gold standard.

Element	Cutoff	TPR	FPR	Threshold ($\mu\text{g/L}$)	% CV
As	Q1- 0.29 $\mu\text{g/L}$	0.81	0.14	0.35	18%
	Q2- 0.40 $\mu\text{g/L}$	0.81	0.21	0.39	
	Q3- 0.54 $\mu\text{g/L}$	0.81	0.14	0.5	
Mn	Q1- 9.2 $\mu\text{g/L}$	0.81	0.1	7.19	13%
	Q2- 11.2 $\mu\text{g/L}$	0.81	0.17	7.92	
	Q3- 14.6 $\mu\text{g/L}$	0.81	0.11	9.2	

Figure S5. Concentrations of measured whole blood manganese as a function of distance from the steel plant colored by the various neighborhoods of East Chicago. A weak correlation was observed ($p=0.073$).

