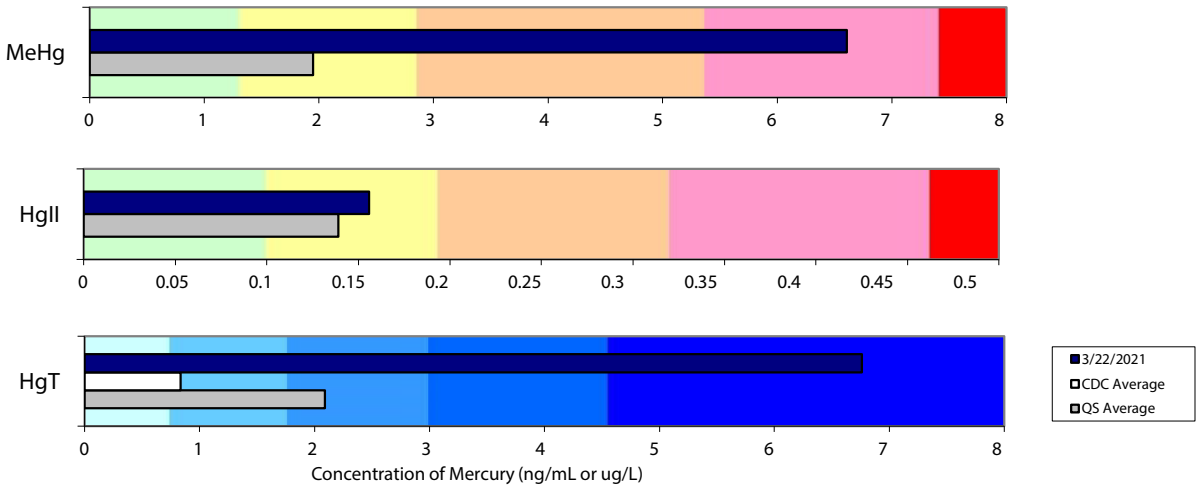
QUICKSILVER SCIENTIFIC

Physician Name	Michael Smith	Dates	Taken	Arrived	Analyzed
			3/22/2021	3/24/2021	3/26/2021
Date Of Birth	Unknown		NA	NA	NA

Blood Results

Blood Mercury Comparison

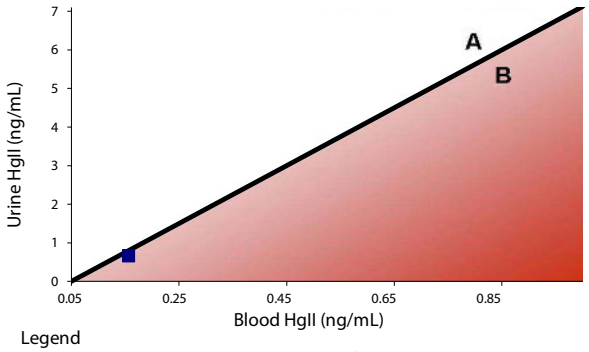


	Results (ng/mL)			Reference Ranges QS n=1011; CDC n=1928		Percentile				
	3/22/2021	NA	% Change	Source	Range	Average	50th	75th	90th	95th
Methylmercury— MeHg	6.61	NA	NA	QS	<0.003 to 23.3	1.95	1.2	2.9	5.4	7.4
Inorganic Mercury— HgII	0.156	NA	NA	QS	<0.007 to 1.75	0.139	0.10	0.19	0.32	0.46
Sum— HgT	6.76	NA	NA	CDC	0.038 to 9.96	0.833	0.7	1.7	3	4.6

Blood Reference Values: Quicksilver Scientific (QS) Data represents 1011 males and females that have utilized our testing. CDC data represents 1928 females, ages 16 to 49. QS blood Hg concentrations are higher that CDC because QS analyzes blood a population that already suspects mercury toxicity.
Data and Analysis Information: Mercury speciation was performed at Quicksilver Scientific, and all values are in concentrations of ng Hg per mL of blood

Urine Results

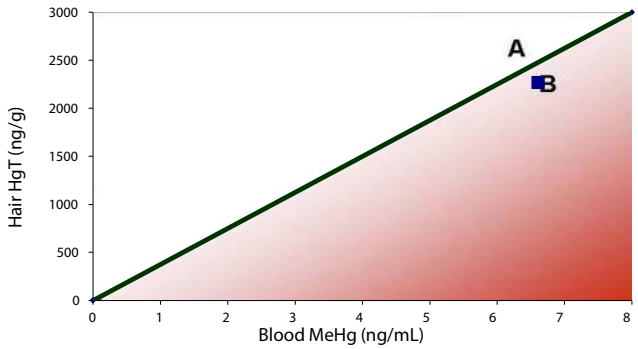
Indication of Inorganic Mercury Excretion Ability



Legend
A) Average Excretion: Mercury output is average or above average when at a ratio of at least 375:1 HgT in hair to MeHg in blood and 6.9:1 HgT in urine to HgII in blood.
B) Below Average Excretion: Mercury output is below average when the tissue Hg comparisons are below ratios mentioned above (red area)

Hair Results

Indication of Methylmercury Excretion Ability

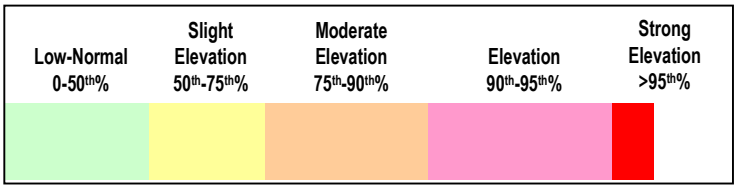


	Urine Results (ng/mL)			Hair (ng/g)
	3/22/2021	NA	%Change	3/22/2021
Methylmercury— MeHg	<0.005	NA	NA	NA
Inorganic Mercury— HgII	0.664	NA	NA	NA
Sum— HgT	0.664	NA	NA	2267

Interpreting This Report

Patients should rely on a trained physician for the interpretation of their mercury laboratory results. NOTE: Reference values used here, with the exception of the total mercury references provided by the U.S. Center for Disease Control, reflect patient data generated at Quicksilver Scientific. Quicksilver Scientific references are updated periodically.

Your Blood Results: Methylmercury (MeHg) and inorganic mercury (HgII) were directly measured via mercury speciation analysis (Liquid Chromatography coupled to Cold-Vapor Atomic Fluorescence Spectrometry). The total mercury result is calculated as the sum of measured methylmercury and inorganic mercury. Methylmercury and inorganic mercury data will give your doctor indications on your most consequential mercury exposures. Methylmercury is absorbed from consumed fish and a small amount is also formed in the gut from amalgam-derived mercury swallowed with saliva. Inorganic mercury is derived from inhalation of mercury released by dental amalgam, from airborne mercury, from demethylation of methylmercury from fish, and from certain cosmetics (e.g. skin whitening creams). You can compare your methylmercury and inorganic mercury results to the color ranges in the bar chart; these are based on percentiles of the tested population and can be interpreted as shown here for either methyl or inorganic mercury. Your total mercury result does not show exposure routes but is provided for comparison to U.S. averages of blood mercury Center for Disease Control percentiles (tests not performed at Quicksilver Scientific).

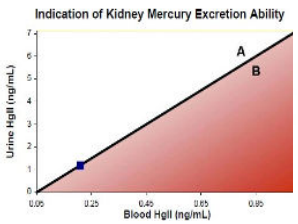


Your Urine Results: Your inorganic mercury results are the most important of your urine results. Mercury in urine is almost exclusively inorganic mercury and urinary output is a dominant excretion pathway for inorganic mercury. Your urinary methylmercury results are less important because it is not a good indicator of methylmercury removal from the body. As with blood, total mercury is inferred by adding your inorganic mercury and methylmercury results.

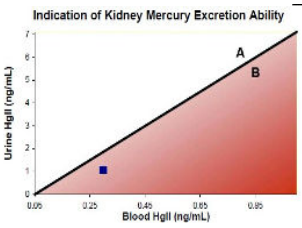
Your Hair Results: Essentially all Hg in hair begins as methylmercury, thus speciation analysis is not necessary. Hair mercury results are determined by total mercury analysis (Combustion/Au-amalgamation/Cold-Vapor Atomic Absorption) or mercury speciation analysis. If your hair results were determined by mercury speciation, your total mercury has been determined by adding methylmercury to inorganic mercury. If your hair results were determined by total mercury analysis, your results will not include individual measurements of methylmercury and inorganic mercury.

Understanding Your Urine:Blood Ratio: Your inorganic excretion index is described in the graph. The point on the graph represents your blood inorganic mercury and your urine inorganic mercury. The line on the graph shows optimum excretion of inorganic mercury in urine, as determined by histograms of the populations measured by Quicksilver Scientific. If your point appears on or above the diagonal line on the graph, your kidneys are excreting mercury at a healthy rate, enabling you to remove inorganic mercury as you are exposed to it. For these people, the blood levels decline rapidly after cessation of exposure (such as amalgam removal). If your point occurs below the line, your kidneys are not efficiently removing the inorganic mercury from the blood, usually resulting in buildup of blood levels and bodily stores of inorganic mercury. For these people, the blood levels are slow to drop after removal from exposure.

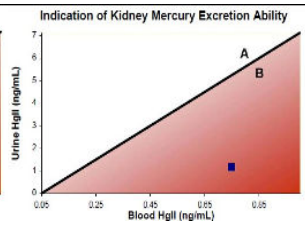
Interpretation of Ratios is Generally The same for both urine and Hair, except that Hair:Blood ratio is allowed a bit more flexibility (deviation from the line) due to timing of hair emergence



Good Ratio



Slightly Depressed Ratio



Strongly Depressed Ratio

Understanding Your Hair:Blood Ratio: Your Hair-Hg:Blood-MeHg ratio gives an indication of methylmercury excretion. The diagonal line on the graph represents an ideal Hair:Blood ratio, as determined from histograms of our measured population. Research by Holmes et al. (International Journal of Toxicology, 22:277–285, **2003**) has shown a low hair excretion level in autistics despite known mercury exposures. The Blood:Hair ratio is used to identify individuals with impaired detoxification and excretion pathways for organomercury forms - methylmercury and ethylmercury (contained in thimerosal). If your point is placed at or above the line, transport dynamics for methylmercury are likely functioning well. If your point is below the line, you may have issues with metabolism of methylmercury. This ratio is sensitive to recent changes in fish consumption since the hair numbers are reflective of blood levels one to three months prior to when the hair was cut. Recent lowering of fish consumption may make the ratio appear high, whereas recent increases in fish consumption may make the ratio appear low - especially fish consumed within 2-3 days of the blood draw. Thus this ratio needs to be interpreted with more flexibility and leniency, including incorporation of recent dietary history, than the urine:blood ratio.

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Elemental Analysis - Whole Blood
Inductively Coupled Plasma/Mass Spectrometry

		Dates	Taken	Arrived	Analyzed
Practitioner	DAT	Present	3/22/2021	3/24/2021	3/30/2021
Date Of Birth	Unknown	Previous	NA	NA	NA

Nutrient Elements

Element	3/22/2021	NA	Range	Units	Percentile Rank by Quintile (20 / 40 / 60 / 80 / 100)	Percentile
Calcium	5.68	NA	4.7 - 6.4	mg/dL		59%
Copper	86	NA	63 - 113	µg/dL		44%
Lithium	1.9	NA	< 0.1 - 21	µg/L		46%
Magnesium	3.27	NA	2.93 - 4.17	mg/dL		22%
Manganese	9.7	NA	4.26 - 14.3	µg/L		56%
Molybdenum	0.9	NA	< 0.2 - 1.9	µg/L		59%
Selenium	215	NA	79 - 362	µg/L		48%
Zinc	573	NA	454 - 745	µg/dL		38%

Potentially Toxic Elements

Element	3/22/2021	NA	Range	Units	Percentile Rank by Quintile (20 / 40 / 60 / 80 / 100)	Percentile
Antimony	3.4	NA	< 7.0	µg/L		22%
Arsenic	3.7	NA	< 6.3	µg/L		68%
Cadmium	0.3 B	NA	< 0.74	µg/L		46%
Cobalt	0.2 B	NA	< 1.3	µg/L		41%
Lead	1.67	NA	< 2.34	µg/dL		70%
Mercury	6.4	NA	< 5.8	µg/L		82%
Silver	0.2 B	NA	< 2.6	µg/L		49%
Strontium	30	NA	< 470	µg/L		48%

Whole Blood Element Ratios:

Element	3/22/2021	NA	Range	Units	20 / 40 / 60 / 80 / 100	Percentile
Ca/Mg Ratio	1.74	NA	1.20-1.99	NA		74%
Cu/Zn Ratio	0.15	NA	0.09-0.21	NA		48%

These test results are not intended for the diagnosis of disease. They are intended for interpretation by qualified healthcare professionals with a full knowledge of patient history to assist in their administration of an appropriate healthcare regimen .

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Elemental Analysis - Whole Blood
Inductively Coupled Plasma/Mass Spectrometry

Report Comments and Interpretation

Reference ranges are compiled from laboratory generated data to reflect the 5th-95th (or <95th) percentile ranking of the sample population with the following exceptions:

- Upper limit of the reference ranges for antimony, arsenic, cadmium, and lead reflect the 90th percentile of population data.
- Upper limit of the reference ranges for cobalt and strontium reflect the 99th percentile of population data.
- Upper reference range for mercury reflects EPA specified guidelines.

The blood lead reference level for children ages 1-5 is 5 µg/dL, which represents the 97.5 percentile.

- CDC update October 30, 2012

Results for elements that are not detected are reported as "< *x*," where *x* is equal to the method detection limit. Percentile rankings are only plotted for elements with sufficient population data and for results greater than the method detection limit for the particular element.

Results containing a "B" indicate that the result is between the method detection limit and the method quantitation limit and should be considered an estimate. These results are reported with 99% confidence that the result is greater than zero, but the result is not accurately quantifiable and has +/- 100% uncertainty.
Results containing an "H" indicate the result is above the instrument calibration range for that particular element, so the accuracy of the reported value cannot be guaranteed. However, any result that is above the calibration range is above the 99.9 percentile.

The lithium reference range is for the 5^{th} and 95^{th} percentile of a blend of persons taking and not taking lithium supplements. The typical range for those not taking supplemental lithium can be between 5 and 30 ug/L whereas those taking lithium as a therapy for cognitive disorders may see levels in the thousands of ug/L, depending on their prescription.

Cobalt is listed as a potentially toxic element in this panel because of metallosis of cobalt/chromium hip replacements. Cobalt can also be a nutrient element and is not generally considered toxic at levels <2 ppb in whole blood. A person with >2 ppb cobalt without a hip replacement may be experiencing external cobalt exposure such as B12 supplements. A person with a hip replacement will tend to have increased cobalt levels in general but may not be at risk of toxicity until the level is >5 ppb. The UKs Medicines and Healthcare Products Regulatory Agency suggests that >7 ppb cobalt in whole blood indicates a potential soft tissue reaction. It is important to note that a person could experience symptoms of cobalt toxicity at lower levels than 5 ppb and, likewise, could experience no symptoms of cobalt toxicity at >5 ppb.

Reference ranges for mercury and arsenic were created using US population data. Our population database averages for both metals from Hong Kong and Japan have are roughly double the US average.

Report Qualifiers