Hello and Welcome to Dr. Lyn's Patient Handout Disk

On this disk you will find pertinent information that Dr. Lyn wants to share with all of her patients.

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Seattle Post Intelligencer | Thursday, March 22, 2001

‘We are walking, talking toxic waste sites’

Human bodies are being polluted by everything from nail polish to soap, CDC survey finds

By Joan Lowy
Scripps Howard News Service

In the first nationwide attempt to measure pollution in people’s bodies, the federal Centers for Disease Control and Prevention yesterday reported finding surprisingly high levels of toxic chemicals commonly used in nail polish, shampoo and soap.

Elevated levels of the chemicals, known has phthalates, have been shown in studies for more than 20 years to cause birth defects in the male sex organs of laboratory animals, as well as low sperm counts and testicular atrophy.

A study published in September last year by two professors from the university of Puerto Rico found elevated levels of phthalates in young girls with premature breast development.

The CDC survey, which is based on tests of blood and urine samples from 3,800 people in 1999, also found evidence of widespread pesticide contamination, including especially high levels of contamination for a small number of people, The data seems to indicate people are being exposed to pesticides more regularly than previously thought, health experts said.

The survey also found that 10 percent of young children and women of child-bearing age tested had levels of mercury close to where people may be expected to begin to show health damage, public health experts said.

Mercury is a reproductive and neurological toxin frequently found in fish. The National Academies of Science estimated last year that 60,000 children are born each year with elevated levels of mercury. The new CDC data suggests that is an underestimate, health experts said.

The survey contained some good news: A sharp decline in the levels of lead in children and women of child-bearing age and a 75 percent reduction in cotinine, a byproduct of second hand smoke. Both decreases were attributed to aggressive government campaigns to reduce lead and secondhand smoke in the environment.

‘The CDC report shows pollution is personal,” said Nancy Evans, a spokeswoman for the Breast Cancer Fund. ‘It’s not jus tout there … It’s in you, it’s in me, it’s in all of us. We are walking, talking toxic waste sites.”

Overall, the survey tested for 27 toxic substances, including seven phthalates, chemical plasticizers frequently found in industrial solvents, cosmetics, soaps, hair-care products and pacifiers.

The CDC study found small amounts of phthalates in all 289 children and women of child-bearing age who were tested. The findings indicate Americans are being contaminated with phthalates on a regular basis, public health experts said.

Some environmental and public health groups have called for a ban on the use of some phthalates. But the National Toxicology Program -- a federal task force – last year recommended against a ban on the grounds that human exposure to the chemicals is extremely limited. The CDC report appears to contradict that.

The survey “data alone is not an indication that anybody’s health is being impaired.” Said Sandra Tierey, a spokeswoman for the American Chemistry Council, a chemical industry trade association. “The health significance of (testing) data is virtually impossible to interpret without toxicity research that can help deter potential health hazards.”

Since the petrochemical industry started around World War II, as many as 85,000 new chemicals have been manufactured and released into the Environment and another 1,000 chemicals are introduced each month.

Many public health experts believe there is a relationship between man-made chemicals in the environment and increased instances in recent years of asthma, Parkinson’s Disease, reproductive disorders low sperm counts, genital defects in male infants, breast cancer, childhood leukemia, brain tumors, attention deficit disorder, autism, dyslexia and chronic disease.

The CDC plans to eventually expand its surveys to 100 toxic substances.

Behavioral Effects and Heavy Metal Toxins: Preparation for June WMA Speaker

Adapted from Article, "Behaviroal Abnormalities Associated with Various Heavy Metal Toxins" in *Townsend Letter for Doctors and Patients*, April 2001, presented by Extended Health.

Our upcoming June speaker, Dr. Lynn Hanshew, MD, will address the issue of heavy metals and mental health. In preparation for her talk, use this list to familiarize yourself with the toxicity symptoms of some metals.

Aluminum: Chronic fatigue (CFS); weakness, malaise; speech disorders; poor concentration, attention deficits (ADHD), response inhibition; poor memory (short term, verbal and auditory); dementia, pre-senile and senile dementia; stupor; decreased locomotor activity; convulsions, seizures.

Arsenic: Depression, mood swings, flat affect; impaired facial recognition; chronic fatigue syndrome (CFS), weakness, malaise, anorexia; symptoms reflecting eating disorders, loss of appetitie/weight; mental retardation, borderline intelligence; stupor; abnormal sensations in the mouth and extremities; hearing loss, difficulty hearing; abnormal touch sensations; diminished touch sensations, aversion to touch; blurred vision, sensitivity to light; decreased locomotor activity, convulsions, seizure

Cadmium: Chbronic fatigue (CFS); weakness, malaise

Copper: Depression, mood swings, flat affect; impaired facial recognition; irritability, aggressive behaviors, temper tantrums; suidical behaviors, chronic fatigue (CFS), weakness, malaise; uneven preformance on IQ scored, low IQ scores; choeiform movements, myoclonal jerks, unusual postures, difficulty walking or swallowing or talking; convulsions, seizure

Mercury: Social deficits, social withdrawal, repetitive, perseverative, stereotyped behaviors; OCD-typical behaviors; depression, mood swings, flat affect, impaired facial recognition; schizoid tendencies, hallucinations, delirium, suicidal behaviors, irritability, aggressive behaviors, temper tantrums, sleep difficulties/disturbances, chronic fatigue, weakness, malaise, anorexia, symptoms reflecting eating disorders, loss of appetite/weight, attentional problems (ADHD), lacks eye contact, impaired visual fixation, speech disorders, loss of speech, developmental problems with language, speech comprehension deficits, dysarthria; articulation problems; slurred speech, unintelligible speech, mental retardation, borderline intelligence, hearnings, difficulty hearing, blurred vision, sensitivity to light, choreiform movements, myoclonal jerks, unusual postures, difficulty walking or swallowing or talking; flapping, circling, rocking, toe walking; problems with intentional movements or imitation, abnormal gait/posture, incoordination, loss of balance; problems sitting, lying, crawling, and walking, convulsions, seizure.

Lead: Depression, mood swings, flat affect; impaired facial recognition, Irritability, aggressive behaviors, temper tantrums; sleep difficulties/disturbances; chronic fatigue (CFS); weakness, malaise; anorexia; symptoms reflecting eating disorders, loss of appetite/weight; attentional problems (ADHD), lacks eye contact, impaired visual fixation; mental retardation, borderline intelligence; uneven preformance on IQ scores, low IQ scores, poor concentration, attention deficits (ADHD), response inhibition; poor memory (short term, verbal and auditory); impaired reaction time; lower performance on timed tests; hearing loss, difficulty hearing, convulsions, seizure.

Thallium: Sleep difficulties/disturbances; chronic fatigue (CFS); weakness, malaise; anxiety; nervous tendencies; convulsions, seizure

X metals: Difficulties understanding abstract ideas; difficulty carrying out complex commands.

Buying Organic

If you wonder what organic food to buy when you can't find or afford to buy all organic, here are some guidelines.

"Ten foods to absolutely buy organic are listed in the *Vegetarian Times* of June 2001. These foods are most likely to have pesticide, herbicide or fumigant residues, some of which are neurotoxic or carcinogenic. These noxious chemicals linger on foods even after thorough washing and are especially concentrated on the outsides of the produce. The suspect ten are:

- Apples
- Bell peppers
- Cucumbers
- Green Beans
- Peaches
- Pears
- Spinach
- Strawberries
- Tomatoes
- Winter Squash

"Furthermore, many experts believe the problem isn't how much of any one chemical we ingest from a particular vegetable. You must look at multiple exposures to pesticides" the *Vegetarian Times* goes on to say. And worse yet, weaker standards in other countries often permit unacceptable levels of pesticides or the use of chemicals that have been banned in this country.

For more information, you can look at the *Consumer Report* website which is *www.consumersunion.org*.

Chronic Fatigue Syndrome

Chronic Mercury Poisoning

A young man, full of hope and life, t fell into 11 years of chronic fatigue syndrome. CFS officially has no known cause, and no known cure. After struggling to have a happy life, battling Candida albicans and CFS, I made a startling discovery, t was not Just ill, I had been poisoned! My story follows.

I moved to Portland, Oregon in 1983 after graduating from college in Montana. Financially, 1 had to struggle through school: food, books and tuition were my priorities, with very little money left for other life needs and wants.

At graduation I was 23, and strapping healthy. There was only one exception to my excellent health, bad teeth. During childhood I had developed a large number of serious cavities, resulting in 13 teeth with major fillings.

By the end of college many of these fillings were eroded, crumbling and falling out. The university health clinic dentist repeatedly did patch work, admonishing me that I needed to go get things fixed property, t assured him, when I had the money, I would.

I started work at Tektronix, Inc. in Beaverton, OR in May 1983. Six months later my dental plan vesting was completed, and I began having my teeth fixed. In a 3 month period, each and every filling was replaced. When it was over I was proud of my teeth. My dentist did
excellent work. The chewing surfaces in my mouth were restored to great condition.

Three months later I started having a sore throat, sniffles, and some fatigue, not unlike a flu. My new job produced stress because of the demands of meeting a product development schedule, and because of my own demands to prove myself in my career.

After about three months of this persistent flu like condition I went to see an MD. He looked in my throat and saw redness and a white coating. I told him that the condition had already persisted for some months. He gave me a 2 week course of antibiotics and
said to check back if that didn't clear up the condition. A month later I went back with a sore throat that was worse than before the treatment.

The second time he gave me a 2 week course of Amoxicillin, a broad spectrum antibiotic. By the time this second treatment was completed I had developed runny stools and diarrhea.

For the longest time the sore throat still persisted, and slowly, almost imperceptibly, my strength began slipping away. I also began to notice inconsistent bowel movements.

By 19^6 my symptoms were an exact match for CFS. I was having night sweats, swollen lymph glands, loss of memory, constant headaches, inability to concentrate, numerous vague aches and pains, extreme fatigue, a high level of anxiety and emotional instability.

My life consisted of fighting through work each day, and collapsing on the sofa in the evening. Sleep, that refreshing friend, could not revive my energies, no matter how long I rested. Work was all I could muster. Off hours and weekends were spent attempting to
rest and recover.

My girlfriend, now my wife, Carmen, wondered how we would ever have a life together. We wanted children, and many other happy things. If all I had energy for was work, how could I help raise children ? have a home ? have a happy life together ?

I went to several doctors. Yes, there were Epstein-Barr titers, but no sign of active virus. Endocrinology checked out. Blood chemistry revealed a perfectly normal 26 year old. At some point I was tested for AIDS, even though my risk level was in the extremely low
category. With no great surprise, AIDS wasn't the cause either.

My doctor decided it must be stress, it must be psychosomatic, it must be in my head. He gave me the name of a psychologist on "pill hill", maybe he could help. I never went.

Of course I was stressed out. There was something drastically wrong with me, and no one could figure out what it was. I was a young man, I had so much life to live. I had to begin resigning myself to a life of chronic fatigue.

I weighed in at a muscular 190 pounds in 1983. At the end of 1986 my weight was down to 150 pounds. Food didn't work for me any more. I ate vigorously, enormous amounts to retain weight. All of this eating just barely kept me alive, moving quickly through my body.

Carmen and I started to notice a pattern in my symptoms. Whenever I would eat something sweet, or drink a soda pop, all of my symptoms would go off together like a 3 alarm fire. This reminded Carmen of a girlfriend who had developed chronic yeast infections.

We picked up the "Yeast Connection" book, and the name of a Natural Path who had helped the friend recover. This began my odyssey into the fringes of conventional medicine.

There were some strong clues supporting the yeast theory. Eliminating all forms of sugar, and testing myself for food allergies helped to stabilize my situation. Some stool tests bore yeast and convinced us that somehow yeast had taken over my body chemistry.'

Mv illness gained a focus, it became a pitched battle with chronic yeast infection. The center of my yeast problem was my lower intestine. I became an expert on how to kill those little buggers in my gut, and it helped. My energies increased a little, and my symptoms eased somewhat. In 1988 Carmen and I decided to marry. We had a life characterized by less than normal energy, and burdened with an onerous picky diet, but we had a life.

My Natural Path kicked me out because she couldn't see any way to progress me further. I was now in maintenance mode.

Never giving up the desire for a cure, I tried a few more doctors. We found some MD's who would prescribe Nizoral and other prescription yeast killing drugs. A couple rounds of this stuff brought me up another level of health, but still didn't cure me. The only proof I needed of not being cured was to stray from my diet.

If I were to have something sweet, I'd be very sick again. The drugs are not a long term solution, because they will destroy your liver if you keep taking them. When I went off the yeast drugs my symptoms would slowly ratchet up again.

In 1992 we had our first daughter. Gradually, by 1994, 4 of my largest dental fillings had been replaced with crowns, and my physical life was more stable. I was the best I had been since early 1983. I was not cured, but I was no longer desperate.

A friend heard a nutritionist speaking on the radio. This expert was talking about chronic yeast infections. The nutritionist contended there is an underlying reason for people not being able to shake chronic yeast.

I hadn't been able to shake chronic yeast by any method, conventional or unconventional, after 8 years of trying. My attention was riveted. The nutritionist believes that heavy metal poisoning is the real culprit.

Astonishingly, almost the entire baby boom generation, including me, has been systematically and routinely exposed to one particular heavy metal, mercury.

Mercury is 50% of the material found in mercury amalgam dental fillings, the most common dental filling material. Mercury amalgam fillings have been around for 160 years for those who could afford restorative dentistry.

Our parents generation was the first to be wealthy enough to afford extensive "modern" dental care for their children. Consequently, our generation is the first to be almost completely exposed to mercury amalgam dental fillings,

98% of the US population between ages 35 and 44 has experience with mercury amalgam dental fillings in their teeth.

My mind went back to 1983. All this time it had been my dental fillings making me sick !

Presentation on EPA's Proposed Regulations for Zinc Fertilizers Made From Recycled Hazardous Wastes

Public Hearing
November 29, 2001

4

ORIGINAL

Presentation Outline

- How fertilizers are regulated
- EPA's fertilizer studies
- Content of proposed rule

How are fertilizers regulated?

- State agriculture agencies have primary responsibility to regulate fertilizer contents
- Only Washington, Texas, California have comprehensive state regulations on fertilizer contaminants
- Fertilizers made from recycled hazardous wastes are regulated by EPA, states under the Resource Conservation and Recovery Act (RCRA)
- Limited EPA authority to regulate other fertilizers

Current RCRA Regulations on Fertilizer Recycling

- Regulated more stringently than most recycling practices:
- Controls on handling of hazardous wastes prior to recycling
  - Permits required for waste storage
  - Manifests for waste shipments
  - Limited reporting, record keeping

1.

Current RCRA Regulations on Fertilizer Recycling

- Fertilizers made from hazardous waste must meet strict limits on contaminants
  - Technology-based treatment standards
  - Exemption for fertilizers made from electric arc furnace dust (K061)

Hazardous Waste Recycling Must be Legitimate

- EPA encourages legitimate recycling of hazardous wastes
- Recycled wastes must be safe, effective substitutes for other materials
- "Sham" recycling subject to civil, criminal penalties
- Ongoing enforcement initiatives focused on fertilizer manufacturers, waste generators
- No evidence yet found of widespread sham recycling

EPA's Fertilizer Studies

- Industry analysis
- Background study of fertilizer contaminants, use, regulations
- Fertilizer risk assessment

Fertilizer Types

- Vast majority of fertilizers used are primary nutrients:
  - Nitrogen (N), Phosphate (P), Potassium (K)
- Less than 3% are micronutrients:
  - Zinc (Zn), Iron (Fe), Manganese (Mn), Cobalt (Co), Copper (Cu), Sulfur (S)
- Soil conditioners:
  - Lime, sewage sludge, other soil amendments

2.

Zinc Fertilizers

- To our knowledge, virtually all fertilizers made from recycled hazardous wastes are zinc micronutrient fertilizers
- Roughly half of zinc fertilizers are made from recycled hazardous wastes
  - K061 (electric arc furnace dust)
  - Tire ash
  - Brass foundry dusts

Zinc Fertilizer Types

- Zinc sulfate monohydrate
  - Processed to remove contaminants
    - Lead content: 5 - 90 ppm
    - Dioxin content: ~1ppt
- Zinc oxysulfate
  - Little processing, higher contaminant levels
    - Lead: 300 - 25,000 ppm
    - Dioxins: 200-500 ppt

EPA Report on Fertilizer Contaminants, Use, Regulations

- Analysis of available data on all fertilizer types
- Estimated long-term loadings of contaminants to soils
- Key findings:
  - Most common contaminants are lead, cadmium, arsenic

Key Findings

- In general, micronutrient fertilizers have higher contaminant levels, are used in much smaller amounts than primary nutrients
- Certain liming products have greatest soil contamination potential, due to high application rates
- Significant cadmium levels in some phosphate fertilizers

3.

EPA's Fertilizer Risk Assessment

- Analysis of potential risks from contaminants in fertilizers
  - Metals
  - Dioxins
- Focused on risks to farmers, farm children, ground water and surface water quality

EPA's Fertilizer Risk Assessment

- Key Findings:
  - Fertilizers are generally safe
  - Highest potential risks:
    - Certain liming materials (Hg, Pb)
    - One iron micronutrient (As)
    - K061 zinc micronutrient (dioxins)
    - Some phosphates (Cd)

EPA's Proposed Regulations

- Response to concerns from industry, environmental groups, citizens
- Published November 28, 2000
- Received more than 600 public comments
  - Concerned citizens
  - Industry
  - Public interest groups
  - State agencies

EPA's Proposed Regulations

- Main objectives:
  - More consistent, more comprehensive regulatory system
  - Ensure that fertilizers made from hazardous wastes are clean, high-quality products
  - Encourage legitimate recycling with proper balance of controls, incentives
  - More industry accountability

4.

EPA's Proposed Regulations

- Key provisions
  - Stricter limits on six metal contaminants - Lead, cadmium, arsenic, nickel, chromium, mercury
    - Based on levels achievable using good manufacturing practices
    - Tied to % Zn content of fertilizer

EPA's Proposed Regulations

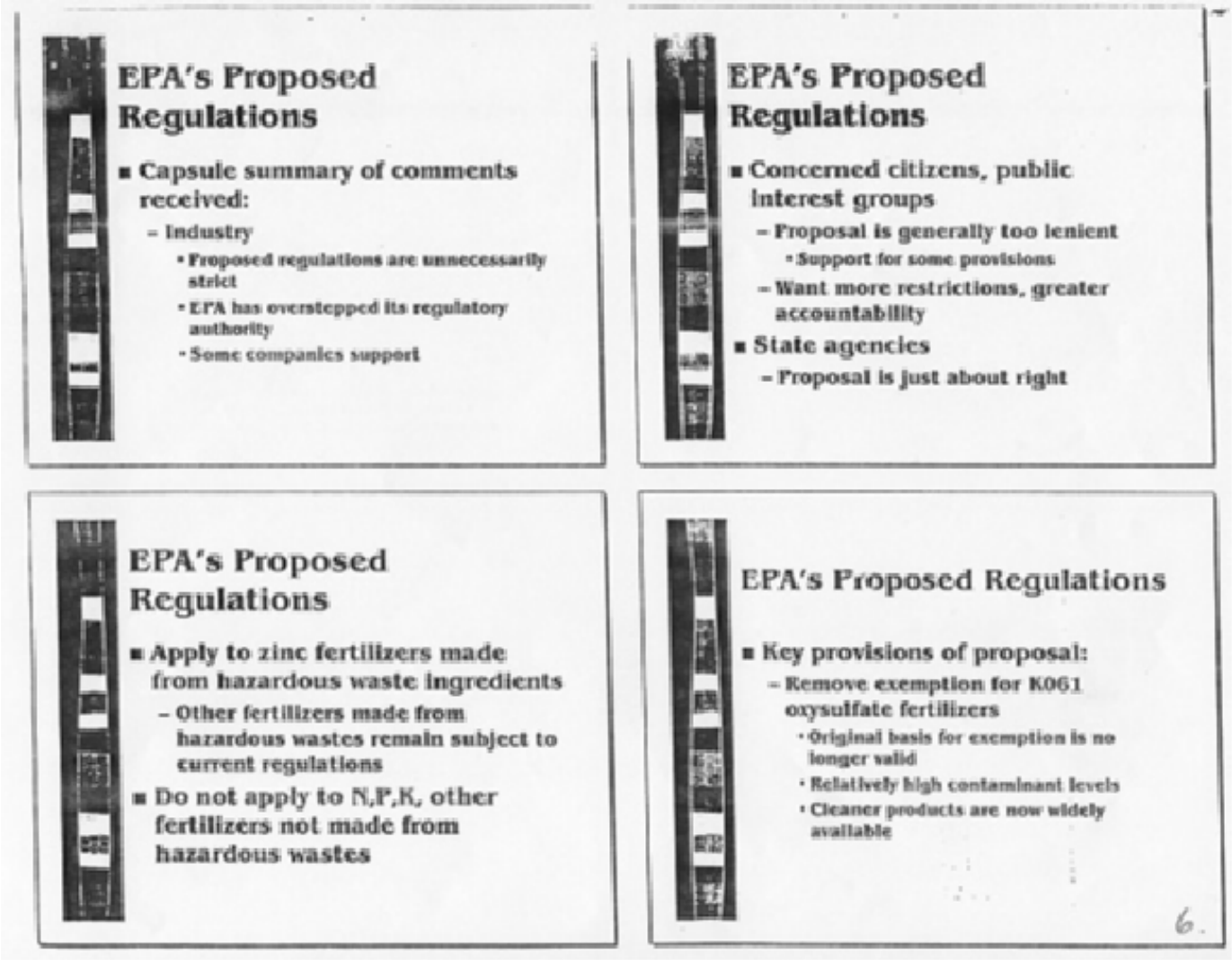
- Key Provisions:
  - Dioxin limit of eight parts per trillion (8 ppt)
    - Based on average national background level in soil
  - Limits on metals and dioxins are well below "safe" (i.e., risk-based) levels

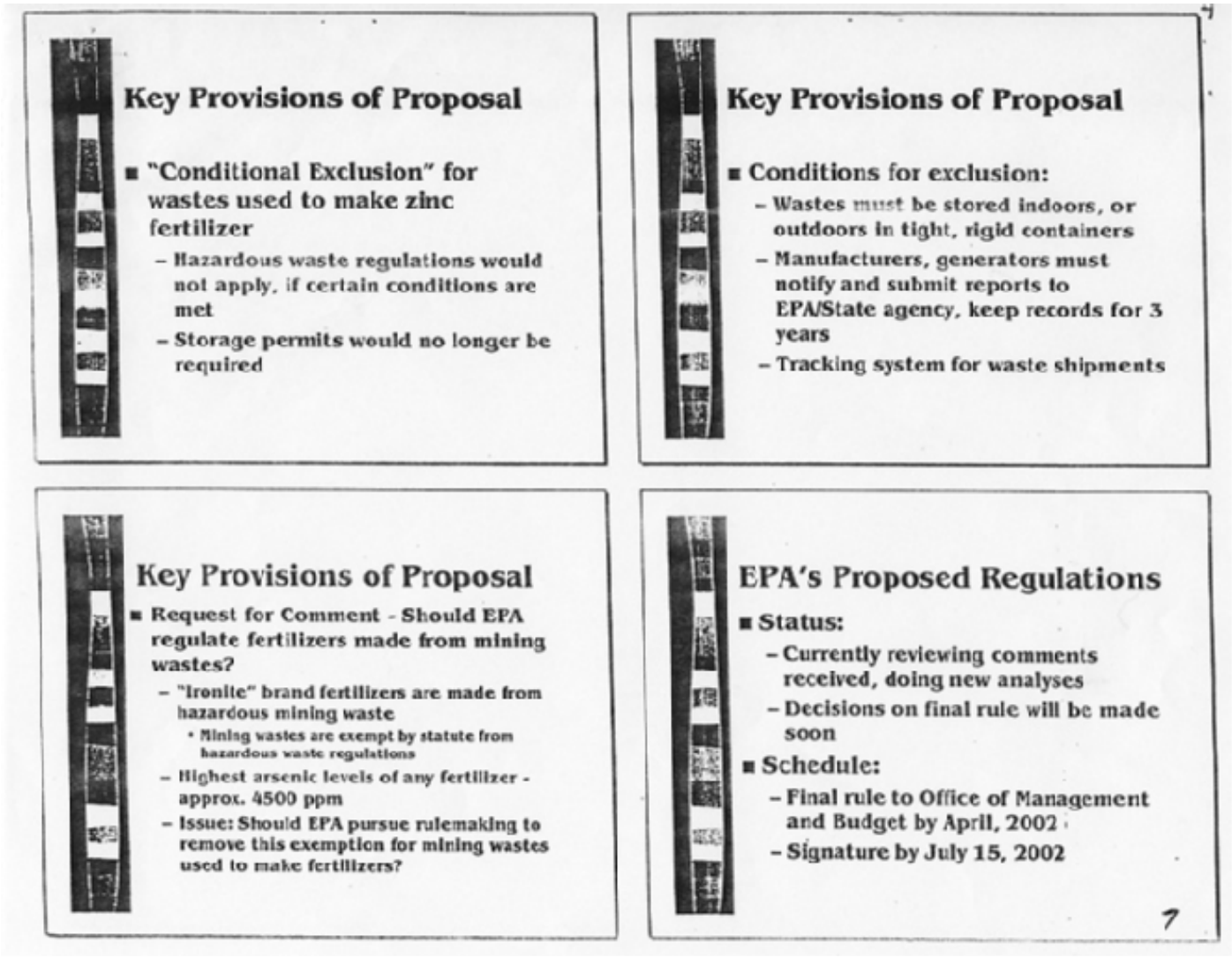
Comparison of Proposed RCRA Contaminant Limits with AAPFCO[1] Recommended Limits and EPA Standards for Sewage Sludge (ppm)[2]

Metal	Proposed RCRA Limit	AAPFCO Recom. Limit	Sewage Sludge Standard
Lead	99	16,437	840
Cadmium	50	2,947	85
Arsenic	21	3,976	75
Chromium	21	-	-
Nickel	50	67,450	420
Mercury	11	213	57
Cobalt	-	816,500	-
Molybdenum	-	10,650	75
Selenium	-	63,090	100
Dioxins	8 ppt	-	300 ppt (proposed)

[1]Association of American Plant Food Control Officials
[2]Typical 38.5% Zinc fertilizer

5


EPA's Proposed Regulations
Capsule summary of comments received:
Industry
Proposed regulations are unnecessarily strict
EPA has overstepped its regulatory authority
Some companies support
EPA's Proposed Regulations
Concerned citizens, public interest groups
Proposal is generally too lenient
Support for some provisions
Want more restrictions, greater accountability
State agencies
Proposal is just about right
EPA's Proposed Regulations
Apply to zinc fertilizers made from hazardous waste ingredients
Other fertilizers made from hazardous wastes remain subject to current regulations
Do not apply to N,P,K, other fertilizers not made from hazardous wastes
EPA's Proposed Regulations
Key provisions of proposal:
Remove exemption for K061 oxysulfate fertilizers
Original basis for exemption is no longer valid
Relatively high contaminant levels
Cleaner products are now widely available
6.

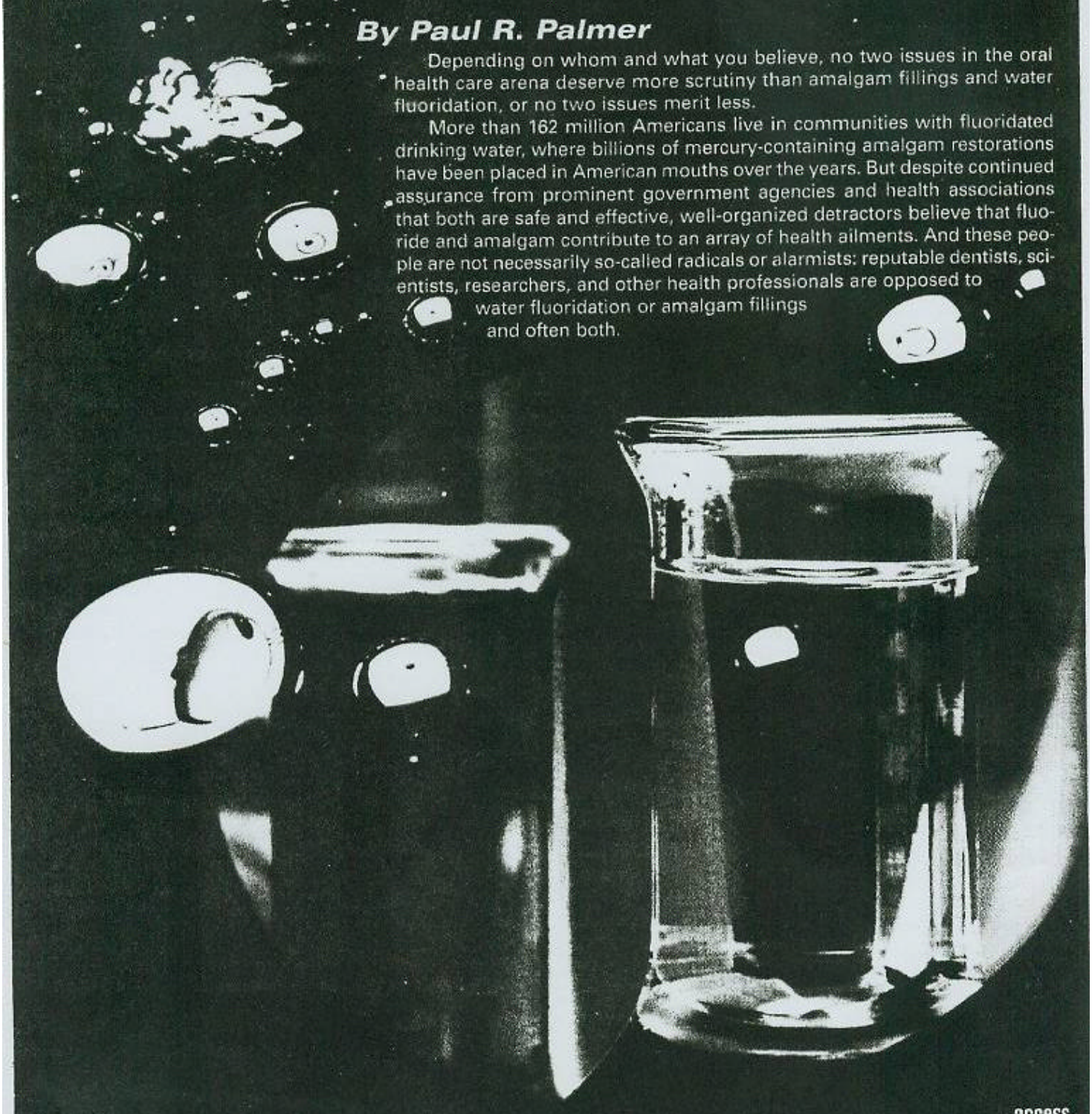

Key Provisions of Proposal
■ "Conditional Exclusion" for wastes used to make zinc fertilizer
– Hazardous waste regulations would not apply, if certain conditions are met
– Storage permits would no longer be required
Key Provisions of Proposal
■ Conditions for exclusion:
– Wastes must be stored indoors, or outdoors in tight, rigid containers
– Manufacturers, generators must notify and submit reports to EPA/State agency, keep records for 3 years
– Tracking system for waste shipments
Key Provisions of Proposal
■ Request for Comment - Should EPA regulate fertilizers made from mining wastes?
– "Ironite" brand fertilizers are made from hazardous mining waste
• Mining wastes are exempt by statute from hazardous waste regulations
– Highest arsenic levels of any fertilizer - approx. 4500 ppm
– Issue: Should EPA pursue rulemaking to remove this exemption for mining wastes used to make fertilizers?
EPA's Proposed Regulations
■ Status:
– Currently reviewing comments received, doing new analyses
– Decisions on final rule will be made soon
■ Schedule:
– Final rule to Office of Management and Budget by April, 2002
– Signature by July 15, 2002
7

Controversial Science: Amalgam and Water Fluoridation

By Paul R. Palmer

Depending on whom and what you believe, no two issues in the oral health care arena deserve more scrutiny than amalgam fillings and water fluoridation, or no two issues merit less.

More than 162 million Americans live in communities with fluoridated drinking water, where billions of mercury-containing amalgam restorations have been placed in American mouths over the years. But despite continued assurance from prominent government agencies and health associations that both are safe and effective, well-organized detractors believe that fluoride and amalgam contribute to an array of health ailments. And these people are not necessarily so-called radicals or alarmists: reputable dentists, scientists, researchers, and other health professionals are opposed to water fluoridation or amalgam fillings and often both.



A History Lesson

Fred Eichmiller, DDS, director of the American Dental Association (ADA) Health Foundation's Paffenbarger Research Center, explains that during the early 19th century dentists were experimenting with all kinds of ways to make fillings. "Any material that was soft and condensable that they could get to stay in a cavity, they tried. So, there was a lot of experimentation," Eichmiller says. Lead foils, tin foils, gold foils, and even lead shot was used in trying to come up with a good, direct filling material that would hold up and stay put in the mouth.

According to Eichmiller, the first round of opposition came from American dentists in the 1850s, after French dentists introduced amalgam. Back then, Eichmiller explains, there was an 'amalgam war,' with two camps—one made up of people who were using the material and thought is was very good and the other that thought it should not be used. However, opposition then was a matter of preference not concern over toxicity.

At the dawn of the 1870s, dentists were making their own amalgams by mixing mercury with other materials such as tin foil and silver powder filed from coins. In Illinois by the 1890s, G.V. Black, DDS, had determined the optimal proportions, Eichmiller says. The result was quite similar to the amalgam used today. "We found a lot of other things to add to it and modify it to make it better then what Black [used]. But, the first commercial alloys that came around in the early 1900s were all what we call 'Black's Formula."

More than 162 million Americans live in communities with fluoridated drinking water, where billions of mercury-containing amalgam restorations have been placed in American mouths over the years. But despite continued assurance from prominent government agencies and health associations that both are safe and effective, well-organized detractors believe that fluoride and amalgam contribute to an array of health ailments.

Black also had a hand in the long history of water fluoridation. In 1901, recent dental school graduate Frederick McKay, DDS, asked Black for help researching the severe grotesque brown tooth stains appearing in almost 90% of children born in Colorado Springs, Colorado. Following Black's death in 1915, McKay continued the research, eventually discovering that the "Colorado Brown Stain" (dental fluorosis) was due to the naturally high fluoride levels in Colorado Spring's drinking water.

Following McKay's findings, scientists at the United States Public Health Service (USPHS) began studying the phenomenon. H. Trendley Dean, DDS, head of the dental hygiene unit at the National Institutes of Health (NIH) and Elias Elvove, DDS, a senior chemist, began fluorosis studies in 1931. By 1936, they had determined that fluorosis occurs when fluoride is present at levels above 1 part per million (ppm) in drinking water. Since McKay and Black had previously documented that mottled tooth enamel is resistant to decay, Dean hypothesized that adding fluoride to water at low levels might fight tooth decay.

In 1945, after discussion with USPHS and the Michigan Health department, the City Commission of Grand Rapids, Michigan, voted to add fluoride to its public water supply, making it the first fluoridated city. Originally sponsored by the U.S. Surgeon General, the Grand Rapids water fluoridation study was handed over to the National Institute of Dental Research (NIDR) after its 1948 inception [today it's known as the National Institute of Dental and Craniofacial Research (NIDCR)]. For 15 years, researchers studied tooth decay among 30,000 schoolchildren in the area. In the 11th year of the project, Dean, then NIDR Director, announced a 60% drop in the rate of caries.

Time Tested

Of course, the long histories of amalgam placement and water fluoridation do not in themselves necessarily provide a sufficient foundation to base current and future decisions on, but supporters say they should not be discounted either.

In a July 2002, ADA press release, "Dental Amalgam: Myths vs. Facts," it says that long-time use of amalgam alone does not justify its continued use, only that "because amalgam has been around so long, the dental profession and scientific community have learned a great deal about its durability, reliability, and safety."

Caswell Evans, DDS, MPH, director of the National Oral Health Initiative in the office of the U.S. Surgeon General, says, that fluoridating water has proven its safety and efficacy throughout these decades. "Water fluoridation now has been practiced in one form or another in this country as a public health measure for more than 60 years. So, you have a large-scale, natural, epidemiological experience, and that experience only draws one conclusion: that it is safe and effective." Those who claim differently, he says, are either misguided or ignoring the patently obvious information before them.

The Amalgam Controversy

Among the ranks of supporters for using mercury-containing amalgam are the ADA, the Food and Drug Administration (FDA), the Academy of General Dentistry (AGD), the Centers for Disease Control and Prevention (CDC), NIH, the World Health Organization (WHO), and USPHS. Based on current available research, all these supporters generally state that dental amalgam is safe and effective, except in extremely rare allergic reactions. However, this is by no means a comprehensive list—many other governments and associations have taken the same position.

Where Does It Go?

Detractors of dental amalgam fillings oppose them for various reasons, including the use of the terms 'silver fillings' and 'silver amalgam,' which they say veil from the public the fact that amalgam contains about 50% mercury. They prefer the term 'mercury amalgams' or mercury-containing amalgams.' Their main point of contention involves one of the few areas of agreement within the debate—that mercury, however minute the amount, is actually released from amalgam restorations while in a patient's mouth.

Eichmiller explains that this is true. Chewing on or grinding amalgam fillings makes them heat up and it's through this wearing process small amounts of mercury can vaporize. However, he says, that amount is just a small portion of what everyone is exposed to anyway through food, water, air, and other environmental sources. "[It would take] more than 500 fillings to actually ever reach a level that is even considered to produce noticeable symptoms in even the most sensitive patients." Even people without amalgams in their mouth cannot eliminate their mercury exposure because there is no way to avoid it, Eichmiller adds. "That is why we have been able to place millions and millions of them without seeing people drop in the street."

Among the ranks of supporters for using mercury-containing amalgam are the American Dental Association, the Food and Drug Administration, the Academy of General Dentistry, the Centers for Disease Control and Prevention, the National Institutes of Health, the World Health Organization, and the United States Public Health Service.

But this lack of control over other mercury sources is exactly why amalgams should not be used, says Mark Breiner, DDS, a practicing dentist in Orange, Connecticut, and author of the book *Whole Body Dentistry*. "Mercury doesn't operate in a vacuum in these fillings," Breiner says. "In other words, we have other things going on. We have exposure to other toxins, chemicals, and pesticides. We don't have much control over what is going on in our environment, but in our oral environment, we do have control. So why would anybody want to have mercury in their mouth?" He adds that polishing amalgam also releases mercury, and he says that dental hygienists should avoid the practice of polishing amalgam altogether.

Breiner, who began practicing in 1971, was introduced to the amalgam debate two years later when taking a course presented by Hal Huggins, DDS, MS. Credited by some for creating much of the anti-amalgam sentiment, Huggins published his controversial book, *It's All in Your Head: The Link Between Mercury Amalgams and Illness*, in 1985. "He talked about different problems as far as amalgam and fluoride and I thought he was kind of off the wall," Breiner says. A few years later, Breiner placed his first amalgam filling for his dental assistant's daughter, which he feels was responsible for the sudden seizures she developed two days later. "So, that was what prompted me to go to the medical library and start to research this. I found out that Huggins was not so crazy after all … it has just been a journey since then."

Breiner, who no longer places amalgam fillings, now lectures nationwide on risks associated with traditional dentistry and the successful integration of holistic dental concepts and procedures with conventional dentistry.

Breiner believes that each person has a sensitivity threshold to mercury, and depending on total exposure (be it through amalgams or in combination with other environmental sources or other synergistic heavy metals), they may or may not experience problems. After treating thousands of patients, he says he has seen firsthand the health problems to which amalgam can contribute.

Leslie Andrews, RDH, MBA, came to a similar conclusion after researching amalgam and other issues and working in a holistic dental office. "I think what it boils down to really is are you sensitive to these materials?"

Breiner and others not only question the validity of evidence supporting the safety of amalgam, they purport there is good evidence to the contrary. "But forget all the science," Breiner argues. "If you only use common sense, that amalgam—those capsules—before they go in your mouth have been handled as a hazardous substance. When I take that filling out of your mouth—which has been perfectly safe, supposedly—if I throw that in the garbage, I could be arrested for disposal of a hazardous material. It makes no sense. Why is that which was safe in the mouth unsafe anywhere else? It is just totally illogical." Eichmiller says because it really is

ıot mercury. He offers an analogy: "If you take pure netallic sodium and drop it in water, it explodes vio-ently. Pure chlorine is a lethal gas, but if put together vith sodium, you have table salt. When you combine hings, you form entirely different compounds. When 'ou combine mercury and silver you form .n entirely different compound that is sta-ble. It is environmentally stable and stable nough to make a restoration that can last n the mouth a lifetime."

"Saying that amalgam will poison you is like saying that drinking water will make you explode and burst into flames."

Robert Baratz, MD, DDS, PhD, presi-lent of the National Council Against Health Fraud NCAHF), offers a similar comparison with a com-non combination of hydrogen and oxygen. "Saying hat amalgam will poison you is like saying that drinking water will make you explode and burst into lames."

However, Michael Ziff, DDS, executive director of :he International Academy of Oral Medicine and Toxicology (IAOMT)—founded in 1984 to scientifi-:ally investigate the biocompatibility of materials and procedures used in dental therapy—finds that these types of analogies are misleading. He says that mercury is only *combined* in an amalgam, not chemically *altered*, which "is a misrepresentation because it is contrary to laws of physics and what is published in dental literature. On one hand, they say you are exposed to three-to-four micrograms per day, and on the other hand, they say that it is locked in [to the amalgam]. What they are saying is so patently negligent that anybody who even says that is contradicting their own position."

Measuring Mercury

Though there is consensus that even in the tiniest amount of amalgam some mercury vaporizes, people still disagree about whether the amount released can be accurately measured. Some dentists, like Breiner, say vapor analyzers accurately measure mercury vapor released from fillings and show higher levels among people who have amalgam fillings than those who don't have them. Though, Eichmiller and others contend that readings are often exaggerated because such equipment is designed to measure vapor in a room, not in a mouth. "A good example of that," Eichmiller says, "is if you take the levels that a lot of times are quoted from [vapor analyzers], the fillings would disappear over a lifetime. It would be impossible to release that much mercury at that rate and still have fillings in the mouth."

To gauge mercury exposure levels experienced by oral health professionals, ADA checks levels in integrated oral health workers during its annual meetings as part of its ongoing health-screening program. "We know that dentists are exposed to more mercury from amalgam than patients are by a long shot," Eichmiller explains. "What we have been monitoring now for many, many years is what the urinary levels are within dental professionals. And what we know is that with our current practices in placing amalgam, today dentist levels are almost exactly the same as what the background levels are in the general population. They have an increased risk for exposure, but because of the safety practices that we have in the placement and removal of amalgams, and because it is handled in a fairly stable state, our exposure is minimal." ADA terms these procedures their 'best management practices.' Eichmiller concedes that early practices were not this good and that exposure risks were higher. "We were using things called squeeze cloths, where you would squeeze out the excess mercury with your fingers." In the early 1980s, it was recommended that all amalgam be preencapsulated.

Preying on Fears?

Due to a lack of credible research proving adverse health effects from dental amalgam, ADA and others believe that dentists who tell patients amalgam can affect their health are being negligent and are banking people's fears.

"This is the part that makes me angry," says Cynthia Sherwood, DDS, an AGD national spokesperson and chairperson of the academy's legislative and governmental affairs council. "There are dentists who can prey on people [who] want to find the reason why they are sick or why they don't feel well. And someone is convincing them that it is because of their amalgam fillings, and we know that they are not going to get better." Not to mention that they might spend thousands of dollars to have perfectly functioning fillings replaced, she adds. "So some of these people are grasping at straws, and they have vague diseases, or not-so-vague diseases, that can't be cured—they are going to try anything. People are vulnerable in that situation, and there are people in dentistry [who] can hurt them."

Just this past summer, AGD passed its strongest endorsement yet of dental amalgam at its annual session. Sherwood says she was among those pushing for the resolution.

In fact, organized dentistry is so staunchly supportive of amalgam that the *ADA Principles of Ethics and Code of Professional Conduct* specifically prohibits member dentists from telling patients that removal of any type of dental filling will cure various diseases, because the statement cannot be scientifically substantiated. Many anti-amalgamists and some dentists feel the code equates to a 'gag clause,' though the association disagrees.

Environmental Contamination

Aside from the controversy over direct exposure of patients to mercury, is the separate issue of amalgam contributing to mercury contamination in the natural environment. *Dentist the Menace?* a comprehensive report compiled in June 2002 by the Mercury Policy Project and Health Care Without Harm and supported by groups including the Sierra Club, examines the environmental impacts of the dental industry's use of mercury. The report charges that despite dental practices accounting for more than 20% of the estimated 200 metric tons of mercury used in 2001, only a small (growing) portion of practices collect and recycle mercury waste. The report also states that approximately 60% of all mercury-bearing amalgam waste is captured in coarse filters at chair side, and over 95% of that waste can be cost-effectively captured with an amalgam separator.

Since mercury contamination is microbiologically based and not related to chemicals within the water system, it remains a somewhat gray area for health care workers involved in the disposal of mercury-containing waste products. This issue is further compounded by the fact that CDC, the Occupational Safety and Health Administration (OSHA), and Organization for Safety and Asepsis Procedures (OSAP) have yet to address the presence of mercury in dental unit waterlines.

"So some of these people are grasping at straws, and they have vague diseases, or not-so-vague diseases, that can't be cured—they are going to try anything. People are vulnerable in that situation, and there are people in dentistry [who] can hurt them."

Michael Bender, director of the Mercury Policy Project, says that the aim is not to be confrontational. "The intention of the report is to raise awareness and get people to the table to discuss how we actually go about sending a positive message to the dental sector that mercury releases can be significantly reduced by a very small effort and a small additional monthly cost."

At the invitation of the U.S. Environment Protection Agency (USEPA), Bender will join ADA representatives and others in Chicago at the Binational Toxic Strategy Meeting in December 2002 to discuss reducing dental mercury released to the environment.

In a July 2002 statement, ADA Executive Director James Bramson, DDS, said, "ADA has been working since the early 1980s to help ensure the proper handling and recycling of dental amalgam filling waste from dental offices." ADA also stated it has implemented a plan to address the problem, which includes assessing the release of mercury from dental offices, the effectiveness of current amalgam reduction technology, and updating educational activities for dental office personnel.

Best Evidence Yet to Come?

Involved people on both sides of the amalgam controversy claim science is on their side and that the other side's argument is based on research that is dated, flawed, not peer reviewed, published only in trade journals and not in scientific publications, or just plain wrong. Without question, mainstream opinion overwhelmingly supports the position that research has yet to show any impact of amalgam on health.

Questioning the validity of research on both sides will continue, Andrews says. "It is never going to be enough for some people. That is the nature of the controversy. You are going to tell me you have the definitive research, I am going to have statisticians look at it and say this is missing or that is missing, or you didn't include enough subjects, and it just goes on and on."

In its 1997 report, *Dental Amalgam and Alternative Restorative Materials*, the ad hoc USPHS amalgam workgroup concluded that "data analyzed from 175 peer-reviewed studies did not support claims that individuals with dental amalgam restorations will experience problems, including neuralgic, renal, or developmental effects, except for rare allergic or hypersensitivity reactions." However, the report also cautions that the safety of amalgam is not beyond doubt. "Scientific research, while continuing to yield important clues, has still to definitively resolve the exact nature and degree of public health risk, if one exists at all, associated with dental amalgam."

While 'definitive' is not a term scientists like to use, NIH is currently conducting two large-scale studies many hope will provide the best evidence to date. In 1993, authors of the USPHS report, *Dental Amalgam: A Scientific Review and Recommend Public Health Service Strategy for Research, Education, and Regulation*, recommend the need for strong, clinically based evidence of the health effects of dental amalgam. Acting on this recommendation, NIDCR launched two large-scale studies in 1996.

"These are two prospective, randomized clinical trials, the point of which is to determine whether or not the normal clinical use of dental amalgam has any adverse health effects," explains Norman Braveman, PhD, assistant to the director at NIDCR and project officer for the trials.

One trial is collaboratively being investigated by scientists at the University of Washington in Seattle and the University of Portugal in Lisbon. The other is being conducted by a consortium of scientists from the New England Research Institutes in Cambridge, Massachusetts, comprising the Forsyth Dental Clinic, Harvard University

n Boston, and the University of Rochester in New York. Each trial involves approximately 500 school-age children and focuses on potential neurological, psychological and behavioral, renal, endocrine, and other relevant organ system impairments and dysfunctions. Mercury concentrations in urine, blood, and other relevant tissues are also examined, along with the progression of mercury in urine, blood, and other tissues over time following amalgam treatments.

Braveman expects it will be at least two-and-a-half or three years before results are published, but cautions, "There is no such thing as a definitive study. The prospective, randomized clinical trial—the evidence you get from that—is the highest level of evidence in clinical research. At this point, there has not been anything like that in the literature. There have been epidemiological studies, but no randomized clinical trials in humans, so this is the first."

The debate in the literature over how to measure mercury release accurately was a point Braveman admits having to wrestle with when designing the studies. "Our reasoning was, if we take enough kids and treat them as they normally would be treated in a dental practice, the dose—whatever it is—is going to be the 'normal' dose, and whatever we see is the result of 'normal' treatment. If we see something bad, we have to be able to report to the American public, and everybody else, that with normal restoration using this restorative material, this causes health problems, and USPHS needs to rethink its position. If, on the other hand, the results show it does not matter in all these different measures—that the kids do not show health effects—we are going to report that as well."

However, NIDCR does have a subcontractor associated with the trials that is trying to develop technology to measure dose accurately, as opposed to exposure, Braveman adds. "It is going to take a long time, I think, to get that measure, but in the meantime we need to know about health effects."

Meanwhile, the ad hoc USPHS amalgam workgroup is organizing an expert group to examine the peer-reviewed, scientific literature related to mercury from amalgam published since 1996.

Water Fluoridation

The list of strong supporters of community water fluoridation is probably even longer than the list of those supporting amalgams. The American Dental Hygienists' Association (ADHA), ADA, AGD, NIH, USPHS, CDC, the American Medical Association (AMA), and more than 100 national and international organizations say it's one of the most effective ways—especially in terms of cost—to reduce dental decay. In April 1999, CDC proclaimed water fluoridation one of the 10 great public health benefits of the 20th century, solidifying the overwhelming opinion in America that fluoridating the water is safe and effective.

How Effective?

Soon after Frederick McKay found high fluoride levels in Colorado Springs water, it was quickly realized that in most water sources fluoride is naturally present at varying levels. Being the 13th most abundant element in the earth's crust, fluoride is often referred to a 'nature's cavity fighter,' and many proponents describe modern water fluoridation as nothing more than 'optimizing' the fluoride already there. In the United States, about 1 ppm is generally accepted as optimal. This level is important, because levels much beyond 1 ppm can cause dental fluorosis, and fluoride in extremely high levels can be toxic.

With extensive research providing varying statistics on how much fluoridation decreases decay rates, determining its effectiveness can be challenging. Older or smaller studies often claim the highest decay reductions. John Stamm, DDS, an ADA spokesperson on fluoride and preventive dentistry, is comfortable saying water fluoridation reduces tooth decay by 20%, a figure based on solid research by NIH and other well-designed, large-scale studies.

The list of strong supporters of community water fluoridation is probably even longer than the list of those supporting amalgams.

Why Do We Have to Drink It?

Those opposed to water fluoridation object to it on a number of fronts, one being the generally accepted opinion that the benefits of fluoride are mostly acquired topically, not systemically, as previously believed.

That is why Ziff from IAOMT sees no reason why people should have to ingest fluoride every time they drink water. "It is well-proven with no contradiction that if fluoride is beneficial, it is only beneficial topically. That is undeniable. If that is the case, and it has even the slightest potential for systemic harm, then why administer it in the water supply? Why not just topically?"

While agreeing that the view shared widely among scientists for the past two decades has been that fluoride benefits are mainly topical, Stamm says that to a lesser degree there are still systemic benefits of fluoride and no reason to discount the role of water fluoridation. "All

Table I. Number of persons and percentage of the population receiving optimally fluoridated water through public water systems (PWS), by state — United States, 1992 and 2000

State	2000 fluoridated population	2000 total PWS population	2000 percentage fluoridated	1992 percentage fluoridated‡	Change in percentage 1992–2000
Alabama*	3,967,059	4,447,100	89.2%	82.6%	6.6
Alaska	270,099	489,371	55.2%	61.2%	–6.0
Arizona	2,700,354	4,869,065	55.5%	49.9%	5.6
Arkansas†	1,455,767	2,431,477	59.9%	58.7%	1.2
California	9,551,961	33,238,057	28.7%	15.7%	13.0
Colorado†	2,852,386	3,708,061	76.9%	81.7%	–4.8
Connecticut	2,398,227	2,701,178	88.8%	85.9%	2.9
Delaware	505,747	624,923	80.9%	67.4%	13.5
District of Columbia	595,000	595,000	100.0%	100.0%	0.0
Florida	9,407,494	15,033,574	62.6%	58.3%	4.3
Georgia	6,161,139	6,634,635	92.9%	92.1%	0.8
Hawaii*	109,147	1,211,537	9.0%	13.0%	–4.0
Idaho	383,720	845,780	45.4%	48.3%	–2.9
Illinois	10,453,837	11,192,286	93.4%	95.2%	–1.8
Indiana	4,232,907	4,441,502	95.3%	98.6%	–3.3
Iowa	2,181,649	2,390,661	91.3%	91.4%	–0.1
Kansas	1,513,306	2,421,274	62.5%	58.4%	4.1
Kentucky	3,235,053	3,367,812	96.1%	100.0%	–3.9
Louisiana*	2,375,702	4,468,976	53.2%	55.7%	–2.5
Maine	466,208	618,033	75.4%	55.8%	19.6
Maryland†	4,124,953	4,547,908	90.7%	85.8%	4.9
Massachusetts†*	3,546,099	6,349,097	55.8%	57.0%	–1.2
Michigan	6,568,151	7,242,531	90.7%	88.5%	2.2
Minnesota	3,714,465	3,780,942	98.2%	93.4%	4.8
Mississippi	1,227,268	2,665,075	46.0%	48.4%	–2.4
Missouri*	4,502,722	5,595,211	80.5%	71.4%	9.1
Montana	143,092	645,452	22.2%	25.9%	–3.7
Nebraska†	966,262	1,243,713	77.7%	62.1%	15.6
Nevada†	1,078,479	1,637,105	65.9%	2.1%	63.8
New Hampshire	347,007	807,438	43.0%	24.0%	19.0
New Jersey	1,120,410	7,208,514	15.5%	16.2%	–0.7
New Mexico	1,187,404	1,548,084	76.7%	66.2%	10.5
New York†	12,000,000	17,690,198	67.8%	69.7%	–1.9
North Carolina	4,862,220	5,837,936	83.3%	78.5%	4.8
North Dakota	531,738	557,595	95.4%	96.4%	–1.0
Ohio	8,355,002	9,535,188	87.6%	87.9%	–0.3
Oklahoma†	2,164,330	2,900,000	74.6%	58.0%	16.6
Oregon†	612,485	2,700,000	22.7%	24.8%	–2.1
Pennsylvania	5,825,328	10,750,095	54.2%	50.9%	3.3
Rhode Island	842,797	989,786	85.1%	100.0%	–14.9
South Carolina	3,086,974	3,383,434	91.2%	90.0%	1.2
South Dakota†	553,503	626,221	88.4%	100.0%	–11.6
Tennessee	4,749,493	5,025,998	94.5%	92.0%	2.5
Texas	11,868,046	18,072,680	65.7%	64.0%	1.7
Utah†*	43,816	2,233,169	2.0%	3.1%	–1.1
Vermont	240,579	443,901	54.2%	57.4%	–3.2
Virginia	5,677,551	6,085,436	93.3%	72.1%	21.2
Washington†	2,844,893	4,925,540	57.8%	53.2%	4.6
West Virginia†	1,207,000	1,387,000	87.0%	82.1%	4.9
Wisconsin	3,108,738	3,481,285	89.3%	93.0%	–3.7
Wyoming*	149,774	493,782	30.3%	35.7%	–5.4
Total	**162,067,341**	**246,120,616**	**65.8%**	**62.1%**	**3.7**

* Reported PWS population exceeded total state population; PWS population was set to the 2000 U.S. census of state populations.

† Complete data were not available from Water Fluoridation Reporting System; additional information was obtained from states.

‡ CDC National Center for Prevention Services: *Fluoridation census 1989 summary.* Atlanta, Georgia: US Department of Health and Human Services, Public Health Service, CDC, 1991.

the water that you drink passes through the mouth and therefore the water provides fluoride ions for the tooth enamel and for the dentin." In addition, he says ingested fluoride is distributed by the bloodstream to the saliva glands and then back to the teeth. "The water benefits as it passes over the teeth in the first place, and then the fluoride that is redistributed, especially in the saliva, further benefits the dental health through this topical fluoride mechanism.

"Back when the relationship of fluoride to tooth decay was discovered—and that took place during the 1930s and 1940s—water was the only available vehicle that allowed fluoride to be effective in reducing tooth decay," Stamm says. The addition of fluoride to toothpaste in a viable formulation only started around 1960, and by that time water fluoridation had a huge lead in public penetration. "In terms of public health prevention, water fluoridation represents a form of passive prevention," Stamm continues. "No person needs to take any active action in order to benefit from water fluoridation. It is just something that occurs to prevent tooth decay on a daily basis, without you even being aware of it or having to do anything." Topical methods, conversely, require people to take action and spend money. "Because [there] is an extra cost, people from lower socioeconomic strata are more likely not to buy and not to utilize dentifrice and brushes the way they ought to."

More than 100 national and international organizations say it's one of the most effective ways—especially in terms of cost—to reduce dental decay.

Put another way, anyone who has teeth benefits from water fluoridation, Evans says. "Over a lifetime, the accrued benefit is greater for children because they receive the preventive benefits earlier, it stays with them longer, and they retain their teeth through adulthood, compared to say someone who is 75 years old and is in a community that just starts water fluoridation."

What's the Problem?

To Breiner, fluoridating in the name of public health amounts to forced-fluoridation. "My biggest problem is we should have a choice if we want to use it," he says. "It should not be in the drinking water, so that I am forced to drink bottled water."

Some communities do give citizens some degree of choice on whether their water will be fluoridated by way of public referendums, while, in others, the decision is made at the administrative level by a public health department, water department, or city manager.

It's nothing new that researchers and antifluoridation groups attribute a litany of health ailments to water fluoridation. "In my experience, you name it and somebody at some point has claimed it," Evans says, who remembers when he was health officer in Los Angeles County in the 1980s and there were people purporting that HIV was caused by fluoride in the water. "This is part of the background hokum, but that is part of the process of dealing with people who have problems with fluoridation—the allegations are endless. At one time, it was [even thought to be] a communist conspiracy."

Hardy Limeback, PhD, head of preventive dentistry at the University of Toronto and former president of the Canadian Association of Dental Research was one of Canada's leading proponents of water fluoridation until 1999. That year, after conducting research and reviewing published literature on the long-term effects of fluoride on bone, he publicly changed his views on the wisdom of adding fluoride to drinking water when interviewed for an article published in the Toronto *Star* newspaper. Factoring into Limeback's reversal was also his concern over elevated levels of moderate and severe dental fluorosis among children in fluoridated communities.

Soon after, Limeback was contacted by various anti-fluoridation groups regarding other fluoride-related problems. "There are numerous studies to show that [fluoride] is connected to harmful effects on the brain, pineal gland, and thyroid," Limeback says. Fluoride is a neurotoxin that has been linked to osteosarcoma in a few studies, he adds, saying that accumulated evidence is enough for him to be quite concerned. Limeback claims government agencies, like CDC, are failing to review or adequately respond to new evidence that they say shows fluoridating the water can be detrimental.

However, according to Scott Presson, DDS, MPH, chief of CDC's Program Services Branch, says the agency is continuing to monitor emerging studies on the safety and effective use of fluoride in the prevention of tooth decay. Presson adds that there is no credible evidence of harmful health effects from fluoridation at the levels commonly recommended by CDC, and that newly published studies are reviewed by CDC scientists and other outside experts as needed to assess how they add to the existing body of evidence.

More Fluoride Sources

Compounding the water fluoridation problem, opponents say, is the proliferation of other fluoride sources, such as the fluoride present in many beverages and processed foods which can elevate fluoride intake.

Addressing this issue in its 2001 report, *Recommendations for Using Fluoride to Prevent and Control Dental Caries in the United States*, CDC states: "In fluoridated areas, dietary fluoride intake has been stable because processed beverages have been substituted for tap water and for beverages prepared in the home using tap water." In fact, the report goes on to say that "the diffusion or 'halo' effect of beverages and food processed in fluoridated areas but consumed in nonfluoridated areas also indirectly spreads some benefit of fluoridated water to nonfluoridated communities."

Stamm explains that people do not take in more fluoride as a result of drinking beverages prepared with fluoridated water because the body has a refined physiological homeostatic sensory system for keeping fluid in balance. "You just can't continue to exceed the physiologically necessary fluid intake."

Fluoride from Fertilizer

It is not just the fact that drinking-water systems are fluoridated opponents have problems with, there is also the issue of how fluoridation is accomplished.

Williams Hirzy, PhD, senior scientist at USEPA and vice president of the union representing USEPA professionals in Washington, DC, along with others, is troubled by the widespread use of hydrofluosilicic acid as a low-cost fluoridation agent. The product, he says, adds other unwanted chemicals to drinking water, which Hirzy describes as "a waste stream coming out of the phosphate fertilizer manufacturing industry." Specifically alarming is that the government has not conducted chronic toxicity studies on this material, he says, bringing up the fact that if hydrofluosilicic acid was not used as a fluoridation agent, USEPA would otherwise have to mandate its management as toxic waste. Further, Hirzy cites recent research implicating silicofluorides in the transport of lead (acquired from other environmental sources) from the gastrointestinal tract into the bloodstream in children.

Those opposed to water fluoridation object to it on a number of fronts, one being the generally accepted opinion that the benefits of fluoride are mostly acquired topically, not systemically, as previously believed.

According to Stamm, there are no inherent problems with using hydrofluosilicic acid, and it is probably the most cost-effective method for large-scale water fluoridation systems. "The water plant engineers have choices, and it is by their own choice that they choose the hydrofluosilicic acid injection method [over] other methods because it better fits their systems."

Taking Matters into Their Own Hands

Jacqui Conway, MS, OTR/L, a Tempe, Arizona-based occupational therapist, had five amalgam fillings replaced with a composite material six months ago. A few months earlier, she had what she thought was a mild seizure and therefore was tested for epilepsy. After hearing claims that mercury exposure might be associated with such problems, Conway sifted through information on both sides of the amalgam debate.

"I also talked to two dentists and a pediatrician about it and they said that it doesn't have anything to do with the amalgam," she explains. "But, because I found a little glimmer of information about it possibly being a contributing factor to seizures, I really just took that and ran with it."

Though Conway's dentist advised her that amalgams could not cause such problems, he agreed to replace them based on their age and esthetics. An epilepsy specialist has since determined Conway's episode was, in fact, not a seizure and she never suffered from the disease. Conway says the only apparent change since then is a dramatic reduction in canker sores, which she experienced frequently since childhood.

For people serious about wanting to limit their fluoride ingestion, Hirzy suggests installing a home water distiller or reverse osmosis unit, something he did decades ago. In an effort to reduce fluoride exposure at USEPA headquarters, the union Hirzy represents filed a grievance asking USEPA to supply bottled water to employees. The agency offered to pay half of bottled water costs, though the union has yet to accept the compromise.

Fluoridation Spreading, Amalgam on the Decline

According to CDC, 162 million Americans (65.8% of the population) were served by fluoridated community water systems in the year 2000. This represents an increase from 144 million (62.1%) in 1991, but is still lower than the 75% target set by the 2000 and 2010 national health goals. Still, 70% of American cities with populations of more than 10,000 are fluoridated.

There are three main impediments to the spread of water fluoridation, according to Mark Ritz, DDS, a

national spokesperson for AGD. "One is infrastructure; another is ignorance—that people do not understand the full benefits associated with it … the cost effectiveness, how much money you save, and how much you can help with disparities; the third is an unfounded fear within certain communities."

Limeback feels that most people do not even realize water fluoridation is a debatable topic. "You really can't get too many people upset about it, because they have lived with it for so many years."

On August 1, San Antonio, Texas became the most recent large city to fluoridate.

Amalgam use, on the other hand, is steadily declining and has been since the 1970s. According to CDC, of 200 million restorative procedures in 1990, amalgam accounted for about 96 million, a 38% decline from 1979. More recently, a nationwide study by ADA's Health Policy Resources Center found that 86 million composite resin fillings were placed in 1999, compared with 71 million amalgams.

Reasons for the decline include better personal oral health care and oral health education, the use of sealants, better composite alternatives, earlier treatment of decay, and patient concerns about mercury.

However, according to Eichmiller, amalgam is still the best option for large, posterior, load-bearing restorations that must be placed in wet conditions. "Amalgam is the only thing we have that we can use in a wet field and have some success."

Amalgam Legislation/ Litigation

Certainly, one of the greatest threats to amalgam is the federal bill introduced by the U.S. House of Representatives (HR 4163) on April 10, 2002 by Congresswoman Diane E. Watson (D-Los Angeles) and Chairman of the House Government Reform Committee Dan Burton (R-Indianapolis).

The bill would phase out the use of mercury in dental fillings by 2006 and immediately ban amalgam use in children under 18, pregnant women, and nursing mothers. It would also require that dentists tell consumers that amalgams contain mercury and that they are a health risk. According to a Watson aid, the bill is at the top of her health agenda.

Prior to the introduction of HR 4163, ADHA communicated with the office of the U.S. Surgeon General and NIDCR and shared their concerns with Watson, such as the lack of scientific authority to support the bill's efforts.

With the vigorous fight against HR 4163, ADA, Sherwood of AGD, and many others believe that the bill will not get far. Charles Brown, former state attorney general for West Virginia and national council for the antiamalgam group Consumers for Dental Choice, is pleased with the attention the bill is getting. "This is the first year of the bill, and it has been talked about all over the place," Brown says. He agrees that the bill will not pass this year, but asks, "how many bills, the first year they are introduced, have copycat bills in eight states, been debated nationally in professional societies of all types, [and] printed in newspapers and magazines all over the county?"

The other bills Brown refers to are also known as 'little Watson-Burton bills.' These similar bills have been introduced to state legislatures in Ohio, Illinois, Arizona, California, Georgia, Alabama, New Hampshire, and Maine—mostly as a direct result of Watson's initiative.

California state legislature's assemblyman Sam Aanestad, DDS, (R-3rd), feels legislation poses a real threat to amalgam because it could circumvent the sci-

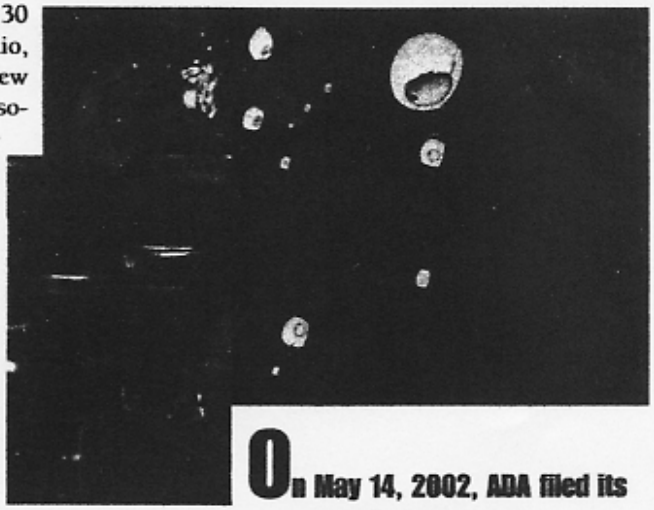
A Closer Look at California

One state government coming off of a legislative amalgam fight is California, where Assembly Bill 2270 (AB 2270), introduced by Richard Dickerson (R-2nd) on February 20, 2002, was also amended by him April 9, 2002. Dickerson's redesign of AB 2270 would have prohibited dentists from placing fillings containing mercury after January 1, 2007, requiring that all patients be informed of the toxicity associated with amalgam fillings, including the health risks they pose, especially to children under the age of 18 and pregnant or lactating woman.

AB 2270 eventually failed in the California Health Committee by a nine to four vote on April 24, 2002, after receiving testimony from prominent voices on the both sides of the debate, including Fred Eichmiller, DDS, director of the American Dental Association Health Foundation's Paffenbarger Research Center. Also helping to defeat the legislation was assemblyman Sam Aanestad, DDS, (R-3rd), who sits on the health committee and is the only dentist in the California state legislature.

entific process. "We should not base our rules and regulations on emotional knee-jerk reactions to things, we should be basing them on science," Aanestad says. "I am not just talking about amalgam, I am talking about traffic safety, whether kids should wear seat belts in school buses, and things like this. Unfortunately, too many legislators don't really understand the scientific process and are just going with what their emotions tell them; I think that is why we have so much bad legislation."

Another front of attack against amalgam is the spat of more than 30 lawsuits filed in California, Ohio, Maryland, Georgia, Texas, and New York against ADA, state dental associations, and others claiming public deception about alleged amalgam dangers. Van Nuys, California attorney Shawn Khorrami, who is involved with all the cases, says that if the suits were successful, damages would be in the "multiple billions."



According to Khorrami, progress in the cases has been slow due to what he calls legal maneuvering. "We are trying to get it to a place where we can go sit inside a courtroom and handle it, but I don't think the associations really want it there."

On May 14, 2002, ADA filed its own lawsuit against Khorrami. The suit states that Khorrami falsely and maliciously accuses ADA of defrauding and endangering the lives of the American public by promoting allegedly unsafe dental practices—specifically the use of dental amalgam fillings—and exerting "undue and unfair pressure" on dentists as a result of a purported "vested economic interest" of ADA in amalgam.

"It seems to me like the ADA is trying to impress some of its members," Khorrami says, regarding the suit against him. He adds that it will not impede his legal battle. "It is silly. The cases are really about people who have the stuff in their mouths. To take the focus off of them and stick it on me, personally, is a typical scheme."

On May 14, 2002, ADA filed its own lawsuit stating that Khorrami, involved in more than 30 antifluoride lawsuits, falsely and maliciously accuses ADA of defrauding and endangering the lives of the American public by promoting allegedly unsafe dental practices—specifically the use of dental amalgam fillings—and exerting "undue and unfair pressure" on dentists as a result of a purported "vested economic interest" of ADA in amalgam.

The Future

On the decline and under attack, amalgam faces an uncertain future. Brown, the national council for the antiamalgam group Consumers for Dental Choice, is very confident that "there will be no amalgam in five years. I can see where the endpoint is, although I am not sure which of the pressure points are going to resolve in the right answer." He feels the end will come from a combination of consumer protection laws, natural environment laws, patient safety laws, workplace safety laws, and costly litigation.

Eichmiller believes that the use of amalgam will continue to decline with better oral health and restorative materials and techniques, but that amalgam should continue to serve an important purpose. "At some point, we will see a very small use of dental amalgam, if we are able to use it, but the best-case scenario for us is we will still have it when we need it."

While water fluoridation is overwhelmingly considered a successful and necessary public health measure, ongoing debate is getting at least some reception. The Ontario Ministry of Environment and Energy, for instance, announced in 2000 a decision to lower the recommended level in fluoride-treated water supplies from 1–1.2 ppm to 0.5–0.8 ppm, due in part to the increasing presence of fluoride in food, beverages, and some personal care products.

Meanwhile, people like Hirzy and groups opposed to fluoridation continue to press for a congressional hearing. "If CDC, USPHS, and ADA are right, and fluoride is the greatest thing for dental health—one of the 10 greatest public health benefits in the last century—then a public hearing ought to be the perfect forum to lay it all out and say here is the evidence for that." Hirzy believes momentum is building for a congressional hearing. "We have not had one since 1978, and there is an awful lot of water, literally, that has gone under the bridge since then."

Eastside soil testers to seek arsenic, lead

No immediate risk seen in old smelter's 'pollution plume'

By Bruce Rommel
Journal Reporter

Soil samples from areas of four Eastside communities will be tested by public health officials for potential contamination from arsenic and lead.

State officials are learning that southwesterly winds over Puget Sound carried airborne pollutants from the old Asarco smelter in Tacoma farther than expected. Areas to be tested include Bellevue, Beaux Arts, Newcastle and Mercer Island, as well as Seattle and south King County.

Soil samples taken from beaches along Puget Sound last year found low levels of contamination from the "pollution plume," the area where predominant winds carried airborne particulates from the smelter just north of Tacoma.

The question now is whether that plume extends even farther north and east through King County, said Curt Hart, a spokesman for the state Department of Ecology.

"In this case, we're looking at a plume that went over much of the most highly populated area in Washington," Hart said.

Besides the Eastside communities, soil samples will be collected in Renton, Auburn, Federal Way, Burien, SeaTac, Normandy Park, Tukwila and South Seattle.

Most samples will be taken from greenbelts with older, second-growth timber, or areas of parks "undisturbed" by development for 50 years or longer.

State and county public health officials stress there's

See SOIL TESTS, A4

Soil tests

CONTINUED FROM A1

no immediate public health emergency. They are, however, concerned because long-term exposure to even low levels of arsenic and lead can harm a person's health.

Arsenic and lead were by-products of copper smelting at the Asarco plant from 1905 to 1985. In 1983, the federal Environmental Protection Agency declared the plant a Superfund clean-up site.

Arsenic occurs naturally in soil in many areas, usually at levels of 7 to 9 parts per million. Arsenic levels above 20 ppm are "low-level contamination" under state and federal standards and are a concern because arsenic is a carcinogen.

Lead concentrations of more than 250 ppm are considered low-level contamination. Lead poisoning can cause learning disabilities in young children.

"What we're concerned about is constant exposure to low-level lead contamination in soil, especially for kids up to 6 years old, since kids are more likely to play in the dirt and stir it up," Hart said.

King County Public Health Department employees and state officials will collect the soil samples. They'll start in about a week and complete their work in June. Then it will take a few months to analyze the results, Hart said.

Earlier testing found lead and arsenic contamination at higher levels than expected on Vashon Island and Maury Island. Last year, more testing found low-level contamination in undeveloped areas along the Puget Sound shoreline in south King County.

The levels of contamination found so far have been far below those considered to be an immediate hazard.

On Maury and Vashon islands, officials found levels of arsenic as high as 430 ppm. Hart said levels of "10,000 ppm and higher" were found in an Everett neighborhood where houses were built at the site of a smelter that had closed around 1900. When those toxic levels were discovered a few years ago, some homeowners had to relocate. Environmental cleanups were required in some yards.

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original

Leading Mercury Scientist, Dr. Haley, Refutes ADA in Congressional Testimony

Dear Mr. Chairman:

At the April 25th meeting of your committee I gave testimony that the President of the American Dental Association (ADA) takes exception to in a letter sent to you dated 11 May 2001.

Quoting from that letter the testimony the ADA dislikes is "that elementary mercury from dental amalgam could work synergistically with other ethyl-mercury sources and have a **cumulative toxic effect on the body**. Dr. Haley postulated that this could be a **potential cause of autism and Alzheimer's disease."**

I stand by my statement as a sensible concern based on published scientific research regarding synergist toxicities caused by two very toxic agents, mercury and the organic mercury compound thimerosal.

This concern is elevated since mercury exposure from amalgams to a pregnant mother concentrates in the fetus and a single vaccine given to a six-pound newborn is the equivalent of giving a 180-pound adult 30 vaccinations on the same day.

Include in this the toxic effects of high levels of aluminum and formaldehyde contained in some vaccines, and the synergist toxicity could be increased to unknown levels. Further, it is very well known that infants do not produce significant levels of bile or have adult renal capacity for several months after birth.

Biliary transport is the major biochemical route by which mercury is removed from the body, and infants cannot do this very well. They also do not possess the renal (kidney) capacity to remove aluminum.

Additionally, mercury is a well-known inhibitor of kidney function.

Common sense indicates that the concern I expressed should be taken seriously since we do not know how combined toxicities effect humans, especially in utero. Consider the current epidemic death on birth of over 500 foals from apparently healthy mares around Lexington, KY.

These deaths were identified as being due to a low level toxicity delivered by caterpillars eating poison plants and later, on migration, depositing their waste products on grass being eaten by the mares.

The point being it is the infant in utero that suffered most on exposure to low level, toxins, not the mother. Combined mercury toxicities can be devastating as I reference below and in the many references available on the www.altcorp.com website.

What is needed is research by non-biased scientists to clarify this, something our FDA and NIDCR have refused to do. As the American public find out what has happened regarding this issue, they will be quite angry. This is a biomedical science issue that should have been resolved a long time ago by the responsible federal agencies.

Below I present detailed and referenced information supporting my case and respond to various statements made by the ADA President that I believe to be misleading and sometimes flagrantly wrong. The ADA seems to think it has the right to select which research it believes and to trash that research that says it is wrong, even though the latter represents the bulk of published research.

To address the issues raised by the ADA President in his letter I will go in sequential order of the comments made in the letter placing the ADA comments in italics and providing scientific references for my conclusions.

"There is no scientifically valid evidence linking either autism or Alzheimer's disease with dental amalgam". First, **mercury is a well-known, potent neurotoxicant**, and common sense would lead to the conclusion that severe neurotoxins would exacerbate all neurological disorders, including Parkinson's, ALS, MS, autism and AD. Several research papers in refereed, high quality journals and scientific publications have shown that mercury inhibits the same enzymes in normal brain tissues as are inhibited in AD brain samples (1a-c, 2, 3).

AD is pathologically confirmed post-mortem by the appearance of neuro-fibillary tangles (NFTs) and amyloid plaques in brain tissue.

Published research, within the past year, has shown that exposure of neurons in culture to sub-lethal doses of mercury (much less than is observed in human brain tissue) causes the formation of NFTs (4), the increased secretion of amyloid protein and the hyper-phosphorylation of a protein called Tau (5).

All three of these mercury-induced aberrances are regularly identified as the major diagnostic markers for AD.

In the manuscript published in the J. of Neurochemistry (5) the authors state "These results indicate that mercury may play a role in the patho-physiological mechanisms of AD." In most of these experiments, mercury and only mercury among the several toxic heavy metals tested, caused the AD related responses reported.

Many medically trained individuals would agree that if something causes the appearance of the pathological hallmarks confirming the disease then it likely causes the disease. I at least have limited my claims to exacerbation of these diseases to err on the side of caution.

Further, consider this about AD. A study of 500 sets of identical twins from World War II era lead to the conclusion that sporadic AD which represents 90% of the cases was not a directly inherited disease. In many cases one twin would get AD and the other would not. Genetic susceptibility is involved, but a toxic exposure is required (e.g., if you are genetically susceptible to being an alcoholic you still need to be exposed to alcohol to become one).

The work by Rose's group at Johns Hopkins University implicates APO-E genotype as a "risk" factor with APO-E2 being protective and APO-E4 being a major risk factor. APO-E2 has the ability to protect the brain from mercury by having two additional thiol-groups to bind mercury appearing in the cerebrospinal fluid whereas APO-E4 does not have this additional capability (1). This may explain the proven genetic susceptibility to AD of the APO-E4 carriers.

NIH has spent hundreds of millions of dollars to find a causal factor for AD. Yet, no virus, yeast or bacteria has been identified so the cause remains unknown to general science. The rate of AD per 1,000 population is nearly the same in California, Michigan, Maine, North Carolina, Florida, Texas, etc. It is not significantly different for rural versus urban individuals, or factory workers versus those with outside jobs.

So the primary toxicant that may be involved is most likely not environmental.

Therefore, it must be a very personal toxicant, like what you put in your mouth. Since we place grams of a neurotoxic metal, mercury, in our mouths in the form of dental amalgam this makes it a good suspect for the exacerbation of AD -- -not that all would be affected, just those that are genetically susceptible, or those who become ill enough to fall prey to the toxicity, or those that are also exposed to another synergistic toxin (see below).

The one fact that ties mercury into a major suspect for AD is the fact that most of the proteins/enzymes that are inhibited in AD brain are thiol-sensitive enzymes.

Mercury is one of the most potent chemical inhibitors of thiol-sensitive enzymes and mercury vapor easily penetrates into the central nervous system (2). Mercury is not the only toxicant to inhibit thiol-sensitive enzymes. Thimerosal and lead will do this also as well as reactive oxygen compounds created in oxidative stress and many other industrial compounds.

However, mercury has been reported to be significantly elevated in AD brain (14a,b, 15). Mercury is in many mouths being emitted from dental amalgam and absolutely would exacerbate the clinical condition identified as AD. Therefore, mercury should be considered as a causal contributor since mercury can produce the two pathological hallmarks of the disease and inhibits the same thiol-sensitive enzymes that are dramatically inhibited in AD brain.

It is documented by a 1991 World Health Organization report that **dental amalgams constitute the major human exposure to mercury.**

Grams of mercury are in the mouths of individuals with several amalgam fillings. Further, the level of blood and urine mercury positively correlates with the number of amalgam fillings. This was confirmed by a recently published NIH funded study (6). Therefore, I fail to see the ADA's viewpoint that there is

no scientifically valid evidence linking mercury from amalgams to exacerbating AD, especially since mercury produces the diagnostic hallmarks of AD (4,5).

The ADA hides behind the fact that there has not been an epidemiological study to attempt to correlate mercury exposure and AD. However, absence of proof is not proof of absence. This also begs the question why the ADA, the FDA and the National Institutes of Dental Craniofacial Research (NIDCR) have not pushed for such a study? These agencies know this would be immensely expensive and only the U.S. government could afford to support any reliable long-term study.

Yet, these same responsible agencies have failed to confirm as safe the placing into the mouth of Americans grams of the most toxic heavy metal Americans are exposed to.

The dental branch of the FDA has steadfastly refused to investigate the toxic potential of dental amalgam.

Look at the references in the ADA letter!

Even they must quote Scandinavian literature to support their contentions of safety, and even then they have to reference papers on fertility instead of neurotoxicity! Where is the ADA, FDA and NIDCR supported U.S. research in this area? Go to the NIH web-sites and look for research on the safety of mercury from amalgams, or try to find an NIH study concerning possible mercury involvement in any common neurological diseases.

NIH does support research on methyl-mercury, as we seem to like beating up on the fishing industry whilst leaving the dental industry alone. However, according to the NIH study about 90% of the mercury in our bodies is elemental mercury, not methyl-mercury, showing the **exposure is more likely from dental amalgams rather than fish** (6). Support at NIH has been very sparse for investigating the relationship of elemental mercury exposure to neurological diseases.

"And there is no scientifically valid evidence demonstrating in vivo transformation of inorganic mercury into organo mercury species in individuals occupationally exposed to amalgam mercury vapor".

There was a paper published entitled "Methylation of Mercury from Dental Amalgam and Mercuric Chloride by Oral Streptococci in vitro" (19). This strongly indicates that "organo mercury species" are indeed capable of being made in the human body and may explain the appearance of methyl-mercury in the blood and urine of individuals who don't eat seafood.

Further, periodontal disease is considered one of the major risk factors for stroke, heart and cardiovascular disease and late onset, insulin independent diabetes. Many studies of the toxicants produced in periodontal disease have identified hydrogen sulfide (H_2S) and methane-thiol (CH_3SH) as major toxic products of infective anerobic bacteria in the mouth metabolizing the amino acids cysteine and methionine, respectively.

These volatile thiol-compounds are what cause bad-breath! Methane-thiol (CH_3SH) would react immediately and spontaneously in the mouth with amalgam generated mercury cation to produce the

following two compounds, CH3S-HgCl and CH3S-Hg-SCH3, which are organo-mercurial compounds (check this out with any competent chemist). They are also very similar in structure to methyl-mercury (CH3-HgCl) and dimethyl-mercury (CH3-Hg-CH3), the latter which caused the highly publicized death of a University of Dartmouth chemistry professor 10 months after she spilled two drops on her gloved hand.

We have synthesized CH3S-HgCl and CH3-Hg-CH3 in my laboratory and tested their toxicity in comparison to Hg2+. As expected, they were both more toxic than Hg2+ and this data is available on the www.altcorp.com web-site. Therefore, the ADA President is badly misinformed on this issue. Additionally, I am amazed that the researchers at the ADA and NIDCR did not previously report on this obvious chemistry as I would imagine this is the kind of topic they should be addressing.

"Based on currently available scientific evidence, the ADA believes that dental amalgam is a safe, affordable and durable material for all but a handful of individuals who are allergic to one of its components. It contains a mixture of metals such as silver, copper and tin, in addition to mercury, which chemically binds these components into a hard, stable and safe substance."

This is a totally wrong statement unless you underline the "ADA believes" and define how big is a "handful of individuals". Sensible people want "believes" replaced with "knows" and a "handful" replaced with a "hard number".

Amalgams emit dangerous levels of mercury and the ADA absolutely refuses to accept this fact or even to study the possibility. Otherwise, the ADA administrators seem to be unable to separate fact from fiction. Consider, if they wanted to destroy my argument on amalgam toxicity they would reference several solid, refereed publication showing that mercury is not emitted from dental amalgams -- -but they cannot do this with even one article.

They always state the "estimate" is that a very, very, very small amount. Competent, well-informed researchers don't use the **evasive language** used in the ADA President's letter. They would state the amount is so many micrograms mercury released per centimeter squared amalgam surface area and a "handful of individuals" would be a percentage of our population! Lets look at the published literature.

First, careful evaluation of the amount of mercury emitted from a commonly used dental amalgam in a test tube with 10 ml of water was presented in an article entitled "Long-term Dissolution of Mercury from a Non-Mercury-Releasing Amalgam". This study showed that "the over-all mean release of mercury was 43.5 ± 3.2 micrograms per cm2/day, and the amount remained fairly constant during the duration of the experiments (2 years)" (7).

This was without pressure, heat or galvanism as would have occurred if the amalgams were in a human mouth. Further, research where amalgams containing radioactive mercury were placed in sheep and monkeys, showed the radioactivity collecting in all body tissues and especially high in the jaw and facial bones. (8,9).

Another publication, from a major U.S. School of Dentistry, stated that solutions in which amalgams had been soaked were "severely cytotoxic initially when Zn release was highest" (13). Zn is a needed

element for body health and is found in very low percentages in dental amalgams when compared to mercury and why mercury was not mentioned in the abstract of this publication baffles me. Why would the statement be true? Because Zn2+ is a synergist that enhances mercury toxicity!

However, does this sound like amalgams are a safe, stable material? We have repeated similar amalgam soaking experiments in my laboratory and the results can be seen at www.altcorp.com. Cadmium (from smoking), lead, zinc and other heavy metals enhanced mercury toxicity as expected (this research is currently being prepared for publication).

The ADA claim that a zinc oxide layer is formed on the amalgams that decreases mercury release is true, if you don't use the teeth.

The zinc oxide layer would be easily removed by slight abrasion such as chewing food or brushing the teeth. Further, my laboratory has confirmed that solutions in which amalgams have been soaked can cause the inhibition of brain proteins that are inhibited by adding mercury chloride, and these are the same enzymes inhibited in AD brain samples.

Further, mercury emitting from a dental amalgam can be easily detected using the same mercury vapor analysis instrument used by OSHA and the EPA to monitor mercury levels.

Anyone who does not believe mercury is emitted from amalgams should consider doing the following.

Have your local dentist make 10 amalgams using the same material he/she places in your mouth. Take these 10 amalgams to your nearest research university's department of chemistry or toxicology department and have them determine how much mercury is being emitted. For example, have them calculate how long it would take a single spill of hardened amalgam to make a gallon of water too toxic to pass EPA standards as drinking water.

You will then have an answer from an unbiased, solid group of scientists who are trained to do such determinations. Also, remember the level of mercury they measure would not include the increase that would occur with amalgams in the mouth where chewing, grinding your teeth, drinking hot liquids and galvanism greatly increase the release of mercury. Since this approach can be easily done by anyone don't you think the ADA, FDA and other amalgam supporters would have this published by now if the level of mercury released was below the danger level?

Here is their attempt.

According to an ADA spokesman he has "estimated" that only 0.08 micrograms of mercury per amalgam per day is taken into the human body. Applying simple math to this "estimate" of 0.08 micrograms/ day one would divide this amount by 8,640 (24 hours/day X 60 minutes/hour X 6 ten second intervals/minute) to determine the amount of mercury in micrograms available for a ten second mercury vapor analysis.

Consider that somewhere between one-half to five-sixths of the mercury released would be into the tooth (that area of the amalgam that exists below the visibly exposed amalgam surface) and not into

the oral air. In addition, some mercury in the oral air would be rapidly absorbed into the saliva and oral mucosa (mercury loves hydrophobic cell membranes) and also not be measured by the mercury analyzer.

Further, as the mercury analyzer pulls mercury containing oral air into the analysis chamber, mercury free ambient air rushes into the oral cavity decreasing the mercury concentration. Taking all of this into account you can calculate that most mercury analyzers could not detect this "estimated" 0.08 micrograms/day level of mercury even if you had several amalgams.

However, the fact is that it is quite easy to detect mercury emitting from one amalgam using these analyzers. Therefore, the "estimate" by this ADA spokesman is way to low.

Also, if you gently rub the amalgam with a tooth-brush the amount of mercury emitted goes up dramatically. This is a test anyone can do and demonstrate to any group. The ADA spokesmen state that the mercury vapor analyzer is not accurate at determining oral mercury levels and they are quite correct.

However, using this instrument would greatly underestimate the amount of mercury exiting the amalgam. The very fact that the mercury analyzer detects high levels of oral mercury strongly indicates the emitted amount of mercury is too high to be acceptable.

Mercury release from dental amalgams is also the reason OSHA has used this analyzer to make the dentists place unused amalgam in a sealed container under liquid glycerin. This is done so that the mercury vapors from the amalgams will not contaminate the dental office making it an unsafe place to work.

This is also the reason the EPA insists that removed amalgam filling and extracted teeth containing amalgam material be picked up and disposed of as **toxic waste.** Apparently, the only safe place for amalgams is in the human mouth if you believe what the ADA believes.

"Amalgams have been used for 150 years and, during that time, has established an extensively reviewed record of safety and effectiveness."

First, what other aspect of industry or medicine is still using the same basic manufactured material that they used 150 years ago? One has to ask the question as to **what has hindered the progress of development of better and safer dental materials?**

Also, consider that in the early 1900s the average life expectancy of most Americans was about 50 years of age and most of them could not afford dental fillings.

Fifty to sixty years is much less than the average age of onset of AD. Further, amalgams became more available to most working class Americans after World War II, or in the early 1950s. The greatest increase in the use of amalgam occurred at about this time and these 'baby boomers are the great ongoing amalgam experiment'.

They are now reaching the age where AD appears and have lived most of their lives carrying amalgam fillings. They also wonder what is causing their chronic fatigue as the physicians can find nothing systemically wrong with them. I would encourage all concerned to contact the health experts on the rate of increase of AD in the U.S.A. at this time.

Consider the cost it will place on the taxpayer and how much we would save if we could even remove the exacerbation factors that might speed up the onset of AD. I must point out that the "extensively reviewed record of safety" mentioned in the ADA letter was mostly done by dentists and committees dominated by ADA dentists.

Also, much of the "safety opinion" was developed long before words like Alzheimer's disease and chronic fatigue were commonplace. Further, these were "reviews" and not carefully documented studies based on scientific experimentation and done by unqualified dentists, not medical scientists. Dentists are not trained to do basic research, nor are they trained in toxicology.

Furthermore, the ADA does have a vested interest in keeping amalgam use legitimate. The ADA was founded on using amalgam technology and participated in patenting and licensing amalgam technology. One has to question why there has not been a general outcry by the bulk of well-meaning dentists and their patients and this question should be addressed.

The International Association of Oral Medicine and Toxicology, started by American & Canadian dentists, does adamantly disagree with the ADA on the issue of safety of dental amalgams and this organization has the mantra of "Show me your science" with regards to all dental issues.

The ADA, through state dental boards stacked with ADA members, has instigated a **"gag order"** preventing dentists from even mentioning to their patients that amalgams are **50% mercury.** Dentists cannot state that mercury is neurotoxic and emits from amalgams and that the dental patient should consider this as they select the tooth filling material they want used.

If a dentist informs a patient of these very truthful facts he will be consider not to be practicing good dentistry and his license will be in jeopardy.

Attacking a person's freedom of speech because he is telling the truth and causing serious questions to be asked about the protocols pushed by a bureaucracy (the ADA) makes me seriously question the commitment the ADA has for the health of the American people.

The negative stand taken by many state dental boards against even informing the patients about the mercury content of amalgams and the other filling choices they have does not speak well for the organized dental profession. What medical group would give a treatment to a patient without telling them of the risks involved?

"Issued late in 1997, the FDI World Dental Federation and the World Health Organization consensus statement on dental amalgam stated "No controlled studies have been published demonstrating systemic adverse effects from amalgam restorations.""

My first comment would be to question, "who staffed these committees and what percentage were connected to the ADA though the NIDCR or the FDA dental materials branch or other relationships?" We appear to have the foxes guarding the henhouse! Then I would again point out that "absence of proof is not proof of absence".

I would then ask 'have any controlled studies been done and if not, why not?' If the ADA dentists insist on placing amalgams in the mouth, are they not required to show it is safe, not the other way around?

Should not the ADA and others concerned push to require the FDA to prove amalgams are safe instead of totally ducking this issue. Go to the FDA dental materials web-site and try to find any evaluation of amalgam safety -- -you will not succeed. The dental branch of the FDA refuses to do a safety study on amalgams and this is shame on our government.

"the small amount of mercury released from amalgam restorations, especially during placement and removal, has not been shown to cause any adverse effects."

This increase in mercury exposure has also not been shown to be safe by proving it does not cause any adverse effects!

Are we to believe this elevated exposure to a toxic metal is good for us?

If one were in a building that caused the rise in blood/urine mercury that appears after dental amalgam removal, then OSHA would shut the building down.

In fact, no study by the ADA or NIDCR has been completed that specifically and accurately addresses this issue. Yet, the ADA leads us to believe that additional exposure to toxic mercury from these procedures is not dangerous to our health.

Mercury toxicity is a retention toxicity that builds up during years of exposure. The toxicity of a singular level of mercury is greatly increased by current or subsequent, low exposures to lead or other toxic heavy metals (12).

Therefore, the damage caused by amalgams could occur years after initial placement and at mercury levels now deemed safe by the ADA.

Our ability to protect ourselves from the toxic damage caused by exposure to mercury depends on the level of protective natural biochemical compounds (e.g. glutathione, metallothionine) in our cells and the levels of these protecting agents is dependent upon our health and age.

If we become ill, or as we age, the cellular levels of glutathione drop and our protection against the toxic effects of mercury decreases and damage will be done.

This is strongly supported by numerous studies where rodents have been chemically treated to decrease their cellular levels of protective glutathione and then treated with mercury, always with

dramatic injurious effects when compared to controls. Therefore, published science indicates that mercury toxicity is much more pronounced in infants, the very old and the very ill.

A recent NIH study on 1127 military men showed the major contributor to human mercury body burden was dental amalgams. The amount of mercury in the urine increased about 4.5 fold in soldiers with the average number of amalgams versus the controls with no amalgams.

In extreme cases it was over 8 fold higher. Since the total mercury included that from diet and industrial pollution are we to expect that this 4.5 to 8 fold average increase in mercury is not detrimental to our health? Does this indicate that amalgams are a "safe and effective restorative material"? Is the public and Congress expected to be so naïve as to believe that increased exposure above environmental exposure levels is not damaging?

Then why are pregnant mothers told to limit seafood intake when mercury exposure from amalgams is much greater? Then why is the EPA pushing regulations to force the chloro-alkali plants and fossil fuel plants to clean up their mercury contributions to our environment?

Obviously, from this study most of the human exposure to mercury is from dental amalgams, not fossil fuel plants. Yet, the FDA lets the dental profession continue to expose American citizens to even greater amounts of mercury. They do this by refusing to test amalgam fillings as a source of mercury exposure. Also, remember that **the amalgam using ADA dentists are a major contributor to mercury in our water and air through mercury leaving the dental offices,** and even when we are cremated.

"The ADA's Council on Scientific Affairs 1998 report on its review of the recent scientific literature on amalgam states: "The Council concludes that, based on available scientific information, amalgam continues to be a safe and effective restorative material." and "There currently appears to be no justification for discontinuing the use of dental amalgam."

What would you expect an ADA Council to say? The ADA, as evidenced in the current letter by the President of the ADA, only quotes and considers valid the published research that supports their desire to continue placing mercury containing amalgam fillings in American citizens. When were dentists trained to evaluate neurological and toxicological data and manuscripts?

What is needed is an international conference where both the pro- and anti-amalgam researchers show up and present their data in front of a world-class scientific committee. I would challenge the ADA to line up their scientists and supporters to participate in such a conference. This could be held in Washington, D.C. so the FDA officials could easily attend. Perhaps we could persuade the FDA to sponsor such a conference.

However, this is unlikely since a recent written request to have a conference to evaluate the safety of amalgams was rejected in a letter from the FDA and signed by three FDA/ADA dentists who presented the ADA line on this issue. Doesn't it seem a bit fraudulent to have FDA/ADA dentists deciding on whether or not a safety study should be done on mercury emitting amalgams being placed in human mouths with the blessing of the ADA? This does seem like a **conflict in interest** that Congress should address.

"In an article published in the February 1999 issue of the Journal of the American Dental Association, researchers report finding "no significant association of Alzheimer's disease with the number, surface area or history of having dental amalgam restorations."

This research was lead by a dentist, Dr. Sax. It was submitted to the J. of the American Medical Association and rejected. It was then submitted to the New England Journal of Medicine and rejected. It was then published in the ADA trade journal, JADA, that is not a refereed, scientific journal. JADA is loaded with commercial advertisements for dental products.

They even called a "press conference" announcing the release of this article! Calling a press conference for a twice-rejected publication that is to appear in a trade journal is playing politics with science at its worst!

At this press conference two of the authors made unbelievable statements that were not supported by any of the data in the article and conflicted with numerous major scientific reports, including the 1998 NIH study (6). Some of these were high-lighted in the side-bars of the ADA publication.

I would suggest that those concerned with this article visit Medline and look at the publication records of the two individuals who made these statements. Also, look at the three earlier excellent publications in refereed journals by some of the other authors showing significant mercury levels in the brains of AD subjects compared to controls (14a,b, 15). However, put a dentist in charge of the project and the data gets reversed!

Apply some common sense. The ancillary comments by some of the authors and the results of the JADA publication are in total disagreement with the vast majority of research published that looks at elevated mercury levels in subjects with amalgam fillings. For example, the NIH study on military men discussed above showed a very significant elevation of mercury in the blood that correlated with number of dental amalgams (6).

Another recent publication demonstrated elevated mercury in the blood of living AD patients in comparison to age-matched controls (10). These studies clearly show that there should be increased mercury in your blood if you have amalgams and especially if you have AD and amalgams (6,10).

Does not the brain have blood in it? This makes it a total mystery as to how could the authors of the JADA article not find elevated brain mercury levels in patient with existing amalgams and/or AD. Even cadavers have brain mercury levels that correlate with the number of amalgam fillings they had on death.

Further, if you are addressing the contribution of amalgams to brain mercury and AD wouldn't it be important to divide the AD and control subjects into those with and without existing amalgams on death? In the JADA article this was not done and represents a **major research flaw!** That this was not done also arouses suspicion.

I participated in submitting a letter pointing out this flaw to editors of JADA but they refused to acknowledge the letter and did not publish our comments. It is my opinion that the entire situation around this singular supportive publication of the ADA position on amalgams, brain mercury levels

and AD represents a weak attempt at controlling the mind-set of well-meaning dentists, scientists, physicians and medical research administrators.

It definitely impedes honest scientific debate. It also explains the cavalier attitude of the ADA and NIDCR about elemental mercury exposure and toxicity when compared to the more serious approaches taken by the EPA and OSHA.

With regards to the JADA article summary that "no statistically significant differences in brain mercury levels between subjects with Alzheimer's disease and control subjects." Here I must quote Mark Twain on honesty, "There are liars, damned liars and statisticians."

Comparing the level of mercury in the AD versus control alone using straight-forward statistics previously showed a significant difference on mercury levels in AD versus control subjects (14a,b, 15). However, there are anomalies, confounders and other factors that can be considered in this situation, especially if you don't like the initial results.

This allows one to invoke a Bon-Feroni statistical manipulation. With Bon-Feroni you include the comparison of one pair of data (that may be statistically significantly different taken alone, e.g. mercury levels in the brains of AD versus control subjects) with several other pairs of data rendering the difference statistically insignificant.

One known weakness of the Bon-Feroni treatment of several coupled pairs of comparisons is that one very likely will miss a single comparison that is significantly different, and clever people know this. It is my opinion that application of the Bon-Feroni manipulation is what happened in this JADA study that reversed the previous significance of the mercury levels in AD versus control brain previously reported.

Research previously reported by some of the very same researchers involved in the JADA study consistently indicated that mercury levels were higher in AD versus age-matched control brains (14a,b, 15).

Only when an ADA dentist became involved did the results change to being insignificant.

I think the data used in this JADA article and funded by NIH needs to be re-evaluated by a different statistician if we are to ever really know if the mercury levels in the AD brains differed significantly from controls.

The letter from the ADA President then lists four publications as proof of amalgams having no statistically significant negative effects. Two of these were published in Scandinavian Journals, another was a review of the literature in a Dental Journal, and one was the JADA article mentioned above.

Sweden is well known to have lead the world in the restriction and replacement of dental amalgams with non-mercury containing materials.

Forces are pushing hard to get the use of amalgams accepted again in Sweden to eliminate this embarrassment to our ADA. The current situation in Sweden and some other European countries, Canada and Japan seriously questions the ADA contention of amalgam safety. What if people in Sweden become healthier without amalgams?

Additionally, the studies quoted by the ADA President were epidemiological studies. These are very complex as many confounders are included which make finding a statistically significant difference very difficult.

So the results are negative, nothing found, and not surprising. However, they are in disagreement with numerous other similar reports and appear to be hand-selected to support the ADA position. One has to wonder, since the ADA President seemed to visit Swedish journals to support the ADA position, how he missed the research of the Nylander group in Sweden that showed increased mercury content in brains and kidneys of humans in relationship to exposure to dental amalgams (17,18).

Also, the referenced studies in the ADA letter did not involve neurotoxicity, autism or neurological disease -- -which is the question at hand. Rather, they addressed fertility, reproduction and other systemic illnesses. Could not the ADA find references to focus on neurotoxiological studies?

What about the 1989 study that showed elevated levels of mercury in 54 individuals with Parkinson's disease when compared to 95 matched controls (16)? Further, one ought to consider who was doing these touted ADA studies and any vested interest they may have in the outcome.

I am also aware of studies done in the U.S.A. by major research universities that would disagree with the conclusions drawn by the ADA on this subject yet these articles are not considered in the ADA letter.

At the end of the last publication the quote "Conclusions: No statistically significant correlation was observed between dental amalgam and the incidence of diabetes, myocardial infarction, stroke, or cancer."

How does this relate to an article published in the J. of the American College of Cardiology where the mercury levels in the heart tissue of individuals who died from Idiopathic Dilated Cardiomyopathy (IDCM) contained mercury levels **22,000** times that of individuals who died of other forms of heart disease? Where did this tremendous amount of mercury come from?

Even a Bon-Feroni manipulation could not make this difference insignificant! Many who die of IDCM are well-conditioned, young athletes who drop dead during sporting events -- -and they live in locations and in economic environments where sea-food is not a dietary mainstay. Perhaps the victims of IDCM are within the ADA Presidents "handful of individuals who are allergic to one of its components."

"The National Institute of Dental and Craniofacial Research is currently supporting two very large clinical trials on the health effects of dental amalgam. Studies underway for several years each in

Portugal and the Northeastern United States involve not only direct neurophysiological measures but also cognitive and functional assessments."

Do we really think that the NIDCR and associated ADA personnel are going to deliver up a conclusion to American parents saying "we put a mercury containing toxic material in your child's mouth that lowered his/her I.Q. and made him more susceptible to neurological problems in comparison to the children whom we selected to not get exposed to this toxic material"?

It is my opinion that most bureaucracies don't have a brain or a heart, but they do have a very strong survival instinct. Therefore, the results presented from this study will likely follow previously ADA supported research, i.e. no significant results.

Since the NIDCR started this project only 4 years ago one has to ask why it took so long for them to get involved since the "amalgam wars" have been going on for scores of years? Was it the overwhelming amount of modern science showing mercury from amalgams being a major part of the daily exposure that forced their hand and they had to develop a defense?

Would I trust the conclusions of this study without knowing who put it together and who did the statistics? Not any more than I trust the conclusions of the JADA article mentioned in the ADA letter that stupendously concludes that mercury from dental amalgams does not get into the brain.

As was proven by the tobacco situation, trying to find any significant negative effect of one product (amalgams) related to any disease through epidemiological studies is very difficult and complex. To do this with mercury would be difficult because of the synergistic effect two or more toxic metals or compounds (e.g. cadmium from smoking) may have on the toxicity of the mercury emitted from amalgams.

For example, one publication showed that combining mercury and lead both at LD1 levels caused the killing rate to go to 100% or to an LD100 level (12). An LD1 level is where, due to the low concentrations, the mercury or the lead alone was not very toxic alone (i.e., killed less than 1% of rats exposed when metal were used alone).

The 100% killing, when addition of 1% plus 1% we would expect 2%, represents synergistic toxicity. Therefore, mixing to non-lethal levels of mercury plus lead gave an extremely toxic mixture! What this proves is that one cannot define a "safe level of mercury" unless you absolutely know what others toxicants the individual is being exposed to.

The combined toxicity of various materials, such as mercury, thimerosal, lead, aluminum, formaldehyde, etc., is unknown. The effects various combinations of these toxicants would have is also not defined except that we know they would be much worse than any one of the toxicants alone.

So how could the ADA take any exception, based on intellectual considerations, to my contention that combinations of thimerosal and mercury could exacerbate the neurological conditions identified with autism and AD?

Autism and AD have clinical and biological markers that correspond to those observed in patients with toxic mercury exposure.

Why would the ADA take this position? I personally feel like I have been in a ten year argument with the town drunk on this issue. Facts don't count and data is only valid if it meets the pro-amalgam agenda.

The ADA was founded on the basis that mercury-containing amalgams are safe and useful for dental fillings. This may have been an acceptable position in 1850. However, modern science has proven that amalgams constantly emit unacceptable levels of mercury.

Especially as the average life span has increased from 50 to 75-78 years of age where AD and Parkinson's become prevalent diseases. The ADA can try to verify its position using selected epidemiological studies. But the bottom line is that amalgams emit significant levels of neurotoxic mercury that are injurious to human health and would exacerbate the medical condition of those individuals with neurological diseases such as ALS, MS, Parkinson's, autism and AD.

I am hoping that the ADA sent this letter to your committee and also placed it on the ADA web-site to indicate that they are now willing for a wide-open discussion to take place on the issue of dental amalgams.

I, for one, would welcome a major scientific conference on this issue. The ADA should feel free to post my letter in response and address any issue they feel that I am mistaken about.

However, in closing I urge your committee to push forward on the study of the potential dangers of mercury in our dentistry and medicines. This includes mercury exposures from amalgams, vaccines and other medicaments containing thimerosal. The synergistic effects of mercury with many of the toxicants commonly found in our environment make the danger unpredictable and possibly quite severe, especially any mixture containing elemental mercury, organic mercury and other heavy metal toxicants such as aluminum.

Sincerely,

Boyd E. Haley
Professor and Chair
Department of Chemistry
University of Kentucky

References:

1. a. Duhr, E.F., Pendergrass, J. C., Slevin, J.T., and Haley, B. HgEDTA Complex Inhibits GTP Interactions With The E-Site of Brain b-Tubulin Toxicology and Applied Pharmacology 122, 273-288 (1993).; b. Pendergrass, J.C. and Haley, B.E. Mercury-EDTA Complex Specifically Blocks Brain b-Tubulin-GTP Interactions: Similarity to Observations in Alzheimer"s Disease. p 98-105 in Status Quo and Perspective of Amalgam and Other Dental Materials (International Symposium Proceedings ed. by L. T. Friberg and G. N.

Schrauzer) Georg Thieme Verlag, Stuttgart-New York (1995).; c. Pendergrass, J.C. and Haley, B.E. Inhibition of Brain Tubulin-Guanosine 5'-Triphosphate Interactions by Mercury: Similarity to Observations in Alzheimer's Diseased Brain. In Metal Ions in Biological Systems V34, pp 461-478. Mercury and Its Effects on Environment and Biology, Chapter 16. Edited by H. Sigel and A. Sigel. Marcel Dekker, Inc. 270 Madison Ave., N.Y., N.Y. 10016 (1996).

2. Pendergrass, J. C., Haley, B.E., Vimy, M. J., Winfield, S.A. and Lorscheider, F.L. Mercury Vapor Inhalation Inhibits Binding of GTP to Tubulin in Rat Brain: Similarity to a Molecular Lesion in Alzheimer's Disease Brain. Neurotoxicology 18(2), 315-324 (1997).

3. David, S., Shoemaker, M., and Haley, B. Abnormal Properties of Creatine kinase in Alzheimer's Diseased Brain: Correlation of Reduced Enzyme Activity and Active Site Photolabeling with Aberrant Cytosol-Membrane Partitioning. Molecular Brain Research 54, 276-287 (1998).

4. Leong, CCW, Syed, N.I., and Lorscheider, F.L. Retrograde Degeneration of Neurite Membrane Structural Integrity and Formation of Neurofibillary Tangles at Nerve Growth Cones Following In Vitro Exposure to Mercury. NeuroReports 12 (4): 733-737, 2001.

5. Olivieri, G., Brack, Ch., Muller-Spahn, F., Stahelin, H.B., Herrmann, M., Renard, P; Brockhaus, M. and Hock, C. Mercury Induces Cell Cytotoxicity and Oxidative Stress and Increases b-amyloid Secretion and Tau Phosphorylation in SHSY5Y Neuroblastoma Cells. J. Neurochemistry 74, 231-231, 2000.

6. Kingman, A., Albertini, T. and Brown, L.J. Mercury Concentrations in Urine and Whole-Blood Associated with Amalgam Exposure in a U.S. Military Population. J. Dental Research 77(3) 461-71, 1998.

7. Chew, C. L., Soh, G., Lee, A. S. and Yeoh, T. S. Long-term Dissolution of Mercury from a Non-Mercury-Releasing Amalgam. Clinical Preventive Dentistry 13(3): 5-7, May-June (1991).

8. Hahn, L.J., Kloiber, R., Vimy, M. J., Takahashi, Y. and Lorscheider, F.L. Dental "Silver" Tooth Fillings: A Source of Mercury Exposure Revealed by Whole-Body Image Scan and Tissue Analysis. FASEB J. 3, 2641-2646, 1989.

9. Hahn, L.J., Kloiber, R., Leininger, R.W., Vimy, M. J., and Lorscheider, F.L. Whole-body Imaging of the Distribution of Mercury Released from Dental Filling Into Monkey Tissues. FASEB F. 4, 3256-3260, 1990.

10. Hock, C., Drasch, G., Golombowski, S., Muller-Span, F., Willerhausen-Zonnchen, B., Schwarz, P., Hock, U., Growdon, J.H., and Nitsch, R.M. Increased Blood Mercury Levels in Patients with Alzheimer's Disease. J. of Neural Transmission v105(1) 59-68, 1998.

11. Frustaci, A., Magnavita, N., Chimenti, C., Caldarulo, M., Sabbioni, E., Pietra, R., Cellini. C., Possati, G. F. and Maseri, A. Marked Elevation of Myocardial Trace Elements in Idiopathic Dilated Cardiomyopathy Compared With Secondary Dysfunction. J. of the American College Cardiology v33(6) 1578-1583, 1999,

12. Schubert, J., Riley, E.J., and Tyler, S.A. Combined Effects in Toxicology-A Rapid Systemic Testing Procedure: Cadmium, Mercury and Lead. J. of Toxicology and Environmental Health v4, 763-776,1978.

13. Wataha, J. C., Nakajima, H., Hanks, C. T., and Okabe, T. Correlation of Cytotoxicity with Element Release from Mercury and Gallium-based Dental Alloys in vitro. Dental Materials 10(5) 298-303, Sept. (1994)

14. a. Ehmann, W., Markesbery, W., and Alauddin, T., Hossain, E. and Brubaker, E., Brain Trace Elements in Alzheimer's Disease. Neurotoxicology 7(1) p197-206, 1986. b. Thompson, C. M., Markesbery, W.R., Ehmann, W.D., Mao, Y-X, and Vance, D.E. Regional Brain Trace-Element Studies in Alzheimer's Disease. Neurotoxicology 9, 1-8 (1988).

15. Wenstrup, D., Ehmann, W., and Markesbery, W. Brain Research, 533, 125-131, 1990.

16. Ngim, C.H., Devathasan, G. Epidemiologic Study on the Assocaiation Between Body Burden Mercury Level and Idiopathic Parkinson's Disease. Neuroepidemiology, 8, 128-141, 1989.

17. Nylander, M., Friberg, L. and Lind, B. Mercury Concentrations in the Human Brain and Kidneys in Relation to Exposure from Dental Amalgam Fillings. Swedish Dentistry J. 11:179-187, 1987.

18. Nylander, M., Friberg, L., Eggleston, D., Bjorkman, L. Mercury Accumulation in Tissues from Dental Staff and Controls in Relation to Exposure. Swedish Dental J. 13, 235-243, 1989

19. Heintze, U. Edwardsson, S., Derand, T. and Birkhed, D. Methylation of Mercury from Dental Amalgam and Mercuric Chloride by Oral Streptococci in vitro. Scand. J. Dental Research 91(2) 150-152, 1983.

Are ‘silver’ dental fillings safe?

By Francesca Lyman

Anyone who has ever had a tooth cavity has probably seen a dentist who drilled it and packed it with a "silver" filling. But how many patients know what's in that silver? And whether it could have consequences for your health?

Could silver dental fillings be causing, or contributing to, health problems? Holistic health advocates, environmentalists and a growing cadre of "mercury-free" dentists fear amalgams emit **dangerous levels of mercury**, stirring up a health controversy that goes back 150 years.

Scientists agree that when absorbed in high enough doses, mercury, in all its chemical forms, can damage the brain, nervous system, kidneys and other organs, especially in infants and children. But they differ on not only how much mercury must be absorbed to cause adverse health effects, but also just how much of the amalgam's mercury is absorbed by the human body to begin with.

Dental associations pooh-pooh alleged dangers. The ADA considers it "a safe, affordable and durable material" that has been used for "more than 150 years and during that time has established an extensively reviewed record of safety and effectiveness."

ADA quotes the U.S. Public Health Service's 1993 report stating that amalgam has **no health consequences** other than for a small percentage of people who might be allergic to the metals.

Others, however, like Boyd Haley, a chemist at the University of Kentucky, argue that it is harmful to more than just sensitive populations. Most people with amalgam fillings get an unsafe dose of the heavy metal because mercury vapor leaks continually from the fillings, says Haley, who recently testified before Congress on mercury exposure in children.

Consumer groups argue, meanwhile, that dental patients ought to be told about what's going into their mouths.

In June, a coalition of citizens' health and environmental groups filed suit against the American Dental Association for allegedly deceiving consumers into thinking amalgam fillings are made of silver, when in fact the major component (about 50 percent, according to the suit) is mercury.

They also claim that the ADA has failed to disclose information regarding the significant risk of harm associated with the fillings in order to promote the continued use of amalgams, a product in which it has a financial stake as a paid endorser.

"**If mercury is so safe, why do they try to hide it?**" says Charlie Brown, one of the lawyers representing Consumers for Dental Choice (CDC), a plaintiff in the suit. Brown notes that CDC has already succeeded in winning a state ruling that requires the California state dental board to advise participating dentists to tell their patients about the mercury content of amalgam fillings as well as

discuss with them any sensitivities and the potential for adverse reactions, including suspected links to birth defects.

Although mercury has been known to be poisonous since ancient times, dentistry associations claim that the mercury is tightly bound with other metals, rendering it safe. Silver fillings usually contain a mix of silver, tin and copper as well as zinc and other metals, according to the Journal of the American Dental Association.

Mercury is essential to make the amalgam harden and adhere, says ADA spokesman J. Rodney Mackert, professor of dentistry at the Medical College of Georgia and an expert in materials science.

Tracking Mercury's Vapors

It wasn't commonly known that amalgam released mercury vapor until recently, although the issue was raised more than a century ago. In 1985, Fritz Lorscheider, a fetal physiologist, and Canadian dentist Murray Vimy showed that mercury in amalgam continuously vaporizes; measuring mercury in the mouths of 46 people, they also found that the amount of vapor released from fillings rose when the subjects chewed gum or brushed their teeth.

In 1990, the same scientists reported that studies on sheep using radioactively tagged mercury revealed that the **highly volatile and unpredictable** element travels to the gastrointestinal tract, kidney, liver and brain.

"Whether those [latter] studies are applicable to humans is a matter of serious importance to public health," says Dr. Norman Braveman, a research administrator at the National Institute of Dental and Craniofacial Research (NIDCR), which has two studies underway on the subject.

At issue, he says, is what dose of mercury a typical patient gets in the dentist's office, how much he is exposed to daily and potential health effects that might arise from this dose. And there isn't much agreement on any of those questions.

"There's no question that mercury is not healthy for us," says Vasken Aposhian, a professor of cellular and molecular biology at the University of Arizona who has studied how mercury acts on the body. How many amalgams you have makes a big difference in terms of how much mercury your body's absorbing, he maintains.

"Some people are hyper-sensitive to metals and can get very sick" from amounts that others can safely handle, he says. "Most are at risk from multiple exposures from fish, food and other sources."

At a Congressional hearing on the use of mercury in medicine last year, Aposhian told legislators that Americans' greatest exposure to mercury is from fillings - a serious threat, he says, because it can cross the placenta and harm the developing nervous system of the fetus.

ADA, however, maintains that **the amount of mercury that vaporizes from the amalgam is trivial**, and less significant than exposures in food, water and air. "Yes," acknowledges ADA's Mackert, "mercury is a poison," and amalgams vaporize, "something only recently discovered." But,

he argues, "there is no convincing evidence that the small amount of mercury vapor from amalgams has any effect on humans."

Further, says Mackert, repeating the mantra of the ADA, "there have been no studies conclusively linking mercury from dental amalgams with any diseases."

But concerns about possible effects "can't be dismissed," as the U.S. Public Health Service noted. Studies show that people with more dental amalgam fillings have higher levels of mercury in their bodies. And researchers at the University of Calgary School of Medicine showed that mercury could be found in the blood and tissues of pregnant mothers and their fetuses within a few days after mercury fillings were placed.

Mercury in dental fillings has been linked to other adverse health effects.

Anne Summers, a microbiologist at the University of Georgia, for example, found that mercury from fillings can inhibit the effectiveness of antibiotics.

Scientists at the Battelle Centers for Public Health Research and Evaluation in Seattle linked exposure to mercury vapor from dental amalgam fillings to central nervous system toxicity among dental personnel.

The Battelle team also found "convincing new evidence of adverse behavioral effects associated with mercury exposures from amalgam fillings within the range of that received by the general population." And researchers at the Colorado State University, Department of Physiology, in Fort Collins, Colo. have linked dental amalgam exposure to mental illness.

Haley and other scientists, including Vimy and Lorscheider, found in experiments on rat brains that chronic inhalation of low-level mercury ã at levels that simulate exposure to amalgam fillings ã can inhibit brain chemistry, producing lesions similar to those in Alzheimer's diseased brains. Mercury inhibits the efficiency of tubulin, a protein vital to brain cells, they explain.

'Safe' For Human Use

Despite such studies, though, the National Institutes of Health, the U.S. Public Health Service, and the World Health Organization have all concluded that amalgams are safe enough to use. There is **"no solid evidence of any harm for millions of Americans who have these fillings,"** wrote the U.S. Public Health Service, and "no persuasive reason to believe that avoiding amalgams or having them removed will have a beneficial impact on health."

By contrast, Canada recently restricted the number of amalgams that could be placed in children and pregnant women, following similar laws passed in Sweden, Germany, the United Kingdom and other countries.

But having produced its new guidelines, the U.K. government then qualified that it had no evidence that there was a risk from amalgam, complicating the issue even further.

While the battle for reliable science rages, many dentists are switching away from mercury. A 1995 survey of dentists found 8.7 percent wanting to ban amalgam and **12.3 percent uncertain about its safety**, according to a report published in the March issue of the Journal of the American Dental Association.

Discussion Board Remembering how he had to dispose of his scrap amalgam as hazardous waste, he says, "It's OK to place these in people's mouths yet it's considered hazardous when you take it out. Go figure that one out."

Looking To The Future

Given amalgam's long track record, however, the government is hesitant to ban it without greater evidence of harm to human health.

"If we ban this material," said NIDCR's Braveman, "**what are our alternatives**, and will they do the job as well?"

For now, he says, two government-funded studies are tracking 1,000 children -- half with mercury amalgams, half with alternative materials -- for such traits as behavior, intelligence, antibiotic resistance, immune function and memory. The results, he says, will be available in about four years.

In the meantime, if you're concerned that you have a great many mercury fillings, Bronte suggests checking yourself for symptoms of mercury toxicity and having your fillings replaced with non-toxic materials.

"If your regular dentist really isn't familiar with these materials, you are better off finding a dentist who is familiar with them," advises Bronte, who went on to write "The Mercury in Your Mouth" after her health improved.

As more patients find out what's in mercury fillings, adds advocate Brown, "more dentists will make it their business to know about the alternatives."

The Seattle Times NEWS Monday, September 3, 2001

MERCURY IN FILLINGS

Q. I am a very natural person. I don't smoke, I am a vegetarian and I avoid anything that I think might pollute my body. Unfortunately I still have silver fillings in my teeth. Is it true that they contain mercury?

A. Yes they do and although there is nothing that scientifically proves amalgam fillings to be harmful to humans it is certainly bad fro the environment. Mercury is still allowed in fillings, but in many places like King County we are not allowed to drain the remains of old fillings into the sewer system when we remove them from teeth. Some countries are even starting to restrict the use of mercury in dentistry. The biggest advantage of mercury containing silver fillings is their low cost, but we have newer materials like porcelain and composite that look much better and are safer fro the environment. For these reasons we do not use any amalgam in our office and have not used if for over five years.

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Maine Legislation Mandates Accurate Information on Mercury Amalgam

Augusta, Maine, 08/23/2001--Governor Angus King today signed the most advanced bill in the United States **requiring dentists to inform their patients that amalgam dental fillings contain a large percentage of the toxic element mercury, which can be harmful to the wearer's health.**

In his preliminary remarks before signing the bill, Governor King noted that Maine has probably taken more action to get mercury out of the air and water than any other state in the union. "And yet we all carry it around in our mouths," he remarked. Senate President Michaud cited the courage of the many individuals who testified on behalf of the bill, especially the dentists who came forward to endorse it despite the opposition of the American Dental Association.

"We hope that the U.S. will take Maine's lead and move forward with legislation at the national level," he said.

The bill mandates that every dentist's office will feature a poster and a brochure informing patients about the presence of mercury in amalgam fillings and about its negative health effects. Scientific research has shown that dental amalgam is the chief source of mercury in the human body. For that reason the bill is a major step forward for women of childbearing age and for children, who receive their first exposure to mercury in the womb and from their mother's breast milk. Mercury has been implicated in neurological disorders of children such as autism and ADD/ADHD, and in fertility problems in women.

"We are delighted that this bill has been signed," said Rep. Stanley. It is a major step forward to protect the health of Maine citizens." Pam Anderson added that the group hopes Maine's next step would be to ban the use of dental amalgam in all women of childbearing age and in children.—*Internet Report*

CA Dentists Required to Warn Patients

FINALLY! After years of litigation, California dentists are required to warn their patients that mercury fillings are a hazard.

According to an article by Hal Huggins, DDS in the May 2001 *Alternative Medicine* journal, on Nov. 2000 the Superior Court of California in San Francisco signed a consent decree that the link between birth defects and silver-mercury dental fillings will have to be disclosed to California dental patients after February 15, 2001. The judge ruled that "according to Proposition 65, patients must be informed of this connection."

Proposition 65, passed overwhelmingly by California voters in order to address growing concerns about exposure to toxic chemicals, includes a provision requiring the governor to publish a list of chemicals that are known to the State of California to cause cancer, birth defects or other reproductive harm. This list must be updated at least once a year.

This decree closes the loophole that dentists previously had in not having to inform patients, even though law required distributors and dentists to be informed the dangers of dental mercury.

"SILVER" FILLINGS IMPLICATED IN

MEMORY LOSS AND NEUROLOGICAL DISORDERS

Mercury, the leading culprit among toxic metals and a primary ingredient of dental fillings, is implicated in several neurological disorders, including amyotrophic lateral sclerosis (ALS), multiple sclerosis (MS), and Alzheimer's disease. Its effects on the brain also lead to memory loss, dementia, and loss of fine motor coordination. An investigational review board established by the Great Lakes College of Clinical Medicine (GLCCM) has set out to evaluate symptomatic changes that occur in patients with these neurological symptoms. The protocol for removing mercury from the body involves 1. Preparing the patient's system with supplementation and gut healing; 2. Removal of dental amalgam fillings from the teeth according to specific guidelines that are designed to avoid increased exposure; and 3. Patients are sent to physicians who have been trained in removing mercury metal from the body, primarily through the use of intravenous (IV) Sodium 2,3 dimercaptopropane-1-sulfonate (DMPS), which binds to mercury and allows it to be excreted through the urine.

According to an official report by the Department of Health and Human Services, the most common source of mercury exposure is dental amalgam fillings, which are made of over 50 percent mercury. Other sources of mercury exposure include contaminated fish, pesticides, industrial pollution, and vaporous mercury as a by-product of cremation. Studies performed on dentists, who have occupational exposure to mercury, show diminished fine motor coordination and slowed response time to various stimuli. According to the International Association of Oral Medicine and Toxicology (IAOMT), mercury from amalgam fillings - commonly referred to as "silver" fillings - is absorbed through the lungs and nasal cavity as a vapor. Then it is transported through the bloodstream where it becomes available to the brain, nervous system, and other tissues. The IAOMT claims that, because the absorption rate of vaporous mercury is so much higher than that of mercury metal (found in fish), mercury exposure from the single source of fillings may far exceed the limitations set forth by the Environmental Protection Agency

Peter Holyk, M.D. of Contemporary Health Innovations, P.A. in Sebastian, FL, is a physician who is participating in the current study of the effects of mercury detoxification on a variety of neurological disorders. According to him, "There are different removal methods that need to be considered based on individual exposure." The level of mercury toxicity can be measured through hair analysis or by administering DMPS and measuring the amount of mercury that is subsequently secreted in the urine. Once mercury levels are determined, Dr. Holyk begins the removal process by first addressing the digestive tract, then tissues where mercury tends to be deposited, and finally the cells and areas of the brain for which mercury has an affinity. "The removal of mercury needs to be performed over a period of time due to the gradient of mercury concentration that occurs between the brain, cells, tissues, and gut," Dr. Holyk explains. "Sometimes we see improvement in patients right away; other patients have so much mercury in their system that we're still pulling out large amounts after a year of treatment."

Learn How Mercury Is Affecting You and the Ones You Love

It is a sad tragedy that mercury is causing such health damage to so many people.

Sad because it is so reversible and easily avoidable -- IF you know where it is and how it can affect you and your family

Mercury Does Leak Out of Your Fillings

The ADA has said for the past 150 years that the mercury in amalgam is safe and does not leak.

However, they **no clinical studies were ever done** and the FDA approved amalgam under the "grandfather clause" Subsequent studies have shown this not to be true.

Over ten years ago the prestigious New England Journal of Medicine published an editorial (12) calling mercury fillings the chief source of mercury exposure to the US population.

American adults have over a 500 tons of toxic mercury poison stored in their dental fillings.

One of my readers, Phil Ratte, was kind enough to perform the following calculations:

An average filling contains an estimated 800 milligrams of amalgam, with the average middle-aged adult having 8 fillings. The average North American adult has 3.2 grams or mercury (8 fillings x 800 mg per filling x 50% of total amalgam is mercury) of potential mercury vapor to go into the lungs, blood, and brain from dental fillings alone -- an average of about three-millionths of a gram a day -- this does not include the amount of mercury we take in from vaccinations and from our food!

Earlier in the article is was stated that 78% of American adults have dental fillings. If there are 200 million American adults that would mean that .78 x 200,000,000 would give us 156 million American adults with dental fillings. If the average American adult has 8 fillings with 800 mg. of amalgam that gives us 3.2 grams of mercury (amalgams are 50% mercury) in their fillings per American adult. 3.2 g x 28g/oz x 156 million = 17,828,571 ounces of mercury x 1/16 (ounces per pound) = 1,114,286 pounds of mercury or 557 tons of mercury stored in our mouths

This appears to be a much bigger problem than the mercury from the burning of coal.

Mercury in "Silver Fillings" Causing Multiple Sclerosis (MS) and Central Nervous System Disorders

Mercury amalgam dental fillings, commonly referred to as 'Silver' dental fillings, contain between 48 & 55 % mercury.

While the American Dental Association originally denied that mercury from these fillings leaked vapor, which is absorbed into the bodies of persons having this dental filling material, in recent years, facing numerous studies to the contrary, have had to concede, that 'silver fillings', do leak mercury vapor, one of the most toxic substances known to man.

The metallic mercury used by dentists to manufacture dental amalgam is shipped as a hazardous material to the dental office. When amalgams are removed, for whatever reason, they are treated as hazardous waste and are required to be disposed of in accordance with federal OSHA regulations and it is inconceivable that the mouth could be considered a safe storage container for this toxic material.

A multi-million dollar U.S. Government study conducted between 1988 and 1994 could hold the key to producing epidemiological data linking dental fillings to a myriad of illnesses.

This new information, comes straight from the National Institute of Health, the NHANES III Study (National Health and Nutritional Examination Survey), a study that according to the mission statement of National Center for Health Sciences "is to provide statistical information that will guide the actions and policies to improve health of the American people. As the Nation's principal health statistics agency, NCHS leads the way with accurate, relevant, and timely data."

A recent statistical analysis of this data was done to see if there were any links to dental fillings and adverse health conditions.

Their initial figures revealed that while 78% of the American public have dental fillings, 95% of the people with International Classification of Disease Codes 340-349: "Disorders of the Central Nervous System", which include MS, Epilepsy, Paralysis and Migraines, have dental fillings.

See also:

Mercury Reaches Brain Directly Through Nerves

If Mercury Is So Safe Why are European Countries Restricting Its Use?

In February, 1994 Sweden announced a total ban on the use of mercury fillings in young adults. Denmark, Germany and Austria followed suit. In Switzerland and Japan, the dental schools no longer teach amalgam use as the primary source of dental care.

The Chewing Gum Connection

Most people don't realize the grave danger that exists in the simple and seemingly innocent act of chewing gum. However, studies have shown that gum chewing greatly increases the exposure to mercury.

One recent study found that heavy gum chewers had **twice** the amount of mercury in their blood and **three times** the level in their urine and breath exhalation than did infrequent chewers. And if you were to compare with those who don't chew gum at all, the difference would likely be even greater.

This is very important, as those most vulnerable, such as pregnant women, may be unknowingly exposing their unborn children to mercury which is a know teratogen (substance that causes birth defects).

However, despite the grave risks, gum manufacturers are NOT required to put any kind of warnings on their products regarding increased mercury release.

See also:

Chewing Gum Releases Mercury From Dental Fillings

Mercury In Fish From Environmental Contamination Damaging Newborns

A recent CDC report reveals that nearly one in 10 US women could have levels of mercury in their blood that are close to hazardous.

Exposure to dangerous levels of mercury can result in permanent damage to the brain and kidney. Exposure is particularly risky for women of childbearing age, because a fetus is highly susceptible to adverse effects.

Combustion in power plants of coal containing mercury is the major source of environmental pollution.

40 Tons of Mercury are released into the US EVERY year by this method.

Mercury pollution from coal-fired power plants moves through the air, is deposited in water and finds its way into fish, accumulating especially in fish that are higher up the food chain. Fish like tuna, sea bass, marlin and halibut show some of the worst contamination, but dozens of species and thousands of water bodies have been seriously polluted.

As a result, women who eat a lot of fish during pregnancy, or even as little as a single serving of a highly contaminated fish, can expose their developing child to excessive levels of mercury. The toxic metal can cross the placenta to harm the rapidly developing nervous system, including the brain.

About 20,000 children this year will be exposed to a dose of methylmercury that increases the risk of adverse neurological effects for the entire pregnancy.

According to Public Citizen, "It is irrefutable that power plant emissions contribute to all sorts of environmental problems -- smog, acid rain, mercury poisoning of rivers and streams, radioactive waste -- all of which lead to climate change, air pollution, damaged crops, dying forests, and health problems like emphysema, lung disease, cancer and premature death."

See also:

Prenatal Mercury Exposure Raises Blood Pressure

US EPA Proposes Regulations to Cut Mercury Emissions From Coal-Fired Power Plants

National Academy of Sciences Backs Stricter Mercury Standards

Toxic Mercury Found in New England Rain and Snow

Mercury In Vaccines Contributing to Autism Epidemic

By age two, American children have received 237 micrograms of mercury through vaccines alone, which far exceeds current EPA "safe" levels of .1 mcg/kg. per day. That's one-tenth of a microgram, not one microgram.

This means that children are getting **2,370 times** the amount of mercury that the EPA deems safe from the shots which are mandated by the government.

The figure of one autistic infant for every 150 is now widely documented

Autism and mercury poisoning damage the:

- **Brain/nerve cells**
- **Eyes**
- **Immune system**
- **Gastrointestinal system**
- **Muscle control**
- **The speech center.**

Although mercury toxicity has been studied for decades, and EPA safety levels have been set, during all that time, a child's greatest exposure to mercury - thimerosol in vaccines - was never even included in the toxicity studies.

Many investigators believe the mercury in the vaccines has contributed to this epidemic of autism. Read the full story of how the mercury, called thimerosol, has been damaging American children for many decades.

See also:

Autism and Mercury

Autism: a Novel Form of Mercury Poisoning

Autism: a Novel Form of Mercury Poisoning (References)

Autism and Mercury Detoxification

CDC Issues Recommendations On Use Of Thimerosal - Mercury- Free Hepatitis B Vaccine

Mercury in Vaccines

Mercury to Be Removed From Vaccines

Joint Statement Of The American Academy Of Pediatrics And The American Public Health Service Regarding Mercury In Vaccines

Mercury and Alzheimer's Disease

Scientists at the University of Calgary have recently shown (3) that trace amounts of mercury can cause the type of damage to nerves that is characteristic of the damage found in Alzheimer's disease. The level of mercury exposure used in the test was well below those levels found in many humans with mercury/silver amalgam dental fillings.

Read more about how no other material or metal tested, including aluminum, has produced even remotely similar reactions.

See also:

Mercury Contributes To Alzheimer's Disease!

Mercury Detoxification

Recently, a paper I co-authored with Dietrich Klinghardt on the removal of mercury from the body, was published in the March 2001 issue of the Journal of Nutritional and Environmental Medicine.

It reviews the published evidence supporting amalgam toxicity and describes practical and effective clinical techniques that facilitate mercury elimination. A literature review is provided which documents effective mercury elimination strategies to reduce mercury toxicity syndromes.

Mercury Toxicity and Systemic Elimination Agents

Mercury Detoxification Protocol

Mercury Elimination with DMSA

Microbial Mercury Mop

References

For a comprehensive review of references please visit

http://www.iaomt.org/biblio-toc.htm

1. Hahn LJ, Kloiber R, Leininger RW, Vimy MJ, Lorscheider FL. Whole-body imaging of the distribution of mercury released from dental fillings into monkey tissues. FASEB J. 1990 Nov;4(14):3256-60.

2. Lorscheider FL, Vimy MJ. Daily dose estimates of mercury from dental amalgams. J Dent Res. 1991 Mar;70(3):233-7.

3. Leong CC, Syed NI, Lorscheider FL. Retrograde degeneration of neurite membrane structural integrity of nerve growth cones following in vitro exposure to mercury. Neuroreport. 2001 Mar 26;12(4):733-7.

4. Lorscheider F, Vimy M. Mercury and idiopathic dilated cardiomyopathy. J Am Coll Cardiol. 2000 Mar 1;35(3):819-20.

5. Pendergrass JC, Haley BE, Vimy MJ, Winfield SA, Lorscheider FL. Mercury vapor inhalation inhibits binding of GTP to tubulin in rat brain: similarity to a molecular lesion in Alzheimer diseased brain. Neurotoxicology. 1997;18(2):315-24.

6. Vimy MJ, Hooper DE, King WW, Lorscheider FL. Mercury from maternal "silver" tooth fillings in sheep and human breast milk. A source of neonatal exposure. Biol Trace Elem Res. 1997 Feb;56(2):143-52.

7. Lorscheider FL, Vimy MJ, Summers AO. Mercury exposure from "silver" tooth fillings: emerging evidence questions a traditional dental paradigm. FASEB J. 1995 Apr;9(7):504-8.

8. Lorscheider FL, Vimy MJ, Summers AO, Zwiers H. The dental amalgam mercury controversy -- inorganic mercury and the CNS; genetic linkage of mercury and antibiotic resistances in intestinal bacteria. Toxicology. 1995 Mar 31;97(1-3):19-22.

9. Lorscheider FL, Vimy MJ. Evaluation of the safety issue of mercury release from dental fillings. FASEB J. 1993 Dec;7(15):1432-3.

10. Goering PL, Galloway WD, Clarkson TW, Lorscheider FL, Berlin M, Rowland AS. Toxicity assessment of mercury vapor from dental amalgams. Fundam Appl Toxicol. 1992 Oct;19(3):319-29.

11. Clarkson TW. Mercury -- an element of mystery. N Engl J Med. 1990 Oct 18;323(16):1137-9.

12. Salonen JT, Nyyssonen K, Salonen R. Fish intake and the risk of coronary disease. N Engl J Med. 1995 Oct 5;333(14):937;

Mercury Reaches Brain Directly Through Nerves

Despite its inability to pass through the brain's protective barrier by way of the blood circulation, studies in fish suggest that mercury, which is toxic to brain cells, can travel directly to the brain through nerves. According to the research team, this is the first study to establish that mercury can enter the brain via nerves. The finding can be extrapolated to humans, as nerve transport also occurs in mammals, including humans. The investigators exposed brown trout and rainbow trout to mercury by adding it to the water surrounding them. The researchers also injected fish with solutions containing mercury, and then looked for mercury in their bodies using a technique called whole-body autoradiography.

Environmental Science and Technology October 1, 1999;33.

COMMENT: It is great to see this study hit the peer-reviewed literature but the investigators are terribly confused as they are not the first to report this finding. Dr. Klinghardt has been teaching this in his courses for well over one decade. He and I have just completed a 25 paper with over 125 references on mercury detoxification. It is likely the most definitive text in the world on the subject. I am very excited about completing this paper as we have been working on it for over one year. I will be submitting a 5,000-word abstract of the article to Lancet for publication. As soon as it is accepted for publication, I will publish the full article in my newsletter. It will also appear in several parts in the Townsend Letter.

Chewing Gum Releases Mercury From Dental Fillings

Heavy gum chewers risk breaking down the amalgam in their dental fillings and having **dangerously** high levels of **mercury** in their blood and urine as a result, a study published in the Stockholm newspaper Aftonbladet on Friday said.

The study was undertaken by the Sahlgrenska university hospital in Gothenburg, west Sweden.

"In our study we found out that people who chewed gum for at least **five hours per day** had significantly **higher mercury levels** in their urine and blood," medical researcher Gerd Saellsten was quoted as saying.

The test group included 17 people with at least five amalgam fillings who chewed gum an average of five hours per day, and consumed seven pieces of gum.

The test group was compared with a control group of equal size comprising people with the same number of fillings, but who chewed gum only 30 minutes per week on average.

A comparison of quicksilver levels between the two groups yielded **clear differences**.

The heavy gum chewers had **twice** the amount of **mercury** in their blood and **three times** the level in their urine and breath exhalation than did the infrequent chewers.

The mercury levels rose in proportion to the number of amalgamfillings the subjects had, the study showed.

Mercury damages the following in humans:

- **brain**
- **central nervous system**
- **kidneys**

DR. MERCOLA'S COMMENT:

Obviously, newspaper studies are not the top of the line peer-reviewed journals, but I thought it would be helpful to include this story to remind those of you who may not be familiar with this issue.

The problem is not just with chewing gum. Although, chewing gum is one of the most foolish things one can do nutritionally due to reasons totally unrelated to mercury.

There are nerves which connect the jaw to the stomach and when one chews the pancreas is stimulated to release digestive enzymes to aid in the digestion process. When one chews gum all day long these enzymes are simply wasted and one's ability to absorb food is compromised. Additionally, the chewing can worsen and TMJ problems that many people in our culture have due to the terrible OB paradigm in traditional medicine.

Back to mercury though, there are nifty meters one can use that are very sensitive to mercury vapors. Many biological dentists have these devices and can actually show you the mercury that is released when you chew anything if you still have amalgams in your mouth.

Don't let your traditional dentist fool you. Mercury is a poison and it has absolutely no health reason to be in your mouth. None! It is an excellent restoration material however, it is relatively inexpensive and lasts for decades. This is far better than many of the composite alternatives.

BUT, mercury will slowly kill you, so is it worthy it? I think not, but everyone gets their own choice. I did not wake up and smell the coffee burning until five years ago when I had all my amalgams replaced with composites.

Don't make the mistake I made though. I started the process ten years ago and had half of my amalgams replaced with gold crowns. Well, these gold crowns formed a battery in my mouth and increased the release of mercury by over 200%! You really do not want any metals in your mouth for this reason. The battery effect (electrogalvanism.

Even if you don't have any amalgam fillings the electricity created by metals in your mouth will adversely affect your brain's ability to function optimally.

Also ONLY see a dentist who is properly trained in removing mercury fillings. If they don't appreciate mercury toxicity they will not implement special precautions, like room air to you by nasal cannula, rubber dams and high pressure suction to suck out the mercury vapors that are released by drilling.

The last thing you want is mercury in your brain as a result of taking your fillings out. And that is exactly where it will go, to your brain. Mercury vapor is HIGHLY permeable and it will go through your skull bone like a hot knife through butter. It won't even blink twice. And it will stay there firmly bound to sulfur proteins in your brain causing damage to the microtubules that nourish your brain cells.

Related Articles:

Why Are Mercury Fillings Still Legal?

Look, No Fillings

Mercury reaches brain directly through nerves

Mercury Elimination with DMSA

Bernhard Windham's Mercury Paper

Bernie sent me this paper for free public distribution. He is a public employee who has been monitoring environmental mercury contamination and it's consequences for some years. He has developed a thorough and noteworthy compilation of the facts presented in scientific journals.

He himself came down with a bewildering illness that, much to his surprise, was diagnosed as mercury poisoning. Bernie suspects that his mercury amalgam dental fillings are the root source of his own mercury contamination.

Below is what Bernie has researched both as a public employee studying environmental mercury contamination, and a suspected victim of mercury amalgam dental fillings.

Bernie's information is organized as lists of facts followed by a list of cited scientific journal references.

- Jeff Clark

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Facts about Mercury and Dental Amalgam

(with Medical Study References)

1. Dental amalgam contains about 50 % mercury. The average filling has 1/2 gram of mercury.

2.Mercury is the most toxic of the toxic metals. Mercury is:
(a) cytotoxic(kills cells) (2,27,33) [106,147,148,150,160]
(b) neurotoxic(accumulates in the brain and damages brain cells) (27,34) [85,111,147,148,160,162]
(c) immunotoxic(damages and weakens the immune system) (27,34,35,42,43,44,45,46,47,48,60) [77,78,105,117,127,128,146,155,160]
(d) endocrine system-disrupting chemical(affects pituitary gland) [85,105,113,146,149]
(e) reproductive and developmental toxin (2,3,4,20,22,24,31,37,38,39,49,41,49)[105,146,149,160,204].
(f) causes cardiovascular damage and disease(47,201,202,205).

3. Mercury crosses the blood brain barrier and is selectively stored in the pituitary gland of the brain. [85,113,146,162] The pituitary gland controls the body's endocrine system and secretes hormones that control most bodily processes, including the immune system and reproductive systems[146].

4. Mercury's biochemical damage at the cellular level include DNA damage, alteration of protein structure, alteration of the transport of calcium, induction of free radical formation, inhibition of glutathione peroxidase enzyme, endothial cell damage, and immune system damage. Only a few micrograms of mercury severely disturb cellular function and inhibit nerve growth(181). 98% of mercury found in the brain is in the methyl mercury form, the most toxic form(220). Most mercury in saliva was also organic.

5. Hormonal secretions of the pituitary gland that control bodily processes are at extremely low levels and extremely low levels of mercury are required to adversely affect hormonal secretions of the pituitary gland. Hormonal secretions affected at levels much lower than acute toxicity effects normally tested for[105,146].

6. Because of the extreme toxicity of mercury, only 1/2 gram is required to contaminate a 10 acre lake to the extent that a health warning would be issued by the government to not eat the fish[151,160]. Over half the rivers and lakes in Florida have such health warnings[160].

7. Some Florida panthers that eat birds and animals that eat fish containing very low levels of mercury(about 1 part per million) have died from chronic mercury poisoning[160]. Since mercury is an estrogenic chemical and reproductive toxin, the majority of the rest cannot reproduce. The average male Florida panther has higher estrogen levels than females, due to the estrogenic properties of mercury[105,160]. Similar is true of some other animals at the top of the food chain like alligators.

8. In addition to having estrogenic effects, mercury has other documented hormonal effects including effects on the reproductive system resulting in lowered sperm counts, defective sperm cells, and lowered testosterone levels in males

and lowered levels of brain neurotransmitters dopamine, serotonin, and noreprenephrine[105,107,140,141],

9. An average amalgam filling contains 1/2 gram of mercury, and the average adult had at least 5 grams of mercury in fillings(unless most has vaporized). Mercury in solid form is not stable and vaporizes continuously, so that within 10 years more than half has been transferred to the brain and body of the host(34,47)[182].

10. The level of mercury in people with amalgam fillings causes a body burden of mercury much higher than they could get from eating contaminated fish from Florida waters with government health warnings. (WHO,183)

11. Running shoes with 1/2 gram of mercury in the heels were banned by several states, because the amount of mercury was considered dangerous to public health and created a serious disposal problem. Mercury from dental offices and human waste from people with amalgam fillings has much higher levels and is a major source of mercury in Florida waters.

* More detailed descriptions and references are contained in [105,160]. References in parentheses were compiled by the Australasian Society of Oral Medicine and Toxicology. References in brackets were compiled by Bernard Windham.

II. Systemic Mercury Intake Level from Amalgam Fillings

1. Mercury in solid form is not stable and evaporates continuously from amalgam fillings in the mouth, being transferred over a period of time to the host(211). Mercury vapor from amalgam is the single largest source of systemic mercury intake for persons with amalgam fillings. (16,17,19,57,) [78-82,94,111,126,129,130,138,161,183,211,216]. Amalgam also releases tin and copper which also have toxic effects, with organic tin being much more neurotoxic than mercury(222).

2. Mercury vapor is absorbed at a rate of 80% through the lungs into the arterial blood and is also absorbed my oral mucosa. (31,40) [77,79,84,94,96,117,133,211]

3. On average for a person having amalgam fillings, vapor from amalgam fillings amounts to about 80% of total systemic intake. [78-82,93,94,179,211]

4. Having dissimilar metals in the teeth(e.g.-gold and mercury) causes electrical currents and much higher mercury vapor levels and levels in tissues. (19,27,30) Average mercury levels in gum tissue near amalgam fillings are 250 ppm, but are often 1200 ppm near a gold cap on an amalgam filling(30,25,47)[186,194]. Concentrations of mercury in oral mucosa for a population of patients with 6 or more amalgam fillings taken during oral surgery were 20 times the level of controls[174]. The level of mercury and copper released from high copper amalgam is as much as 50 times that of low copper amalgams[191]. High levels of mercury vaporize and are picked up by the body and bloodstream during dental work(high-

speed grinding) on amalgam fillings, which results in much higher levels in the heart, brain, liver, and kidneys(219).

5. The average level of mercury in the urine of a person with amalgam fillings(1.9 parts per million) is approximately twice that of the FDA and EPA Action Level for bans on eating fish and food due to high mercury level(1 ppm) and can be as much as 50 times the EPA Critical Level. [134, 154,etc.,160]
The U.S. Agency for toxic Substances and Disease Registry standard (MRL) for acute inhalation exposure to mercury vapor is 0.02 mcg Hg/m3 and the MrL for chronic inhalation exposure is 0.014 mcg Hg/m3. Common levels found in persons with amalgam fillings are over 100 times these MRLs(217,209). Thus persons with amalgam fillings have levels of intraoral mercury vapor higher than the level considered to have significant health risk.

6. There is only a weak correlation between blood or hair mercury levels and body burden or level in a target organ[157]. Feces has a significant mercury burden in people with amalgam fillings, having a higher correlation to systemic body burden than urine or blood, which tend to correlate with recent exposure level.(47) [79,80] As damage occurs to kidneys over time, mercury is less efficiently eliminated[157].

7. Mercury accumulates in the brain, liver, kidneys, heart,and oral mucosa(1,20,31) [77,79,84,85,94 ,111,149,211,219]

8. The number of amalgam surfaces has a statistically significant correlation to :
(a) blood plasma mercury level (17) [84,133,211]
(b) urine mercury level (16) [76,77,138]
(c) oral mucosa and saliva [77,79,94,117,199,211]
(d) feces mercury [79,94,117]
(e) pituitary gland (14,16,19,25) [85,113]
(f) brain occipital cortex (14,16,19,25) [85,111,149,211]

9. A person with amalgam fillings has daily systemic intake from mercury vapor of between 3 and 70 micrograms of mercury, with the average being at least 12 micrograms per day.[77,83,85,179,211]. Total intake is proportional to the number and extent of amalgam surfaces, but other factors such as chewing gum and drinking hot liquids influence the intake significantly.(28,31,56) [135- 139,193,211]. Vapor emissions range up to 200 mcg/M3 (47)[193] and are much higher after chewing. Approx. 39% of those having amalgam fillings tested in a large German study had ingested mercury levels exceeding the WHO mercury standard(199).

10. The blood and kidney mercury load of a person with amalgam fillings is often 5 times that of a similar person without.(16)[79,80,82,84,93,111,136,138 The average blood level for one large population was 24.8 nmol/l[176]. Normal blood levels are less than 20 ppb, but health effects have been observed in patients in the upper part of this range[196]. A Swedish study estimated the total amount mercury swallowed per day from intra-oral vapor was 10 micrograms per

day[177]. Other studies have found similar amounts(211).

11.Teeth are living tissue and have massive communication with the rest of the body via blood, lymph, and nerves. Mercury vapor (and bacteria in teeth) have paths to the rest of the body. (34,etc.) One German study of mercury loss from vapor in unstimulated saliva found the saliva of those with amalgams had 5 times as much mercury as for controls[179].

12. Mercury crosses the blood brain barrier and is stored preferentially in the pituitary gland, hypothalamus, and occipital cortex in direct proportion to the number and extent of amalgam surfaces.(1,13,19,20,25,34,55a) [85,111,113,149] Thus mercury has a greater effect on the functions of these brain areas.

13. Some mercury entering nasal passages is absorbed directly into the olfactory lobe and brain without coming from blood.(34,47,55a).

14. Mercury is transported along the axons of nerve fibers (33,34,47,50).

15. Mercury from amalgam is transported freely via the blood after entering the blood through the lungs (19,34,35).

16. Mercury has a long half life in the body and brain, and chronic low level intake results in a slow accumulation in body tissues. (20,26,34,47) [etc.]

17. Methyl mercury is more toxic to some body processes than elemental mercury. Mercury from amalgam is methylated by bacteria in the mouth and intestines(51,53,54) [81.185]. Methyl mercury is 1000 times more potent in causing genetic damage than any other known chemical(Ramel, in(47)).

18. The level of mercury in the brain tissue of the fetus, new born, and young children is directly proportional to the number of amalgam surfaces in the mother's mouth. (61,etc.) [112,113,114]

19. Mercury from amalgam in pregnant women crosses the placenta and appears in amniotic fluid and fetal blood, liver, and pituitary gland within 2 days of placement(18,31) [113,162]. Mercury is often stored in breast milk and the fetus at much higher levels than that in the mother's tissues (18,19,22,23,40,41,61) [112,114]. The highest level is in the pituitary gland of the fetus which affects development of the endocrine,immune, and reproductive systems.

20. There is a significant correlation between the number of amalgam fillings of the mother and the level of the fetus and older infants[112,113,114], and also with the level in mothers milk(18,19,61) [112,113]. Fertile women should not be exposed to vapor levels above 10 mcg/M3 (61)[195].

III. Medical Studies Finding Health Problems Related to Amalgam Fillings

1. Toxic/allergic reactions often result in lichen planus lesions in oral mucosa or gums and play a roll in pathogenesis of periodontal disease. Removal of amalgam fillings usually results in cure of such lesions. [82,86,87,90,94,101,133,145,192]

2. Numerous studies have found long term chronic low doses of mercury cause neurological, memory, behavior, and mood problems(34) [71,74,107,108,109, 115, 119,140,141,196]. Organic tin compounds formed from amalgam are even more neurotoxic than mercury(222).

3. Studies of groups of patients with amalgam fillings found significantly more neurological, memory, mood, and behavioral problems than the control groups. (34) [107,108,109,140,141,196]

4. Mercury binds to hemoglobin in the red blood cells thus reducing oxygen carrying capacity(1,16,17,21,26,35,47), and at 1 ppm can destroy the membrane of redblood cells(35,47,22,17) and damage blood vessels- reducing blood supply to the tissues(34). These effects often result in fatigue and reduced energy levels [115,119,140,141,202,212]. Mercury also accumulates in the heart and damages mycardial and heart valves(Turpayev, in (47)).

5. Mercury amalgam exposure adversely affects the immune system(27,34,48) [77,78,118,199]. One of several effects is to increase the average blood white cell count by 2000 to 10000 (47). The increased white count usually normalizes after amalgam removal. Mercury also blocks the immune function of magnesium and zinc [197].

6. Mercury from amalgam interferes with production of cytokines, disabling early control of viruses and leading to enhanced infection[131].

7. A group of patients with amalgam fillings and complaints of systematic symptoms including central nervous system problems and a group of controls were given MRI tests. 81% of the group with health complaints had pathological MRI results including signs of degeneration of the basal ganglia of the brain, but none in the controls. 60% of the symptom group tested positive for immune system reaction to mercury. The authors concluded that immune reactions have an important role in development of brain lesions ,and amalgam fillings induce immune reactions in many patients[118].

8. Among a group of patients testing positive as allergic to mercury, low level mercury exposure was found to cause adverse immune system response, including reduction of in vitro production of tumor necrosis factor TNF alfa and interleukin-1. [152]

9. Patch tests for hypersensitivity to mercury have found from 2% to 42% to test positive[87,154,178]. In a study of medical students, 12.8% tested positive as allergic to mercury, and those testing positive had significantly higher average

number of amalgam fillings than those not testing positive(and higher levels of mercury in urine[132]. Other studies have found increasing allergy to mercury related to amount of exposure and time period of exposure[156,etc.]. If this is a good estimate of the percent of Americans allergic to mercury, this would be about 30 million people especially vulnerable to increased immune system reactions to amalgam fillings. However, patch tests do not measure the total population getting toxic reactions from mercury. The most sensitive reactions are immune reactions, DNA mutations, and systemic effects(47).

10. Low level mercury exposure including exposure to amalgam fillings has been found to be associated with increased auto immune diseases , including lupus,Chrons disease, lichen planus, endometriosis (1, 14, 17, 19, 21, 25,27,34,35,42,43,44,45,47,49,55,60) [77,78,215]. Silver, like mercury, is released from amalgam fillings and stored in the body and has been shown to cause immune reactions and autoimmunity in animal studies [77, 78, 129]

11. People with amalgam fillings have an increased number of intestinal microorganisms resistant to mercury and many standard antibiotics. (47,58)[116,117] Studies have found a significant correlation between mercury resistance and multiple antibiotic resistance[116,117,161].

12. Mercury from amalgam binds to the -SH (sulphydryl) groups, resulting in inactivation of sulfur and blocking of enzyme function, producing toxicity. Sulfur is essential in enzymes, hormones, nerve tissue, and red blood cells. These exist in almost every enzymatic process in the body. Mercury also blocks the metabolic action of manganese and the entry of calcium ions into cytoplasm. Mercury from amalgam thus has the potential to disturb all metabolic processes(25,33,47,60)[180,197}. Mercury is transported throughout the body in blood and can affect cells in the body and organs in different ways.

13. Several studies found adverse health effects at mercury vapor levels of 1 to 5 mcg/M3 (47).

14. Mercury accumulates in the kidneys with increasing levels over time. Mercury exposure has been shown to adversely affect kidney function in occupational and animal studies(59,203,211,etc.). The Government's toxic level for mercury in urine is 30 mcg/L [189], but low levels in urine often mean high mercury retention and chronic toxicity problems.

15. Amalgam fillings produce electrical currents which increase mercury vapor release and may have other harmful effects(19,27,28,29,35,47,56)[194]. These currents are measured in micro amps. The central nervous system operates on signals in the range of nano-amps, which is 1000 times less than a micro amp(28). Negatively charged fillings or crown appear to cause higher mercury vapor losses(47).

16. Mercury from amalgam fillings is transferred to the fetus of pregnant women and children who breast feed at levels often higher than those of the mother(18,19,31,61) [112,113,114,195].

17. Since mercury is documented from studies of humans and animals to be a reproductive and developmental toxin[105,146], mercury can reduce reproductive function and cause birth defects and developmental problems in children. (2,3,4,20,24,31,37,38,39,40,41,49) Clinical evidence indicates that amalgam fillings leads to hormone imbalances that can reduce fertility(199). Some researcher's advise pregnant women should not be exposed to mercury vapor levels above 10 mcg/M3 (61)[195].

18. Mercury causes breaks in DNA (41,42,)[197]. Low non-cytotoxic levels of mercury induce dose dependent binding of mercury to DNA and significantly increased cell mutations[142] and birth defects[197].

19. Mercury by its effect of weakening the immune system contributes to increased chronic diseases and cancer. Amalgam fillings have also been found to be positively associated with mouth cancer(206).

20. In addition to the endocrine system disrupting effects of high mercury accumulation in the pituitary gland, mercury causes a reduction in thyroid production and an accumulation in the thyroid of radiation. Mercury's adverse influence on thyrocytes can play a major role in thyroid cancer etiology[144].
Mercury has been found to affect hormone production at very low concentrations(199).

21. Allergies and hair-loss were found to be 2-3 times as high in a group with large number of amalgam fillings compared to controls(199). Higher levels of hormone disturbances, immune disturbances, recurrent fungal infections were also found in the amalgam group.

22. There has been no evidence found that there is any safe level of mercury in the body that does not kill cells and harm body processes(WHO,183, etc.). Mercury levels of 10ppm severely disturb cellular function, and growth of nerve fibers are affected at much lower levels[181]. This is especially so for the pituitary gland of the developing fetus which is the most sensitive to mercury(2-4,19-24,30,31,36,37,39-44).

22. The level of mercury released by amalgam fillings is often more than the levels documented in medical studies to produce adverse effects(see previous text).

IV. Health Effects from Dental Personnel Exposure to Mercury Vapor

1. Dentists and dental personnel who work with amalgam are chronically exposed to mercury vapor.(1,6-12,32,34,36) [72,122,123,124,171,172,173] Studies note that carpeting in dental offices should be avoided as it is a major repository of mercury[188]. Mercury levels in urine of dental personnel average about 2 times that of controls(123,124,171) and was 43 nmol/liter for a population
surveyed in Sweden(171), which is above the Swedish occupational exposure guideline.

2. Drilling old amalgam fillings with only a saliva extractor and no other precautions produces mercury vapor levels 2 to 15 times occupational threshold limit values(30 micrograms/cubic meter)[120,219].

3. The average dental office exposure affects the body mercury level approximately the same as having 19 amalgam fillings[123,124,173].

4. Body burden increases with time and older dentists have median mercury urine levels about 4 times those of controls, as well as higher brain and body burdens(13,34) [70-74,122]. Some older dentists have mercury levels in some parts of the brain as much as 80 times higher than normal levels(14,34).

5. Dentists and dental personnel experience significantly higher levels of neurological, memory, mood, and behavioral problems, which increase with years of exposure(13,34,49) [69-74,88,122,188].

6. Female dental technicians who work with amalgam have significantly reduced fertility and lowered probability of conception(3,24)[121], and their children have significantly lower average IQ compared to the general population(13). The level of mercury excreted in urine is significantly higher for female dental assistants than dentists(171,172,173).

7. Many homes of dentists have been found to have high levels of mercury contamination used by dentists bringing it home on shoes and clothes[187].
8. Some studies have found increased risk of lung, kidney, brain, and CNS system cancers among dental workers(14,34)[143].

8. Autopsies of former dental staff found levels of mercury in the pituitary gland averaged over 10 times that of controls(99), as well as higher levels in the occipital cortex and renal cortex and thyroid.

V. Results of Removal of Amalgam Fillings

1. For the week following amalgam removal, body mercury levels increase approx. 30 % (unless Chelation is also used), but within 2 weeks levels fall significantly.[82,89]

2. Removal of amalgam fillings resulted in a significant reduction in body burden and body waste product load of mercury[75,82,88,89,93,95,96,125,200].

3. Total reduction in mercury levels in blood and urine is often over 80% within a few months[82,89,93,96,200].

4. There are extensive documented cases where removal of amalgam fillings led to cure of serious health problems such

as periodontal diseases, immune system problems,epilepsy, blood conditions, depression, mental confusion,infertility, lupus, arthritis, tachycardia, universal reactors, etc. or significant improvement in symptoms[75,86-91,95-103,125,148,165.167.168,170,180,182, 192,199,200,222].

5. Some studies of patients with major neurological or degenerative diseases such as Alzheimers ,ALS,MS,Parkinson's,etc. have found evidence amalgam fillings may play a major role in development of that condition(66,67) [92,97,98,100,102,145,148,158,159,163,166,169,170,175,183,184,207,213,218,221] Very high levels of mercury are found in brain memory areas such as the cerebral cortex and hippocampos of patients with diseases with memory related symptoms[158]. Studies have found mercury related mental effects to be indistinguishable from those of MS(207). Mercury at extremely low levels interfers with formation of tubulin producing neurofibrillary tangles in the brain similar to those observed in Alzheimers patients with high levels of mercury in the brain(207). Also mercury binds with cell membranes interfering with sodium and potassium enzyme functions, causing excess membrane permeability, especially in terms of the blood-brain barrier [159,207]. Less than 1ppm mercury in the blood stream can impair the blood- brain barrier. Mercury was also found to accumulate in the mitochondria and interfere with their vital functions, and to inhibit cytochrome C enzymes which affect energy supply to the brain. Persons with extra Apo-E4 gene copies are especially susceptible to this damage(207,221).
In many cases removal of amalgam fillings and treatment for metal toxicity led to "cure' or significant improvement in health[97,100,102,148,170,207,213,222]. There is some evidence that some forms of leukemia are abnormal response to antigenic stimulation by mercury or other such toxins and removal of amalgam has led to remission in some cases(47)[180].

VI. Scientists and Government Panels or Bodies That Have Found Amalgam Fillings to be Unsafe.

1. A World Health Organization Scientific Panel concluded that there is no safe level of mercury exposure(183,208). The Chairman of the panel, Lars Friberg stated that "dental amalgam is not safe for everyone to use(208).

2. In 1987 the Federal Dept. of Health in Germany issued an advisory warning against use of dental amalgam in pregnant women(61). A Swedish National Mercury Amalgam Review Panel found that "from a toxicological point of view, mercury is too toxic to use as a filling material"[164]. The U.S. EPA found that removed amalgam fillings are hazardous and must be disposed of as hazardous waste(214). A Canadian Government study for Health Canada concluded that any person with any number of amalgam fillings receives exposure beyond that recommended by the USPHS Standard(209). Many of those researching amalgam related health effects including several very prominent scientists have concluded that the health effects are widespread and serious so that mercury should not be used as a filling material (1,18,19,26,36,38,61) [88,94,99,100,113,115,125,126,148,153,164,170,183,208,209,210,222].

3. The use of mercury amalgams has been banned for children and women of child-bearing age or put on a schedule for phase out by 4 European countries. The use of amalgam is declining in Europe and Germany's largest producer of

amalgam has ceased production, The director of the U.S. Federal program overseeing dental safety advises against using mercury amalgam for new fillings.

References

References 1-67 are from the Paper "Scientifically proven Facts About Mercury & Dental Amalgam" by the Australasian Society of Oral Medicine and Toxicology

Additional References: Based on Abstracts from Medline medical articles

(edited by Bernard Windham, Chemical Engineer)

(68)K.A.Ritchie et al,"Psychomotor testing of dentists with chronic low level mercury exposure", J Dent Res 74:420, IADR Abstract 160(1995).

(69)D Gonzalez-Ramirez et a; "Uninary mercury, porphyrins, and neurobehavioral changes of dental worker in Monterey, Mexico, J Pharmocol Exp Ther 272(1): 264-274,1995

(70) N.J. Heyer et al, "Behavioral Effects of Low Level Exposure to HgO Among Dentists", Neurotoxicol Teratol 17(2):161-168(1995).

(71)S.C.Foo et al, "Neurobehavioral effects in Occupational Chemical Exposure", Environmental Research, 60(2): 267-273, 1993.

(72)D.L.Smith,"Mental effects of mercury poisoning",South Med J 71:904-5,1978. (73)RT McNerney et al, "Mercury Contamination in the Dental Office: A Review", NYS Dental Journal, Nov 1979, p457-458.

(74) D.G. Mantyla et al, "Mercury toxicity in the dental office: a neglected problem", JADA, 92:1189-1194, 1976.

(75)Katsunuma et al, "Anaphylaxis improvement after removal of amalgam fillings", Annals of Allergy, 1990, 64(5):472-75.

{76)A. Schulte et al, "Mercury Concentrations in Children with and without Amalgam Restorations", J.Dent Res 73(4): 980 A-334.

(77)I.Skare, "Mass Balance and Systemic Uptake of Mercury Released from Dental Fillings", Water, Air, and Soil Pollutio, 80(1-4):59-67, 1995.

(78)G.Drasch et al," Silver Concentrations in Human Tissues: the Dependence on Dental Amalgam",J Trace Elements in Medicine and Biology,9(2):82-7,1995.

(79) L.Bjorkman et al, "Mercury in Saliva and Feces after Removal of Amalgam Fillings", J Dent Res 75: 38- IADR Abstract 165, 1996.

(80)M.Osterblad et al, "Antimicrobial and Mercury Resistance among Persons with and without Amalgam Fillings", Antimicrobial Agents and Chem, 39(11):2499,1995

(81) L.I.Liang et al, "Mercury reactions in the human mouth with dental amalgams" Water, Air, and Soil pollution, 80:103-107.

(82) J.Begerow et al,"Long-term mercury excretion in urine after removal of amalgam fillings", Int Arch Occup Health 66:209-212, 1994.

(83) I.et al, "Human Exposure to Hg and Ag Released from Dental Amalgam

Restorations", Archives of Environmental Health 49(5):384-394, 1994.

(84) J.E.Abraham et al, "The Effect of Dental Amalgam Restorations on Blood Mercury Levels", J Dent Res 63(1): 71-73, 1984

(85) J.A.Weiner et al,"The relationship between mercury concentration in human organs and predictor variables",138(1-3):101-115,1993; & "An estimation of the uptake of mercury from amalgam fillings", Sci Total Environ, v168,n3,1995.

(86)E.R.Smart et al, "Resolution of lichen planus following removal of amalgam restorations", Br Dent J 178(3): 108-112,1995.

(87)A. Skoglund, Scand J Dent Res 102(4): 216-222, 1994; and 99(4):320-9,1991.

(88) M.Godfrey et al, Confirmation of mercury retention and toxicity using DMPS", J Advance Med 7(1):19-30, 1994.

(89)M.Molin et al, "Kinetics of mercury in blood and urine after amalgam removal", J Dent Res 74:420, IADR Abstract 159, 1995.

(90) P.Koch et al, "Oral lichenoid lesions,mercury hypersensitity, ...",Contact Dermatitis, 33(5):323-328.

(91) B. Lindqvist et al, "Effects of removing amalgam fillings from patients affecting the immune system", Med Sci Res 24(5): 355-356, 1966.

(92) L. Tandon et al, "Elemental imbalance studies by INAA on ALS patients", J Radioanal Nuclear Chem 195(1):13-19,1995; .

(93) L.Barregard et al, "People with high mercury uptake from their own dental amalgam fillings", Occup Envir Med 52: 124-128, 1995.

(94) F.Berglund, Case reports spanning 150 years on the adverse effects of dental amalgam, Bio-Probe, Inc., Orlando, Fl, 1995; ISBN 0-9410011-14-3.

(95)H.J.Lichtenberg, "Elimination of symptoms by removal of dental amalgam from mercury poisoned patients", J Orthomol Med 8:145-148, 1993.

(96) R. Stromberg et al, "A case of unusually high mercury exposure from amalgam fillings", Tandlakartidningen 88(10): 570-572, 1996.

(97) O. Redhe et al, "Recovery from ALS after removal of dental amalgam fillings", Int J Risk & Safety in Med 4:229-236, 1994.

(98) A. Seidler et al, "Possible environmental factors for Parkinson's disease",Neurology 46(5):1275-1284, 1996; & F.O.Vroom et al, "Mercury vapor intoxication", Brain 95: 305-318, 1972.

(99) M.Nylander et al, Mercury accumulation in tissues drom dental staff and controls", Swedish Dental Journal, 13:235-243, 1989.

(100) M.E. Godfrey, "Chronic illness in association with dental amalgam",

J Adv Med 3:247-255, 1990; & M.Hanson et al, "The dental amalgam issue: a review", Experientia, 47:9-22,1991.

(101) E.Henriksson et al, "Healing of Lichenoid Reactions followin Removal of Amalgam", J Clinical Periodontol, V22,N4, p287-94,1995.

(102)R.L. Siblerud et al,"Evidence that mercury from silver fillings may be an etiological factor in multiple sclerosis", Sci Total Environ,v142,n3,p191 , 1994; & "Mental health, amalgam fillings, and MS", Psychol Rep, 70(3 Pt2), 992, 1139-51; & T.Engalls,Am J Forensic Med Pathol, 4(1):1983, Mar, 55-61.

(103) A.P.Tanchyk,"Amalgam Removal for Treatment of Arthritis", Gen Dent, v42,n4, July 1994, p354-

(104) G.Drasch et al, "Mercury burden of human fetal and infant tissues", Europeon J Pediatr, v153,n8, p607-10, 1994.

(105) B.Windham, "Health, Hormonal, and Reproductive Effects of Endocrine Disrupting Chemicals" (including mercury), Annotated Bibliography ,1996.

(106) G.R.Bruce,"Cytotoxicity of retrofil materials", J Endod, v19,n6,p288-92, 1993

(107) R.L.Siblerud et al, Psychometric evidence that mercury from dental fillings may be a factor in depression,anger,and anxiety", Psychol Rep,v74,n1,1994.

(108)M.Henningsson et al,"Defensive characteristics in individuals with amalgam illness", Acta Odont Scand 54(3): 176-181,1996.

(109) Y.X. Liang et al,"Psychological effects of low exposure to mercury vapor",Environ Res, 60(2): 320-327, 1993; & T.Kampe et al, "Personality traits of adolescents with intact and repaired dentitions",Acta Odont Scand,44:95-,1986

(110) N.Roeleveld et al, "Mental retardation and parental occupation",

Br J Ind Med 50(10):945-954, 1993.

(111) M.Nylander et al, "Mercury concentrations in the human brain and kidneys and exposure from amalgam fillings", Swed Dent J 11:179-187, 1987.

(112) A.Oaskarsson et al, "Exposure to toxic elements via breast milk", Analyst, 120(3): 765-770, 1995.

(113) M.J.Vimy et al, Maternal-fetal distribution of mercury released from amalgam fillings", Am J Physiol 258:R939-R945,1990.

(114) G.Drasch et al, Eur J Pediatr 153:607-610,1994.

(115) VDM Stejskal et al, "MELISA: tool for the study of metal allergy",

Toxic in Vitro, 8(5):991-1000, 1994.

(116) A.O.Summers et al, Antimicorbial Agents and Chemotherapy,37(4):825-834, 1993; & The Physiologist 33(4), A-116,1990; & M.Vimy et al, Silver dental fillings provoke an increase in mercury and antibiotic resistan bacteria in the mouth and intestines of primates", APUA Newsletter, Fall, 1991.

(117)C.Edlund et al, "Resistance of the Normal Human Microflora to mercury and antimicrobials", Clin Infect Dis 22(6):944-950, 1996.

(118) L.Tibbling et al, Immunolocial and brain MRI changes in patients with suspected metal intoxication", Int J Occup Med Toxicol (2):285-294,1995.

(119) L.Ronnback et al, "Chronic encephalopaties induce by low doses of mercury or lead", Br J Ind Med 49:233-240, 1992.

(120) L.Pohl, "The dentist's exposure to elemental mercury during clinical work", Acta Odontol Scand,v53,n1,p44-48,1995.

(121)A.S.Rowland et al,"The Effect of Occupational Exposure to mercury vapor on the fertility of female dental assistants",Occup Environ Med, v55,n1,1994

(122) K.A.Ritchie et al, "Psychomotor testing of dentists with chronic low level mercury exposure", J Dent Res 74:420 IADR Abstract 160 (1995).

(123) I. Skare et al, "Mercury exposure of different origins among dentists and dental nurses", Scand J Work Environ Health, 16:340-347, 1990.

(124) I.Akesson et al, "Status of mercury and selenium in dental personel", Arch Environ Health, 46(2): 102-109, 1991.

(125) G. Hall, "Perspectives of Amalgam and Other Dental Materials", European Acadamy Symposium Article, Ostzenhausen,Germany, April 29, 1994.

(126) F.L.Lorscheider et al, "Mercury exposure from silver tooth fillings: emerging evidence questions a paradigm", FASEB J 9:504-508,1995.

(127)P. Moszczynski et al, "The behavior of T-Cells in the blood of workers
exposed to mercury",Med Lav 85(3):239-241,1994;
& "Lymphocytes, T and NK cells in men exposed to mercury",Int J Occup Med Environ Health,8(1):1995.
(128) M.L.S.Queiroz et al, "Immunoglobulin Levels in Workers Exposed to Inorganic Mercury", Pharmacol Toxicol 74:72-75, 1994.

(129) P.Hultman et al,"Adverse immunological effects and immunity induced by dental amalgam" FASEB J 8:1183-1190, 1994.

(130) S. Enestrom et al, "Does amalgam affect the Immune System?" Int Arch Allergy Immunol 106:180-203,1995.

(131) S.Ellermann-Eriksen et al, "Effect of mercuric chloride on macrophage- mediated resistance mechinisms against infection", Toxicology, 93:269- 297,1994.

(132) K.Sato et al, "An epidemiological study of factors relating to mercury sensitization", Arerugi 44(2): 86-92, 1995.

(133) M.Molin et al, "Mercury in plasma in patients allegedly subject to oral galvanism", Scand J Dent Res 95:328-334, 1987.

(134) A.M.Aronsson et al, "Dental amalgam and mercury", Biol Metals 2:25- 30,1989.
(135) L.Bjorkman et el, "Factors influencing mercury evaporation rate from dental amalgam fillings", Scand J Dent Res, 100(6): 354-360, 1992.

(136) D. Gay et al, "Chewing releases mercury", Lancet, 8123:985-98, 1979.

(137) B.Fredin, "Studies on the Mercury Release from Dental Amalgam Fillings", Swed J Biol Med No.3, 1988, pp8-15.

(138) D. Zander et al, "Studies on Human Exposure to Mercuy Amalgam Fillings", Zbl Hyg 190: 325-334, 1990.

(139) G. Sallsten et al, "Long term use of nicotine chewing gum and mercury exposure from dental amalgam", J Dent Res 75(1):598,1996.

(140) R.L.Siblerud, "Health Effects After Dental Amalgam Removal", JOrthomolecular Med 5(2): 95-106.

(141)R.L.Siblerud et al, "Evidence that mercury from dental fillings may be an etiological factor in smoking",Toxicol Lett,v68,n3,1993,p307- & v69(3):305.

(142) M.E.Ariza et al, "Mutagenic effect of mercury", InVivo 8(4):559-63,1994.

(143) P.Boffetta et al, "Carciagenicity of mercury", Scand J Work Environ Health, 19(1):1-7,1993; & J Occup Med, 36(11):1260-64, 1994.

(144)V.Y Zaichick et al,"Trace Elements and thyroid cancer",Analyst, 120(3),1995.

(145) D.E. Swartzendruber, Med Hyptheses, 1993, v41,n1, p31-34.

(146) T.Colborn(Ed.),Chemically Induced Atlerations in Functional Development,Princeton Scientific Press,1992 & Developmental Effects of Endocrine- Disrupting Chemicals",Eniron Heath Perspectives, V 101, No.5, Oct 1993.

(147)J.M.Wood,"Mechinisms for the Neurotoxicity of Mercury", in Organotrans - itional Metal Chemistry, Plenum Publishing Corp, N.Y, N.Y, 1987.& R.P. sharma et al, "Metals and Neurotoxic Effects", J of Comp Pathology,Vol 91, 1981.

(148)H.R.Casdorph, Toxic Metal Syndrome, Avery Publishing Group, 1995.

(149) B.Choi et al, "Abnormal neuronal migration of human fetal brain", Journal of Neurophalogy, Vol 37, p719-733, 1978; & L.Verschaeve, "Genetic damage induced by mercury exposure", Envir Res,12:306-10,1976.

(150)U.S. Public Health Service, "Toxicological profile of Mercury", 1988.

& J.Leiskir,"Cytotoxity of Silver amalgam", Scand J of Dental Res, 1974. (151) Electric Power Research Institute, EPRI Technical Brief:"Mercury in the

Environment", 1993; & EPRI Journal, April 1990.

(152) Langworth et al, Effects of low exposure to inorganic mercury on the human immune system", Scand J Work Environ Health, 19(6): 405-413.1993.

(153) International Acadamy of oral Medicine and Toxicology, "A Scientific Response to the American Dental Association Special Report and Statement of Confidence in Dental Amalgam, IAOMT, POB 608531, Orlando,32860- 8531.

(154) E.Djerasci et al, Int Dent J 19:481-8,1969; & A.M.Robinson et al, Contact Dermatitis due to Amalgam fillings",Arch Dermatol Syphilol, 59:p116-8,1949; & R.R.White et al, J Amer Dent assoc, 92:124-7,1976; & K.Nordlind et al, "Patch test reactions to metal salts in patients with oral mucosal lesions associated with amalgal fillings", Contact Dermatitis, 1992, 27:3, 157-160.

(155) L.D.Koller, "Immunotoxicology of Heavy Metals", Int J of Immunopharm,

2:269-279,1980; & Amer J Vet Res, vol34,p1457-,1973.

(156) E.G.Miller et al, "Prevelence of Mercury Hypersensitivity among Dental Students", 64:Abstract 1472, p338,1985.

(157) L.J Goldwater, "Toxicology of Inorganic Mercury", Annals: NY Acad Sci,

65:498-503,1957; & J.B.Nielsen et al, "Evaluation of Mercury in Hair & Blood as Biomarkers for Methylmercury Exposure", Arch of Toxicology, 1994,65(5):317-321.

(158) Wenstrup et al, Trace element imbalances in the brains of Alzheimers patients",Brain Research, Vol 533,p125-131,1990; &

D.W. Eggleston et al, J Prosthet Dent, 1987,58(6),704-7;

and Journal of the American Medical Assoc., Sept 96.

(159) L.D. Koller, Immunotoxicity of heavy metals", Int J of Immunopharmacology, V2,p269,1980; & Amer j Vet Res, Vol 34,1457,1973.

(160)B.Windham, "Health Effects of Toxic Metals: An Annotated Bibliography",1995. (161) F.L.Lorscheider et al, "Inorganic mercury and the CNS; genetic linkage of mercury and antibiotic resistance,Toxicology,1995,97(1): 19-22.

(162) N.K.Mottet et al, "Health Risks from Increases in Methylmercury Exposure",vol63:133-140,1985.

(163) Ahlrot et al, Nutrition Research, 1985 Supplement, & Second Nordic Symposium on Trace Elements and Human Health, Odense, Denmark, Aug 1987.
(164) Swedish National Dept. of Health, Mercury Amalgam Review Panel, 1987.

(165) G.Anneroth et al, "Comprehensive Medical Examination of patients with alleged adverse effects from dental amalgams", Acta Odontal Scand, 1992,50(2):101-11.

(166) H.Basun et al, J Neural Transm Park Dis Dement Sect, "Metals in plasma and cerebrospinal fluid in normal aging and Alzheimer's disease",1991,3(4):231-58

(167)R.Brehler et al,"Mercury sensitization in amalgam fillings", Dtsch med Wochenschr,1993,118(13):451-6.

(168) J.Laine et al, "Resolution of oral lichenoid lesions after replacement of amalgam restorations", Br J Dermatol, 1992,126(1):10-15.

(169) C.H.Ngim et al, Neuroepidemiology,"Epidemiologic study on the association between body burden mercury level and idiopathic Parkinson's disease", 1989, 8(3):128-41.

(170) R.L.Siblerud, "A commparison of mental health of multiple schlerosis patients with silver dental fillings and those with fillings removed", Psychol Rep, 1992, 70(3),Pt2, 1139-51.

(171) A.Jokstad, "Mercury excretion and ocuupational exposure of dental personnel", Community Dent Oral Epidemio, 18(3):143-8,1990.

(172) B.Nilsson et al, "Urinary mercury excretion in dental personnel", Swed Dent J, 1986,10(6):221-32.

(173) D.Zanders et al, "Mercury exposure of male dentists, female dentists, and dental aides", Zentralbl Hyg Umweltmed, 1992,193(4):318-28.

(174) B.Willershausen et al, "Mercury in the mouth mucosa of patients with amalgam fillings", Dtsch Med Wochenschr, 1992, 117:46, 1743-7.

(175) L.Larkfors et al,"Methylmercury induced alterations in the nerve growth factor level in the developing brain", Brain Res Dev BrainRes,62(2),1991,287-

(176) A.Jokstad et al, "Dental amalgam and mercury", Pharmacol Toxicol, 70(4), 1992,308-13.

(177) S.Olsson et al, "Daily dose calculations from measurements of intra-oral mercury vapor", J Dent Res, 71(2):414-23,1992.

(178) K.Nordlind et al, "Patch test reactions to salts in patients with amalgam restorations", Contact Dermatitis, 27(3):157-60,1992.

(179) A.Lussi, "Mercury release from amalgam into saliva", Schweiz Monatsschr ahnmed, 103(6):722-6,1993.

(180) O.F.Pinto et al, J Intl Acad Prev Med, Vol 3, No.2, 1976.

(181) R.P.Sharmo et al,"Metals and neurotoxic effects", J Comp Pathol , 91:235,1981.

(182) J Pleva, J Orthomol Psych, Vol 12, No.3, 1983.

(183) World Health Organization(WHO),1991, Environmental Health criteria 118, Inorgtanic Mercury, p36, WHO, Geneva; & W.Craelium, J Epidemiology and Community Health, 32:155-65,1978.

(184) T.H.Ingalls, J Forsenic Med and Path, Vol 4, No 1, 1953.

(185) U.Heintze, Scand J Dent Res, 1983, 1991:150-2.

(186) H Reden, Odont Revy, 25,1971,207-210.

(187) P.A.Gronla et al, JADA, 1970, 81:923-25.

(188)I.I. Ship et al, School of Dental Research, Univ of Penn., Mar 1983.

(189) WHO and U.S.CDC, Tocicology Division, Atlanta, Ga.

(190) T.B. Eyl, Mod Med, Vol 38, 1970.

(191) C.Brune et al, Scand J Dent Res, 1983, 19:66-71.

(192) L.J. Calsakis et al, "Alergy to Silver Amalgams",Oral Surg,46:371-5,1978

(193) D.D.Gay et al, 1979, Lancet, May 5, 1985 & C.W.Svare et al, J Dent Res, The effects of amalgams on mercury levels in expired air", 60, 1981, p1668-.

(194) T.Fusayama et al, J Dental Res, 1963, 42:1183-1197.

(195) Koos & Loongo,"Pregnacy ...", Pediatrics, Vol 64, No.5, Nov 1970.

(196) Gowdy & Demes, 1978, in (47).

(197) J.Taylor, A Complete Guide to Mercury Toxicity from Dental Fillings, Scripps Pullishing.

(198) E.S. West et al, Textbook of Biochemistry, MacMillan Co, 1957,p853.

(199) I.Gerhard et al, Tubingen Univ. Gynecological Clinic,Heidelberg,1996.

(200) S.Langworth et al, "A case of high mercury exposurte from dental amalgam", Eur J Oral Sci 104:320-321,1996.

(201) J.T. Solonen et al, "Intake of mercury from fish and the risk of myocardial infarction and cardiovasculr disease in eastern Finnish men", Circulation, 1995; 91(3):645-55.

(202) T.Kishimoto et al, "Methylmercury injury of Cultured Human Vascular Endothelial Cells", Journal of Trace Elements in Experimental Medicine, 6(4): 155-163, 1993.

(203) S. Eti et al, "Renal Effect of Mercury from amalgam fillings", Pharmacology & Toxicology, 1995, 76(1): 47-9.

(204) W.D. Kuntz et al, "Maternal and cord blood background mercury levels", American Journal of Obstetrics & Gynecoology, 1982; 143(4): 440-3.

(205) M.F. Ziff et al, A Persuasive New Look at Heart Disease As It Relates to Mercury, Bio-Probe, Inc., ISBN 0-941011-08-9.

(206) R. Ma et al, "Association between dental restorations and carcinoma of the tongue", European Journal of Cancer. Part B, Oral Oncology, 1995; 31B(4): 232-4.

(207) Boyd Haley, Univ. Of Kentucky, "The Toxic Effects fo Mercury on CNS Proteins: Similarity to Observations in Alzheimer's Disease", IAOMT Symposium paper, March 1997.

(208) L.T.Friberg, "status Quo and perspectives of amalgam and other dental materials", International symposium proceedings, G.Thieme Verlag Struttgart, 1995.

(209) Mark Richardson, Environmental Health Directorate,Health Canada,
Assessment of Mercury Exposure and Risks from Dental Amalgam, 1995 (peer-reviewed report); & Bio-Probe Newsletter, May 1996.

(210) Mats Berlin, "Is amalgam in dental fillings hazardous to health?", Lakartidningen, 1992; 89(37):2918-23.

(211) M.J.Vimy and F.L. Lorscheider, Faculty of Medicine, Univ. Of Calgary, July 1991. (Study findings) & J. Dent. Res. 1985, 64:1069-75; &
J. Trace Elem. Exper. Med., 1990,3, 111-123.

(212) Ziff, M.F., "Documented clinical side effects to dental amalgams", ADV. Dent. Res., 1992; 1(6):131-134.

(213) Dr. C. Kousmine, Multiple Scherosis is Curable, 1995.

(214) "Amalgam declared hazardous", Dentistry Today, February, 1989, p1.

(215) K.W. Sehnert, "Autoimmune Disorders", Advance, Jan 1995, p47-48.

(216) F.L. Lorscheider et al, Lancet, 1991, 337,p1103; & T.W. Clarkson et al, in Biological Monitoring of Toxic Metals, Plenum Press, N.Y., p247-260.

(217) Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, "Toxicological Profile for Mercury"(ATSDR TP93/10), 1994.

(218) A. Seidler et al, "Possible environmental or occupational factors for Parkinson's Disease", Neurology, 1996; 46(5): 1275-84.

(219) D.E. Cutright et al, "Systemic mercury levels caused by inhaling mist during hig-speed amalgam grinding", J Oral Med 28(4):100-104,1973 ; &
A.Nimmo et al, "Inhalation during removal of amalgam restorations", J Prosthet Dent, 63(2):1990 Feb, 228-33.

(220) C Arch Environmental Health, 19,891-905, Dec 1969.

(221) R. Golden et al, Duke Univ., "Dementia and Alzheimer's" Disease", Minnesota Medicine, 78:p25-29, 1995.

(222) M. Daunderer, "Improvement of Nerve and Immunological Damages after
Amalgam Removal", Amer. J. Of Probiotic Dentistry and Medicine, Jan 1991.

The Klinghardt Neurotoxin Elimination Protocol

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What are Neurotoxins?
Neurotoxins are substances attracted to the mammalian nervous system. They are absorbed by nerve endings and travel inside the neuron to the cell body. On their way they disrupt vital functions of the nerve cell, such as axonal transport of nutrients, mitochondrial respiration and proper DNA transcription. The body is constantly trying to eliminate neurotoxins via the available exit routes: the liver, kidney, skin and exhaled air. Detox mechanisms include acetylation, sulfation, glucuronidation, oxidation and others. The liver is most important in these processes. Here most elimination products are expelled with the bile into the small intestine and should leave the body via the digestive tract. However, because of the lipophilic/neurotropic nature of the neurotoxins, most are reabsorbed by the abundant nerve endings of the enteric nervous system (ENS) in the intestinal wall. The ENS has more neurons than the spinal chord. From the moment of mucosal uptake the toxins can potentially take 4 different paths:

1. neuronal uptake and via axonal transport to the spinal chord (sympathetic neurons) or brainstem (parasympathetics) – from here back to the brain.
2. Venous uptake and via the portal vein back to the liver
3. Lymphatic uptake and via the thoracic duct to the subclavian vein
4. Uptake by bowel bacteria and tissues of the intestinal tract

Here is an incomplete list of common neurotoxins in order of importance:

(i) Heavy metals: such as mercury, lead, cadmium and aluminum.

(ii) Biotoxins: such as tetanus toxin, botulinum toxin (botox), ascaridin (from intestinal parasites), unspecified toxins from streptococci, staphylococci, lyme disease, clamydia,

tuberculosis, fungal toxins and toxins produced by viruses. Biotoxins are minute molecules (200-1000 kilodaltons) containing nitrogen and sulfur. They belong to a group of chemical messengers which microorganisms use to control the host's immune system, host behavior and the host's eating habits.

(iii) Xenobiotics (man-made environmental toxins): such as dioxin, formaldehyde, insecticides, wood preservatives, PCBs etc.

(iv) Food Preservatives, excitotoxins and cosmetics: such as aspartame (diet sweeteners) food colourings, fluoride, methyl-and propyl-paraben, etc.

I have found that mercury in it's different chemical forms has a synergistic amplifying effect with all other neurotoxins. When mercury is removed, the body starts to more effectively eliminate all other neurotoxins, even if they are not addressed.

What are the symptoms?
Any illness can be caused by, or contributed to, or exaggerated by neurotoxins. Fatigue, depression, insomnia, memory loss and blunting of the senses are common early symptoms (see list of mercury related symptoms on the following pages).

How is the diagnosis established?
1. History of Exposure: (Did you ever have any amalgam fillings? A tick bite? etc)
2. Symptoms: (How is your short term memory? Do you have areas of numbness, strange sensations, etc)
3. Laboratory Testing: (Metals: hair, stool, serum, whole blood, urine analysis, xenobiotics: fatty tissue biopsy, urine)
4. Autonomic Response Testing: (Dr. Dietrich Klinghardt M.D., Ph.D.)
5. BioEnergetic Testing (EAV, kinesiology etc.)
6. Response to Therapeutic Trial
7. Functional Acuity Contrast Test (measure of Retinal Blood Flow)

TREATMENT

Why would we want to treat anyone at all? Is it really needed? Can the body not eliminate these toxins naturally on its own?

Here is a short list of **independent risk factors** which can either cause accumulation of metals in an otherwise healthy body - or slow down, or inhibit the bodies own elimination processes.

- genetics
- occupational exposure to toxic material
- prior illnesses
- surgical operations
- medication or ´recreational´ drug use
- emotional trauma, especially in eary childhood
- social status
- high carbohydrate intake combined with protein malnutrition (especially in vegetarians)
- use of homeopathic mercury
- food allergies
- the patients electromagnetic environment (mobile phone use, home close to power lines etc)
- constipation
- compromise of head/neck lymphatic drainage (sinusitis, tonsillectomy scars, poor dental occlusion)
- number of dental amalgam fillings over the patients life-time, number of the patients mothers amalgam fillings

We will discuss here only those elimination agents, which are natural, safe and have also been shown to be as effective (or more effective) than the few available pharmaceuticals. Because these products cannot be patented and exploited for unethical personal gain, little attention has been given to them by European or North American medical researchers. Many of the best scientific studies on this topic are from Asian countries.

The basic program:

High protein, mineral, fatty acid and fluid intake

Rationale:

- proteins provide the important precursors to the endogenous metal detox and shuttle agents, such as coeruloplasmin, metallothioneine, glutathione and others. The branched-chain amino acids in cow and goat whey have valuable independent detox effects.
- Metals attach themselves only in places that are programmed for attachment of metal ions. Mineral deficiency provides the opportunity for toxic metals to attach themselves to vacant binding sites. A healthy mineral base is a prerequisite for all metal detox attempts (selenium, zinc, manganese, germanium, molybdenum etc.). Substituting minerals can detoxify the body by itself. Just as important are electrolytes (sodium, potassium, calcium, magnesium),

which help to transport toxic waste across the extra cellular space towards the lymphatic and venous vessels.

- Lipids (made from fatty acids) make up 60-80 % of the central nervous system and need to be constantly replenished. Deficiency makes the nervous system vulnerable to the fat soluble metals, such as metallic mercury constantly escaping as odorless and invisible vapor evaporating from the amalgam fillings.
- Without enough fluid intake the kidneys may become contaminated with metals. The basal membranes swell up and the kidneys can no longer efficiently filtrate toxins. Adding a balanced electrolyte solution in small amounts to water helps to restore intra-and extra cellular fluid balance

Cilantro (Chinese parsley)

This kitchen herb is capable of mobilizing mercury, cadmium, lead and aluminum in both bones and the central nervous system. It is probably the only effective agent in mobilizing mercury stored in the intracellular space (attached to mitochondria, tubulin, liposome's etc) and in the nucleus of the cell (reversing DNA damage of mercury). Because cilantro mobilizes more toxins then it can carry out of the body, it may flood the connective tissue (where the nerves reside) with metals, that were previously stored in safer hiding places. This process is called re-toxification. It can easily be avoided by simultaneously giving an intestinal toxin-absorbing agent. Our definite choice is the algal organism chlorella. A recent animal study demonstrated rapid removal of aluminum from the skeleton superior to any known other detox agent.

Dosage and application of cilantro tincture: give 2 drops 2 times /day in the beginning, taken just before a meal or 30 minutes after taking chlorella (cilantro causes the gallbladder to dump bile - containing the excreted neurotoxins - into the small intestine. The bile-release occurs naturally as we are eating and is much enhanced by cilantro. If no chlorella is taken, most neurotoxins are reabsorbed on the way down the small intestine by the abundant nerve endings of the enteric nervous system). Gradually increase dose to 10 drops 3 times/day for full benefit. During the initial phase of the detox cilantro should be given 1 week on, 2 –3 weeks off.

Other ways of taking cilantro: rub 5 drops twice/day into ankles for mobilization of metals in all organs, joints and structures below the diaphragm, and into the wrists for organs, joints and

structures above the diaphragm. The wrists have dense autonomic innervation (axonal uptake of cilantro) and are crossed by the main lymphatic channels (lymphatic uptake).

Cilantro tea: use 10 to 20 drops in cup of hot water. Sip slowly. Clears the brain quickly of many neurotoxins. Good for headaches and other acute symptoms (joint pains, angina, headache): rub 10 –15 drops into painful area. Often achieves almost instant pain relief.

Chlorella:
Both C.pyreneidosa (better absorption of toxins, but harder to digest) and C.vulgaris (higher CGF content – see below, easier to digest, less metal absorbing capability) are available. Chlorella has multiple health inducing effects:

Antiviral (especially effective against the cytomegaly virus from the herpes family)

- **Toxin binding** (mucopolysaccharide membrane)
  all known toxic metals, environmental toxins such as dioxin and others
- Repairs and activates the bodies **detoxification functions**:
- Dramatically increases reduced glutathion,
- Sporopollein is as effective as cholestyramin in binding neurotoxins and more effective in binding toxic metals then any other natural substance found.
- Various peptides restore coeruloplasmin and metallothioneine,
- Lipids (12.4 %) alpha-and gamma-linoleic acid help to balance the increased intake of fish oil during our detox program and are necessary for a multitude of functions, including formation of their peroxisomes.
- Methyl-coblolamine is food for the nervous system, restores damaged neurons and has ist own detoxifying effect.
- Chlorella growth factor helps the body detoxify itself in a yet not understood profound way. It appears that over millions of years chlorella has developed specific detoxifying proteins and peptides for every existing toxic metal.
- The porphyrins in chlorophyl have their own strong metal binding effect. Chlorophyll also activates the PPAR-receptor on the nucleus of the cell which is responsible for the transcription of DNA and coding the formation of the peroxisomes (see fish oil), opening of the cell wall (unknown mechanism) which is necessary for all detox procedures, normalizes insulin resistance and much more. Medical drugs that activate the PPAR receptor (such as pioglitazone) have been effective in the treatment of breast and prostate cancer.
- **Super nutrient**: 50-60% amino acid content, ideal nutrient for vegetarians, methylcobolamin - the most easily absorbed and utilized form of B12, B6, minerals, chlorophyll, beta carotene etc.
- **Immune system strengthening**

- **Restores bowel flora**
- **Digestive aid (bulking agent)**
- **Alkalinizing agent (important for patients with malignancies)**

Dosage: start with 1 gram (=4 tabl) 3-4 times/day. This is the standard maintenance dosage for grown ups for the 6-24 months of active detox. During the more active phase of the detox (every 2-4 weeks for 1 week), whenever cilantro is given, the dose can be increased to 3 grams 3-4 times per day (1 week on, 2-4 weeks back down to the maintenance dosage). Take 30 minutes before the main meals and at bedtime. This way chlorella is exactly in that portion of the small intestine where the bile squirts into the gut at the beginning of the meal, carrying with it toxic metals and other toxic waste. These are bound by the chlorella cell wall and carried out via the digestive tract. When amalgam fillings are removed, the higher dose should be given for 2 days before and 2-5 days after the procedure (the more fillings are removed, the longer the higher dose should be given). No cilantro should be given around the time of dental work. During this time we do not want to mobilize deeply stored metals in addition to the expected new exposure. If you take Vitamin C during your detox program, take it as far away from Chlorella as possible (best after meals).
Side effects: most side effects reflect the toxic effect of the mobilized metals which are shuttled through the organism. This problem is instantly avoided by significantly increasing the chlorella dosage, not by reducing it, which would worsen the problem (small chlorella doses mobilize more metals then are bound in the gut, large chlorella doses bind more toxins then are mobilized). Some people have problems digesting the cell membrane of chlorella. The enzyme cellulase resolves this problem. Cellulase is available in many health food stores in digestive enzyme products. Taking chlorella together with food also helps in some cases, even though it is less effective that way. C.vulgaris has a thinner cell wall and is better tolerated by people with digestive problems. Some manufactures have created cell wall free chlorella extracts (NDF, PCA) which are very expensive, less effective - but easily absorbed.

Chlorella growth factor
This is a heat extract from chlorella that concentrates certain peptides, proteins and other ingredients. The research on CGF shows that children develop no tooth decay and their dentition (maxillary-facial development) is near perfect. There are less illnesses and children grow earlier to a larger size with higher I.Q and are socially more skilled. There are case reports of patients with dramatic tumor remissions after taking CGF in higher amounts. In our experience, CGF makes the detox experience for the patient much easier, shorter and more effective.

Recommended dosage: 1 cap. CGF for each 20 tabl. chlorella

Garlic (allium sativum) and wild garlic (allium ursinum)

Garlic has been shown to protect the white and red blood cells from oxidative damage, caused by metals in the blood stream - on their way out – and also has its own valid detoxification functions. Garlic contains numerous sulfur components, including the most valuable sulph-hydryl groups which oxidize mercury, cadmium and lead and make these metals water soluble. This makes it easy for the organism to excrete these substances. Garlic also contains alliin which is enzymatically transformed into allicin, natures most potent antimicrobial agent. Metal toxic patients almost always suffer from secondary infections, which are often responsible for part of the symptoms. Garlic also contains the most important mineral which protects from mercury toxicity, bio active selenium. Most selenium products are poorly absorbable and do not reach those body compartments in need for it. Garlic selenium is the most beneficial natural bioavailable source. Garlic is also protective for against heart disease and cancer.

The half life of allicin (after crushing garlic) is less then 14 days. Most commercial garlic products have no allicin releasing potential left. This distinguishes freeze dried garlic from all other products. Bear garlic tincture is excellent for use in detox, but less effective as antimicrobial agent.

Dosage: 1-3 capsules freeze dried garlic after each meal. Start with 1 capsule after the main meal per day, slowly increase to the higher dosage. Initially the patient may experience die-off reactions (from killing pathogenic fungal or bacterial organisms). Use 5-10 drops bear-garlic on food at least 3 times per day.

Fish oil:

The fatty acid complexes EPA and DHA in fish oil make the red and white blood cells more flexible thus improving the microcirculation of the brain, heart and other tissues. All detoxification functions depend on optimal oxygen delivery and blood flow. EPA and DHA protect the brain from viral infections and are needed for the development of intelligence and eye-sight. The most vital cell organelle for detoxification is the peroxisome. These small structures are also responsible for the specific job each cell has: in the pineal gland the melatonin is produced in the peroxisome, in the neurons dopamine and norepinephrine, etc. It is here, where mercury and other toxic metal attach and disable the cell from doing its work. Other researchers have focused on the mitochondria and other cellorganelles, which in our experience are damaged much later. The cell is constantly trying to make new peroxisomes to replace the

damaged ones– for that task it needs an abundance of fatty acids, especially EPA and DHA. Until recently it was believed, that the body can manufacture its own EPA/DHA from other Omega 3 fatty acids such as fish oil. Today we know, that this process is slow and cannot keep up with the enormous demand for EPA/DHA our systems have in today's toxic environment. Fish oil is now considered an essential nutrient, even for vegetarians. Recent research also revealed, that the transformation humans underwent when apes became intelligent and turned into humans happened only in coastal regions, where the apes started to consume large amounts of fish. Why not benefit from that knowledge and consume more fish oil?
The fatty acids in fish oil are very sensitive to exposure to electromagnetic fields, temperature, light and various aspects of handling and processing. Trans fatty acids, long chain fatty acids, renegade fats and other oxidation products and contaminants are frequently found in most commercial products. Ideally, fish oil should be kept in an uninterrupted cooling chain until it ends up in the patients fridge. The fish-source should be mercury and contaminant free, which is becoming harder and harder. Fish oil should tast slightly fishy but not too much. If there is no fish taste, too much processing and manipulation has destroyed the vitality of the oil. If it tastes too fishy, oxidation products are present. I recommend to use the product recommended below (grade I), where meticulous care has been taken to comply with all the necessary parameters. The clinical results are outstanding.

Dosage: 1 capsule Omega 3 taken 4 times/day during the active phase of treatment, 1 caps. twice/day for maintenance
Best if taken together with chlorella
The VegiPearls contain half the amount of EPA/DHA. The vegetarian capsules eliminate even the most remote possibility of containing prions and make the idea of taking fish oil more easily acceptable for vegetarians. Recently a fatty acid receptor has been discovered on the tongue, joining the other more known taste receptors. If the capsules are chewed, the stomach and pancreas start to prepare the digestive tract in exactly the right way to prepare for maximum absorption. Children love chewing the VegiPearls.
To treat bipolar depression, post partum depression and other forms of mental disease, 2000 mg of EPA are needed/day (David Horrobin). For the modulation of malignancies, 120 mg of EPA 4 times/day are needed. The calculations can easily be done with the information given on the label.

Balanced electrolyte solution (Selectrolyte)

The autonomic nervous system in most toxic patients is dysfunctional. Electric messages in the organism are not received, are misunderstood or misinterpreted. Toxins cannot be shuttled through the extracellular space. Increased intake of natural ocean salt (celtic sea salt) – and avoidance of regular table salt - has been found to be very effective in resolving some of these problems. Most effective is a

solution pioneered by the American chemist Ketkovsky. He created the formula for the most effective electrolyte replacement, which was further improved by Morin Labs, and is now called „selectrolyte“. I recommend this to all my patients and have observed, that every aspect of the detoxification process seems to be enhanced. 5 % of the population is sodium or chloride sensitive – the blood pressure goes up (easily reversible). In these patients the detox process takes longer and is more difficult.

Dosage: 1 tsp in a cup of good water 1-3 times/day During times of greater stress the dosage can be temporarily increased to 1 tbsp 3 times/day

More aggressive approaches, such as i.v Glutathione, Vit.C, DMPS, CaEDTA and others have a place in reasonably healthy people but often worsen the condition in patients with advanced illness.
Most valuable is the addition of psychotherapeutic interventions such as applied psychoneurobiology (APN) and mental field therapy (MFT) to trigger the release of toxins from their hiding places.

Chlorella, cilantro, garlic-products and fatty acids vary greatly in quality and nutrient content, also in content of contaminants. I no longer recommend BioReurella and other products that have not undergone or passed our quality control screening process.

Heavy metal detox has to be done carefully and right!

October 2002
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The Critical Role of Nutrients in Severe Mental Symptoms

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Each of us has innate biochemical factors which influence mental health, immune function, allergic tendencies, and more. Scientists tell us that the number of different genetic combinations possible in a child from the same two parents exceeds forty-two million. It's interesting to note that we do not possess a combination of characteristics from our parents, but instead have a diverse collection of characteristics from many ancestors on both sides of the family.

Except for identical twins, each human being has unique biochemistry resulting in quite diverse nutritional needs. Shakespeare was correct when he wrote, "One man's meat is another man's poison." For example, some of us are genetically suited for a vegetable-based diet and others are not. Some people can satisfy their nutritional needs by diet alone and others must have nutritional supplements to overcome genetic aberrations.

Because of genetic differences in the way our bodies process foods, most of us are quite deficient in certain nutrients and overloaded in others. Even with an ideal diet, most of us have certain nutrients that are at very low levels causing us to require many times the RDA (Recommended Daily Allowance) to achieve a healthy balance.

The nutrients in overload must be carefully avoided in vitamin supplements or serious health problems can develop. After studying the biochemistry of 10,000 persons, I've learned that the greatest mischief is usually caused by nutrients that are stored in excessive amounts, rather than those at depleted levels. The most common nutrients that are stored in overload include copper, iron, folic acid, calcium, methionine[1], manganese, choline[2], and omega-6 fatty acids[3]. Of course, these same nutrients may be in deficiency in other persons. [Note: Some technical terms are explained at the end of this article.]

I am amused by supplement manufacturers who attempt to develop the ideal combination of vitamins, minerals and amino acids for the general population. This is a bit like trying to determine the ideal shoe size for the population. The truth is that multiple vitamins and minerals are too indiscriminate and may do as much harm as good.

Each of us should ask the question, "Who am I nutritionally?" The answer to this question is important for all, but may be especially critical for persons with mental health problems.

Nutrients and Mental Health

As we enter the new millennium, the medical and scientific communities agree on the tremendous influence of neurotransmitters[4] on behavior disorders, "ADHD" (Attention Deficit Hyperactivity Disorder), depression, and "schizophrenia." People can have a predisposition for these problems due to genetically aberrant levels of specific neurotransmitters. Our mental health is dependent upon having the proper amount of these critical brain chemicals.

Some psychiatrists express their scorn for nutrient therapies, claiming that they are too puny to have any real clinical potency. They often say, "You really need a drug to get the job done for a serious condition like

depression."

My favorite response begins by asking the question, "Where do our neurotransmitters come from?"

The brain is a chemical factory that produces serotonin, dopamine, norepinephrine[5], and other brain chemicals 24 hours a day. The only raw materials for their syntheses are nutrients, namely, amino acids, vitamins, minerals, etc. If the brain receives improper amounts of these nutrient building blocks, we can expect serious problems with our neurotransmitters.

For example, some depression patients have a genetic pyrrole disorder which renders them grossly depleted in vitamin B-6. A pyrrole is a basic chemical structure that is used in the formation of heme, which makes blood red. Pyrroles bind with B_6 and then with zinc, thus depleting these nutrients. These individuals cannot efficiently create serotonin (a neurotransmitter) since B-6 is an important factor in the last step of its synthesis.

Many of these persons appear to benefit from Prozac, Paxil, Zoloft, or other serotonin-enhancing medications. However, as with all mind-altering drugs, side effects occur and the true cause of the mental difficulties remains uncorrected. Similar – and more healthful – benefits can be achieved by simply giving these patients sufficient amounts of B-6 along with supporting nutrients.

Most neurotransmitter problems appear to be genetic in nature and involve abnormal absorption, metabolism, or storage of key nutrients. As neuroscience advances, biochemical treatments to correct brain chemistry become better defined. Nutrient therapy can be very potent and does not involve side effects, since no molecules foreign to the body are needed. This therapeutic approach may eventually eliminate the need for most psychiatric medications.

Biochemical Factors in Behavior Disorders, "ADHD," and "Mental Illness"

The Pfeiffer Treatment Center has amassed a large database of biochemical information from more than 10,000 patients with mental health problems. Examination of this data shows that most of these persons have striking abnormalities in specific nutrients required for neurotransmitter production. The most common chemical imbalances we encounter include the following:

Over-methylation

Many persons who suffer from anxiety along with depression are over-methylated. Methyl is an important chemical group consisting of one carbon and three hydrogen atoms (CH3). Over-methylation (too many added methyl groups) results in excessive levels of the neurotransmitters dopamine, norepinephrine, and serotonin. Typical symptoms include chemical and food sensitivities, underachievement, upper body pain, and an adverse reaction to serotonin-enhancing substances such as Prozac, Paxil, Zoloft, St. John's Wort, and SAMe[6]. They have a physical tendency to be very depressed in folates (a form of folic acid), niacin and Vitamin B-12, and biochemical treatment focuses on supplementation of these nutrients. These persons are also overloaded in copper and methionine (a sulfur-containing amino acid) and supplements of these nutrients must be strictly avoided.

Under-methylation

Many patients with obsessive-compulsive tendencies, "oppositional-defiant disorder[7]," or seasonal depression are under-methylated, which is associated with slow serotonin levels. They generally exhibit seasonal allergies and other distinctive symptoms and traits. They have a tendency to be very depressed in calcium, magnesium, methionine, and vitamin B-6 with excessive levels of folic acid. These under-methylated persons can have a positive effect from Paxil, Zoloft, and other serotonin-enhancing medications, although nasty side effects are common. A more natural approach is to directly correct the underlying problem using methionine, calcium, magnesium, and B-6. SAMe, St. John's Wort, Kava Kava, and inositol (a natural sugar alcohol) are

also very useful in treating these individuals.

Metal-metabolism

A common problem in "ADHD," behavior disorders, and hormonal depression is a physical inability to control copper, zinc, manganese, and other trace metals in the body due to improper functioning of metallothionein – a small protein synthesized in the liver and kidney in response to the presence of some metal ions[8], including zinc, mercury, cadmium, and copper. It binds the metal ions tightly and is important both in ion transport and in detoxification.

These patients are often deficient in zinc and manganese, the amino acids cysteine and serine, and vitamin B-6. They are commonly overloaded in copper, lead, and cadmium. They must avoid supplements and "enriched foods" containing copper. In addition we recommend they drink bottled water and limit use of swimming pools and jacuzzis treated with copper sulfate anti-algae agents. Foods to be limited due to high copper content include shellfish, chocolate, and carob.

Elevated copper levels are associated with hormonal imbalances and a classic symptom is intolerance to estrogen. Biochemical treatment focuses on stimulation of metallothionein using zinc, manganese, cysteine, serine, and vitamin B-6.

Pyrrole disorder

A common feature of many behavioral and emotional disorders is pyroluria, detectable as a purple (on testing paper) metabolite in urine called "the mauve factor." Pyroluria is an inborn error of pyrrole chemistry, which results in a dramatic deficiency of zinc, vitamin B-6, and arachidonic acid (an omega-6 fatty acid). As noted earlier, certain pyrroles called kryptopyrroles (literally, "hidden pyrroles") bind with B-6, then zinc to deplete the body's supply. Common symptoms include explosive temper, mood swings, poor short-term memory, and frequent infections. These patients are easily identified by their inability to tan, poor dream recall, abnormal fat distribution, and sensitivity to light and sound. The decisive laboratory test is analysis for kryptopyrroles (the "mauve factor") in urine. Treatment centers on zinc and B-6 supplements together with omega-6 essential fatty acids.

Glucose dyscontrol

Our database indicates a significant number of our patients have chronic low blood glucose levels. This problem doesn't appear to be the cause of behavior disorders, depression, etc., but instead is an aggravating factor which can trigger striking symptoms. Typical symptoms include drowsiness after meals, irritability, craving for sweets, trembling, anxiety, and intermittent poor concentration and focus. Treatment includes chromium, manganese, and other glucose-stabilizing nutrients, but the primary focus of treatment is on diet. These patients benefit from six or more small meals daily with emphasis on complex carbohydrates and protein. In essence, they cannot tolerate large meals or quick sugars. Complex carbohydrates provide the necessary glucose in a slow, gradual manner and may be thought of as "time-released" sugar.

Toxic substances

Occasionally we encounter a patient whose condition has resulted from a heavy-metal overload (lead, cadmium, mercury, etc.) or toxic levels of pesticides or other organic chemicals. Our database indicates that persons with a metallothionein disorder are especially sensitive to toxic metals and that over-methylation is associated with severe chemical sensitivities. Effective treatment requires a three-part approach: (1) avoidance of additional exposures, (2) biochemical treatment to hasten the exit of the toxic substance from the body, and (3) correction of underlying chemical imbalances to minimize future vulnerability to the toxic material.

Malabsorption

Although only 10% of our database case histories involve serious malabsorption, more than 90% of autistics exhibit this problem. There are three primary classes of absorption problems: (1) stomach problems, including excessive or insufficient HCl (hydrochloric acid) levels, (2) incomplete digestion in the small intestine, and (3) problems at the brush-border, the tiny villi[9] that tremendously increase the surface area of the intestine, where most nutrients are absorbed into to the blood stream. The consequences can include nutrient deficiencies, irritation of the intestinal tract, candida, and mental health problems. Incomplete breakdown of protein and fats can adversely affect brain neurotransmission, and is associated with impulsivity and academic underachievement. Treatment depends on the type of malabsorption present and may involve adjustment of stomach HCl levels, digestive enzymes that survive stomach acid, nutrients to enhance digestion, and special diets.

Essential Fatty Acids

The brain is 20% fat (by dry weight) and these fatty substances fulfill very important functions. The myelin sheaths which surround our brain cells contain essential fatty acids that are directly involved in nerve receptor formation and nerve transmission. A 1998 Symposium at the National Institute of Mental Health presented strong evidence of the important roles for omega-3 oils (especially EPA an DHA[10]) and omega-6 oils (especially AA and DGLA[11]) in "ADHD," depression, and "schizophrenia." A recent Harvard study showed EPA and DHA supplements to be more effective than psychiatric medications in combating "bipolar depression."

Typical American diets usually result in insufficient omega-3 and excessive omega-6 and some nutritionists routinely recommend supplements of omega-3 oils. However, biochemical individuality also exists with oils and certain persons are innately low in omega-6 oils. A review of symptoms and specialized plasma and red-cell-membrane lab tests can identify individual needs.

Summary

Nutrients play a critical role in mental health. They are the building blocks of the nervous system. Correct testing and understanding of deficiencies and overloads can pinpoint the causes of many severe mental symptoms, thus opening the door to hope and recovery.

Footnotes:

1. Methionine is an amino acid you need that you can only get from food or supplements.
2. Choline is part of the vitamin B complex family.
3. Fatty acids are the building blocks of fats. The tail end of the fatty acid molecule is called the "omega." Some fatty acids have two carbon atoms together located 6 atoms from the end. These are called omega-6 fatty acids. Omega-3 fatty acids have a double carbon atoms at 3 from the end.
4. Chemicals that transfer messages from one nerve cells to the other.
5. Serotonin, dopamine, and nonepinephrine are all neurotransmitters.
6. SAMe stands for S-Adenosyl Methionine. It is a supplement and a chemical produced in the brain from the amino acid methionine. In one chemical process, SAMe adds methyl groups, thus would be harmful to people already over-methylated.
7. A psychiatric diagnosis for a pattern of negativistic, hostile, and defiant behavior lasting at least 6 months.
8. An ion is a negatively charged atom or group of atoms. They tend to want to combine with other atoms or groups of atoms.
9. Villi are minute, finger-like projections that give the small intestine lining a velvet-like appearance. They absorb nutrients.
10. There are 3 kinds of omega-3 fatty acids. Two of them are EPA and DHA, which are found in fish oil.
11. There are 3 kinds of omega-6 fatty acids. Two of them are AA (arachidonic acid, mentioned earlier in this article) and DGLA.

DISCLAIMER:

The information of this Website is for educational purposes only and is not intended to replace the advice of physicians or health health care practitioners. It is also not intended to diagnose or prescribe treatment for any illness or disorder. Anyone already undergoing physician-prescribed therapy should seek the advice of his or her doctor before reducing the dosage or stopping such treatment.

Pesticide Pestilence

by Gabriel Cousens, MD

Pesticides can affect every living organism, and human beings are no exception. The more detrimental effects of pesticide, herbicide, and fungicide use include cancer, nervous system disorders, birth defects, alterations of DNA, liver, kidney, lung, reproductive problems, and an overall disruption of the ecological cycles on the planet. According to Dr. David Pimentel, an entomologist at Cornell University, pesticides cost the nation more than $6 billion annually in public health costs, ground water decontamination, fish kills, bird kills, and domestic animal deaths.

The pesticide potential for causing health problems depends on the extent and type of exposure and the susceptibility of the individual. Children and the elderly are the most susceptible. Children's bodies are smaller and they receive proportionally higher dose of toxins per body weight; their organs can be damaged more readily because they are not fully developed. Many of the most frequently used pesticides affect the nervous systems and children are more susceptible to neurotoxins than adults. The National Cancer Institute found an increased risk of leukemia in children whose parents used pesticides in their home or garden. The elderly are more susceptible because their immune systems and organ systems decline with age.

The main studies of the effects of pesticides are mostly on cancer. Between 1969 and 1986, several types of cancer increased significantly among people ages 64-84 in six leading industrial countries. These cancer types are multiple-myeloma (a cancer that starts in the bone marrow and spreads to other bones), melanoma of the skin, cancer of the prostate, bladder, brain, lung, and breast. Farmers whose general life style is healthier than city folks with lower risks for most cancers and non-cancer diseases were found to have some specific cancers including: multiple myeloma, lymphomas, skin melanomas, leukemia, cancer of lip, stomach, prostate, and brain. Work related exposures may be causing specific cancers among farmers.

What is Going On?

Evidence has accumulated that many industrial chemicals (including many common plastics and pesticides) mimic estrogen hormones. These

hormone mimickers disrupt reproduction and development in humans, mammals, birds, and fish, just like diethylstilbestrol (DES) did to those mothers and fetuses who received the chemical drug. These estrogenic-like chemicals may be the cause for the increasing incidence of cancer of the breast, testicles, and prostate. According to the *American Chemical Society*: 1. sperm count in men world wide is 50% of what it was 50 years ago; 2. the incidence of testicular cancer has tripled and of prostate cancer has doubled in the past 50 years; 3. in 1960 the incidence of breast cancer was 1/20 and now it is 1/9; 4. and young male alligators in pesticide contaminated lakes in Florida have such small penises they are unable to function sexually. Estrogen mediated hormonal imbalances can create these changes.

Estrogen is usually considered a female hormone, but males produce estrogen in small amounts. In the developing fetus, a specific ratio of androgens (male hormones) to estrogen must be maintained for proper sexual differential to occur. If the hormone balance is disturbed, the offspring may be born with two sets of sexual organs or a single set that is incompletely developed. Diminished sperm count and possible future cancer may be set at this stage.

Examples of estrogen mimickers are: DDT, DDE, dierdrin, dicofol, methoxychlor, some PCB's, alkyl phenols from penta- to nonylphenol, as well as bisphenol-A (the building block of polycarbonate plastics and which is used in many common detergents, toiletries, lubricants, and spermicides). Many of these estrogen mimickers resist breaking down in the environment and are highly soluble in fat. This sets the stage for them to accumulate in the bodies of fish, birds, mammals, and humans. Non-vegetarians obviously accumulate a higher amount. One study showed that the mother's milk of vegetarians had only 1% the amount of pesticides as that of meat eating mothers. Many of these estrogen mimickers will cross the placenta barrier and pass into the developing fetus.

Even the *American Medical Association Journal (JAMA)* has reported that estrogenic chemicals have an effect. Ana Soto, a medical researcher at Tufts University, combined 10 estrogenic mimickers, each at one-tenth the dose, to produce minimal response. She found that when all ten were combined, they were strong enough to produce an estrogenic response. This is significant because the U.S. government has been regulating based on their testing of *individual* chemical effects. They have almost no data on the synergistic affect of the many pesticides, herbicides, fungicides, plastics, PCB's, etc., working together.

Scientists can only pretend to discern "safe" levels, for an individual chemical, but they have no idea of any safe level for any chemicals when

they are looked at from a synergistic point of view. There is no "safe" levels, as current anti-environmentalist deregulators are trying to say. Political decision makers need to understand we have to abandon the chemical-by-chemical regulation approach, and regulate whole classes of chemicals together. Instead of judging pesticide affects on healthy adults, their affect on children who are most vulnerable should be used as a standard. These categories of dangerous chemicals need to be immediately discontinued if we are to survive as a species.

There are about 19 major chemicals used on U.S. crops that are associated with disrupting the human hormone system. According to the Washington-based *Environmental Working Group*, over 200 million pounds of these hormone disrupters are applied annually to 68 different crops in this country alone. In 1992, Frank Falck M.D., Ph.D., assistant professor of surgery at the University of Connecticut School of Medicine examined the tissues from suspicious breast lumps in 40 women and found that those which were cancerous had higher levels of PCBs, DDT, DDE (a DDT byproduct) than those which were benign. Dr. Wolf, professor of community medicine at Mt. Sinai Medical Center in New York City, analyzed blood from more than 14,000 women and found that those who developed breast cancer had higher levels of DDE than those without cancer. He found that the women with the highest levels of DDE had four times the risk of breast cancer than those with the lower levels. Since the 1960's researchers in the US. have felt that the findings which connect the estrogenic pesticides with breast and other cancer are only preliminary, but the Israeli government has already acted on the evidence with exciting results.

From 1976 to 1986, Israel was the only country among 28 countries studied, where breast cancer death rate dropped. One explanation was that in 1978, Israel banned three estrogenic pesticides. Within two years after the ban, Lindanc levels were reduced by 90 percent; DDT by 43 percent, and BHC by 98 percent. By 1986, the death rate for breast cancer among Israeli women, below the age of 44, had dropped by 30 percent.

The amazing observation is that pesticides also don't achieve their stated purpose! Dr. David Pimentel, a world-leading agriculture expert at Cornell University, estimates that more than 500 species of insects are now resistant to pesticides. It is no accident that crops destroyed by insects have almost doubled during the last 40 years in spite of an almost tenfold increase in the amount and toxicity of insecticides. One recent study showed that the pesticide usage by Filipino rice farmers cost the individual farmer more in medical bills than it generates in increased rice production. Even on a cost-benefit verses health approach, the use of pesticides comes out on the negative side of things. Aside from increased rates of certain cancers, farmers who were not organic growers suffered nearly double the

kidney and respiratory problems as organic farmers and were five times more likely to experience eye problems. Farmers who used pesticides had considerably more skin complaints, gastrointestinal problems, neurological problems, and hematological problems.

In 1986, the Indonesian government sponsored a plan to decrease the use of pesticides. The rice production since then has increased by 10 percent, and there is much less capital outlay for pesticides and their concomitant medical problems. In Bangladesh, farmers using integrated pest management spent 75 percent less money on pesticides and increased their crop harvest by 14 percent over those using high levels of pesticides.

Pesticide usage is a major public health problem worldwide. It reflects a consciousness that is completely out of touch with the laws of nature. The *National Academy of Sciences* estimates that pesticides are responsible for 20,000 cancer cases annually! Cancer is the worst concern, but what about the amount of increased neurological problems, learning disabilities, and hyperactivity our children are having on what appears to be a mass basis? How much damaged immune systems and environment allergies are being created?

Why?

What sort of consciousness does it take to continue deliberately poisoning yourself and your family in order to get less effective crop outputs? What sort of consciousness does it take to manufacture these poisons and sell them; and especially to sell banned poisonous chemicals to third world countries where the people do not understand how to minimally protect themselves?

Pesticide usage is also associated with directly destroying the life force of the soil. I do not understand how people can choose to spend more money for something that not only doesn't work, but poisons us humans and the environment. As a German medical doctor once said, "it is like pissing next to the urinal."

We can protect ourselves, and change the situation, by buying only organic produce. This not only protects ourselves from pesticide poisoning, but supports the organic farmers who are rebuilding the soil. The more organic farmers there are, the less the organic produce will cost, and the more the soil is brought back into balance. Organic produce, according to a study at Tufts University, has a nutrient content that is approximately 88 percent higher than commercially grown produce. This means by buying organic produce we actually get more for our money and for our health. The other

thing we can do is support the Pesticide Food Safety Act. Presently, there is a movement to deregulate environmental protection on many levels including pesticide regulation. Let the politicians know it is time they awoke and became more responsible to themselves and to their constituency. Regardless of what Washington does, ultimately, it comes down to us taking responsibility for the health and safety of ourselves, our families and our community. We have the power to consume what is safe, and refuse to consume what is detrimental to our health and to the planet. The power of the marketplace is a power that is stronger than that of even Washington politics. Let us put our money where our mouths... *and health* are. We have the power to restore the world to one that is aligned with the healing harmony of the universe. Let us do it!

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CANCER: *What you may Not Have Been Told*

By Michael Prytula N.D.

President Richard Nixon declared War on cancer in 1971. Since that time the US has spent more than one trillion dollars on treatment and research. One trillion dollars! That is one thousand billion US dollars. Since that time the overall death rate from cancer has increased 5% and some cancers have increased several hundred percent.

The very basic concept of cancer is that cells of a certain type have gone amuck in large numbers. Cancer can be of two types: one benign (usually the good one) which is localized and only causes problems by its location and rate of growth; the second one is malignant which means it can move from one place to another (this is definitely the bad one). We all have cancer cells. I do. You do. Newborn babies do. Whether or not these cells will mutate depends on our immune systems ability to identify these cells as abnormal cells and kill them.

Cancer is caused by a number of things. The biggest causes are chronic stealth infections (microorganisms), chemicals, radiation and strong electromagnetic fields. Microorganisms causing cancer include adenoviruses, herpes viruses, hepadenoviruses, and papovaviruses which includes the now famous SV40 virus. The notorious and now famous SV 40 was found as a contaminant in the polio vaccines in the 60s and 70s. SV 40 is the cause of AIDS in monkeys and brain cancers in humans.

Investigating microorganisms as a cause for various cancers is only now being explored. Since 1967, when the US Surgeon General, William H. Stewart, made the statement “the book is closed on infectious disease,” the funding for the investigation of microorganisms as a causal factor for cancer and other diseases dried up. Then billions of dollars went into research on genetic causes of cancer. This research has made no appreciable difference to the life expectancy, quality of life or treatment of cancer or other diseases. Cancer-causing genes have been found. So what? Has this finding made any difference in life expectancy or quality of life? It is interesting to note the current biotech industry would not be where it is today without this research.

Chemicals are other cancer causing agents. In 1990 Elihu Richter and Jerry Westin of Hebrew University's Hadassah School of Medicine observed that between 1976 and 1986, Israel was the only country among twenty-eight that showed a breast cancer rate drop. They were anticipating a 20% rise in breast cancer mortality consistent with other countries. In fact, they observed an 8% drop. In the youngest group, instead of a 20% rise, the rate dropped 34%. Statistically this is a 50% change. In the study of cancer, this is enormous. The reason for this drop in mortality rates was the 1978 ban on three organochloride pesticides: alpha benzene hexachloride, gamma benzene hexachloride (lindane which is typically used for lice treatment), and DDT. There are many studies showing the toxic effects of chemicals. Interestingly, chemical companies have paid for studies that come to the conclusion that chemicals are good. Yet independent, non-industry organizations show significantly that chemicals are harmful. This poses the question of whose interests are being served?

Radiation is yet another known carcinogen beyond a doubt. ElectroMagnetic Fields (EMF's) are known to cause cancer. Electricians are ten times more likely than anyone in the general population of developing cancer (leukemia).

The mechanism as to how cancer becomes established is always the same, oxygen deficiency. Two-time Noble Prize winner for medicine, Otto Warberg, theorized that cancer was caused by the replacement of oxygen with the fermentation of sugar. In an oxygen-deprived state, the normal tissue cells regress in their development and start to behave like bacteria utilizing sugar as their means to get energy. Cancer cells, when they behave like bacteria, lose their growth inhibition. They do not remain anchored to other cells and have an indefinite proliferative life span.

Conventional therapies for the battle against cancer include chemotherapy, radiation therapy, and surgery. Patients need to beware that what their medical doctor shares with them regarding cancer treatments does not present the entire picture and the doctor's word should not be taken as gospel without further research. In 1978, for example, the Office of Technology Assessment, an arm of the US Congress, issued a major report concluding that only 10-20% of all procedures used in medical practices have been shown to be efficacious by controlled trial. In other words, 80-90% of what doctors implement as treatment is unscientific guesswork. Since then this study to my knowledge has

not been repeated, as it would only serve to strengthen the case against these conventional therapies.

The pharmaceutical industry, which is the most profitable industry in the world, has a strong vested interest in what goes on in all countries' governments but in particular the industrial nations. On Capitol Hill in Washington DC there are 625 registered lobbyists that are on the pharmaceutical industry payrolls. That is more drug lobbyists than senators and congressmen together. Unfortunately, I have not found similar statistics for Canada, though I have no reason to believe that the situation is much better here. In the US more than half of the pharmaceutical lobbyists were either former members of congress (21) or worked in congress or other federal agencies (295). These are hired guns are to ensure that the interests of the pharmaceutical industry are well served. In the 1999-2000 US federal election $262 million was spent by this industry for political influence. Governments are not immune to the influence of the long arm of the pharmaceutical industry. Pharmaceutical companies are not interested in winning the war on cancer. Their interests lie in waging the war on cancer, not winning the war. Why? In waging a war, maximum profits for pharmaceuticals are guaranteed by those convinced of victory over a bitter enemy, regardless of the evidence to prove otherwise.

Two- time Nobel Prize winner Dr. Linus Pauling wrote, "Everyone should know that the war on cancer is largely a fraud ." According to the US National Cancer Institute: a five-year survival rate for cancer for all nationalities was 49% in 1974 to 1975 and 50.7% in 1981 to 1986. This represents merely a 1.7% improvement in thirteen years. Even with a positive change this may be a statistical artifact as the trend towards earlier diagnosis is certainly a factor. However, from 1947-1984 the overall incidence of cancer in the general US population grew by 40%.

Over the years, official medicine has poured billions of dollars into radiation, chemotherapy and surgical research as the major weapons in the war on cancer. The overall cancer death rate has risen by 5% since the war on cancer began. (Richard Waters, "Options", 1993.) Dr. Alan Levin of the University of California Medical School stated, "most cancer patients in this country die of chemotherapy". According to Dr. John Cairn of the Harvard University School of Public Health, "Only 2-3% of the nearly one-half million Americans diagnosed with cancer every year are being saved by

chemotherapy. ” In March 1971, a New York Journal of Medicine study found that 10% of 133 patients using the chemo drug 5FU (5 Flouro Uracil) died as a result of the drug’s toxicity. Some doctors jokingly refer to this drug as 5 Feet Under.

In February 1996, The WHO (World Health Organization) formally designated tamoxifen as a carcinogen. According to Dr Samuel Epstien of the University of Illinois, the drug tamoxifen is “a rip roaring liver carcinogen”. The National Cancer Institute and Zeneca Pharmaceutical lobbied to keep legislators from adding tamoxifen to its list of carcinogens. (Science News, March 2, 1996). Zeneca’s annual revenues from Tamoxifen were $470 million. Interestingly enough, Zeneca Pharmaceuticals is one of the world’s largest producers of pesticides and industrial chemicals. Zeneca makes the carcinogenic herbicide acetochlor and other chlorine products creating annual revenues of over $300 million on these chemicals.

Acetochlor and all polychlorinated herbicides are estrogen mimickers, which is precisely what tamoxifen is used to block. Not surprisingly, who would know more about estrogens effects on the body and how to block this than the company who produces estrogen mimickers. Estrogen mimickers on their own have a one to one estrogenicity factor. This means that one molecule of estrogen mimicker acts like one molecule of estrogen. Put two estrogen mimickers together and you have a compound that can have an estrogenicity factor of 1600. This means that the effects of two molecules of two estrogen mimickers can act like 1600 molecules of estrogen. It is broadly known that estrogen is a significant cause of breast cancer.

An NCI (National Cancer Institute) study followed 46,355 women and tracked the 2,082 cases of postmenopausal breast cancer that occurred among them. Women on estrogens only were 20% higher risk. Those on both estrogens and progestins had a forty- percent higher risk. A UCLA study found that women who received combined Hormone Replacement Therapy for five to ten years were 51% more likely to develop breast cancer.

Radiation is another weapon in the war against cancer yet radiation is also a major cause of cancer itself. According to internationally respected radiation expert Rosalie Bertells, her research provided evidence that mammographies cause more cancer than they detect. And regular mammographies cause cumulative radiation damage not to mention that as a diagnostic tool they are very ineffective.

This crude method will detect cancers that are no less than seven years old. Yet radiation therapy is a cash cow for most cancer therapy hospitals and clinics. Not to mention, most doctors are lavishly treated by pharmaceutical companies with gifts. According to ABC Primetime Thursday night, (Feb 21,2002) doctors were coerced with $6 billion in parties, gifts and trips to “educate” medical doctors.

Surgery for cancer is, in my opinion, a good therapy. Yet radiation and chemotherapy are toxic substances which in turn can, and do, generate cancer. Adding a poison to kill a poison is not good math for our bodies. Yet government bows to the dictums of industry which supports and promotes these aggressive interventions.

Government institutions are generally against alternative medicine. As an example,the Ontario government proposed deregulation of Naturopathic Medicine in 1982 as one MPP explained, “Naturopathic Doctors are not a threat to the public and do not need to be regulated because since their legislative inception in 1925 they have not killed anyone. Therefore naturopathic doctors do not need to be regulated.”

This animosity has been prevalent in government for many years. As a response to proposed deregulation, naturopathic doctors and their patients created the most powerful lobby of the Ontario government for two years running. The Ontario government then succumbed to public demands and retained the Naturopathic Medicines Drugless Practitioners Act while promising to get naturopathic medicine inclusion into the Regulated Health Professions Act. After countless submissions by the Naturopathic profession and systematic delays by at first the Liberal government, then the NDP government, and finally the Progressive Conservative government, none have taken the legislative commitment to the profession nor to the public.

In the US, official medicine also stifles alternative medicine. The Office of Alternative Medicine was established within the National Institute of Health and given a mere $2 million research budget. Yet the same year, the National Institute of Health spent $68 million of taxpayers’ money on a single research trial for one drug. One chemical received 34 times more funding than an entire research department that funds non-patentable research.

The pharmaceutical industry not only coerces governments, it also coerces your monetary donations. The American Cancer Society claimed it reached 71 million Americans in 1991 (21 million more than it reached in 1988) with its public education programs. Yet from 1988 to 1991 cancer death rates rose 5.3%. In 1970 the American Cancer Society was accused of hoarding millions of dollars worth of publicly contributed funds. During the same time, wages and salaries accounted for 25% of all expenses. This is"a very efficient voluntary organization," says Burton Goldberg in his book, "Definitive Guide to Cancer". Is the situation in Canada any different? It is important for you to be wary of where and what your donations are doing. Your donations may be ensuring maximum drug cartel profits. Has either cancer society ever mentioned anything about researching pesticides as a cancer cause and if so, were the results ever made public?

Imagine that your body is the house of your soul and you have been putting garbage in one room in your house for years. Eventually, this garbage finally attracts flies. Flies are like cancer. Chemotherapy and radiation therapy may kill the flies but they also contribute to the garbage. So if you don't get rid of the garbage the flies will come back.

(Be sure to read the next installment of this article in our Fall 2002 issue of The Natural Healer, which will explore how to clean up this garbage in a safe, healthy, natural and effective way).

To read part two of this article in the fall 2002 issue of The Natural Healer, click here

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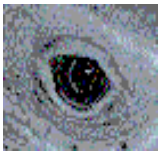

Melissa Kaplan's

Chronic Neuroimmune Diseases

Information on CFS, FM, MCS, Lyme Disease, Thyroid, and more...

Last updated February 27, 2004

Estrogen Dominance and Xenoestrogens

Undiagnosed threat to human health

I first found out that there was a problem with my estrogen levels when I told my doctor that it was time to retest my thyroid function as I was starting to experience early acute thyroiditis symptoms again: hair loss, and weak and tearing finger nails, are early signs for me that my thyroid medication needs to be tweaked again. As we were talking about other things during that visit (abnormally heavy periods, very tender breasts pre-menstrually, some of my other symptoms that I associated as being part of my CFS and MCS), he said that it we should test my estrogen and testosterone levels. I already knew that my DHEA was low, but I can't take enough of it to raise my serum levels to what is normal for my age because I start breaking out and getting facial hair at anything over 10 mg a day (why couldn't it be head hair instead of facial hair?!)

So, off to the lab I went, and the results were, to say the least, interesting. Because of having acute thyroiditis (Hashimoto's thyroiditis, which requires more extensive testing than is normally done when doctors order a CBC or thyroid test, which is why this thyroid disorder is in the top five underdiagnosed diseases in the U.S.), it was interesting to see that my thyroid, with its current level of .1 mg of Synthroid was working just fine. My estrogen, however, was off the map - way high, while my testosterone was extremely low.

The testosterone was easy: because the testosterone pill manufacturers do not make the dosage I needed, my pharmacy gave me a choice: they could compound a cream or troques (sublingual lozenges) to apply or take on a daily basis.

Not all pharmacies will compound drugs any more since most insurance plans won't reimburse them because for some reason they can't figure out a reasonable cost formulary to reimburse the drug and labor involved, despite the fact that my parents' drug plan that they developed and administered for a wide range of corporate and insured clients, starting in the early 1960's through the 1980s, did that quite well and to the satisfaction of both the pharmacies and patients, as well as the plan insurer or administrator. But I digress... You may have to check around town for a pharmacy who will compound; another alternative is the online pharmacies who will compound to your doctor's prescription. Or, just bite the bullet and pay for it yourself rather than submitting it fruitlessly to your drug insurance carrier.

I thought that would be that, but the problem wasn't that my estrogen was too high in relation to the testosterone, it was too high, period. It turns out that there is a charming little bacteria that lives in our gut that was ripping the estrogen off of its glucuronide escort that it attached to in the liver, and so frees the estrogen to recirulate rather than letting it be escorted out of our bodies through our waste elimination system. (Actually, the unbinding is caused by ß-glucuronidase, a glucuronide-destroying enzyme produced by one or more of the more than 500 species of gut bacteria that inhabit a healthy gut.*) For some reason, my bacteria were running rampant, pillaging the glucuronides, so glucuronidation had essentially stopped. Thus, not only was the new estrogen my body was producing naturally being circulated, but so was the estrogen from my birth control pills AND all the internally manufacturered estrogen that should have been eliminated. Since I was tested after I'd been off the pill for over a month (and had experienced no abatement of the symptoms), the high estrogen test results showed that it was my naturally occurring estrogen - both the new estrogen being made by my body as well as the used estrogen that was being recirculated instead of being glucaronidized that was causing the problem.

The answer was not progesterone, but calcium d-glucarate. Available in tablet/capsule form, I took it three times a day for about six months; when my next test showed that my serum levels were back within normal ranges for my age, I dropped down to one a day. I had already been taking milkthistle to help support my dysfunctional liver; I continue taking it as the liver helps detoxify xenoestrogens and other toxins. I also take chlorella or spirulina to help rid my system of circulating mercury as part of my mercury detox efforts, in addition to IV treatment.

The reason I mention the liver and mercury is that symptoms can mimic those of thyroid disease as well.

Update, Late 2001: Well, my estrogen, testosterone and other hormones are where they should be now, I continue to take the calcium d-glucarate because of the low levels of n-butyrate in my gut, but the problems with horrific periods continued. My doctor, as we were talking about my lab results (including negative pelvic and vaginal ultrasounds), he mentioned that what doctors used to call polycystic ovaries (and pretty much shrugged off doing anything about it, since it was a "female" thing) really seems to be related to hyperinsulinemia - elevated levels of insulin due to problems with the diet and/or an enzyme that the liver should be producing to knock out unneeded insulin, but isn't (or not producing enough of it). With this percolating in the back of my mind, my eye was caught by a very interesting article, The Prediabetic Epidemic (Syndrome X). I read it, made some more dietary changes (and reduced the "many small meals a day" so many doctors and health sites recommend to four "not as small meals a day"), added some new supplements, increased amounts of others, and there have been some positive changes with my periods over the past three months...and I lost 20 lbs without even trying. So, while insulin/glucose processing isn't the whole answer (still losing hair, but that could be telogen effluvium from the diet changes I've been putting into play over the past year), it is part of the puzzle.

2002 Update: I retested my gut again to see if there has been any change. There hasn't

been: still no beneficial bacteria, still excessively high amounts to beta-glucuronidase (the enzyme that breaks the glucuronidation/estrogen bond), and still too alkaline. So, I will have to continue to take FOS, beneficial bacteria (various -dophilus and -bacillus organisms), along with digestive enzymes and hydrochloric acid/betaine. My doctor and I talked about why the friendly bacteria is absent in my gut and what could be instrumental in the excessive production of glucuronidase, an the answer may be the same thing: anaerobic organisms. The gut digestive test that he uses (Great Smokies Diagnostic Lab's Comprehensive Digestive Stool Analysis) does not look for anaerobic organisms (other than *E. coli* which, in "normal" amounts, is healthy), so we don't know which are present or in what numbers. Anaerobic organisms, such as *E. coli*, *Bacteriodes*, and *Clostridia*, are known to induce the formation of glucuronidase.

To see if we can change the situation, along with everything else I'm taking, I will be adding Sacchromyces to my daily regimen, for 3 weeks, to see if that helps quash the overabundance of anaerobes. I am also now taking a daily dose of grapefruit seed extract, known to have antifungal and antibacterial properties. As a result of still having abnormally heavy periods despite the progesterone I'm using to create a new cycle (7 d@100mg/day; 7 d@200mg/d; 7 d@300mg/d; 7 days off), they still aren't "normal".

I also just had a dicey mammogram with a recall in six months to recheck the abnormalities seen in this one (for which I was called back for magnification and ultrasound). I've always had fibrous breast tissue. That, along with the estrogen dominance due to the usual unavoidable culprits (xenoestrogens) and the elevated circulating estrogen due to the elevated glucuronidase, my doctor has me starting on DIM (Diindolylmethane). DIM is a phytonutrient found in cruciferous vegetables including broccoli, brussels sprouts , cabbage, cauliflower and kale. Unlike other plant nutrients such as soy isoflavones, diindolylmethane has unique hormonal benefits: it works on the estrogen metabolites, enhancing their conversion to nonproliferative function rather than proliferative. IOW, it increases the level of "good" estrogens (2-hydroxy-estrogen) while reducing the level of "bad" estrogens (16-hydroxyestrogen). The 16-hydroxyestrogen is involved in breast and uterine growth, which is fine when you're going through puberty - it isn't when you're an adult with fibrocystic breasts, excessive uterine lining, and estrogen dominance. So, I will take it for six months and repeat the CDSA test and mammogram, and see what effect, if any, the additions to my daily regimen have.

Articles on Estrogen, Estrogen Dominance, and Xenoestrogens

While some of the following sites are selling product, my purpose for including them here is because they provide information about ED which is easily understood and will help readers understand what the disorder does to the functioning - or dysfunctioning - of the body. Progesterone itself, natural or otherwise, is not necessarily the "cure" for having too much estrogen, so despite the fact that some of the following sites promote various forms of progesterone, please know that this is something you need to discuss with your

physician in the course of evaluating test results and what they mean to you.

Journal and other articles related to environmental estrogens (xenoestrogens), estrogen dominance, and elevated serum estrogen levels:

Estrogen Dominance Syndrome, Ronald Hoffman, MD, 1999

Unwanted HRT playing havoc with songbirds, New Scientist, March 2002

Breast Cancer and the Chlorine Connection (Organochlorines), September 1994

Industry Addiction to Estrogen Mimickers & Endocrine Disrupters, 1996

DDT, Other Chlorine-Based Chemicals Were Banned for a Reason, St. Louis Tribune 2002

Hormonal Sabotage: Synthetic chemicals in the environment may be wreaking havoc with the endocrine systems of humans and animals. Natural History, 1996. This one is probably the scariest of them all...

Environmental Estrogens, American Scientist, 1996, John A. McLachlan and Steven F. Arnold

Estrogens in Unexpected Places: Possible Implications for Researchers and Consumers, Environmental Health Perspectives 103, Supplement 7, October 1995, David Feldman and Aruna Krishnan

Why Are So Many Women Depressed? Scientific American, Ellen Leibenluft, M.D.

Estrogen, Progesterone Implicated in Provoking PMS, by Kenneth J. Bender, Pharm.D., M.A.

Pheromones in Humans: Myth or Reality?

Editorial. Does Estrogen Receptor Expression in Normal Breast Tissue Predict Breast Cancer Risk? Journal of the National Cancer Institute, Leslie Bernstein, Michael F. Press

Correlation of Menstrual Cycle at Time of Breast Cancer Surgery to Disease-Free and Overall Survival. Southern Medical Journal, 1997, VW Vanek MD, TF Kadivar, MD, and CC Bourguet, PhD

Androstenedione Use May Increase Testosterone And Estrogen Levels (Male and female body-builders beware...)

What cautionary tales can Lake Apopka tell us?
Anna Marie Gillis, Zoogoer, 1995.

Sun block: Gender-bending chemicals that mimic oestrogen
From New Scientist. Just when you thought it was safe to go back into the water...

PubMed Search: organochlorine +estrogen

Articles related to estrogen, progesterone, pre-menstrual syndrome and menorrhagia:

Estrogen, Progesterone Implicated in Provoking PMS

Articles appearing at product-related sites:

Hormone Heresy: Part I and Part II, Sherrill Sellman

Tamofaxin: A Major Medical Mistake? Sherrill Sellman. See also What is Tamofaxin?

Sites and literature related to calcium d-glucarate:

Glucuronidase (beta-D-Glucuronoside glucuronosohydrolase) is an enzyme that hydrolyzes a glucuronide, especially the beta form of a glucuronide. It is widely found in the liver and spleen. One of its functions is to bind estrogen to assist the body in eliminating, making room for the new estrogen the body makes on a regular basis. Bacteria in the gut break this bond, freeing the estrogen to recirculate, thereby increasing serum and organ levels of estrogen throughout the body. Calcium d-Glucarate blocks the activity of this bacteria.

Calcium D-Glucarate

Of Related Interest

Thyroid.About.com

BreastCancer.About.com

Testosterone, Aggression and Green Iguanas

National Resources Defense Council's FAQ on Endocrine Disruptors

Glucuronidation

Effect of Human Intestinal Bacteria On the Metabolism of Estrogen Hormones

Other Endocrine Disruptors: Smoking, Arsenic

Sun block: Gender-bending chemicals that mimic oestrogen

Safety Concerns with Sunscreens - these products pose a threat to some breast cancer survivors

Chemical Industry Whines

The Media's War on Essential Chemicals: Targeting Chlorine, 1994

http://www.anapsid.org/cnd/cnd/hormones/estrogen.html