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December 8, 2005

Rep. Charles W. Norwood
2452 Rayburn Building
Washington, DC 20515

Dear Rep. Norwood:

This law firm represents the International Academy of Oral Medicine & Toxicology ("IAOMT"), an organization of dentists, physicians, and research professionals devoted to the examination, compilation, and dissemination of scientific research relating to the biocompatibility of oral/dental materials. The IAOMT was disappointed in your electronic submission to your congressional colleagues entitled "Don't Buy the Dental Scare Tactics." Your comments propagate the same myths so earnestly defended by the American Dental Association that are so detrimental to the public health.

The IAOMT is not attacking science and health care, as you claim– the organization supports science and health care. However, we do not support the use of a dental restorative material that represents the primary source of mercury exposure for the general population and a predominant source of mercury in our environment.

Mercury is a very toxic substance-- more toxic than lead, cadmium, or arsenic.[1] The mercury is not locked into the amalgam matrix, but is continuously released as a vapor and inhaled into the lungs of the dental patient. On average, eighty percent of

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[1]Sharma, RP; Obersteiner, EJ. *Metals and Neurotoxic Effects: Cytotoxicity of Selected Metallic Compounds on Chick Ganglia Cultures*. J Comp Pathol, 91(2):235-44 (1981).

the mercury inhaled into the lungs is absorbed into the bloodstream.[2] Elemental mercury is continuously emitted from dental amalgam fillings and absorbed by the patients in whom the fillings are implanted. Studies demonstrate that two-thirds of the mercury absorbed by non-occupationally exposed populations is derived from amalgam fillings.[3] Other studies have confirmed a correlation between the number of fillings and the mercury found in cadaver brains.[4] Your claim that people are exposed to more mercury by eating seafood is just a myth that is contradicted by the scientific literature. We are not surprised that you offered no scientific support for your position.

Your statements about the Jerome Mercury Analyzer are misguided. Contrary to your claims, the Jerome Analyzer does not measure *average* amounts of mercury vapor in a room; it measures the mercury in the air sample that is analyzed. Moreover, there are no data demonstrating that analysis of mercury in intra-oral air will result in artificially high measurements. Indeed, the Jerome Analyzer's manufacturer, Arizona Instruments Corporation, distributes a written protocol with its Jerome Analyzer describing a standardized technique for use in evaluating intra-oral mercury vapor levels from amalgam fillings.

The mercury absorbed by those in whom dental amalgam has been implanted is well-studied and documented. The published literature contains at least seventeen separate studies that have assessed the quantity of mercury absorbed by persons with mercury fillings.[5]

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[2]Kudsk, F.N., *Absorption of Mercury Vapour from the Respiratory Tract in Man*, Acta Pharmacol. et Toxicol. 23:250-262 (1965).

[3]Aposhian, H.V., et al., *Urinary mercury after administration of 2,3-dimercaptopropaane-1-sufonic acid: correlation with dental amalgam score,* FASEB J, vol. 6 (April 1992), pp. 2472-2476. *See also*, Sandborgh-Englund, et al., *Mercury in Biological Fluids After Amalgam Removal*, J Dent Res, 77(4): 615-24 (Apr. 1998); World Health Organization, *Environmental Health Criteria 118: Inorganic Mercury* (1991) p. 36; Clarkson, T.W.; et al., *Biological Monitoring of Toxic Metals: The Prediction of Intake of Mercury Vapor From Amalgams* (1988) p. 256. ("The release of mercury from dental amalgams makes the predominant contribution to human exposure to inorganic mercury including mercury vapor in the general population."); Lorscheider, FL; et al. *"Mercury Exposure from Silver Tooth Fillings: Emerging Evidence Questions a Traditional Dental Paradigm."* FASEB J., 9:504-8 (1995). ("[D]ental amalgam tooth fillings are the major source of Hg exposure for the general population.")

[4]Eggleston, et al., *Correlation of dental amalgam with mercury in brain tissue,* J Prosth Dent, 58(6), 1987.

[5]These studies were recently summarized in the following paper: Richardson, G.M., *Inhalation of Mercury-Contaminated Particulate Matter by Dentists: An Overlooked*

While the precise quantity of mercury absorbed varies from study to study, the authors of all seventeen studies agree that dental amalgam fillings are a source of mercury exposure. It does not appear to us that the public is well-served by your efforts to suppress the fact that amalgam fillings represent the predominant source of mercury exposure in the general population.

In 1995, an important review article summarized some of the scientific documentation concerning dental amalgam was published in the highly prestigious scientific publication, the FASEB Journal.[6] The authors detailed the scientific data and conclusions from scores of peer-reviewed articles documenting the deleterious effects of mercury vapor on the immune, renal, reproductive, and central nervous systems. The authors noted that "[r]esearch evidence does not support the notion of amalgam safety." In their conclusion, the authors admonished that:

> The collective results of numerous research investigations over the past decade clearly demonstrate that the continuous release of Hg° from dental amalgam tooth fillings provides the major contribution to Hg body burden. The experimental evidence indicates that amalgam Hg has the potential to induce cell or organ pathophysiology. At the very least, the traditional dental paradigm, that amalgam is a chemically stable tooth restorative material and that the release of Hg from this material is insignificant, is without foundation. One dental authority states that materials are presently available that are suitable alternatives to Hg fillings.
> * * * *
> It would seem that now is the time for dentistry to use composite (polymeric and ceramic) alternatives and discard the metal alchemy bestowed on its profession from a less enlightened era. Although human experimental evidence is incomplete at the present time, the recent medical research findings presented herein strongly contradict the unsubstantiated opinions pronounced by various dental associations and related trade organizations, who offer assurances of amalgam safety to dental personnel and their patients without providing hard scientific data, including animal, cellular and molecular evidence, to support their claims.

Occupational Risk, Human and Ecological Risk Assessment, 9:1519-1531 (2003).

[6]Lorscheider, FL; et al. *"Mercury Exposure from Silver Tooth Fillings: Emerging Evidence Questions a Traditional Dental Paradigm."* FASEB J., 9:504-8 (1995).

A number of studies demonstrating neurobehavioral deficits in dental personal have been published.[7] Standard medical textbooks also recognize this phenomenon.[8] Dentists with occupational exposure to mercury score below normal on neurobehavioral tests of motor speed, visual scanning, verbal and visual memory, and visuomotor coordination.

Mercury is of even greater concern where the patient is a child or a woman of child-bearing age. "The developing fetus and young children are thought to be disproportionately affected by mercury exposure, because many aspects of development, particularly brain maturation, can be disturbed by the presence of mercury. Minimizing mercury exposure is, therefore, essential to optimal child health."[9] Mercury in all of its forms is toxic to the fetus and children, and efforts should be made to reduce exposure to the extent possible to pregnant women and children as well as the general population.[10]

About eight percent of U.S. women of child-bearing age have enough mercury in their blood for their children to be at risk. The National Academy of Sciences estimates that 60,000 newborns a year could be at risk of learning disabilities because of mercury their mothers absorbed during pregnancy. Significantly, mercury in the tissues of fetuses and infants (11-50 weeks of life) correlates significantly with the number of dental amalgam fillings of the mother.[11] "From the nephrotoxicity point of view, dental amalgam is an unsuitable filling material, as it may give rise to mercury toxicity. In these

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[7]Ngim, CH; et al., *Chronic Neurobehavioral Effects of Elemental Mercury in Dentists*, Brit J Indust Med, 49:782-90, 1992. Gonzalez-Ramirez, D; et al. *Sodium 2,3-Dimercaptopropane-1-Sulfonate Challenge Test for Mercury in Humans: II. Urinary Mercury, Porphyrins and Neurobehavioral Changes of Dental Workers in Monterrey, Mexico.* J Pharmocol Exper Therap, 272(1):264-74 (1995); Echeverria, D; et al., *Behavioral Effects of Low-Level Exposure to Hg ° Among Dentists.* Neurotoxicol Teratol, 17(2):161-8 (1995); Shapiro, I.M., et al., *Neurophysiological and neuropsychological function in mercury-exposed dentists.* The Lancet 1, 1147-1150 (1982); Uzzell, B.P., et al., *Chronic low-level mercury exposure and neuropsychological functioning.* J of Clin and Exper Neuropsych. 8, 581-593.

[8]*See* Harrison's Principles of Internal Medicine (14th Edition) at 2567.

[9]Goldman LR, Shannon MW, *Technical Report: Mercury in the Environment: Implications for Pediatricians.* American Academy of Pediatrics: Committee on Environmental Health. Pediatrics (2001) Jul;108(1):197-205.

[10]*Id.*

[11]Drasch et. al., "*Mercury Burden of Human Fetal and Infant Tissues,*" European Journal of Pediatrics (August 1994).

exposure conditions, renal damage is possible and may be assessed by urinary excretions of albumin, NAG, and gamma-GT."[12]

Scientific studies have demonstrated associations between mercury and neurological disease. These studies justify avoiding unnecessary mercury exposure. For example, one epidemiologic study correlates body mercury levels with increased risk of idiopathic Parkinson's disease.[13] Animal studies demonstrate exposure to mercury vapor and autoimmunity.[14] One such study showed that dental silver amalgam and silver alloy implanted in the physiological milieu of the peritoneal cavity released enough metals to adversely effect the immune system.[15]

Contrary to the statements of the Alzheimer's Association (which are completely unsupported by scientific reference), mercury has been linked to Alzheimer's disease ("AD").[16] Professor Boyd Haley, Chairman of the Department of Chemistry at the

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[12]Mortada WL, Sobh MA, El-Defrawy MM, Farahat SE. Urology and Nephrology Center, Mansoura University, Faculty of Science, Egypt. J Nephrol 2002 Mar-Apr;15(2):171-6.

[13] Ngim, C., *Epidemiologic Study on the Association between Body Burden Mercury Level and Idiopathic Parkinson's Disease*, Neuroepidemiology, 8:128-141 (1989).

[14]Warfvinge, et al., *Systemic Autoimmunity Due to Mercury Vapor Exposure in Genetically Susceptible Mice: Dose-Response Studies*, Toxicol Appl Pharmacol, 132:299-309 (1995).

[15]Hultman, P; et al., *Adverse Immunological Effects and Autoimmunity Induced by Dental Amalgam and Alloy in Mice*, FASEB J, 8:1183-90 (1994).

[16]Ehmann, et al., *Brain Trace Elements in Alzheimer's Disease*, Neurotoxicology, 7(1):195-206 (Spring 1986); Thompson, et al., *Regional Brain Trace-element Studies in Alzheimer's Disease*, Neurotoxicology, 9(1):107 (Spring 1988); Vance, *Trace Element Imbalances in Hair and Nails of Alzheimer's Disease Patients*, Neurotoxicology, 9(2):197-208 (Summer 1988); Wenstrup, et al., *Trace Element Imbalances in Isolated Subcellular Fractions of Alzheimer's Disease Brains*, Brain Res, 12;533(1): 125-31 (Nov. 1990); Cornett, et al., *Imbalances of Trace Elements Related to Oxidative Damage in Alzheimer's Disease Brain*, Neurotoxicology, 19(3):339-45 (June 1998); Mutter, *Alzheimer Disease: Mercury as a Pathogenetic Factor and Apolipoprotein E as a Moderator*, Neuroendocrinol Lett. 2004; 25(5):275-283. ("Inorganic mercury [found in dental amalgam] may play a major role [in the pathogenesis of Alzheimer's Disease."]) Pendergrass, J. C., et al., *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); Pendergrass, J.C., *Inhibition of Brain Tubulin-Guanosine 5'-Triphosphate Interactions by Mercury: Similarity to*

University of Kentucky, concludes that "mercury and other blood-brain permeable toxicants that have enhanced specificity for thiol-sensitive enzymes are the etiological source of AD. Included in this category are other heavy metals such as lead and cadmium that act synergistically to enhance the toxicity of mercury and organic-mercury compounds."[17]

Material safety data sheets distributed by Kerr Corporation (by far our nation's largest manufacturer of mercury fillings) and other amalgam manufacturers reflect, *inter alia*, that mercury is a skin sensitizer, a pulmonary sensitizer, a nephrotoxin, and a neurotoxin. Kerr does not qualify its warnings by informing the user (i.e. dentists) that such toxic properties are ameliorated by mixing mercury with the other amalgam constituents. Indeed, despite conceding that its warnings address only the dangers of mercury and not mixed dental amalgam, Kerr successfully argued that its warnings were legally adequate to notify a dentist of the dangers associated with mercury ***and*** mixed dental amalgam. This argument convinced the Sixth Circuit Court of Appeals to dismiss a lawsuit brought by a dentist who alleged personal injuries caused by Kerr's failure to warn of the dangers associated with mixed dental amalgam. Kerr's stated position is that its warnings are equally pertinent to mixed dental amalgam. Under the circumstances, a dentist is compelled by law to notify his/her patients of these warnings.

Mercury from dental fillings also represents an environmental catastrophe. In 2001, the Association of Metropolitan Sewerage Agencies (AMSA) evaluated seven major municipal wastewater treatment plants to determine and quantify sources of mercury coming into these facilities. At all plants, dental uses were identified as "by far" the greatest contributors to the mercury load, accounting on average for 40% of the load. Dental mercury was more than three times greater than the next largest source of mercury in the wastewater.[18] Most municipal wastewater treatment systems are not designed to

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Observations in Alzheimer's Diseased Brain, Metal Ions in Biological Systems V34, Mercury and Its Effects on Environment and Biology, Chapter 16. Edited by H. Sigel and A. Sigel (1996); Duhr, E.F., et al., *HgEDTA Complex Inhibits GTP Interactions With The E-Site of Brain b-Tubulin*, Toxicology and Applied Pharmacology 122, 273-288 (1993); Leong, CCW, et al., *Retrograde Degeneration of Neurite Membrane Structural Integrity of Nerve Growth Cones Following In Vitro Exposure to Mercury*, Neuroreport, vol.12, pps. 733-737 (2001).

[17]Haley, B., *The Relationship of the Toxic Effects of Mercury to Exacerbation of the Medical Condition Classified as Alzheimer's Disease*, The Nordic Journal of Biological Medicine (June-July 2003).

[18]Association of Metropolitan Sewerage Agencies(AMSA)/U.S. EPA, *Mercury Source Control Program Evaluation* (www.amsa-cleanwater.org/ advocacy/ mercgrant/ finalreport.pdf), Larry Walker Associates, Final Report (March 2002).

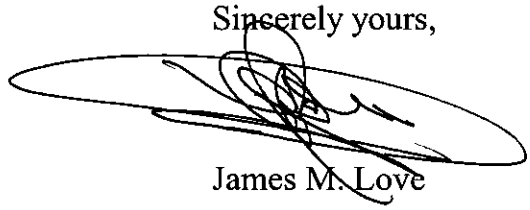
treat hazardous waste or reduce mercury releases to the environment. Consequently, mercury that enters most sewage systems will be discharged to the environment either through the sludge or wastewater. Amalgam has also been determined to be the primary source of mercury in human waste. Human wastes are the second greatest contributor of dental mercury to wastewater treatment plants.[19]

Dr. Maths Berlin, professor emeritus who chaired the WHO Task Group for inorganic mercury, was recently commissioned by Sweden's "Dental Material Commission" to review and assess the past five years' research literature on amalgam and potential health hazards. In his report, Dr. Berlin concluded that "[t]he lowest exposure, in terms of urinary mercury secretion, that has been found to give rise to a demonstrable toxic effect has fallen from 30-50 g/l to 10-25 g/l. Accordingly, the safety margin that it was thought existed with respect to mercury exposure from amalgam has been erased." Dr. Berlin further concludes that "[w]ith reference to the fact that mercury is a multipotent gift with effects on several levels of the biochemical dynamics of the cell, amalgam must be considered to be an unsuitable material for dental restoration. This is especially true since fully adequate and less toxic alternatives are available."

Contrary to your bare allegations, "science" has not demonstrated that dental amalgam is safe and effective. This is but another myth circulated by the ADA that is not supported by valid and reliable scientific data.

Alternative dental restorative materials are available that are clinically safe and effective. Now is the time to discontinue amalgam use and end the public's needless exposure to mercury. We encourage your colleagues in Congress to protect the public's health by supporting the "Mercury in Dental Fillings Disclosure and Prohibition Act."

Sincerely yours,



James M. Love

cc: Dr. Terrance Messerman, President
International Academy of Oral
Medicine & Toxicology

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[19] *Id.*