

Arsenic, Cadmium, Lead, and Mercury in Sweat: A Systematic Review

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This article has 52 references.

To adequately address this toxin/sweating issue, the authors searched Medline, Embase, Toxline, Biosis, and AMED, with no restriction on date or language.

KEY POINTS FROM THIS ARTICLE:

- 1) Toxic elements are implicated in many serious chronic conditions.
- 2) "No person is without some level of toxic metals in their bodies, circulating and accumulating with acute and chronic lifetime exposures."
- 3) "Arsenic, cadmium, lead, and mercury exposures are ubiquitous. These toxic elements have no physiological benefits." "Arsenic, cadmium, lead, and mercury have no known beneficial effect in humans."
- 4) "With toxic elements ubiquitous in our air, water, food, and the physical environment, as well as in many consumer products, prudent avoidance is not always possible."
- 5) Arsenic, cadmium, lead, and mercury are "confirmed or probable carcinogens, and they exhibit wide ranging toxic effects on many bodily systems, including the nervous, endocrine, renal, musculoskeletal, immunological, and cardiovascular systems."
- 6) "Children and the fetus are most at risk of harm [from exposure to these toxic elements], with early exposures potentially predisposing the youngster over his/her lifetime to multisystem ailments, as well as lower IQ and dysfunctional behavior."
- 7) "In older populations [exposure to these toxic elements], there is increased likelihood of early cognitive decline, as well as a range of conditions including kidney and cardiovascular disease, diabetes, and osteoporosis."
- 8) The physiological process of sweating is a low risk method of "cleansing." "An often overlooked route of excretion of toxicants is via the process of sweating." "Sweating deserves consideration for toxic element detoxification."

- 9) Cadmium accumulates in foods grown in locations with high levels fertilizer use, including shellfish, grains and brassicas (include broccoli, cauliflower, cabbage, choy sum, rutabaga, turnip).
- 10) "Tobacco avidly accumulates cadmium and lead from soil, making smoking a major source of exposure."
- 11) Arsenic, cadmium, lead, and mercury are integral in many products, including electronics, batteries, and alloys:
- Arsenic from precious metal mining and refining
 - Arsenic as a wood preservative
 - Arsenic in veterinary drugs

 - Mercury from chloralkali production (the process of producing chlorine)
 - Mercury in switches
 - Mercury in thermometers
 - Mercury in dental amalgams
 - Mercury in preservatives
 - Mercury in light bulbs and lamps
 - Mercury in from burning coal and other incineration, including cremation
 - Mercury accumulates in fish and seafood

 - Lead and cadmium from mining
 - Lead in gasoline
 - Lead in paint
- 12) "Although signs and symptoms of chronic disease are consistent with effects of arsenic, cadmium, lead, and/or mercury, physicians commonly have a low index of clinical suspicion, and therefore levels of toxic elements are seldom investigated."
- 13) The ill effects of these toxic elements are synergistic. "Renal toxicities of mixtures of lead plus mercury are greater than would be predicted knowing the toxicity dose response of the individual elements."
- 14) "Neurological toxicities of mixtures of lead plus arsenic, lead plus methylmercury, and lead plus cadmium are supra-additive."
- 15) All patients presenting with hypertension or any vascular disease should be assessed for mercury.
- 16) Along with essential minerals, sweat is an acknowledged excretory route for toxic metals.
- 17) With sweating, arsenic dermal excretion is several-fold higher in arsenic-exposed individuals than in unexposed controls.

- 18) With repeated saunas high mercury levels can be normalized.
- 19) Increasing the thermal load on the body activates heat loss mechanisms including increased circulation throughout the skin and sweating.
- 20) A number of studies have shown the presence of toxic metals in sweat, including arsenic, cadmium, lead, and mercury. "Sauna increased excretion with sweat," and as such "sauna is recommended."
- 21) Sweat may be an important route for excretion of toxic ions. "Sauna bathing might provide a therapeutic method to increase elimination of toxic trace metals."
- 22) "Sweating should be the initial and preferred treatment of patients with elevated mercury urine levels."
- 23) "Arsenic, cadmium, lead, and mercury may be excreted in appreciable quantities through the skin," which is enhanced with sweating.
- 24) Sweating may be a means of excretion of metals complexed with natural or synthetic chelating agents.
- 25) "Vitamin E, zinc, and other nutrients are required for methylation and detoxification of arsenic within the body."
- 26) Occupational exposure to lead and other toxic elements that may be absorbed via the skin, supports showering at work and suggests the possibility of purging workers' skin by washing with a chelating agent like EDTA.
- 27) Sweating is a long-standing aspect of mercury detoxification.
- 28) Sweating enhances excretion of the toxic elements and also increases excretion of diverse toxicants such as persistent flame retardants and bisphenol-A.
- 29) Combination therapies, such as administration of *n*-acetyl cysteine, vitamin C, a chelating agent, along with sauna and/or exercise therapy to induce sweating, may be fruitful avenues of investigation.
- [N-acetyl cysteine boosts glutathione levels; glutathione binds with toxins through a process termed S-conjugation, making the toxin water-soluble, enhancing elimination, especially with sweating].**
- 30) Sweating assists "with removal of toxic elements from the body."

COMMENTS FROM DAN MURPHY

After reading the 2002 book *Detoxify or Die* by physician Sherry Rodgers, we have incorporated the use of an infrared sauna into our standard health regime. These toxins disrupt the neuroendocrine systems of the body. The modern toxin burden is an issue that neither DD nor BJ Palmer had to deal with.