

Consumers for Dental Choice

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3/20/2008

Petition to California Occupational Safety and Health Standards Board

Vertical Standard Needed: No Implanting of Mercury-Based Dental Fillings

Petitioners are:

- A national consumer group: Consumers for Dental Choice, www.toxicteeth.org
- A former Public Member of the Dental Board of California: Kevin J. Biggers of Rancho Palos Verdes,
- Two international dental societies: the International Academy of Biological Dentistry and Medicine, www.iabdm.org (vice president: Dr. R. Andrew Landerman of Sebastopol) and the Holistic Dental Association, www.holisticdental.org (president, Dr. Timothy Gallagher of Sunnyvale).
- A dental hygienist who is a leader in promoting safe working conditions for dental hygiene: Victoria DaCosta, R.D.H., of Santa Barbara.
- Two dental assistants: Millie Navarro of Beverly Hills and Rebecca Huntsman of Cambria.
- A dentist, and national leader in the cause of mercury-free dentistry, Dr. Grant Layton of Rancho Santa Fe.
- Plus an honorary petitioner: Debbie Seltenreich (deceased), R.D.A.

Because of the unnecessary placing of mercury amalgam fillings (43-54% elemental mercury) by old-fashioned and assembly-line dentists, dental offices and clinics are patently unsafe work environments – especially for young women and their unborn (and future) babies. The issue is no longer a subject of controversy; through a court-approved Proposition 65 warning, the California Dental Association (still, sadly, advocates for mercury fillings) advised dentists to post this warning:

“Dental Amalgam, used in many dental fillings, causes exposure to mercury, a chemical known to the state of California to cause birth defects or other reproductive harm.”ⁱ

In 2002, the California Medical Association House of Delegates called for a phase-out of all mercury-based products in health care – with no “professional courtesy” exemption to their dentist colleagues.ⁱⁱ The Dental Board of California, whose dentist majority resisted disclosing the health risks mandated in the Watson Law for over a decade, has a fact sheet stating:

“Toxicity of Dental Materials: Dental Amalgam: Mercury in its elemental form is on the State of California’s Proposition 65 list of chemicals known to the state to cause reproductive toxicity. Mercury may harm the developing brain of a child or fetus. Dental amalgam is created by mixing elemental mercury (43-54%) and an alloy powder (46-57%) composed mainly of silver, tin, and copper. ... Questions have been raised about its safety in pregnant women, children, and diabetics.”ⁱⁱⁱ

Half of dentists, recognizing that the era of mercury fillings is over in dentistry, have abandoned placing this archaic 19th century device – which means the other half could do so as well. A 2006 Zogby poll confirms massive ignorance about the existence of mercury as the primary component of an amalgam, www.toxicteeth.org/natcamp_fedgovt_zogby_poll_2006.cfm. The Prop 65 warning has been torpedoed with the acquiescence if not the direction of court-signatory California Dental Association; most dental offices do not have the requisite ten employees and the dentists still placing mercury fillings – the ones who should post it – generally do not. Neither patients nor dental workers are being apprised that amalgam is 50% mercury, and that its virulently toxic properties can harm unborn babies and children’s neurological development. The term "silver fillings" – perpetuated by the American Dental Association to hide the mercury – is a cruel deception on workers and consumers alike.

The 50-50 Split Inside Dentistry

Dentists who practice “mercury-free” (always using non-toxic materials, such as resin) grew from 3% in 1985 to 9% in 1995 to 27% in 2001.^{iv} A 2007 dentist magazine survey shows that **the pro-mercury vs. the mercury-free dentists are now split evenly:** 52% mercury-free and 48% still placing mercury fillings.

www.toxicteeth.org/Mercury%20survey.pdf. The dental societies are likewise split: the American Dental Association and its California affiliate support the continued use of mercury fillings, due in part to their overlapping economic bonds tying the ADA to the product: the ADA has patents on amalgam,^v and for decades endorsed amalgam through its controversial, pay-to-play, Seal of Acceptance program.^{vi} To protect its patents, the ADA adopted a gag rule in its “code of ethics,” directing dentist silence about the controversy; manifestly, the ADA’s gag rule is one of the reasons that the mercury controversy stays inside dentistry. Rival organizations, composed of mercury-free dentists, have formed, but they lack the PACs, lobbyists, and PR firms to equate to the CDA’s clout in Sacramento.^{vii}

The issue of social/environmental injustice looms large in this issue. Although most adults got mercury fillings in years past, today, mercury fillings are placed primarily in children, the working poor, and minorities. Both the NAACP and the National Black Caucus of State Legislators have passed resolutions on the issue, the NAACP resolution called for a ban on mercury in dentistry.^{viii} The system of two-tiered dentistry was described by an NAACP witness before Congress as "choice for the rich and mercury for the poor."^{ix} Alternative materials are comparably priced for small cavities, and cost a little more for large cavities.

The defenders of mercury fillings note that it has been used since the Civil War, somehow suggesting that makes it safe. They say the poor get mercury fillings because such fillings are easier and cheaper to do, that being all the poor deserve. Before the Civil War, physicians sawed off legs, a procedure that even today would be cheaper and quicker – but to our knowledge, the American Medical Association does not advocate carving off the legs of poor people with broken legs. Likewise, it’s time for the ADA to stop supporting mercury fillings for the poor. It is not necessary in any public setting -- we personally know mercury-free dentists who operate in prisons and in public health clinics. A long history of use, or the fact that mercury fillings are so easy to implant, is no longer an excuse to stay with 19th-century dentistry.

Regardless of the politics, this much is clear: if half of America's dentists can fill any kind of cavity without using mercury fillings, the other half can too.

The Menace of Mercury for Dental Workers

Mercury, the most toxic and the most vaporous of the heavy metals, is a virulent neurotoxin. Its most severe risk is to the developing brains of children and unborn children.^x The W.H.O. says no safe level of mercury exists,^{xi} as do scientific researchers.^{xii}

The California Permissible Exposure Limits for Mercury, Metallic and Inorganic Compounds, are, by average exposure, 0.025, and by maximum at any one time, 0.1 mg/M(3).^{xiii} The International Academy of Oral Medicine and Toxicology has tested the amalgam cap when opened, and finds that the exposure at that point exceeds the maximum by at least ten times. Such level of toxicity is thus per se incompatible with a tolerable workplace in California.

A correlative point in any sound regulation is that if the workplace has a choice between a toxic and a non-toxic product, it should use the non-toxic. New Jersey's OSHA publishes "Controlling Metallic Mercury Exposure in the Workplace, A Guide to Employers," www.state.nj.us/health/eoh/survweb/mercemp.pdf, which states (page 9) that the #1 control to protect employees from mercury exposure is "substitute safer chemicals." That is exactly what we ask for. It's time that the remaining mercury-using dentists in California substitute other fillings materials – resin composite, porcelain, or gold.

U.S. OSHA's Deal to Refrain from Inspecting Dental Worksites

Due to the lobbying power of the American Dental Association, U.S. OSHA gives dental worksites a pass. The Bush Administration signed a series of deals with the ADA in 2001, in 2004, and in 2006, backing off inspections, and ignoring the mercury issue entirely; see, e.g., www.osha.gov/dcsp/alliances/ada/ada.html; www.osha.gov/dcsp/alliances/ada/ada_renewal_20060518.html. Cal-OSHA is not bound by these backroom, special-interest arrangements.

Two Science Advisory Committees of the U.S. Food & Drug Administration voted 13 to 7, on September 7, 2006, confirming concerns about mercury amalgam are well-founded, especially for children, pregnant women, and hypersensitive adults.^{xiv} In 1996 the Canadian Government advised Canadian dentists that mercury fillings are contraindicated for children and pregnant women.^{xv} The American Dental Association now anticipates that FDA will put limits on mercury fillings, perhaps even a ban; it so warned its members in July 2007.^{xvi} But that could take years; nothing prevents a Cal-OSHA from taking precautionary steps now.

Who Is Most at Risk?

Answer: **Young female dental workers, their unborn babies, and their future babies.**

- Since 2003, California dentists have been required to place in their worksites this unequivocal Proposition 65 warning: dental mercury is “a reproductive toxin” and “causes birth defects.”^{xvii}
- Studies show that women who work in dental offices – as dentists, hygienists, dental assistants – are more likely to miscarry, and less likely to achieve conception.^{xviii} Studies show dental workers have more reproductive failures^{xix} – a tragedy which should come as no surprise, given the universal knowledge of mercury’s horrid effects.
- Attached is a commentary by former dental assistant Karen Palmer of Bethlehem, PA, who documents the dramatic impact of mercury exposure to her health

That the placing of mercury fillings makes for a toxic worksite is illustrated to what the ADA quietly tells its dentists. Dentists are instructed by the ADA to keep a vaporizer in their office to monitor mercury in the air and to clear everyone out of the office when it reaches a danger level. Dentists are told not to have carpeted floors, which would retain mercury spillage, nor to touch the amalgam before implanting it [!].^{xx} It’s time the precaution given to dentists be known to all dental workers.

Cost to Taxpayers No Longer At Issue

In the past, a shift from mercury fillings to resin could have a financial consequence to taxpayers. No longer. The Horton Law, Welfare and Institutions Code, §14132.22, provides parity in reimbursement rates for mercury-free fillings and mercury-free dentistry. Should the dentist implant a non-mercury filling, such as resin, the state reimburses at the amalgam rate.^{xxi} Since half of all dentists are now mercury-free, this reimbursement law allows a substantial expansion of providers who can provide dental services.

Studies Showing Reduced Fertility and Reproductive Harm to Young Women Who Work in Dental Offices

A study of Norwegian “dental nurses,” who we would call dental hygienists and dental assistants, was presented to the 2006 FDA hearing on the health risks of mercury fillings. www.mercurypolicy.org/new/documents/FDADentalMPPNorwayFinal090706.pdf

Dr. Kennedy’s submission of studies: David Kennedy, D.D.S., of San Diego, past president of the International Academy of Oral Medicine & Toxicology, www.iaomt.org, provided the following bullet-points submission:

- A case-controlled study of dental assistants and females found when the variables of age, frequency of intercourse, alcohol and smoking were adjusted, that there was a 40% decline in fecundability (fertility) for dental assistants. Therefore, if you are looking only for a birth defect you will miss the problem due to infertility and a lower birthrate for the exposed group. See, Rowland AS et. al. “The effect of occupational exposure to mercury vapor on the fertility of female dental assistants”, *Journal of Occupational Environmental Medicine* 51, 28-34 (1994). Abstract: Exposure to mercury vapour or inorganic mercury compounds can

impair fertility in laboratory animals. To study the effects of mercury vapour on fertility in women, eligibility questionnaires were sent to 7000 registered dental assistants in California. The final eligible sample of 418 women, who had become pregnant during the previous four years, were interviewed by telephone. Detailed information was collected on mercury handling practices and the number of menstrual cycles without contraception it had taken them to become pregnant. Dental assistants not working with amalgam served as unexposed controls. Women with high occupational exposure to mercury were less fertile than unexposed controls. The fecundability (probability of conception each menstrual cycle) of women who prepared 30 or more amalgams per week and who had five or more poor mercury hygiene factors was only 63% of that for unexposed women (95% CI 42%-96%) after controlling for covariates. Women with low exposure were more fertile, however, than unexposed controls. Possible explanations for the U shaped dose response and limitations of the exposure measure are discussed. Further investigation is needed that uses biological measures of mercury exposure.

- See also, Gerhard, B. Runnebaum, "Toxic Materials and Infertility: Heavy Metals and Minerals," *Obstetrics and Gynecology* vol 52 p. 383-396 (1992). Dr. Gerhard, who is in charge of the German fertility clinic in Munich, sets out a broad overview article that includes 3 infertility cases with resulting pregnancy after treatment for mercury.
- Dr. B. Gerhard also did a study in which she evaluated body burden and found a very significant relationship between mercury body burden as measured with a DMPS urine challenge test and in 500 cases of long term chronic infertility. Removal of amalgam resulted in 80% of participants experiencing spontaneous conception when amalgams were removed. Gerhard, I., Monga, B., Waldbrenner, A., Runnebaum, B., "Heavy Metals and Fertility" *Journal of Toxicology and Environmental Health, Part, A*, 54:593-611, (1998). Abstract: Heavy metals have been identified as factors affecting human fertility. This study was designed to investigate whether the urinary heavy metal excretion is associated with different factors of infertility. The urinary heavy metal excretion was determined in 501 infertile women after oral administration of the chelating agent 2,3-dimercaptopropane-1-sulfonic acid (DMPS). Furthermore, the influence of trace element and vitamin administration on metal excretion was investigated. Significant correlations were found between different heavy metals and clinical parameters (age, body mass index, nationality) as well as gynecological conditions (uterine fibroids, miscarriages, hormonal disorders). Diagnosis and reduction of an increased heavy metal body load improved the spontaneous conception chances of infertile women. The DMPS test was a useful and complementary diagnostic method. Adequate treatment provides successful alternatives to conventional hormonal therapy.
- Gordon H., Pregnancy in female dentists - A mercury hazard. In proceedings of the International Conference on Mercury Hazards in Dental Practice Glasgow, Scotland, 2-4 Sept 1981, Gordon presented finding a dramatic increase in birth defects related to mercury exposure at this conference.

- Mishonova VN, Stepanova PA, and Zarudin VV. "Characteristics of the course of pregnancy and births in women with occupational contact with small concentrations of elemental mercury vapors in industrial facilities." *Gig Truda Prof Zabol* 24(2):21-23, 1980. Found dysmenorrhea in women occupationally exposed to mercury. This may give us some clue as to how mercury causes infertility.
- Kuntz WD, Pitkin RM, Bostrom AW, Hughes MS, "Maternal and cord blood background mercury levels: a longitudinal surveillance," *Am J Obstet Gynecol* 143(4):440-3 (1982). Twenty-five years ago Kuntz found cord blood to have a significant level of mercury. Summary: Fifty-seven prenatal patients with no known exposure to the element mercury, or any of its compounds, were observed for change in whole blood total mercury concentration from the initial prenatal clinic examination through delivery and postpartum hospitalization. On hospital admission for labor and delivery, whole blood total mercury averaged 1.15 parts per billion (ppb), compared to 0.79 ppb from the first prenatal clinic visit; these levels represent a 46% increase and significant difference in maternal concentration of a substance previously recognized for its peculiar ease at crossing the placental barrier. Previous stillbirths, as well as history of birth defects, exhibited significant positive correlation with background mercury levels. Search of the literature of the last 5 years revealed no other report of cohort heavy metal surveillance throughout pregnancy.
- Kuntz, et al. were roundly criticized for flaws in methodology and the conclusions. Now some 25 years later, the EPA has once again identified mercury in cord blood as being so high that 1 out of 6 births are to mothers with such high mercury levels that their babies are at serious risk of brain damage. The FDA cautions against fish during pregnancy. The EPA cautions against occupational exposure to mercury during pregnancy, and yet Snapp, et al. showed that if you want your blood level of mercury to go down, the only proven way to permanently lower your blood level of mercury 90% is by removal of all your amalgams. (See next abstract, below.)
- Snapp K.R. Svare C.W. and Peterson L.D., "Contribution of Dental Amalgams to Blood Mercury Levels," *J Dent Res* 65:311 (1981); Abstract #1276, Special issue. Summary: Took blood mercury levels several weeks prior to removal. At 57 days after treatment the level had dropped to the pre treatment levels. At 214 the level found in the patients blood was only 10% of the original base line level. Hence "the 57- 214 rule". If a patient expects to become pregnant, then it would be best to have all dental work completed at least 57 days prior to fertilization and for best results, 214 days prior to fertilization. See also, Snapp, KR, Boyer, DB, Peterson, LC, Svare, CW; "The contribution of dental amalgam to mercury in blood", *J Dent Res.*, May; 68(5):780-5 (1989).
- Bernie Windham [P.E., president, Dental Amalgam Mercury Solutions] has an excellent summary here of the effects of mercury from amalgam on fetal body burden. www.home.earthlink.net/~berniew1/fetaln.html Mr. Windham's extensive web site submissions are footnoted below.^{xxii}

Particular Risk at Dental Professional Schools

Mercury fillings are headed to the dustbins of history. No reason exists for current dental students to learn to place them. They must learn to remove them (safely) – not this process must go on for another generation – but not replace them.

Two facts are abundantly clear. One, is that mercury fillings cause dental students to be increasingly mercury toxic. H. Tezel, *et al.*, “Blood mercury levels of dental students and dentists at a dental school, *British Dental Journal*, 191:8 (2001); indeed, that study showing increased mercury levels in dental students covering just one year, not the four years that students must go through.^{xxiii} The other important fact is that the demographics of dental schools, always young, are now increasingly female, at 50% or greater. To put this mercury into women who may well be pregnant in a few years, or are even pregnant now, and expose unborn children to a toxin for the sole purpose of protecting the assembly-line or old-fashioned half of dentistry is an outrage.

Masks or Respirators, and Full Protective Clothing

Amalgam must be removed from the mouths of dental consumers for decades to come. For that reason alone – and in addition should the Board choose to allow dentists to continue to implant mercury fillings and put their workers at risk – protective clothing and protective respirators are essential.

The ADA and the CDA know such protections are needed.

www.cent4dent.com/html/mercury_issues/mercuryADA.html

But the pro-mercury advocates are vigilant in keeping their use of neurotoxic mercury a secret. They continue to protect the use of mercury fillings. **They know that implementing full clothing protection and the use of respirators would shock patients, causing them to inquire why such protective precautions are necessary.** Then ... the secret that “silver fillings” aren’t really silver would have to be revealed to the dental patients of California.

An immediate order is needed for all dental personnel exposed to mercury vapor or mercury particulates to be provided with, and required to wear:

- Small particulate masks or respirators;
- DuPont Tychem fabric covering over all clothes and skin;
- Full hair covering; and
- Nitrile or Silver Shield gloves (not latex).

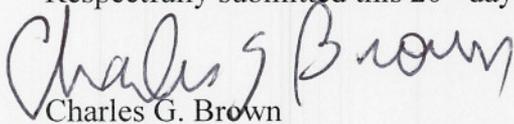
Warnings Posted in Office for Dental Workers

The board should order warnings posted about the hazards of mercury to protect unborn children. Under the federal right-to-know law, employers are required to issue warnings to employees about hazardous exposures. See Lewin G. Joel, *Every Employee’s Guide to the Law, 3d edition*, Penguin Books (2001), at 210-211. It would be simple, and effective, to order the posting of the Proposition 65 warning in *all* dental worksites.

Proposed Vertical Standard

1. No mercury fillings may be implanted in dental patients in California.
2. No mercury fillings may be implanted in dental patients at the dental schools.
3. When removing mercury fillings (or if #1 and #2 not be adopted, when placing them too): Respirators or small particulate masks and full body protective clothing, including covering the hair shall be worn by all dental personnel exposed to mercury vapor or mercury particulate in the work place.
4. Place the first paragraph of the Proposition 65 Warning in every dental workplace.

Respectfully submitted this 20th day of March 2008



Charles G. Brown

National Counsel, Consumers for Dental Choice

ⁱ *As You Sow v. _____* (Super. Ct. S.F. Cty) (2004)

ⁱⁱ "Preventing Human Mercury Exposure," CMA Resolution 115-00 (2000).

ⁱⁱⁱ www.dbc.ca.gov/formspubs/pub_dmfs2004.pdf

^{iv} Surveys were conducted by the respected Clinical Research Associates, home of the largest continual dental education program in the country.

^v Patent # 4,018,600; patent # 4,078,921.

^{vi} <http://www.gentlehealer.co.uk/helpyourselftohealth/id25.html>

^{vii} International Academy of Oral Medicine and Toxicology, www.iaomt.org; American Academy of Biological Dentistry and Medicine, www.iabdm.org; Holistic Dental Association, www.holisticdental.org; Institute of Nutritional Dentistry, www.naturaldentistry.org/

^{viii} www.naacp.org/inc/docs/health/health_resolutions-04.pdf

^{ix} www.mercurypoisoned.com/hearings/carlton_statement.html

^x US Public Health Service, Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Mercury (Update)*, 1999. www.atsdr.cdc.gov/toxprofiles/tp46.html

^{xi} www.inchem.org/documents/cicads/cicads/cicad50.htm

^{xii} Kazantzis, G; Mercury exposure and early effects: an overview, *Med Lav.* 2002 May-Jun;93(3):139-47.

^{xiii} Table AC-1, www.dir.ca.gov/Title8/5155table_ac1.html

^{xiv} www.fda.gov/cdrh/meetings/090606-summary.html

^{xv} www.mercurypoisoned.com/health_canada.html

^{xvi} www.toxicteeth.org/natcamp_fedgovt_ADA_July07.cfm

^{xvii} "PROPOSITION 65 WARNING: Dental Amalgam, used in many dental fillings, causes exposure to mercury, a chemical known to the state of California to cause birth defects or other reproductive harm." The California Medical Association has called for a phase-out of all mercury-based products in health care.

^{xviii} Rowland, et al., The Effect of Occupational Exposure to Mercury Vapor on the Fertility of Female Dental Assistants, *Occupational & Environmental Medicine*, Vol. 51:28-34, 1994; Gordon, "Pregnancy in Female Dentists: A Mercury Hazard?" *International Conference on Mercury Hazards in Dental Practice*, Glasgow 1981. See Fabrizio, et al., "High prevalence of extrapyramidal signs and symptoms in a group of Italian dental technicians." *BMC Neurol.* 2007 [7(1):24]

^{xix} See attached compilation of studies by Bernard Windham, president, Dental Amalgam Mercury Syndrome, Inc.

^{xx} ADA's Mercury Hygiene Guidelines:

www.cent4dent.com/html/mercury_issues/mercuryADA.html

^{xxi} §14132.22. (a) For purposes of this section, dental restorative materials are limited to composite resin, glass ionomer cement, resin ionomer cement, and amalgam, as described on the Dental Board of California's dental materials factsheet. (b) A provider of services that includes the provision of dental restorative materials to a beneficiary under this chapter may recommend, after consultation with the beneficiary, a dental restorative material other than the covered benefit of amalgam. (c) A provider may claim and receive the reimbursement rate for an amalgam restoration when using a different dental restorative material.

^{xxii} Amalgam effects on children

Amalgam is the largest source of both inorganic and methyl mercury in most people with several amalgam fillings (1,2).

The extent to which exposure from amalgam usually far exceeds that from fish means that it is not clear what the primary source of either total mercury or methyl mercury was in the mothers or children (1,2). On average, mercury exposure and excretion in adults with several amalgam fillings is approximately 10 times that for those without amalgams in U.S. or European populations, and significantly higher in methyl mercury body burden as well (1,2). And for those with more than the average number of amalgam fillings, the ratio of mercury exposure for those with several amalgam fillings can often be 100 times that of the average exposure of those without amalgams(2). Also since the population likely had exposure both to methyl mercury and mercury vapor, the fact that mercury vapor is known to produce developmental effects at lower levels of exposure than methyl mercury, yet was not controlled for, significantly confounds the results(6).

Dental amalgam from mother's amalgam fillings has been documented to be a major source of mercury exposure to the fetus and to infants (5,27). Mercury in breast milk is positively correlated with the number of the mother's amalgam fillings. Mercury in breast milk of mothers with more than 7 amalgam fillings in one population studied was more than 10 times the average for those with no amalgam fillings(27). As previously noted, there is no direct way of knowing exactly which mercury in mother's milk came from amalgam or from fish. Mercury has been documented to commonly cause birth defects and neonatal developmental conditions and illnesses (3,4,8,9,14,15).

The saliva and feces of children with amalgams have approximately 10 times the level of mercury as children without[20,21], and much higher levels in saliva after chewing. A group of German children with amalgam fillings had urine mercury level 4 times that of a control group without amalgams[22], and in a Norwegian group with average age 12 there was a significant correlation between urine mercury level and number of amalgam fillings(23). Since mercury vapor is known to rapidly cross cellular membranes and to bioaccumulate over time with chronic exposure, these relationships get stronger with age, with the most serious health effects occurring more commonly in middle-aged individuals.

Other toxic metals including dental metals also are documented to have significant synergistic neurological effects with mercury on children and to commonly have significant exposures in such populations of children (3,4,8,9,12).

(1) Leistevuo J et al, Dental amalgam fillings and the amount of organic mercury in human saliva. Caries Res 2001 May-Jun;35(3):163-6;

(2) Dental Amalgam is the Largest Source of Inorganic and Methyl Mercury in Most People with Several Amalgam Dental Fillings, B. Windham, Review, FS1, www.home.earthlink.net/~berniew1/damspr1.html

<<http://www.home.earthlink.net/~berniew1/damspr1.html>>

Lindberg A, Bjornberg KA, Vahter M, Berglund M, Exposure to methylmercury in non-fish-eating people in Sweden. Environ Res. 2004 Sep;96(1):28-33

(3) Neurological and Behavioral Effects of Toxic Metals on Children, B. Windham, Review, www.flcv.com/tmlbn.html <<http://www.flcv.com/tmlbn.html>>

- (4) Neurological and Developmental Effects of Mercury from Vaccines, B. Windham, Review, www.flcv.com/kidshg.html <<http://www.flcv.com/kidshg.html>>
- (5) Natal and Neonatal Effects of Mercury Exposure, B. Windham, Review, www.home.earthlink.net/~berniew1/fetaln.html <<http://www.home.earthlink.net/~berniew1/fetaln.html>>
- (6) Mercury Vapor Causes Neurological Developmental and Behavioral Effects at Lower Levels than Other Forms of Mercury. B. Windham, Review, DAMS FS13 <<http://www.home.earthlink.net/~berniew1/damspr13.html>> www.home.earthlink.net/~berniew1/damspr13.html <<http://www.home.earthlink.net/~berniew1/damspr13.html>>
- (7) A.S. Holmes, M.F. Blaxill and B.E. Haley, Reduced Levels of Mercury in First Baby Haircuts of Autistic Children; International Journal of Toxicology, 2003; www.safeminds.org/ <<http://www.safeminds.org/>>
- (8) Andrew Hall Cutler, PhD, PE; Amalgam Illness: Diagnosis and Treatment; 1996, www.noamalgam.com/ <<http://www.noamalgam.com/>>
- (9) Autism Treatment Center, Baton Rouge, La, Experience from Treating 300 Mercury Toxic Autism Patients, <http://www.healing-arts.org/children/holmes.htm#wethink>
- (10) Mercury concentrations in urine, scalp hair, and saliva in children from Germany. Pesch A, Wilhelm M et al, J Expo Anal Environ Epidemiol. 2002 Jul;12(4):252-8.
- (12) Metal Metabolism and Autism: Disablement of Metallothionein Proteins <http://www.healing-arts.org/children/metal-metabolism.htm>
- (13) NHanesIII Condition Graphs <http://www.vimy-dentistry.com/nhanesgraphs.htm>
NHANES III Screening – 35,000 Americans www.mercola.com/article/mercury/no_mercury.htm <http://www.mercola.com/article/mercury/no_mercury.htm>
- (14) Walsh, WJ, Health Research Institute, Autism and Metal Metabolism, www.hriptc.org/autism.htm, Oct 20, 2000; & Walsh WJ, Pfeiffer Treatment Center, Metal-Metabolism and Human Functioning, 2000, http://www.hriptc.org/metal_metabolism.html & Metal-Metabolism and Autism: Defective Functioning of Metallothionein Protein, Amy Holmes, MD; <http://www.healing-arts.org/children/metal-metabolism.htm>
- (15) Mechanisms by which mercury has been documented to cause epilepsy and seizures, B. Windham, Review, <http://www.home.earthlink.net/~berniew1/epilepsy.html>
20. Engin-Deniz B. Die Quecksilberkonzentration im Speichel zehnjähriger Kinder in Korrelation zur Anzahl und Größe ihrer Amalgamfüllungen” Zeitschrift für Stomatologie, 1992, 89:471-179.
21. Malmstrom C. Amalgam derived mercury in feces”, Journal of Trace Elements in Experimental Medicine 1992; 5 (Abs 122).
22. Schulte A, Stoll R, Wittich M, Pieper K, Stachniss V. Mercury Concentrations in Children with and without Amalgam Restorations. Schweiz Monatsschr Zahnmed, 1994,104(11):1336-40(German). & J.Dent Res 73(4): 980 A-334; & Childhood urine mercury excretion: dental amalgam and fish consumption as exposure factors. M. Levy et al, Arch Environ Health. 1994 Sep-Oct; 49(5): 384-94
23. Olmsted ML, Holland RI, Wandel N, Petterson AH. Correlation between amalgam restorations and mercury in urine. J Dent Res 1987, 66(6): 1179-1182
24. Drasch G, Roeder G. Zahnamalgam und Schwangerschaft. Geburtshilfe Frauenheilkd 1995; 55(6): M63-M65
- (27) Mercury in human colostrum and early breast milk. Its dependence on dental amalgam and other factors. Drasch G, Aigner S, Roeder G, Staiger F, Lipowsky G. J Trace Elem Med Biol. 1998 Mar; 12(1):23-7.

Studies have found much higher levels of mercury and copper in infants whose mother's were treated with amalgam during pregnancy[37], as well as children with congenital hearing deficiencies[63]. Most researchers in this field advise that fertile women should not be exposed to vapor levels above government health guidelines or have amalgams placed or removed during pregnancy [10-12,15,16,24,27,39,40,65,74,103,144,145]; the U.S. ATSDR mercury health MRL is 0.2 ug/M3 [32]. Many governments of developed countries have bans or guidelines restricting use of amalgam by women of child-bearing age. These include Canada, Sweden, Germany, Norway, Austria, Great Britain, France, Australia, New Zealand, and Japan.

^{xxiii} www.nature.com/bdj/journal/v191/n8/full/4801205a.html