Why Hasn't Mercury Dental Amalgam Been Banned?

Misconceptions in Mercury Science

Mercury science is complicated. The following common misconceptions help perpetuate the myth that mercury dental amalgam is safe.

1. Mercury's toxic mechanism is unusually broad.

Mercury causes general oxidative damage, as in rapid aging. Mercury binds to reduced sulfur, which is ubiquitous in the body, particularly at active sites of enzymes and transport proteins. These molecular mechanisms are so broad that the resulting symptoms are myriad, non-specific, and idiosyncratic -- thus difficult to diagnose.

2. Mercury exposures are ubiquitous.

Sources include dietary fish, dental amalgams, air pollution, vaccines, and *in utero* exposures. Much is iatrogenic. Multiple exposure routes muddy the results of population studies of any single source.

3. There is no reliable metric.

Due to the toxicological principles described next, there is no reliable measure of mercury body burden, short of autopsy.

4. The medical literature overlooks fundamental principles of toxicology.

Most medical textbooks neglect chronic mercury poisoning -- covering mercury poisoning as if it's seen only in acute or occupational exposures -- thus physicians fail to consider the low-dose, chronic condition.

Many medical textbooks list three diagnostic criteria required for a finding of mercury poisoning -- 1) symptoms; 2) exposure; and 3) a finding of elevated blood or urine mercury. The latter requirement overlooks the following **fundamental principles of toxicology:**

a. Partitioning -- Mercury partitions into different body compartments (preferring the brain and organs), with each compartment having different detox capacities. Blood and urine levels have no relation to brain or organ levels, particularly in any individual.

b. Stocks and flows -- Even if blood or urine levels are low, the brain compartment may be stockpiling mercury.

c. Feedback loops -- Once mercury disables key detoxification enzymes, excretion is impaired and retention is increased.

d. Biotransformation -- Both mercury vapor and organic mercury travel easily through the body, settling preferentially in the brain, where they are oxidized to inorganic mercury and are thus trapped inside the neurons.

e. Synergy -- Mercury toxicity is synergistic with lead and other toxins such that toxicities can occur at exposures that are orders of magnitude lower than those for individual toxins.

f. Biochemical individuality -- Mercury toxicity is individualized -- it's a function of other toxic burdens, nutritional status, and detox genes (of which there are at least ten, most of which are poorly understood).

Unfortunately, only specialized toxicology textbooks cover these seemingly common-sense concepts.

5. Epidemiology is ill-suited to investigating chronic mercury poisoning.

Good science first requires recognition of a problem, yet most epidemiological studies of mercury (like most medical textbooks) fail to recognize the complexity of mercury's toxicity as described above. Most studies rely on blood or urine levels that are almost meaningless; they ignore total exposures (which are virtually unknowable); and they neglect genetic susceptibilities.

Practically speaking, epidemiology is too weak a tool to investigate reliably such a complex issue. Lab science is more appropriate. Yet epidemiology is the preferred tool of policymakers, who tout negative epidemiology studies as proof of safety, even when these studies have asked the wrong questions.

6. Mercury is the elephant in the room.

In addition to the technical hurdles described above, political hurdles to mercury investigation stem from the iatrogenic nature of many exposures. To insiders, mercury is the elephant in the room -- ignored and avoided lest one get hurt.