

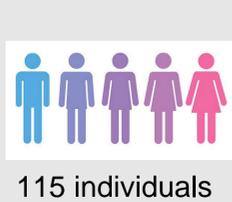
**Key findings:** Informal work conditions increased the blood levels of arsenium, cadmium and lead of soldering workers compared to a control group. Negative health effects may occur due to this occupational exposure, such as the symptom of shortness of breath, was reported more often among the group of people exposed to welding fumes.

## Background

- Biological matrices, such as blood, can be used to monitor occupational exposure to potentially toxic elements (PTEs).
- The aim of this study was to evaluate the PTEs exposure in informal outsourced workers from Limeira – SP, Brazil, who perform jewelry soldering in the home environment without protective equipment and occupational hygiene.

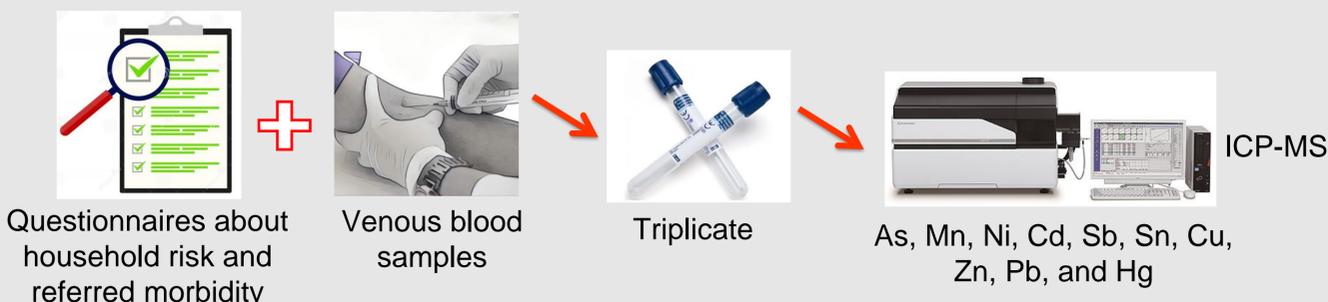


## Materials and Methods



**Exposed Group (n=66)**  
informal workers and families

**Control Group (n=49)**  
without occupational chemical exposure



## Results

- 53.9 % adults (all females aged 18 to 62 years).
- Children and adolescents (1-18 years old) 49.1% females and 50.9% males.

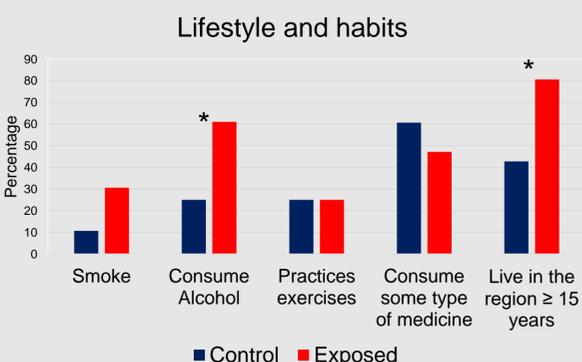


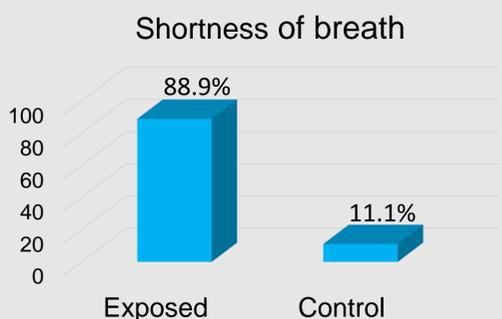
Table. Geometric mean (GM), confidence interval (95% CI) and 95<sup>th</sup> percentile of potentially toxic elements (PTEs) determined in blood ( $\mu\text{g L}^{-1}$ )

PTEs	Exposed group		Control group		p-value
	95 <sup>th</sup> Percentile	GM (95% CI)	95 <sup>th</sup> Percentile	GM (95% CI)	
As	6.52	0.44 (0.39 – 0.50)	5.35	0.35 (0.28 – 0.44)	0.0007
Mn	14.48	8.50 (7.76 – 9.32)	14.93	8.23 (7.45 – 9.10)	0.32
Ni	6.52	1.76 (1.11 – 2.77)	5.35	2.08 (1.30 – 3.32)	0.80
Cd	3.21	0.21 (0.13 – 0.34)	0.42	0.01 (0.01 – 0.02)	0.0001
Sb	4.24	2.41 (2.18 – 2.66)	3.47	2.33 (2.09 – 2.59)	0.60
Sn	1.43	0.95 (0.76 – 1.19)	1.37	0.83 (0.74 – 0.93)	0.80
Cu	1,454	1,046 (992 – 1,102)	1,666	1,156 (1,099 – 1,217)	0.10
Zn	6,205	4,111 (3,832 – 4,410)	5,965	4,306 (4,041 – 4,586)	0.75
Pb*	6.15	1.88 (1.54 – 2.28)	2.11	1.04 (0.90 – 1.19)	0.0001
Hg	3.66	1.45 (1.00 – 1.32)	4.57	1.14 (0.95 – 1.34)	0.50

\* valor de Pb em  $\mu\text{g dL}^{-1}$

## Additional Methods and/or Results

- Symptom with statistically significant difference between the groups (p=0.004)



- Although not statistically different:

### Respiratory Diseases



- 40.9% reported bronchitis, asthma, or upper respiratory tract infection.



- 50% reported allergy, the main one being dust allergy.
- Highest prevalent symptom = headaches (37.4%).

## Conclusions

- The informal workers and relatives constitute a particular risk group because of the home environment with uncontrolled occupational activity.
- The higher concentrations of PTEs in exposed population raise a concern and may impact health outcomes.

### ACKNOWLEDGMENTS:

