

Heavy Metals Hair Analysis

LONG-TERM EXPOSURE ASSESSMENT



Client Name: **Jordan Sample**

Gender: **Female**

Date of Birth: **April 12, 1985**

Hair Type: **Head**

Practitioner Name: **Dr. Morgan Ellis, ND**

Sample Collection Date: **July 15, 2026**

Practitioner ID: **9000**

Sample Receive Date: **July 17, 2026**

Sample ID (SID): **HM900001**

Report Date: **August 6, 2026**

Previous SID: **HM890001**

Suggested Next Test Date: **January 15, 2027**



PRIMARY HEAVY METALS

Metals with the strongest documented health concerns

Analyte	Result	Unit	Risk Level			Reference Range
			Acceptable	Warning	Severe	
Arsenic (As)	0.042	µg/g				<0.085
Cadmium (Cd)	0.031	µg/g				<0.065
Lead (Pb)	2.480	µg/g				<1.000
Mercury (Hg)	0.410	µg/g				<1.200
Beryllium (Be)	0.004	µg/g				<0.010
Thallium (Tl)	0.006	µg/g				<0.010
Uranium (U)	0.031	µg/g				<0.080

Ranges are provided for guide only. Results should be interpreted with the clinical presentation of the patient

— Last Test Reading — In Range — Warning — Severe

SECONDARY HEAVY METALS

Metals more commonly encountered in everyday environmental and dietary exposure

Analyte	Result	Unit	Risk Level			Reference Range
			Acceptable	Warning	Severe	
Aluminum (Al)	24.600	µg/g				<20.00
Antimony (Sb)	0.089	µg/g				<0.150
Barium (Ba)	1.240	µg/g				<3.000
Bismuth (Bi)	0.058	µg/g				<0.200
Nickel (Ni)	1.310	µg/g				<0.800

<dl: Below Method Detection Limit; NA: No Analytical Data (Suspected Contamination).

— Last Test Reading — In Range — Warning — Severe



HEAVY METALS OVERVIEW

Heavy metals are environmental toxins that can build up in the body over time, potentially competing with essential nutrients and influencing the body's internal terrain. This test offers a non-invasive way to look at long-term patterns of heavy metal deposition in hair tissue.

Please note: **This test measures the body's heavy-metal exposure and accumulation.** Review your results with a qualified practitioner to determine their clinical significance and any appropriate next steps.



Interpreting Metal Levels: Exposure vs. Release

When reviewing your report, it is critical to understand that hair analysis measures what the body is excreting. The presence of metals in hair generally reflects one of two scenarios

1. ONGOING EXPOSURE: The body is eliminating metals it has recently encountered in the environment.

2. BENEFICIAL RELEASE (DETOXIFICATION): The body is mobilizing and releasing older metal storage from deep tissues as part of a natural elimination process.

Therefore, a higher reported level does not always indicate a new exposure; it can often be a positive sign that the body's elimination pathways are working efficiently to clear stored elements.



The Role of Supportive Minerals

Systemic detoxification is a nutrient-dependent process. To mobilize heavy metals and facilitate excretion, the body requires specific mineral cofactors to prevent metabolic recirculation and oxidative stress.

ZINC & SELENIUM: These minerals act as essential shields to sequester and neutralize heavy metals, provided they are balanced within the body's mineral terrain to ensure safe and effective detoxification.

SULFUR: Provides the thiol groups required for Phase II Sulfation and Glutathione synthesis, facilitating the binding and elimination of Lead and Arsenic to reduce oxidative stress and prevent metabolic recirculation.

IRON & CALCIUM: Iron and calcium help limit absorption of heavy metals such as lead and aluminum at shared transport sites, as low calcium increases lead uptake and low iron increases lead and aluminum absorption. Their protective role depends on adequacy rather than excess, since elevated iron can increase oxidative stress and impair detoxification.

If screening suggests heavy metal exposure, a full Hair Mineral Analysis (HTMA) is a valuable next step. Rather than quantifying absolute heavy metal load, HTMA evaluates mineral patterns and excretion trends to offer insight into how the body is managing minerals and detoxification pathways over time. This helps assess metabolic readiness instead of just measuring heavy metal burden, ensuring that the body has the mineral reserves to handle the elimination process safely.

Supporting Natural Clearance

Foundational functions also play an important role in mobilizing tissue metals for excretion:

HYDRATION: Adequate water intake supports healthy circulation to move substances through processing pathways.

ELIMINATION: Regular bowel movements are the primary route for clearing waste and preventing re-absorption.

DIGESTION: Healthy bile flow is required to efficiently package waste for removal through the digestive tract.

REST: Sleep allows the body to perform its deepest repair and 'clean up' work when the nervous system is regulated.

MOVEMENT: Gentle, consistent sweating through daily activity supports an additional natural pathway of release.

Disclaimer: Any concerns about heavy metal exposure should be discussed with a licensed healthcare professional, who can determine whether further assessment or care is appropriate.



ELEVATED LEAD (Pb)

Lead (Pb) is a heavy metal with no known physiological function in the human body. Research confirms that lead is chemically similar to calcium and actively competes with iron and zinc for binding sites. Because of its ability to mimic these essential nutrients, lead can cross biological barriers (including the blood-brain barrier) and displace minerals in key enzymes. This interference disrupts cellular signaling and impairs systems critical for neurological development, heme production (oxygen transport), and kidney function.

Additionally, lead is frequently encountered as a co-contaminant with antimony or arsenic. Health evaluations often consider these potential synergistic exposures when assessing body burden.

Body System Interplay

Heavy metals often act across several systems at once. Some research findings on lead's potential physiological impacts are described below:

NERVOUS SYSTEM: Cognitive & Motor Function: Lead substitutes for calcium in nerve signaling. Literature links this substitution to alterations in neurotransmitter release, cognitive function, and behavior.

BLOOD & OXYGEN: Heme Synthesis: By inhibiting iron-dependent enzymes, lead exposure is associated with reduced heme production, which impacts the blood's ability to transport oxygen (red blood cell health).

KIDNEYS: Filtration & Clearance: The kidneys are the primary route of excretion for lead. Chronic exposure is linked in research to increased renal workload and changes in uric acid management.

BONE HEALTH: Mineral Storage: Lead accumulates in bone tissue by replacing calcium. It can remain stored for decades and may be released back into the bloodstream during periods of bone turnover (e.g., aging, pregnancy).

Common Sources of Exposure

The below are common sources of environmental exposure to Lead:

OLD PAINT & DUST: Homes built before 1978 often contain lead-based paint. Cracking, peeling, or renovation dust is a primary source of exposure.

WATER PIPES: Older plumbing systems may use lead pipes, lead solder, or brass fixtures that can leach lead into drinking water (especially hot or stagnant water).

HOBBIES & INDUSTRY: Activities involving metal: Stained glass making (solder), shooting ranges (bullets/residue), pottery glazing, and battery manufacturing.

CONSUMER PRODUCTS: Imported items: Certain cosmetics (e.g., kohl, surma), spices from specific regions (e.g., turmeric), and older painted toys or jewelry.

SOIL: Soil around older homes (from exterior paint) or near busy roadways (historical residue from leaded gasoline).

Practical Next Steps + Supportive Options

The following nutrients and lifestyle factors are known to support the body's normal elimination pathways. This information is provided for educational purposes and should be discussed with a healthcare provider to determine whether it is applicable to your specific health history.

REDUCE POTENTIAL EXPOSURE: Common strategies to reduce exposure include using a water filter certified (NSF 53) for lead removal and running cold tap water for 1-2 minutes before using it for drinking or cooking.

SUPPORT MINERAL COMPETITION: Nutrients that compete with lead absorption include calcium, iron, and zinc. Maintaining adequate levels of these minerals are common strategies to help prevent the body from absorbing lead in their place.

SUPPORT ELIMINATION: Foods rich in Vitamin C (citrus, peppers, strawberries) can help increase the excretion of lead. Pectin (found in apples and pears) and other soluble fibers support digestive clearance.

STEADY HYDRATION AND PROTEIN INTAKE: Adequate protein helps transport minerals, while hydration supports kidney filtration.

REINFORCE OVERALL REGULATION: Maintaining balanced meals, restorative sleep, and regular movement helps the body manage energy, stress, and mineral utilization.

CONSIDER FURTHER ASSESSMENT: A repeat Hair Mineral Analysis tracks long-term excretion. If acute exposure is suspected, a clinician-ordered blood lead test may be advisable for assessing current exposure levels.



ELEVATED ALUMINUM (Al)

Aluminum (Al) is the most abundant metal in the earth's crust and is frequently encountered in daily life through food additives, consumer products, and water treatment. Research confirms that aluminum serves no biological function but actively competes with magnesium, iron, and calcium for binding sites.

Because of its chemical behavior, aluminum can mimic these essential minerals and cross the blood-brain barrier. This interference disrupts cellular energy production (which depends on magnesium) and can impair systems critical for cognitive function, bone mineralization, and neurological health.

Body System Interplay

Heavy metals often act across several systems at once. Some research findings on aluminum's potential physiological impacts are described below:

NERVOUS SYSTEM: Aluminum can cross the blood-brain barrier and accumulate in neural tissue. Research associates this accumulation with increased oxidative stress and potentially neuro-inflammation.

ENERGY PRODUCTION: Because it displaces magnesium in ATP-dependent enzymes, aluminum exposure has been linked to reduced efficiency in cellular energy production.

BONE HEALTH: By competing with calcium and binding phosphorus, aluminum impairs bone remodeling. Literature has linked chronic retention to reduced bone density and structural integrity.

DIGESTION: Aluminum is known to inhibit smooth muscle contraction (which requires magnesium), potentially influencing bowel motility. It also binds dietary minerals, reducing their absorption.

Common Sources of Exposure

The below are common sources of environmental exposure to aluminum:

PERSONAL CARE: Many antiperspirants use aluminum salts (e.g., aluminum chlorohydrate) to block sweat ducts.

FOOD ADDITIVES: Aluminum compounds are common in baking powders (leavening agents), anti-caking agents in salt/spices, and emulsifiers in processed cheeses.

COOKWARE & STORAGE: Uncoated aluminum pans, baking sheets, and aluminum foil, especially when used with acidic foods (like tomatoes or lemon) or high heat.

MEDICATIONS: Many antacids use aluminum hydroxide to neutralize stomach acid. Buffered aspirin and some vaccines (adjuvants) also contain aluminum compounds.

WATER: Aluminum sulfate (alum) is frequently used as a flocculant in municipal water treatment plants to clarify water.

Practical Next Steps + Supportive Options

The following nutrients and lifestyle factors are known to support the body's normal elimination pathways. This information is provided for educational purposes and should be discussed with a healthcare provider to determine whether they are applicable to your specific health history.

REDUCE POTENTIAL EXPOSURE: Common strategies to reduce exposure include switching to aluminum-free deodorants and replacing aluminum cookware with stainless steel, cast iron, or ceramic. It is also often recommended to avoid baking powder containing "aluminum sulfate" and limit the use of aluminum foil for cooking acidic foods.

SUPPORT MINERAL COMPETITION: Magnesium is the primary metabolic competitor to aluminum. Maintaining optimal magnesium levels helps prevent aluminum from binding to ATP and other enzymes.

SUPPORT ELIMINATION (SILICA): Silica (found in mineral water, bamboo extract, or horsetail) is unique in its ability to bind aluminum and facilitate its excretion through urine. Hydration with silica-rich water is a common supportive strategy.

SUPPORT NATURAL CLEARANCE: Malic acid (found naturally in apples and often taken as magnesium malate) has a high affinity for aluminum and is sometimes used to support its clearance from tissues.

REINFORCE OVERALL REGULATION: Maintaining balanced meals, restorative sleep, and regular movement helps the body manage energy, stress, and mineral utilization.

CONSIDER FURTHER ASSESSMENT: A repeat Hair Mineral Analysis may be helpful in tracking long-term trends. Because aluminum is largely excreted by the kidneys, ensuring healthy renal function is important for clearance.



ELEVATED NICKEL (Ni)

Nickel (Ni) is a metal found widely in the environment, food, and industrial applications. While trace amounts may have biological activity, elevated levels are often associated with environmental or occupational exposure. Research confirms that nickel is chemically similar to iron and can compete with zinc and magnesium for binding sites in the body.

Because of this molecular mimicry, nickel can displace these essential nutrients in enzyme systems and cell membranes. This interference disrupts cellular defense mechanisms and can impair systems critical for skin health, kidney function, and oxidative stress management.

Body System Interplay

Heavy metals often act across several systems at once. Some research findings on nickel's potential physiological impacts are described below:

SKIN: Hypersensitivity: Nickel is the most common cause of contact dermatitis (allergic skin reaction). Systemic absorption can trigger flare-ups in sensitive individuals, manifesting as eczema or rashes.

BREATHING: Tissue Irritation: Breathing nickel dust or fumes is associated with inflammation of the respiratory tract. Chronic exposure is linked in research to lung tissue stress and reduced defense mechanisms.

KIDNEYS: Filtration Stress: The kidneys are the primary route of excretion for absorbed nickel. Research indicates that high levels can increase oxidative stress on the kidneys and potentially impact filtration efficiency.

IMMUNE SYSTEM: Inflammatory Response: Nickel is known to activate specific immune pathways (T-cells). This activation can lead to chronic inflammation and hypersensitivity reactions.

Common Sources of Exposure

The below are common sources of environmental exposure to nickel:

JEWELRY & CLOTHING: Costume jewelry, watch bands, belt buckles, zippers, and snaps often contain nickel alloys. Prolonged skin contact is a primary source of sensitization.

DIETARY SOURCES: Foods grown in nickel-rich soil (e.g., cocoa, soy, nuts, oats, and hydrogenated oils) can contain higher levels. Stainless steel cookware can also leach nickel into acidic foods.

PERSONAL CARE: Eyelash curlers, tweezers, and razors may release nickel. Some cosmetics (eyeliners, shadows) may contain nickel as an impurity in pigments.

TOBACCO SMOKE: Tobacco plants accumulate nickel from the soil. Smoking (and second-hand smoke) delivers nickel directly to the lungs, where absorption is highly efficient.

INDUSTRY & HOBBIES: Electroplating, welding, battery manufacturing (Ni-Cd), and handling coins or keys.

Practical Next Steps and Supportive Options

The following nutrients and lifestyle factors are known to support the body's normal elimination pathways. This information is provided for educational purposes and should be discussed with a healthcare provider to determine whether it is applicable to your specific health history.

REDUCE POTENTIAL EXPOSURE: Common strategies to reduce exposure include switching to nickel-free jewelry and clothing fasteners (look for "hypoallergenic"), using stainless steel cookware marked "nickel-free", or switching to glass/ceramic. It is often recommended to avoid smoking and minimize exposure to second-hand smoke.

SUPPORT MINERAL COMPETITION: Low iron stores can increase nickel absorption, and ensuring iron sufficiency is frequently recommended. Similarly, zinc competes with nickel for absorption and binding sites, helping to protect enzyme function.

SUPPORT NATURAL CLEARANCE: Vitamin C is known to form complexes with nickel, and is often recommended to reduce its retention and aid in excretion.

SKIN BARRIER PROTECTION: For those with skin sensitivity, creating a barrier (e.g., clear nail polish on buttons) or using protective gloves when handling metals is often recommended to prevent reactions.

REINFORCE OVERALL REGULATION: Maintaining balanced meals, restorative sleep, and regular movement helps the body manage energy, stress, and mineral utilization.

CONSIDER FURTHER ASSESSMENT: A repeat Hair Mineral Analysis tracks long-term trends. If allergic reactions are suspected, a dermatologist can perform patch testing to confirm nickel sensitization.