

1. INTRODUCCIÓN

Arsenic (As), lead (Pb), cadmium (Cd), and mercury (Hg) are naturally present in the environment, but the most important exposures result from human activity. A cross-sectional study was conducted in the Metropolitan Region of Sao Paulo (MRSP) in 2009 as a pilot study for a National Surveillance System to be implemented in order to assess the exposure of Brazilian population to environmental contaminants. This paper reports the results of Hg, As, Cd, and Pb in blood.

2. MATERIAL AND METHODS



Study group: 373 blood donors living in the municipalities within the MRSP.

Period: August and September of 2009.

A questionnaire was applied for each participant to obtain sociodemographic and habit information.

Analytical method: ICP-MS

Limits of quantification = 0,047 µg As/L; 0,01 µg Cd/L; 0,1 µg Pb/dL; 0,27 µg Hg/L.

3. RESULTS AND DISCUSSION

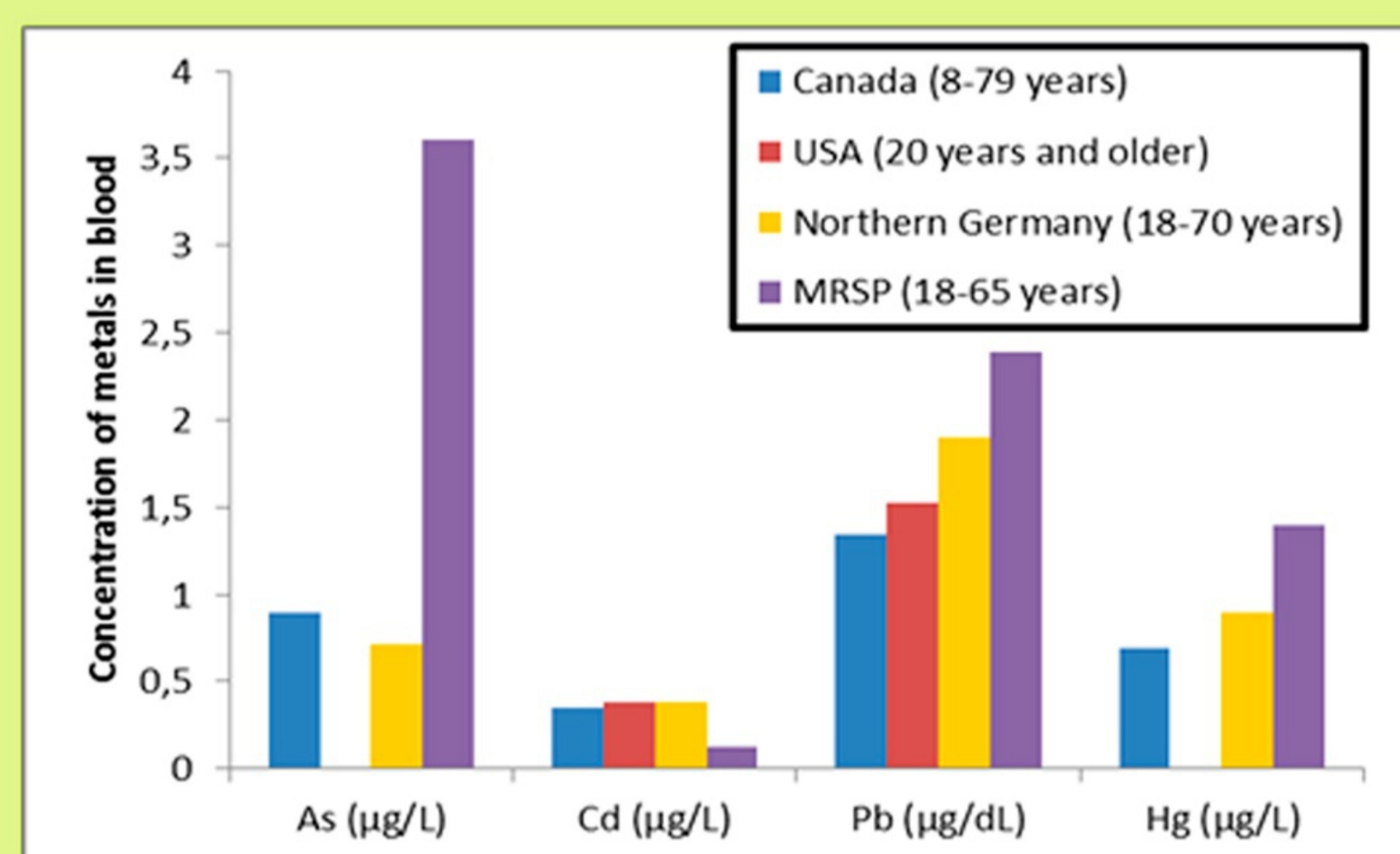


Figure 1 - Geometric mean for blood arsenic, cadmium, lead, and mercury concentrations in blood donors residing in MRSP compared with the population of Canada¹, United States², and northern Germany³.

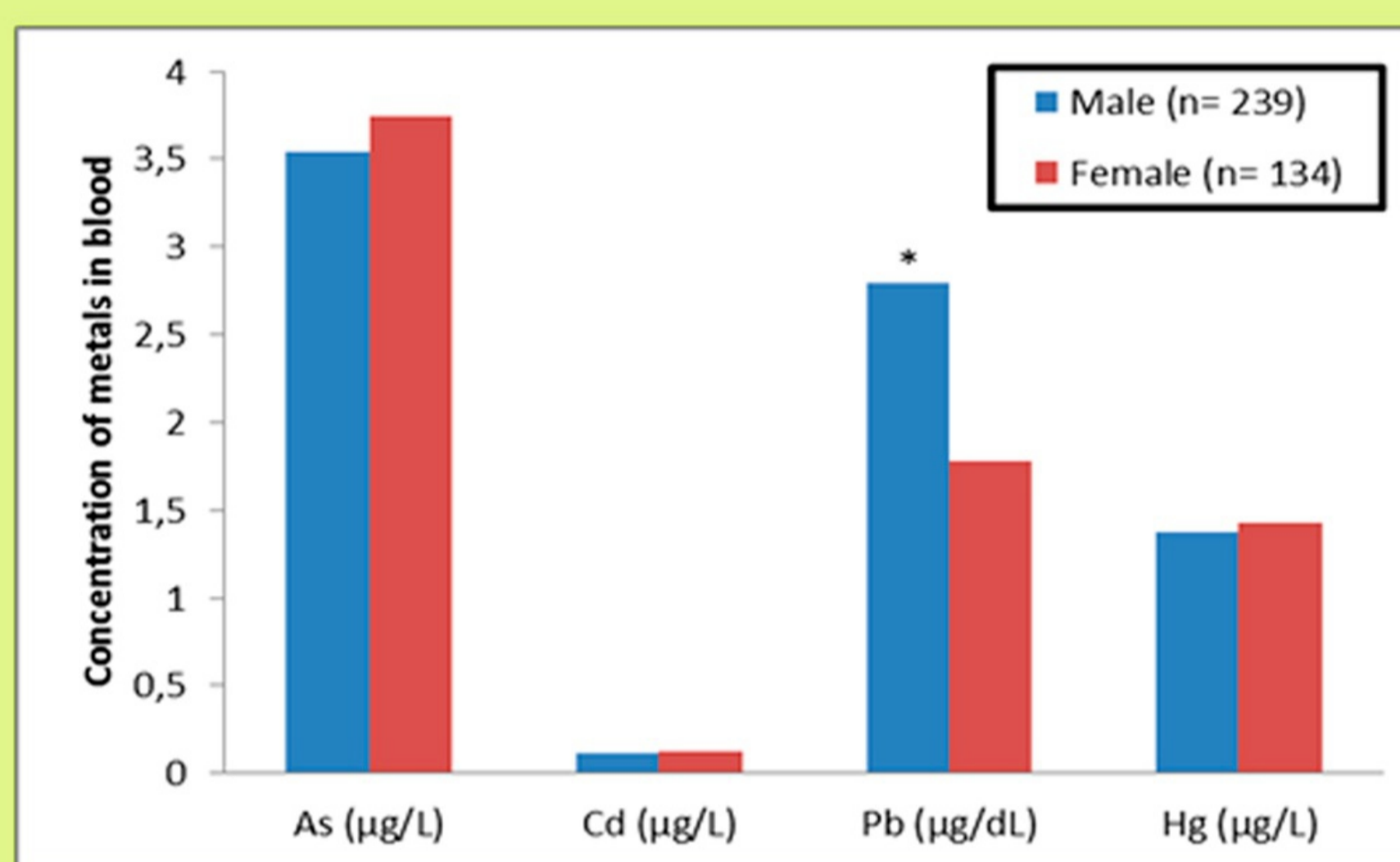


Figure 2 - Geometric mean for blood arsenic, cadmium, lead, and mercury concentrations in blood donors residing in MRSP by gender. *p<0.001, Mann-Whitney test.

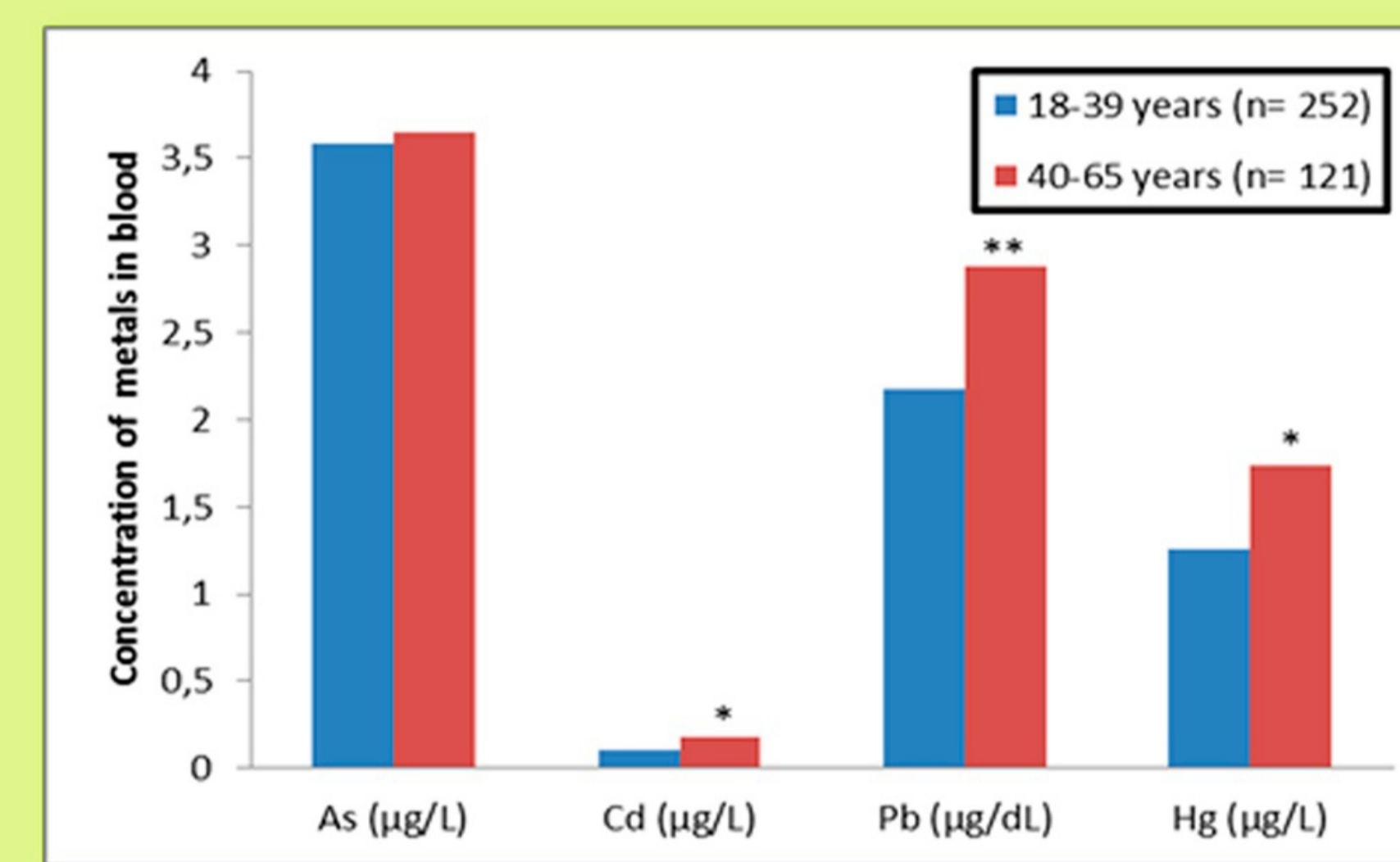


Figure 3 - Geometric mean for blood arsenic, cadmium, lead, and mercury concentrations in blood donors residing in MRSP by age. *p= 0.01; **p <0.001, Mann-Whitney test.

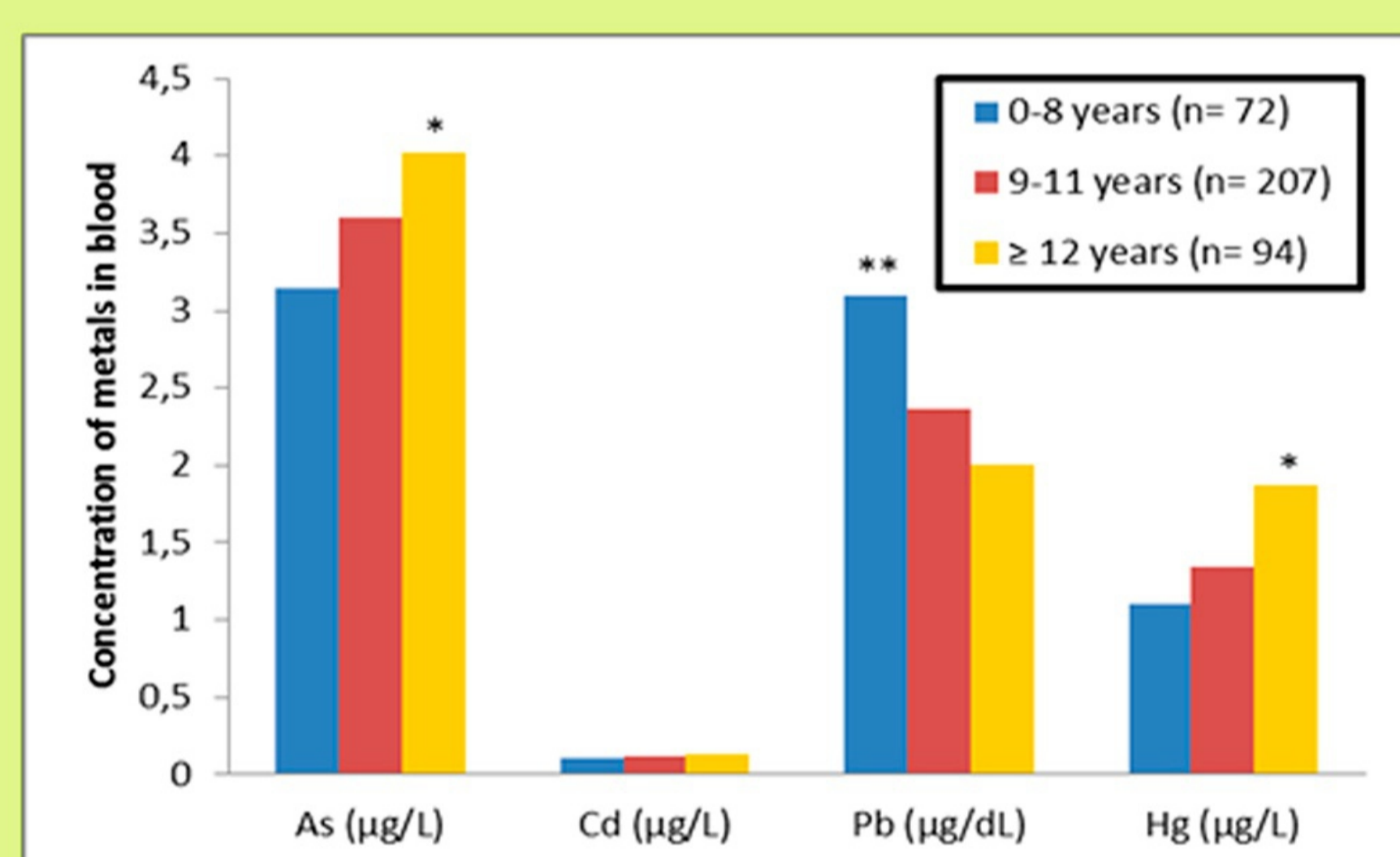


Figure 4 - Geometric mean for blood arsenic, cadmium, lead, and mercury concentrations in blood donors residing in MRSP by education level. *p<0.005; **p<0.001, Kruskal-Wallis test.

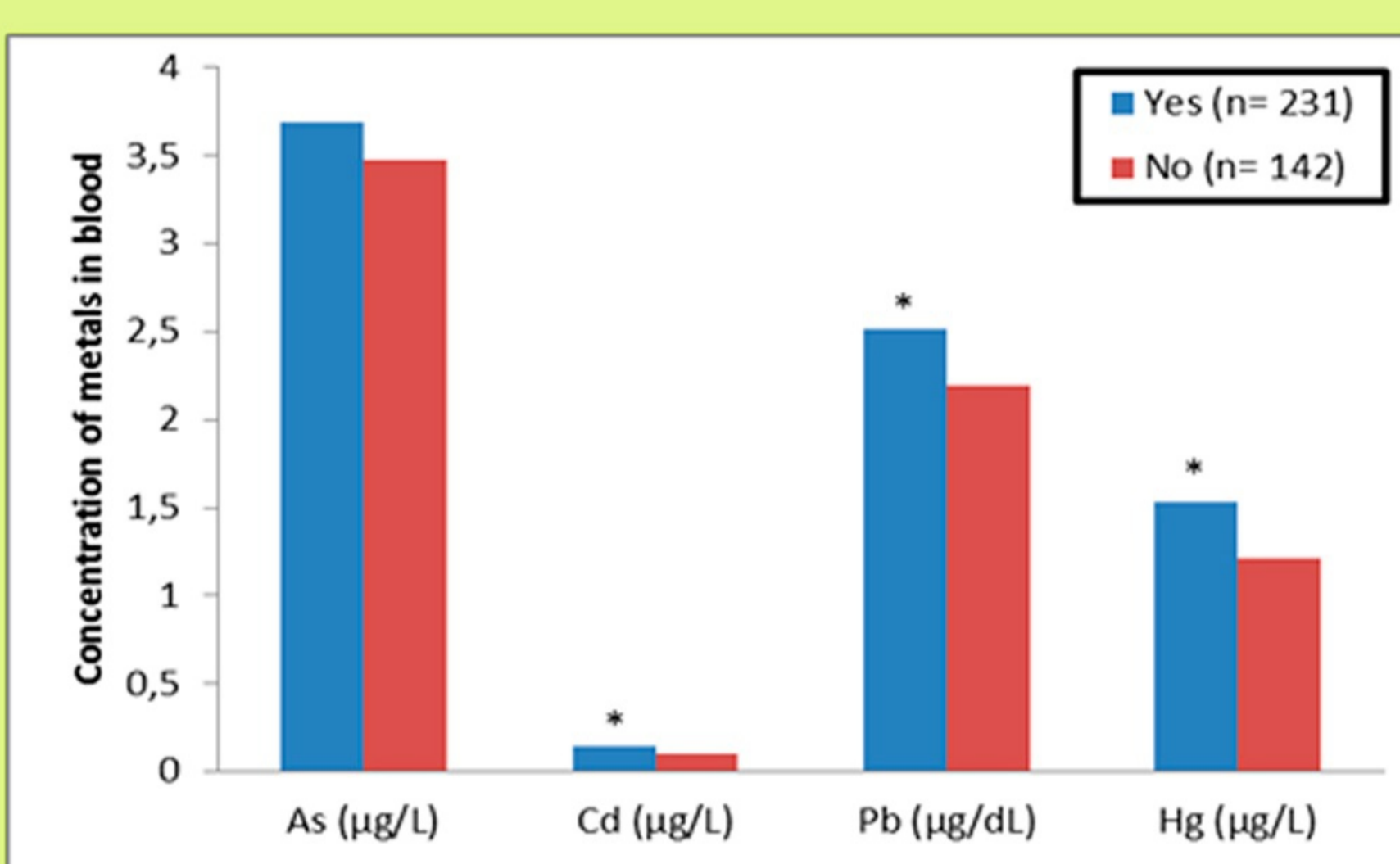


Figure 5 - Geometric mean for blood arsenic, cadmium, lead, and mercury concentrations in blood donors residing in MRSP by alcohol consumption. *p<0.05, Mann-Whitney test.

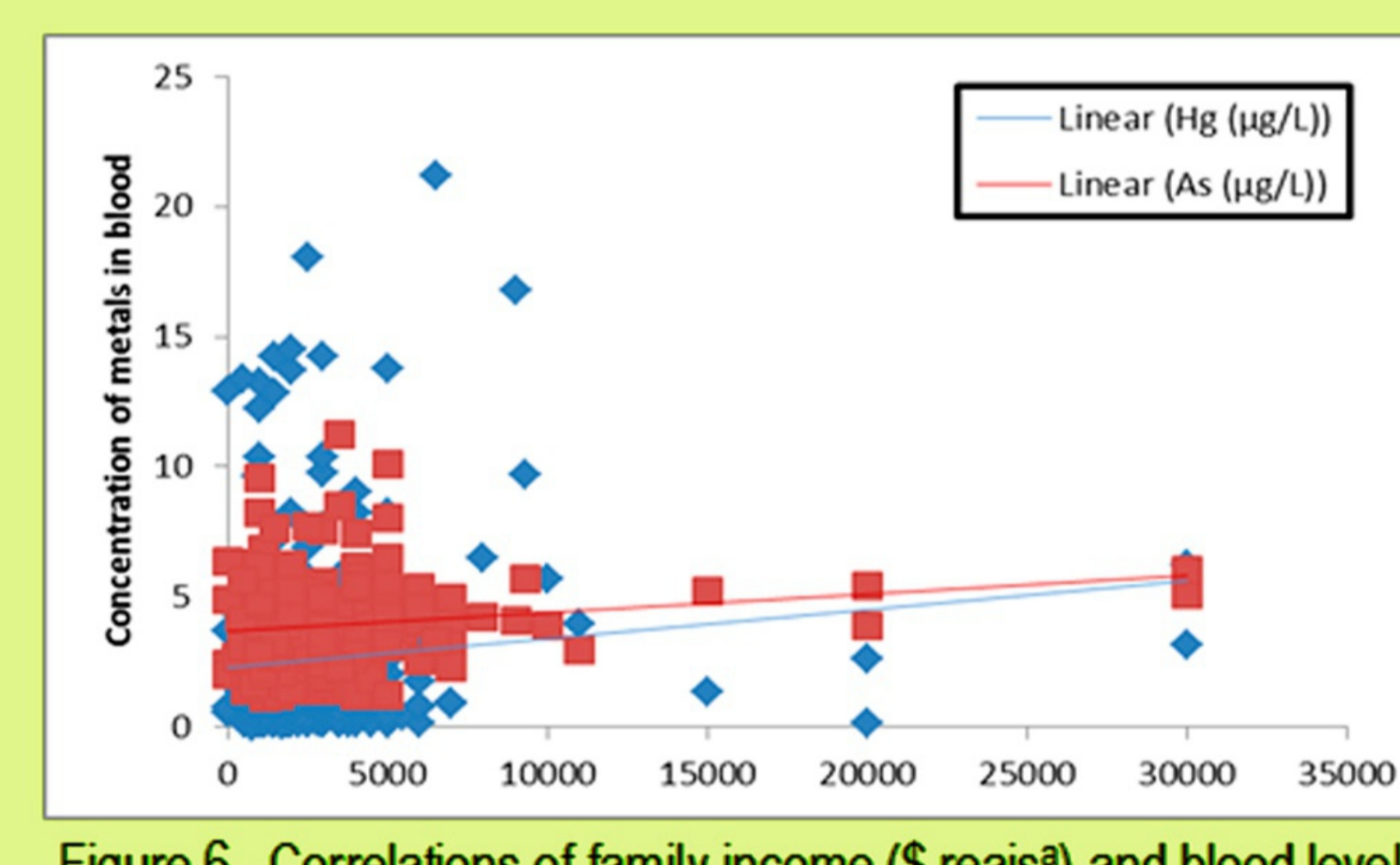


Figure 6 - Correlations of family income (\$ Reais^a) and blood levels of As and Hg. r= 0.115; p= 0.03 (Hg); r= 0.115; p= 0.03 (As), Spearman rank correlation test. Note: ^a\$ Reais = Brazilian currency (1 USD = 2,03 reais)

4. CONCLUSION

Biomonitoring can help the identification of potential exposed populations and provide valuable information of possible source of exposure. Comparison with biomonitoring data from other countries indicates that the exposure of the MRSP population to mercury, arsenic, and lead is higher, but exposure to cadmium is lower. Results showed correlation between metal levels and sociodemographic factors and alcohol consumption.

5. REFERENCES

- Health Canada. Report on Human Biomonitoring of Environmental Chemicals in Canada. Results of the Canadian Health Measures Survey Cycle 1 (2007–2009). Ontario, 2010.
- CDC. Fourth national report on human exposure to environmental chemicals. Atlanta, 2009.
- Heitland P.; Köster HD. Biomonitoring of 37 trace elements in blood samples from inhabitants of northern Germany by ICP-MS. Journal of Trace Elements in Medicine and Biology, v. 20, p. 253-262, 2006.

