

23 May 2001

The Honorable Dan Burton

Chairman

Committee on Government Reform

U.S. House of Representatives

Washington, D.C.

RE: May 11th letter by Robert M. Anderton, D.D.S., J.D., LL.M. and President of the ADA, challenging my statement to the Committee on Government Reform looking at the topic, Autism-Why the Increased Rates? A One Year Update.

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 *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.

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-fibrillary 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 aberrancies 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 (H₂S) and methane-thiol (CH₃SH) as major toxic products of infective anaerobic bacteria in the mouth metabolizing the amino acids cysteine and methionine, respectively. These volatile thiol-compounds are what cause bad-breath! Methane-thiol (CH₃SH) 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 cm^2/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 Zn^{2+} 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 considered 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 through 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, metallothionein) 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

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

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

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 neurotoxicological 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,

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