

Concentrations of [metals](#) in urine samples collected from 99 firefighters in 2010 - 2011 for the [Firefighter Occupational Exposures \(FOX\) Project](#)

| Metals ^a (units) | Geometric Mean (95% Confidence Interval) | Selected Percentiles | | | | Detection Frequency | Limit of Detection (LOD) |
|---|---|----------------------|------------------|------------------|------------------|---------------------|--------------------------|
| | | 25 th | 50 th | 75 th | 90 th | | |
| Arsenic (µg/L) | 10.7 (8.93 – 12.9) | 6.04 | 10.4 | 21.0 | 36.6 | 100% | 0.16 |
| Manganese (µg/L) | * | <LOD | <LOD | <LOD | <LOD | 9.1% | 0.18 |
| Mercury (µg/L) | 0.45 (0.38 – 0.54) | 0.21 | 0.44 | 0.91 | 1.3 | 100% | 0.052 |
| Cadmium (µg/g creatinine) | 0.15 (0.13 – 0.16) | <LOD | 0.14 | 0.19 | 0.29 | 69.7% | ** |

a. See page two for [explanation of terms](#).

* Geometric mean was not calculated because the chemical was found in less than 65% of the study group.

** The LOD for cadmium on a creatinine-adjusted basis varies by individual creatinine level. The LOD for cadmium in urine on a wet weight basis is 0.11 µg/L.

Chemical Abstracts Service Registry Numbers (CASRN) for metals

| Metals | CASRN ^a |
|------------------|--------------------|
| Arsenic | 80-05-7 |
| Manganese | 3380-34-5 |
| Mercury | 94-26-8 |
| Cadmium | 120-47-8 |

a. See page three for [explanation of CASRN](#).

Explanation of Terms

| | |
|---|--|
| µg/L | Micrograms of the chemical per liter of urine. |
| µg/g creatinine | Micrograms of the chemical per gram of creatinine. |
| Geometric mean | The geometric mean is an estimated middle value of a set of numbers. This is different than the average, also called the "arithmetic mean." A geometric mean is sometimes calculated when the set of numbers contains some extreme values. For example, the geometric mean of the set of numbers "1, 2, 2, 3, 4, 5, 5, 6, 10, 100" is calculated by <i>multiplying</i> all ten numbers together and then <i>raising the product to the 1/10th power</i> , giving 4.8. To compare, the arithmetic mean is calculated by <i>adding</i> all ten numbers and <i>dividing by 10</i> , giving 14. |
| 95% confidence interval | A <i>sample</i> is a subset of a larger <i>population</i> . A confidence interval for a statistical measure is a range of values estimated from <i>sample</i> data. This interval is likely to include the true value of the statistical measure, such as a geometric mean, for the larger <i>population</i> . A 95% confidence interval for a statistical measure implies that we are 95% confident that the range includes the true <i>population</i> value for this measure. |
| Percentiles | Percentiles are best explained by an example: if the 75 th percentile is 1.5 µg/L, this means that 75% of participants had levels less than or equal to 1.5 µg/L. |
| Limit of detection (LOD) | The LOD is the lowest level of a chemical that the laboratory can measure in blood or urine. |
| Creatinine-adjusted concentration | Creatinine is a normal byproduct of metabolism that is found in urine. The concentration of creatinine in urine can indicate how dilute or concentrated the urine is. To account for urine dilution, some chemicals are reported in terms of, for example, micrograms per gram of creatinine (µg/g). |
| CASRN - Chemical Abstracts Service Registry Number | The CASRN is a unique identification number assigned to individual chemicals by the Chemical Abstracts Service division of the American Chemical Society. |