

HEAVY METAL DETECTION AND THE CONCEPT OF CHELATION INFORMATION FOR HEALTH CARE PROVIDERS

Chelation removes stored metals by binding them avidly and promoting excretion. Chelation carries inherent risks including unintended chelation of metals necessary for physiologic processes and redistribution of sequestered metals to the central nervous system and other tissues. Circulating heavy metal concentrations often return to pre-chelation levels after treatment. In spite of these risks, chelation garners broad support from lay media and for-profit websites.

If you need immediate assistance in evaluating a potentially serious exposure to a metal,
contact the [MN Poison Control System](https://www.mnpoisoncontrol.com) at 1-800-222-1222.

What to know before talking with your patients

Metal toxicity is rare. Heavy metal toxicity does not typically occur in the absence of an extraordinary exposure. MDH can assist in identifying possible exposures. Examples of typical exposures include:

- Occupational exposures: e.g. recycling metals, specialized alloy welding, instrument manufacture or repair, use of heated or fuming metals, fishing tackle or ammunition manufacturing, artisan metal work.
- Use of alternative or ethnic medicines: e.g. skin-lightening creams (mercury), Ayurveda (heavy metals), in addition - in the past some imported ethnic candies have been found to have high lead content.
- High consumption of large predatory fish.
- High levels of arsenic in well water (all private wells should be tested).

Even if a clinically significant metal exposure is suspected or possible, the differential diagnosis should remain broad until definitive proof of exposure and toxicity is obtained.

- Removal from exposure is always firstline therapy for suspected metal toxicity.
- Chelation is almost never a firstline treatment for documented metal toxicity. It is known to be of no value in many cases, and known to cause harm in others.^{1,2,3}
- Chelation during ongoing exposure is without benefit and is potentially dangerous.
- There is no singular “chelation therapy” for all metal exposures.
 - Determining the need for chelation, and choosing the appropriate chelator, depend on a number of factors including:
 - A verified exposure and its chronicity;
 - The toxic metal identified (in some instances the metal species is also critical);
 - Laboratory, historical, and clinical evidence of toxicity.
- Nonspecific metal “screening” is of no value; a specific known exposure, or a constellation of symptoms and objective findings, may suggest a need for directed testing.
 - Testing in response to nonspecific symptoms, or testing in the absence of a suspected exposure is of no value.
 - Results of nonspecific metal screenings are easily misinterpreted and may lead to further testing and potentially harmful treatments in the absence of underlying toxicity.
 - Hair and nail analyses are typically restricted to research projects as they are easily misinterpreted due to environmental contamination, technique variability, reference variability, and metal species specificity.
- “Provoked” urine testing refers to urine screening, often for multiple metals, after the administration of a chelating agent.
 - Provoked testing predictably returns urinary levels of chelated metals in excess of “normal” ranges.⁴

¹ Brown MJ et al. *Deaths resulting from hypocalcemia after administration of edetate disodium: 2003-2005*. Pediatrics. 2006 Aug

² Wax PM. *Current use of chelation in American health care*. J Med Toxicol. 2013

³ Dietrich KN et al. *Effect of chelation therapy on the neuropsychological and behavioral development of lead-exposed children after school entry*. Pediatrics. 2004 Jul.

⁴ Ruha AM. *Recommendations for provoked challenge urine testing*. J Med Toxicol. 2013

- The results of provoked urine studies have no role in determining the body's burden of toxic metals, nor the need for chelation therapy.

Disease-specific Concerns

- Chelation therapy is an inappropriate, ineffective, and potentially dangerous treatment of autism spectrum disorders (ASD).
 - A large body of evidence refutes any association between thimerosal and ASD.
 - For-profit entities and providers whose practices are inadequately informed by available evidence continue to peddle inappropriate and potentially harmful chelation therapies for ASD.^{5,6}
 - Similar to other children, children with ASD are at risk for elevated blood levels of heavy metals, for which testing and treatment should be undertaken, when indicated, on an individual basis.
- The most recent [data](#) evaluating chelation for atherosclerotic disease are colored by [methodological concerns](#).^{7,8} Chelation remains an [investigational treatment](#) that is not recommended for improving symptoms or reducing cardiovascular risk in patients with SIHD [stable ischemic heart disease].⁹
- Over-the-counter (OTC) chelation products are ubiquitously advertised to treat a wide variety of maladies, and are frequently identified as potential consumer hazards.¹⁰ Data to support their use in these contexts is lacking.
 - The Food and Drug Administration has taken action against manufacturers of these products due to claims of treating specific diseases in the absence of FDA oversight.
 - Many are marketed specifically for use in children; none are supported by the scientific literature.
 - The use of OTC chelation products should be strongly discouraged.

Recommendations for Doctors

- Call your local Poison Center at 1-(800) 222-1222. The [Minnesota Poison Control System](#) provides immediate access to expert consultation around the clock, every day of the year.
- [MDH](#) has expertise in identifying possible sources of metal exposure, in understanding the behavior of metals in the body, and in evaluating biomarkers of metal exposure.
- [The American College of Medical Toxicology](#) (ACMT) has published a series of *Choosing Wisely* [guidelines](#) referencing chelation and provoked testing. Physicians should become familiar with these guidelines and the data behind them.
 - ACMT guidelines recommend *against* heavy metal “screens” for nonspecific symptoms in the absence of known excessive exposure, *against* provoked urine heavy metal testing, and *against* hair and nail testing in patients with nonspecific symptoms.
- Talk with your patients about the difference between laboratory *evidence* of the presence of toxic metals and *toxicity* resulting from excessively elevated metal levels.
- Educate your patients on the very limited efficacy of chelation therapy: **only** in cases of known exposure, **only** in cases of documented high levels, **only** once exposure has been eliminated, **only** in collaboration with a medical doctor, and ideally in consultation with a medical toxicologist.
- Counsel your patients to avoid the use of [over-the-counter chelating agents](#), especially in their children.

This information was put together as a joint project between the Minnesota Department of Health/[Site Assessment and Consultation Unit](#) and the [Minnesota Poison Control System](#).

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⁵ Brent J. *Commentary on the abuse of metal chelation therapy in patients with autism spectrum disorders*. J Med Toxicol. 2013

⁶ Institute of Medicine. (2004). *Immunization safety review: Vaccines and autism*. Retrieved from <https://www.iom.edu/Reports/2004/Immunization-Safety-Review-Vaccines-and-Autism.aspx>

⁷ Lamas GA et al. *Effect of disodium EDTA chelation regimen on cardiovascular events in patients with previous myocardial infarction*. JAMA. 2013 Mar 27

⁸ Nissen, JA. *Concerns about reliability in the Trial to Assess Chelation Therapy (TACT)*. JAMA. 2013 Mar 27

⁹ Fihn SD et al. *2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons*. J Am Coll Cardiol. 2012

¹⁰ Lee CE. *Federal regulation of unapproved chelation products*. J Med Toxicol. 2013

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URL REFERENCE LIST:

- Minnesota Poison Control System - <http://www.mnpoison.org/>
- predictably returns urinary levels of chelated metals - http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3846974/pdf/13181_2013_Article_350.pdf
- data - <http://jama.jamanetwork.com/article.aspx?articleid=1672238&resultClick=3>
- methodological concerns - <http://jama.jamanetwork.com/article.aspx?articleid=1672219&resultClick=3>
- investigational treatment - <http://auth.acc.org/accfederatedlogin/sso?SP=https://sp.silverchair.com/jacc/production/shibboleth&src=Silverchair&SSO=True&targeturl=/journals.aspx&targeturl=/article.aspx?articleid=1136740>
- Minnesota Poison Control System - <http://www.mnpoison.org/>
- MDH - <https://www.health.state.mn.us/communities/environment/water/wells/waterquality/index.html>
- The American College of Medical Toxicology - <http://www.acmt.net/>
- Choosing Wisely guidelines - <http://www.choosingwisely.org/wp-content/uploads/2015/02/ACMT-AACT-Choosing-Wisely-List.pdf>
- over the counter chelating agents - <http://www.fda.gov/downloads/ForConsumers/ConsumerUpdates/UCM229436.pdf>
- MDH/Site Assessment and Consultation Unit - <https://www.health.state.mn.us/communities/environment/hazardous/index.html>
- Minnesota Poison Control System - <http://www.mnpoison.org/>