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Taking a Bite out of the Harmful Effects of Mercury in Dental Fillings: Advocating for National Legislation for Mercury Amalgams

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TAKING A BITE OUT OF THE HARMFUL EFFECTS OF MERCURY IN DENTAL FILLINGS: ADVOCATING FOR NATIONAL LEGISLATION FOR MERCURY AMALGAMS

“Having an amalgam filling placed in a tooth is like having a time bomb in your mouth waiting to go off.”¹

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I. INTRODUCTION

Mary Stephenson, a fifty-nine-year-old grandmother, visited dozens of counselors and experimented with an array of antidepressants but nothing worked to curb her suicidal feelings.² Janie McDowell, a fifty-six-year-old housewife, suffered from hand tremors, leg-muscle spasms, recurring nausea, chronic bladder and kidney infections, severe depression, short-term memory loss, and slurred speech.³ Freya Koss, a former event planner, experienced dizziness and double vision. Physicians misdiagnosed Koss with lupus, multiple sclerosis, and, finally, myasthenia gravis.⁴ The common theme among these medical tragedies is that the above victims all

¹AOL Hometown, <http://www.members.aol.com/lynrennick2000/> (last visited Sept. 9, 2006).

²Sinead McIntyre, *Having All My 19 Fillings Removed Changed My Life*, DAILY MAIL (London), Nov. 22, 2004, at 17.

³Amy Brouillette, *Mercury Rising*, BOULDER WEEKLY, Feb. 2, 2005, <http://www.boulderweekly.com/archive/020305/hygeia.html>. Janie McDowell also suffered from balancing problems, chronic fatigue, loss of appetite, incontinence, severe constipation, confusion, and mood swings. *Id.*

⁴Judith Trustone, *Looking for the Silver Lining*, MAINLINE TODAY MAGAZINE, Oct. 2002, <http://www.toxicteeth.org/forms/mainLineToday.pdf>. Myasthenia gravis is an autoimmune disorder characterized by extreme weakness in the voluntary muscles. Medline Plus, <http://www.nlm.nih.gov/medlineplus/ency/article/000712.htm> (last visited Sept. 9, 2006). Freya Koss is currently active in the Pennsylvania Coalition for Mercury-Free Dentistry. Doran Taussig, *Two Minutes with...Freya Koss*, CITY PAPER (Philadelphia, Pa.), Oct. 13-19, 2005, <http://www.citypaper.net/articles/2005-10-13/cb4.shtml>.

returned to being healthy, active adults after the removal of their mercury amalgam dental fillings.⁵

Amalgam is the name dentists give the silver filling material used to reconstruct damaged teeth.⁶ Approximately nineteen out of every twenty Americans suffer from dental cavities, and more than 200 million people have at least one cavity in their mouth filled with dental amalgam.⁷ The amalgam composite contains a mixture of mercury, powdered silver, tin, and copper.⁸ Mercury, a highly toxic substance, has been linked to neurological problems, gastrointestinal problems, Alzheimer's disease, brain damage in children, cardiac dysfunction, impaired kidney functioning, and a host of other ailments.⁹ Experts vehemently disagree on whether the mercury found in dental amalgam is in a large enough quantity to be harmful to humans; however, the evidence against using mercury in dental fillings continues to grow.¹⁰ The use of mercury amalgam dental fillings is dangerous, and there needs to be national legislation to prohibit its use.

This paper begins with a historical look at the use of mercury in dental fillings. Part III discusses the forms of mercury, while Part IV discusses the composition of mercury amalgams. Part V focuses on the mercury amalgam controversy and highlights the major arguments made by pro-amalgam and anti-amalgam activists. Parts VI and VII, respectively, explain why litigation and removal of fillings are insufficient remedies for the mercury amalgam problem. Part VIII addresses the environmental impact of mercury amalgams. Part IX examines legislation enacted in other countries that prohibit, limit, or discourage the use of mercury amalgams. Part X addresses the inadequacies of state-level legislation as a solution. Part XI proposes national legislation as the best solution to the mercury amalgam problem. Additionally, the final part recommends changes to the currently proposed national legislation.

⁵See McIntyre, *supra* note 2; Brouillette, *supra* note 3; Trustone, *supra* note 4.

⁶Joseph Mercola Do & Dietrich Klinghardt, *Mercury Toxicity and Systematic Elimination Agents*, 11 J. NUTRITIONAL & ENVTL. MED. 53 (2001).

⁷Gary Null & Martin Feldman, *Mercury Dental Amalgams: Analyzing the Debate – Part I* (Sept. 2002), <http://www.garynull.com/Documents/Dental/Amalgam/MercuryDental0902Pt1.htm>.

⁸Do & Klinghardt, *supra* note 6. Dental amalgams are approximately forty-five to fifty-two percent mercury, thirty-five percent silver and varying portions of copper, zinc, and tin. *Consumer Cause, Inc. v. Smilecare*, 110 Cal. Rptr. 2d 627, 630 (Cal Ct. App. 2001). Sometimes palladium or indium are also present in the mercury amalgam compound. *Dental Devices: Classification of Encapsulated Amalgam Alloy and Dental Mercury and Reclassification of Dental Mercury; Issuance of Special Controls for Amalgam Alloy*, 67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872) at 4.

⁹Dental Amalgam Mercury Syndrome Inc., *The Dental Amalgam Issue*, MERCURY FREE AND HEALTHY, Aug. 2005, <http://www.amalgam.org/#anchor71305> [hereinafter *Dental Amalgam*]. See *infra* note 107 and accompanying text for a discussion of other ailments that have been linked to mercury amalgams.

¹⁰Mary Ann Chirba-Martin & Carolyn M. Welshhans, *An Uncertain Risk and an Uncertain Future: Assessing the Legal Implications of Mercury Amalgam Fillings*, 14 HEALTH MATRIX 293 (2004).

II. HISTORICAL OVERVIEW

The use of mercury as dental filling material is a practice with a long history throughout the world.¹¹ The Chinese used a mercury-containing “silver paste” as early as the seventh century to repair decaying teeth.¹² Mercury intrigued the alchemists of China because it is the only metal that is a liquid at room temperature.¹³ Furthermore, the ancient Chinese also knew that shavings of other metals such as copper, tin, and silver dissolved in liquid mercury.¹⁴ By the early 1800s, the popularity of “silver paste” for dental fillings had spread to England and France,¹⁵ eventually arriving in North America in the 1830s.¹⁶

Joseph Bell, a British chemist, created the modern amalgam filling by combining melted coins and mercury.¹⁷ The problem with this compound was that the impurities in the metal used for coins caused the amalgams to expand, which often caused the teeth to fracture.¹⁸ Over time, improvements were made in the mercury amalgam compound, which led to a durable dental filling material.¹⁹ Although the expansion problem was solved, many dentists continued to express concerns about the use of mercury in amalgams.²⁰ As early as the 1930s, it was already a well-known and accepted fact that mercury exposure, even in small amounts, could result in mercurial poisoning.²¹

In 1845, the American Society of Dental Surgeons (ASDS) advocated strongly against the use of mercury amalgams and required its members to sign a pledge to stop using mercury amalgams in their practices.²² Over the next decade, several members of the ASDS were suspended for malpractice when they placed amalgam

¹¹*Dental Amalgam*, *supra* note 9.

¹²*Id.*

¹³International Academy of Oral Medicine and Toxicology, *The Scientific Case Against Amalgam*, <http://www.iaomt.org/documents/The%20Scientific%20Case%20Against%20Amalgam.pdf> (last visited Sept. 9, 2006) [hereinafter *Scientific Case*].

¹⁴*Id.*

¹⁵*Dental Amalgam*, *supra* note 9.

¹⁶*Scientific Case*, *supra* note 13. The English Crowcour brothers used the silver filling in their New York City dental practice which opened in 1833. The brothers heralded the praises of the so-called “silver fillings” because they were a cheap alternative to gold fillings. *Id.*

¹⁷*Consumer Cause, Inc. v. Smilecare*, 110 Cal. Rptr. 2d 627, 630 (Cal Ct. App. 2001). Bell created the modern amalgam filling in 1812. *Id.*

¹⁸Mark Wheeler, *The Issue of Amalgams*, 3 ENVTL. HEALTH PERSP. 106 (1998).

¹⁹*Dental Amalgam*, *supra* note 9. Tin was the ingredient added to the amalgam mixture, which helped control the expansion problem. *Id.*

²⁰Chirba-Martin & Welshhans, *supra* note 10.

²¹*Dental Amalgam*, *supra* note 9.

²²*Smilecare*, 110 Cal. Rptr. 2d at 630.

fillings in patients in violation of their ASDS pledge.²³ Eventually, membership in the ASDS declined, and it dissolved in 1856.²⁴ The American Dental Association (ADA), founded in 1859, arose to take the place of the ASDS.²⁵ However, the ADA's position on mercury amalgams was in direct opposition to that of the former ASDS. The ADA strongly advocated for the use of amalgam as a safe tooth-filling material.²⁶ The public was receptive to the use of amalgam fillings because their only alternatives at the time were painful extractions without anesthesia or expensive hot gold fillings.²⁷ The support from the ADA, coupled with the low cost of the mercury amalgam fillings, effectively overshadowed the warnings from mercury amalgam opponents.²⁸ Concerns about the safety of amalgam fillings briefly resurfaced in Germany in the 1920s²⁹ but, subsequently, diminished without a clear resolution.³⁰ The debate over the safety of mercury amalgams continues today, and advances in scientific tests have helped bolster the case against amalgams.³¹

III. FORMS OF MERCURY

Mercury is found in three forms: metallic or elemental, inorganic, and organic.³² Metallic or elemental mercury is a liquid at room temperature and is silver-white in color.³³ It is the purest form of mercury and is used in fluorescent light bulbs, batteries, dental fillings, thermometers, and some light switches.³⁴ At room

²³*Dental Amalgam*, *supra* note 9. Accord F.L. Lorscheider, M.J. Vimy, & A.O. Summers, *Mercury Exposure from Silver Tooth Fillings: Emerging Evidence Questions a Traditional Dental Paradigm*, 9 FED'N OF AM. SOC'Y EXPERIMENTAL BIOLOGY J. 504 (1995).

²⁴*Dental Amalgam*, *supra* note 9.

²⁵*Id.*

²⁶*Id.*

²⁷Mercury Free, The History of the "Silver" Mercury Amalgam Filling, http://www.mercury-free.com/learn_more.html (last visited Sept. 9, 2006).

²⁸*Dental Amalgam*, *supra* note 9. Even recently, the American Dental Association tried to "gag" dentists who opposed the Association's views. *Breiner v. St. Dental Commission*, 750 A.2d 1111 (Conn. 2000). See also Eric Weinstock, *Defamation, Dentists, and Dentistry*, 2 DEPAUL J. HEALTH CARE L. 325 (1998); Avi Salzman, *Dentist Wins Round on Mercury Warnings*, N.Y. TIMES, July 24, 2005, at 4.

²⁹Alfred Stock (Birget Calhoun trans.), *The Dangerousness of Mercury Vapor*, 29 ZEITSCHRIFT FUER ANGEWANDTE CHEMIE 461-466 (1926).

³⁰*Dental Amalgam*, *supra* note 9.

³¹*Scientific Case*, *supra* note 13. Tests like mass spectrophotometry and the Jerome Mercury Vapor Detector have been able to identify mercury in humans with more accuracy than in the past. *Id.*

³²United States Environmental Protection Agency, *Frequent Questions About Mercury*, <http://www.epa.gov/mercury/faq.htm> (last visited Sept. 9, 2006) [hereinafter EPA FAQ].

³³HAL. A. HUGGINS & THOMAS E. LEVY, *UNINFORMED CONSENT: THE HIDDEN DANGERS IN DENTAL CARE* 171 (Hampton Roads Publishing 1999); see also EPA FAQ, *supra* note 32.

³⁴HUGGINS & LEVY, *supra* note 33.

temperature, exposed metallic mercury can evaporate.³⁵ This invisible, odorless vapor is harmful to humans.³⁶

Inorganic mercury is mercury combined with other elements.³⁷ Inorganic mercury usually forms white powder or crystals (with the exception of cinnabar, which is a red powder).³⁸ The third form of mercury, organic mercury, is formed when mercury combines with carbon.³⁹ The most common organic mercury compound is methylmercury, which is produced when microscopic organisms convert inorganic mercury into methylmercury.⁴⁰ Methylmercury is often found in soil or water, and the primary way humans are exposed to this type of mercury is through consumption of fish that contain methylmercury.⁴¹

All three forms of mercury (metallic, inorganic, and organic) are found in the body.⁴² Mercury in vapor form is usually attributed to mercury amalgam fillings.⁴³ When the vapor escapes from the fillings, it enters the bloodstream via absorption through the lungs and intestinal tract.⁴⁴ Mercury vapor primarily targets the brain and central nervous system.⁴⁵ Chewing, drinking hot foods, and tooth brushing all exacerbate the release of mercury from dental fillings.⁴⁶

The second type of mercury found in the body is mercury in the ionic form containing two positive charges. Ionic mercury does not move around or through tissue like other forms of mercury, but ionic mercury is, arguably, the most destructive form. It usually damages the kidneys and gastrointestinal tract.⁴⁷

The final form of mercury found in the body is methylmercury.⁴⁸ Methylmercury is the organic form of mercury.⁴⁹ It is formed when mercury vapor and ionic mercury come into contact with bacteria in the mouth, stomach and intestinal tract, or in the bloodstream.⁵⁰ This process of conversion is known as methylation.⁵¹

³⁵*Id.*

³⁶*Id.*

³⁷*Id.*

³⁸*Id.*

³⁹*Id.*

⁴⁰*Id.*

⁴¹*Id.*

⁴²*Id.*

⁴³*Id.* at 171.

⁴⁴*Id.*

⁴⁵*Id.*

⁴⁶C.O. Enwonwu, *Potential Health Hazard of Use in Mercury in Dentistry: Critical Review of the Literature*, 42 ENVTL. RES. 257, 258 (1987).

⁴⁷HUGGINS & LEVY, *supra* note 33.

⁴⁸*Id.* at 171-188.

⁴⁹*Id.*

⁵⁰*Id.*

Methylmercury is able to cross any cell membrane or barrier in the body.⁵² This includes being able to cross the placenta and the blood-brain barrier.⁵³ Once methylmercury reaches its destination, it is converted back into ionic mercury.⁵⁴ Degeneration and atrophy of the sensory cerebral cortex, paresthesia (numbness and tingling), hearing and visual impairment are all attributed to poisoning by methylmercury.⁵⁵

For thousands of years, mercury has aided advances in medicine, chemistry, dentistry, and money.⁵⁶ In 2001, amalgam sales through dental dealers totaled 39 million dollars,⁵⁷ but, today, mercury is banned or in the process of elimination in almost every aspect of society because modern scientists acknowledge mercury's dangers.⁵⁸ For example, mercury use is being reduced in hospitals⁵⁹ and schools nationwide.⁶⁰ Additionally, mercury-containing compounds are no longer

⁵¹*Id.*

⁵²*Id.*

⁵³*Id.*

⁵⁴*Id.*

⁵⁵*Id.*

⁵⁶ERNIE MEZEI, TOOTH TRAITORS, n.d., available at http://www.talkinternational.com/PDF/tooth_traitors.pdf (last visited Sept. 9, 2006).

⁵⁷*Heavy Metal*, DAILY J. EXTRA (Cal.), Sept. 9, 2002, at 12.

⁵⁸MEZEI, *supra* note 56. Although this paper is primarily about the toxic effects of mercury from dental amalgams, there are other sources of exposure to mercury. The most common forms of exposure are food (tuna, shellfish, other large saltwater fish, carrots, lettuce, grains treated with methylmercury fungicides, kelp and other seaweeds); cosmetics (hair dye, mascara, skin lightening creams); medications and personal items (hemorrhoid creme, toilet paper made from recycled paper, calomel, mercurochrome, merthiolate, laxatives containing calomel, psoriasis ointments, Calamine lotion, contact lens solutions, vaginal gels); industrial (bactericide makers, barometer makers, battery makers, bronzers, calibration instrument makers, cap loaders, carbon brush makers, chlorine makers, dentists, direct current meter workers, disinfectant makers, disinfectors, drug makers, electric apparatus makers, electroplaters, embalmers, explosive makers, farmers, fingerprint detectors, fireworks makers, fish cannery workers, fungicide makers, fur preservers, gold extractors, histology technicians, ink makers, insecticide makers, investment casing workers, jewelers, chemical laboratory workers, fluorescent lamp makers, mercury workers, gold miners, mercury miners, mirror makers, neon light makers, paint makers, paper makers, pesticide workers, photographers, pressure gauge makers, mercury refiners, seed handlers, silver extractors, switch makers, tannery workers, taxidermists, textile printers, thermometer makers, vinyl chloride manufacturers); and other miscellaneous items (latex and solvent thinned paints, fabric softeners, floor waxes and polishes, air conditioner filters, wood preservatives, felts, adhesives, tattooing, batteries with mercury cells, sewage disposal, and fungicides). HAL A. HUGGINS, IT'S ALL IN YOUR HEAD (DISEASES CAUSED BY SILVER-MERCURY FILLINGS) 100-102 (Life Science Press 1990).

⁵⁹*DoH to Phase Out Use of Mercury in Hospitals*, BUSINESS WORLD, Feb. 2, 2006, at S2.

⁶⁰Safe Communities and Safe Schools Mercury Reduction Act, H.R. 2391, 109th Cong. (2005). See also VT. STAT. ANN. tit. 10, § 7109 (2005).

recognized as safe for veterinary use.⁶¹ Recent legislation also prohibits the use of mercury in childhood immunizations.⁶²

The Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), and the World Health Organization (WHO) all establish “safe limits” for daily mercury exposure.⁶³ However, there are substantial variations in their recommendations primarily because of the different safety margins used by each organization.⁶⁴ The EPA sets the lowest limit at 0.1 mg/kg body weight per day.⁶⁵ These limits are not invariable nor do they mean that negative reaction is certain to occur above the recommended level. Their levels only mean that mercury exposure below the recommended level should not lead to health problems.⁶⁶ Dentists are regularly exposed to 50-4000 mcg/cubic meter of mercury vapor daily.⁶⁷ Studies show that glioblastomas (brain cancer) afflict dentists at twice the rate of the general population and that twenty percent of Canadian dentists are on long-term disability pensions as a result of mental health problems.⁶⁸

Although the use of mercury amalgams is waning and, in 2001, an estimated twenty-seven percent of dentists reported to be practicing mercury-free, mercury amalgams are still used to repair damaged teeth.⁶⁹ The Centers for Disease Control

⁶¹*Nationwide Recall of Miracle Leg Paint*, 17 FDA VETERINARIAN 4 (2002). A horse died after receiving bi-weekly applications of a mercuric chloride blistering agent to its legs. Mercuric chloride blistering agents were used to treat lameness, shin bucks, bows, chips, splints, and other horse leg ailments, but that practice is now outdated. Owners brought the horse to the veterinary hospital after it became frantic and maniacal. Toxicology reports after the horse’s death revealed heavy metal poisoning. *Id.* The author ponders if mercury containing products are not fit for use in animals, can they possibly be safe for humans? The FDA said:

There are no approved veterinary drug products that contain mercury as an active ingredient, and the use of mercuric blistering agent is not generally recognized as safe and effective. There are safety concerns for humans handling the products containing mercuric blistering agents. Poisoning and death have occurred in humans after applying the mercuric chloride products to large areas of the skin.

Id.

⁶²Mercury Policy Project, Status of Local, State, and Federal Mercury Product Legislation and Laws for the 2005-2006 Legislative Sessions (2005), <http://www.mercurypolicy.org/new/documents/20052006LegislativeSummary.pdf> (last visited Feb. 23, 2007).

⁶³Mercury Poisoning Exposure, http://www.mercurypoisoningfyi.com/mercury_poisoning_exposure.html (last visited Jan. 10, 2006). See also Mercury Policy Project, <http://www.mercurypolicy.org/> (last visited Jan. 29, 2006).

⁶⁴Mercury Poisoning Exposure, *supra* note 63.

⁶⁵*Id.*

⁶⁶*Id.*

⁶⁷Jule Klotter, *Quecksilber: The Strange Story of Dental Amalgam*, TOWNSEND LETTER FOR DOCTORS AND PATIENTS, July 1, 2005, at 107.

⁶⁸*Id.* at 107.

⁶⁹*Id.* “The American Dental Association estimates that the dental industry places approximately 70,000,000 dental amalgams annually, and each dental amalgam may contain

and Prevention (CDC) attribute the decrease in amalgam use to a decline in the amount of cavities in children and young adults, a decrease in the size of cavities, earlier detection of cavities, improved oral hygiene including fluoride and sealant use, and possibly dietary modifications.⁷⁰ Although there has been a decrease in mercury amalgam use, those dentists who continue to use mercury amalgams in their practices use what is known as encapsulated amalgam.⁷¹

IV. POISON PALETTE? FACTS ABOUT AMALGAMS

Dentists purchase amalgam capsules that contain mercury on one side and a mixture of powdered metals collectively called dental alloy on the other side.⁷² Once the capsules are in the dental office, dentists combine the two components inside the capsules by breaking the thin plastic wall that separates the components, thus, creating the liquid amalgam filling mixture.⁷³ The amalgam mixture is then placed into the cavity in the tooth where it binds to the tooth as it hardens.⁷⁴ The average dental restoration requires two capsules of amalgam.⁷⁵ The label on the jars sent to dentist with the amalgam capsules states in capital letters that the product "CONTAIN[S] METALLIC MERCURY."⁷⁶ The label bears a skull and crossbones image next to the word "POISON."⁷⁷ The label also lists other serious health hazards that mercury may cause if it is ingested, inhaled or comes into contact with the skin.⁷⁸

one half to three fourths of a gram of mercury, depending on the size of the filling." Mercury in Dental Filling Disclosure and Prohibition Act, H.R. 4011, 109th Cong. (2005).

⁷⁰Centers for Disease Control and Prevention, *Dental Amalgam Use and Benefits*, Sept. 2001, <http://www.cdc.gov/oralhealth/factsheets/amalgam.html>.

⁷¹*Dental Amalgam*, *supra* note 9.

⁷²*Id.* There are "approximately thirty-five manufacturers of dental mercury, amalgam alloy, and encapsulated dental mercury." *Barnes v. Kerr Corp.*, 418 F.3d 583, 586 (6th Cir. 2005). However, a 1999 study by the FDA reports that encapsulated amalgam accounts for over ninety-nine percent of the dental amalgam market. Dental Devices: Classification of Encapsulated Amalgam Alloy and Dental Mercury and Reclassification of Dental Mercury; Issuance of Special Controls for Amalgam Alloy, 67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872). In 2001, approximately 100 million cavities were filled with mercury amalgams. *Consumer Cause, Inc. v. Smilecare*, 110 Cal. Rptr. 2d 627, 630 (Cal Ct. App. 2001).

⁷³*See Barnes*, 418 F.3d at 583.

⁷⁴*Consumer Choice and Implementing Full Disclosure in Dentistry: Hearing Before the Subcommittee on Human Rights and Wellness*, 108th Cong. 324 (2003) (statement of Rep. Burton, Chairman, House Committee on Government Reform) [hereinafter *Consumer Choice Hearing*].

⁷⁵67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872).

⁷⁶*See Barnes*, 418 F.3d at 586.

⁷⁷*Id.* at 591.

⁷⁸*Id.* The label warns that ingestion of mercury could cause "Neurotoxic/Nephrotoxic effects," that the inhalation of mercury could cause "Bronchiolitis, Pneumonitis, [and] Pulmonary Edema," and that even skin contact with mercury could have harmful effects including "redness and irritation to [the] eyes and skin." *Id.* at 587.

In addition to the harsh warnings found on the outside of the encapsulated amalgams bottle, a Material Safety Data Sheet (MSDS) is also included in the packaging.⁷⁹ All products sold in the United States are required to have a MSDS. A MSDS, “describes the product’s physical properties, health problems, fire risk data, and other hazards associated with it.”⁸⁰ The list of health hazards on the MSDS for dental mercury states:

Chronic (long-term exposure): Inhalation (breathing it in, as from fillings) of mercury vapors causes mercurialism. Findings are extremely variable and include tremors (shakes), salivation (excess saliva), stomatitis (inflammation of the mouth), loosening of the teeth, blue lines on the gums (tattoos), pain and numbness in the extremities (multiple sclerosis symptoms), nephritis (inflammation of the kidney), diarrhea, anxiety, headache, weight loss, anorexia, mental depression, insomnia (sleeplessness), irritability, instability, hallucinations, and evidence of mental deterioration (Alzheimer-like symptoms).

Even with the harsh warnings appearing on the label of the encapsulated amalgams and the MSDS fact sheet accompanying the encapsulated amalgams, the Food and Drug Administration (FDA) has not evaluated the harmful effects of the amalgam mixture resulting when the capsule is broken and the elements are mixed together in the dentist’s office.⁸¹ In 1987, the FDA labeled the two separate pre-mixed components of dental amalgams, the amalgam alloy and the dental mercury, as Class II and Class I devices, respectively.⁸²

A Class I device is one that does not present a risk to humans and is subject only to the general FDA controls for goods manufacturing procedures.⁸³ A Class II device are those devices “for which there is insufficient information to show that general controls themselves will assure safety and effectiveness, but there is sufficient information to establish special controls to provide such assurance.”⁸⁴ Special controls can include “performance standards, post-market surveillance, patient registries, and the development and dissemination of guidelines, recommendations, and other appropriate actions” that the FDA deems necessary.⁸⁵

⁷⁹FRANK J. JEROME, *TOOTH TRUTH: A PATIENT’S GUIDE TO METAL-FREE DENTISTRY* 100 (New Century Press 2000).

⁸⁰*Id.*

⁸¹*Dental Amalgam, supra* note 9.

⁸²Congratulating American Dental Association for Sponsoring Second Annual “Give Kids a Smile” Program, Testimony Before the Subcommittee on Human Rights and Wellness, 108th Cong. (2004) [hereinafter Give Kids a Smile] (statement of Richard Fischer, dentist and past president of the International Academy of Oral Medicine and Toxicology).

⁸³*Id.* Other Class I devices are toothbrushes and dental floss. *Id.*

⁸⁴ Dental Devices: Classification of Encapsulated Amalgam Alloy and Dental Mercury and Reclassification of Dental Mercury; Issuance of Special Controls for Amalgam Alloy, 67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872). *See also* 21 C.F.R. § 872.3050 (2006) (affirming amalgam alloy as a Class II drug); 21 C.F.R. § 872.3700 (2006) (affirming dental mercury is a Class I drug).

⁸⁵67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872).

The FDA admitted that there were risks associated with dental mercury (i.e., mercury poisoning and adverse tissue reaction), but the FDA decided general controls were sufficiently safe.⁸⁶ The general controls included labeling the dental mercury with “adequate directions for use.”⁸⁷ In addition to the label, dental mercury requires a warning that would “warn dentists about the rare risk of allergic reactions among patients and the risk of toxicity to dental health professionals.”⁸⁸

Although the FDA placed regulatory controls on the two separate components of dental amalgams, it avoided regulation of the mixed amalgams.⁸⁹ However, neither product by itself is an effective filling material. The amalgam alloy or the mercury would wash away in the saliva if either was used alone to fill a cavity.⁹⁰ In 1991, the FDA director of Dental Devices stated that the mixed dental amalgam cannot be regulated by the FDA because it is prepared by the dental clinician.⁹¹ The FDA claims that the mixing of mercury and dental alloy is only a “reaction” product manufactured by dentists to be used solely in their professional practices.⁹² However, the FDA regulates other materials like composite fillings and dental cements, which are both prepared by the dental clinician.⁹³ The current FDA classification of encapsulated amalgam has resulted, thus far, in mercury amalgam mixture being exempted from federal regulation.⁹⁴ In 1998, mercury received the label of “not generally recognized as safe” from the FDA.⁹⁵ However, the FDA failed to change the label on the mercury used in dental fillings.⁹⁶ Dental mercury continues to be labeled as a safe and effective Class I Dental Device by the FDA.⁹⁷

V. THE MERCURY AMALGAM CONTROVERSY

“Medicine is an inexact science, and eminently qualified physicians may legitimately diverge in their beliefs as to what constitutes the best treatment.”⁹⁸ It is not likely that physicians or dentists will all ever agree on how best to treat any injury or ailment. This disagreement, to an extent, is beneficial to society because it furthers research and debate. However, when one side is unfairly advantaged, whether fiscally or politically, it harms patients. The mercury amalgam debate has

⁸⁶*See id.*

⁸⁷*See id.*

⁸⁸*See id.*

⁸⁹*Dental Amalgam, supra note 9.*

⁹⁰*Give Kids a Smile, supra note 82.*

⁹¹*Id.*

⁹²*Dental Amalgam, supra note 9.*

⁹³*Give Kids a Smile, supra note 82.*

⁹⁴*Dental Amalgam, supra note 9.*

⁹⁵*Give Kids a Smile, supra note 82.*

⁹⁶*Id.*

⁹⁷*Id.*

⁹⁸*Fitzgerald v. Manning*, 679 F.2d 341, 347 (4th Cir. 1982).

been active for years, but it has only recently been brought back to the attention of the public through media coverage and the internet.⁹⁹ On one side of the debate are anti-amalgamists calling for the complete removal of mercury in dental fillings and in other areas of society. The other side supports the use of mercury amalgams, claiming that the “benefits of restoring teeth with dental amalgam outweigh significantly the documented risks.”¹⁰⁰

Arguably, mercury ranks as the second most poisonous compound on earth, and no agency or health organization would dispute that mercury is toxic.¹⁰¹ There is significant debate over the potential harmful effects of exposure to mercury through amalgam dental restoration, but the arguments in favor of banning the use of mercury amalgams are strong. Many healthcare organizations, including the American Public Health Association, the California Medical Association, and Health Care Without Harm, support a ban on any mercury-containing product used by humans.¹⁰² Current scientific research indicates that: 1) mercury amalgams release a significant amount of mercury into the body, 2) mercury from amalgams can cross the placenta and result in significant exposure for infants, and 3) mercury exposure causes adverse effects in the human body.¹⁰³ The World Health Organization (WHO) estimates that dental amalgams release and the body retains three to twenty-seven micrograms of mercury per day.¹⁰⁴ A report by the Centers for Disease Control and Prevention (CDC) found that one out of every twelve women of childbearing age has mercury levels above the “safe” threshold of 5.8 parts per million in their blood.¹⁰⁵ One study estimates that adults with as little as four amalgam fillings could experience health problems, while children are at risk from

⁹⁹First Annual National Amalgam Awareness Week, <http://www.nationalamalgamawarenessweek.com> (last visited Jan. 10, 2006). The first annual National Amalgam Awareness Week campaign took place October 3 – 10, 2005. *Id.*

¹⁰⁰67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872).

¹⁰¹Juliet Fletcher, *Biting Back*, CITY PAPER (Philadelphia, Pa.), May 23-29, 2002, <http://www.citypaper.net/articles/2002-05-23/cover.shtml>.

¹⁰²Mercury in Dental Filling Disclosure and Prohibition Act, H.R. 4011, 109th Cong. (2005). The International Academy of Oral Medicine and Toxicology (Orlando, FL), the American Academy of Biological Dentistry (Carmel, CA), and the Holistic Dental Association (Denver, CO) are all national dental societies that support a ban on mercury amalgams. Letter from Charles G. Brown, Counsel, Consumers for Dental Choice, to Janis Pappalardo, Bureau of Economics, Federal Trade Commission (Feb. 11, 2003), *available at* <http://www.ftc.gov/ogc/healthcare/hearings/docs/030612mcclure2.pdf> [hereinafter Brown Letter].

¹⁰³*Scientific Case, supra* note 13.

¹⁰⁴H.R. 4011, *supra* note 102. The amount of mercury retained in the average human each day from mercury amalgams is higher than from any other source of mercury. *Id.*

¹⁰⁵CENTERS FOR DISEASE CONTROL, SECOND NAT’L REP. ON HUMAN EXPOSURE TO ENVTL. CHEMICALS (Jan. 2003). Another agency which sets the “safe” threshold for mercury levels in humans is the Environmental Protection Agency. *Id.* The fact that one in twelve women have unsafe levels of mercury in their blood could place between 60,000 and 320,000 newborns at risk of neurological damage from mercury exposure in utero. *Id.*

two amalgam fillings.¹⁰⁶ Further, there is scientific evidence linking mercury amalgams to neurological problems, gastrointestinal problems, Alzheimer's disease, brain damage in fetuses, cardiac dysfunction, autism, and impaired kidney functioning.¹⁰⁷ A 2002 overview of the previous five year's scientific literature dealing with mercury amalgams and their health hazards uncovered three new possible links between mercury amalgam and mercury accumulation in the eyes and testicles and mercury causing impairment in kidney functioning.¹⁰⁸ Even the FDA does not reject outright the potential for harm from mercury amalgam. The FDA states:

At the mercury doses produced by amalgam fillings, the evidence is not persuasive that the wide variety of nonspecific symptoms attributable to fillings and "improvement" after their removal are ascribable to mercury from the fillings. Conversely, the evidence is not persuasive that the potential for toxicity at the levels attributable to dental amalgams should be totally disregarded. The potential for effects at levels of exposure produced by dental amalgam restorations has not been fully explored.¹⁰⁹

Although there is debate in the medical and academic communities about the harmful effects of mercury amalgams, another argument supporting a ban on mercury amalgams is that "fully adequate and less toxic alternatives are available."¹¹⁰

¹⁰⁶Do & Klinghardt, *supra* note 6. *But see* David C. Bellinger et al., *Neuropsychological and Renal Effects of Dental Amalgam in Children*, 295 JAMA 1775 (2006); Timothy A. DeRouen et al., *Neurobehavioral Effects of Dental Amalgam in Children: A Randomized Clinical Trial*, 295 JAMA 1784 (2006). Both studies conclude that traditional mercury amalgams are safe for school-age children. However, the studies do not look at the safety of amalgams in children younger than six years old. Kathleen Doheny, *Mercury in Dental Fillings Safe for School-Age Children* (June 29, 2006), <http://www.medicinenet.com/script/main/art.asp?articlekey=62728>.

¹⁰⁷*See generally* *Dental Amalgam*, *supra* note 9. *See* A.O. Summers et al., *Mercury Released from Dental "Silver" Fillings Provokes an Increase in Mercury- and Antibiotic-Resistant Bacteria in Oral and Intestinal Floras of Primates*, 37 ANTIMICROBIAL AGENTS & CHEMOTHERAPY 825 (1993) (linking mercury amalgams to intestinal problems); G. Drasch et al., *Mercury Burden of Human Fetal and Infant Tissues*, 153 EUR. J. PEDIATRICS 607 (1994) (discussing the dangers caused by mercury amalgams to fetuses); J.H. Growdon & R.M. Nitsch, *Increased Blood Mercury Levels in Patients with Alzheimer's Disease*, 105 J. NEURAL TRANSMISSION 59 (1998) (linking mercury amalgams to Alzheimer's Disease); B. E. Haley, *Mercury Toxicity: Genetic Susceptibility and Synergistic Effects*, 2 MEDICAL VERITAS 535 (2005) (linking mercury to autism). The other ailments mercury amalgams have been linked to are multiple sclerosis, depression, and impaired immune functioning. Gary Null & Martin Feldman, *Mercury Dental Amalgams: Analyzing the Debate – Part I* (Sept. 2002), <http://www.garynull.com/Documents/Dental/Amalgam/MercuryDental0902Pt1.htm>.

¹⁰⁸MATHS BERLIN, THE DENTAL MATERIAL COMM'N, MERCURY IN DENTAL FILLING MATERIALS: AN UPDATED RISK ANALYSIS IN ENVTL. MED. TERMS (2002), *available at* <http://www.toxicteeth.org/berlinbilaga.doc>. Berlin is the former Chair of the World Health Organization (WHO) Task Group on Environmental Health Criteria for Inorganic Mercury. *Id.*

¹⁰⁹67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872).

¹¹⁰BERLIN, *supra* note 108.

Alternatives include gold, ceramic, porcelain, and polymeric filling materials.¹¹¹ Public support and scientific evidence that support a ban on mercury amalgams is growing, but the pro-amalgamists are standing firmly behind the safety and continued use of mercury amalgams.

The American Dental Association (ADA) released a statement claiming “[d]ental amalgam (silver filling) is considered a safe, affordable and durable material that has been used to restore the teeth of more than 100 million Americans.”¹¹² The FDA and the United States Public Health Service also promote the continued use of amalgam.¹¹³ The ADA touts as the advantages of mercury amalgams, lower cost, ease of use, and greater durability as compared with alternative filling materials.¹¹⁴ Ultimately, the ADA claims that there is not enough scientific evidence to prove the case against mercury amalgams and maintains the position that “dental amalgam has been studied and reviewed extensively, and has established a record of safety and effectiveness.”¹¹⁵ To the limited extent that the ADA acknowledges the harmful effects of mercury amalgams, it is only in respect to the relatively small number of patients who suffer allergic reactions to mercury.¹¹⁶ The ADA does admit “[m]inute amounts of mercury vapor (between 1-3 micrograms per day) may be released from amalgam under the pressure of chewing or grinding, but there is no scientific evidence that such low-level exposure is harmful.”¹¹⁷ Dr. Walter Crinnion’s skeptical view of the ADA’s position on mercury amalgams states, “[i]t would

¹¹¹United States Army Corp of Engineers & The Louis Berger Group, Inc., Detailed Study of Non-Mercury Alternatives as an Environmental Attribute, (2005), <http://www.mercury.policy.org/new/documents/NonMercuryAlternativesUSMilitary0206.pdf> (last visited Feb. 23, 2007). A new device is currently being tested to repair a damaged tooth with a ceramic filling in under an hour. Previous methods used for ceramic repair required patients to return for a second visit. Ceramic fillings are natural looking and have been proven “precise, safe, and effective.” *Local Dentist Creates High-Tech Fillings*, THE MEDINA GAZETTE (Medina, Ohio), Oct. 5, 2005, at A6.

¹¹²Position Statement, American Dental Association, ADA Statement on Dental Amalgam (Jan. 8, 2003) <http://www.ada.org/prof/resources/positions/statements/amalgam.asp> [hereinafter ADA Statement].

¹¹³Chirba-Martin & Welshhans, *supra* note 10.

¹¹⁴ADA Statement, *supra* note 112. Dr. Frederick Eichmiller, Director of the Paffenbarger Research Center, a dental research facility states, “in some situations, like large cavities in the rear molars, or cavities below the gum line, amalgam is often used...because it is one of the best filling materials” for places that are difficult to keep dry. Press Release, American Dental Association, Science Versus Emotion in Dental Filling Debate: Who Should Decide What Goes in Your Mouth? (July 2002), available at http://www.ada.org/public/media/releases/0207_release06.asp.

¹¹⁵ADA Statement, *supra* note 112.

¹¹⁶Food and Drug Administration, *Consumer Update: Dental Amalgams*, <http://www.fda.gov/cdrh/consumer/amalgams2002.html> (last visited Feb. 23, 2007). The FDA estimates that allergic reactions to mercury are “very rare” stating that approximately 0.04 percent to 0.00001 percent of the population is allergic to mercury. See also 67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872).

¹¹⁷Press Release, American Dental Association, Dental Amalgams: Myth v. Facts (July 2002), available at http://www.ada.org/public/media/releases/0207_release01.asp.

bankrupt the ADA with lawsuits if they were to admit how dangerous mercury fillings truly are.”¹¹⁸ In fact, one estimate is that liability for amalgam replacements and monetary damages could reach five trillion dollars.¹¹⁹

There are many allegations that the American Dental Association and amalgam manufacturers work together. The ADA is by far the dominant trade group among dentists, with a membership equaling or exceeding seventy percent of all American dentists. The ADA’s monopolistic grasp on dentists is evidenced by:

The seventy percent figure far exceeds the level of the bar (under forty percent) or medical (under fifty percent) associations, and perhaps any other health trade group. Unlike law and medicine, the ADA has an ironclad “tripartite” system, meaning a dentist may only join the local and state dental society by joining the American Dental Association. The ADA controls the accreditation of dental schools. Using that power, the ADA requires that dentists pass tests of implanting mercury fillings, even though some dental students consider it a health risk for themselves and their patients.¹²⁰

The American Dental Association argues there are no financial connections between the ADA and amalgam manufacturers.¹²¹ This is disputed by many anti-amalgam advocacy groups. Consumers for Dental Choice assert that the “ADA masquerades as a society focused on dental health. Actually, the ADA works hand-in-glove with its secret contractual partner, the amalgam manufacturers, to keep their fillings in use and to prevent the public from learning they are mainly mercury.” Consumers for Dental Choice claim that the ADA endorsed amalgams with the American Dental Association Seal of Acceptance after receiving compensation from amalgam manufacturers.¹²² The ADA says it has *never* been paid as an endorser of amalgam products.¹²³ However, the practice of requiring amalgam manufacturers to submit a fee with their application for evaluation of a product was an established practice from 1995 to 2002.¹²⁴ The reputed compensation took the form of a “fee for processing” the seal of acceptance application and constituted thirty percent of the

¹¹⁸Brouillette, *supra* note 3. Dr. Crinnion is the director of the Environmental Center of Excellence at the Southwest College of Naturopathic Medicine and Health Sciences in Tempe, Arizona, and he is a nationally renowned expert in recognizing and treating heavy metal toxicity.

¹¹⁹MEZEI, *supra* note 56.

¹²⁰Petition to the Attorney General of Maine and to the Federal Trade Commission, Boston Regional Office (Apr. 12, 2005) available at http://www.toxicteeth.org/natcamp_stategovt_ME_042005.cfm.

¹²¹See Press Release, Dental Amalgams: Myth v. Facts, *supra* note 117.

¹²²Petition to the Attorney General of Maine and to the Federal Trade Commission, Boston Regional Office (Apr. 12, 2005), available at http://toxicteeth.org/natcamp_stategovt_ME_042005.cfm.

¹²³Peter M. Sfilkas, *Letter to the Editors of Health Matrix, An Uncertain Risk and an Uncertain Future: Assessing the Legal Implications of Mercury Amalgam Fillings*, 15 HEALTH MATRIX 459, 459 (2005).

¹²⁴*Id.*

costs.¹²⁵ The ADA states “[b]e assured that the ADA does not profit from amalgam, nor does it promote the material. The cost of maintaining the ADA Seal program is financed primarily through ADA member dentist dues.”¹²⁶

In December 2004, the National Institutes of Health issued a report regarding the safety of dental amalgams.¹²⁷ However, as a result of the alleged wrongdoing in the contract award, the results of the report are of questionable value. The contract was awarded to Life Sciences Research Office, Inc. (LSRO) which, according to Charles Brown, counsel for Consumers for Dental Choice, has a “history of building [research] panels with conflicted members whose findings favor industry.”¹²⁸ Brown added, “LSRO is the tobacco industry’s consultant of choice.”¹²⁹ Consumers for Dental Choice claimed that LSRO was handpicked without a competitive bid, had announced the desired results in advance of their study, and had mandated the research panel be devoid of mercury researchers.¹³⁰ Additionally, Senator Frank Lautenberg challenged the National Institutes of Health to eliminate the “inherent conflict of interest” resulting from the designation of organized dentistry (which endorse mercury fillings) to be in charge of the research. This entire process is currently under federal investigation.¹³¹ Although the ADA and other organizations maintain the position that mercury amalgams are a safe filling material, they may be relying upon faulty research. The anti-amalgam activists are intent on continuing research into the harmful effects of mercury amalgams and on lobbying for a ban on the use of mercury in the mouth.

VI. LITIGATION IS AN INSUFFICIENT REMEDY

The American Dental Association claims that there is not enough scientific evidence to prove the case against mercury amalgams and maintains the position that “dental amalgam has been studied and reviewed extensively, and has established a record of safety and effectiveness.”¹³² However, dentists, the ADA, and amalgams manufacturers should be aware that lawyers are preparing the case against mercury

¹²⁵*Heavy Metal*, *supra* note 57, at 12. The American Dental Association claims it did not make a profit from the application fees. Sfilkas, *supra* note 123.

¹²⁶*See* Press Release, Dental Amalgams: Myth v. Facts, *supra* note 117. The American Dental Association currently places its seal of approval on amalgams manufactured by Goldsmith and Revere, Carl Heyer Inc., and Darby Dental Supply Co. ADA Seal Product Search, <http://www.ada.org/ada/seal/sealsrch.asp> (last visited Aug. 5, 2006).

¹²⁷Press Release, Consumers for Dental Choice, Mercury Amalgam Report Bogus; Released as Feds Investigate Wrongdoing in Contract Award (Dec. 9, 2004), http://www.toxicteeth.org/pressroom_releases_cdc_122004.cfm.

¹²⁸*Id.*

¹²⁹*Id.*

¹³⁰*Id.*

¹³¹*Id.*

¹³²ADA Statement, *supra* note 112. “[T]here are 1,500 articles that we know of that talk about the threat to human beings from amalgams and mercury in dental filling. The scientists from Sweden found 700 articles that are credible, and I cannot figure out why our health agencies can’t find one. . . .” *See also Consumer Choice Hearing*, *supra* note 74.

amalgams.¹³³ The scientific evidence against mercury amalgams continues to mount, and plaintiffs will use the scientific evidence in litigation against dentists and amalgam manufacturers. The problem with litigation, however, is that patient plaintiffs must meet a high burden of proof to win a lawsuit against the dentists or the amalgam manufacturers.¹³⁴

Exposure to mercury, a heavy metal, may result in cranial and peripheral nerve injury, but oftentimes, the injury as a result of mercurial poisoning is hard for the patient plaintiff to prove.¹³⁵ In order to prove a claim of nerve injury due to toxic substance exposure, plaintiffs must pass a two-prong test. First, the plaintiff must have symptoms consistent with those of an injury from the suspected toxin.¹³⁶ Second, plaintiffs must prove that their level of exposure to the suspected toxin was potentially high enough to cause such injury.¹³⁷

Often, it is hard to prove toxic neuropathy because evidence surrounding the exposure and the resulting injury is inconclusive and ambiguous.¹³⁸ Two tests are available to establish a person's level of mercury exposure.¹³⁹ The first test available is a blood test.¹⁴⁰ "Blood tests can detect exposure to all three types of mercury (metallic, inorganic, and organic), but blood tests must be done within a few days of exposure in order to be accurate."¹⁴¹ Additionally, consuming fish before the test can influence the results.¹⁴² The second test is a urine mercury test.¹⁴³ It can detect metallic and inorganic mercury exposure, but because organic mercury is not excreted from the body in urine, the urine test cannot detect organic mercury.¹⁴⁴ Mercury exposure gradually causes debilitation and injury and the likelihood that patient plaintiffs would be able to prove causation sufficient to meet the high burden of proof is unlikely.¹⁴⁵

Another reason litigation is insufficient is that a failure to warn case against an amalgam manufacturer has already failed.¹⁴⁶ In *Environmental Law Foundation v.*

¹³³Association of Trial Lawyers of America, Teleconference: *Mercury Silver Dental Fillings as the Next Mass Tort* (Mar. 9, 2004). See also *Moms Against Mercury v. Food & Drug Admin.*, No. 06-1147, 2007 U.S. App. LEXIS 8470 (D.C. Cir. Apr. 13, 2007).

¹³⁴14 AM. JUR. 3D *Proof of Facts* § 1 (2005).

¹³⁵*Id.*

¹³⁶*Id.*

¹³⁷*Id.*

¹³⁸*Id.*

¹³⁹Mercury Poisoning Exposure, *supra* note 63.

¹⁴⁰*Id.*

¹⁴¹*Id.*

¹⁴²*Id.*

¹⁴³*Id.*

¹⁴⁴*Id.*

¹⁴⁵14 AM. JUR. 3D *Proof of Facts* § 1 (2005). See also *Mercury in Dental Filling Disclosure and Prohibition Act*, H.R. 4011, 109th Cong. (2005).

¹⁴⁶*Env'tl. Law Found. v. Wykle Research, Inc.*, 134 Cal. App. 4th 60 (Cal. Ct. App. 2005).

Wykle Research, the plaintiff alleged that the amalgam manufacturer failed to provide a clear and reasonable warning with its shipments of dental amalgam in violation of Proposition 65.¹⁴⁷ The court held that *Wykle*'s warning was sufficient to comply with what is required by the "safe harbor" provision in Proposition 65 regardless of the fact that the warning was small, "combined with information required by the American Dental Association and did not refer specifically to mercury."¹⁴⁸ The rationale for this decision was that the warning would be read by dentists and dental workers and there was no reason to assume these workers would not read or understand the warning.¹⁴⁹ Additionally, the "safe harbor" requirement of Proposition 65 was not intended to create a hierarchy of warnings or require manufacturers to use the best warning; its intent was only to require a "simple and reasonable" warning.¹⁵⁰ Given that a failure to warn case against an amalgam manufacturer failed in a state with strict and progressive laws against mercury, the likelihood that a plaintiff would succeed in another jurisdiction is low.

In another amalgam-related case, Dr. Barnes, a dentist, brought an action against Kerr Corporation, a dental amalgam provider, for "negligence, the manufacture and sale of a defectively designed product, the failure to warn, intentional concealment, the failure to disclose a known defective condition, and breach of implied warranty."¹⁵¹ Barnes alleged he was injured by exposure to mercury primarily through "mercury vapor and mercury contained in amalgam particulate inhaled when removing existing amalgam from the teeth of patients."¹⁵² Barnes' expert witness testified that "between 81 percent - 89.3 percent of Barnes' daily exposure came from this source."¹⁵³ Kerr refuted this by stating that there were no facts to support that Kerr manufactured the majority of amalgams Barnes removed during his career.¹⁵⁴ The expert witness then testified that between 2.5 percent to 10 percent of Barnes' daily exposure came from contaminated dental office air and between 7.5 percent to 8.2 percent came from alleged exposure to mercury vapor and particulate produced when placing new amalgam fillings.¹⁵⁵ Kerr argued that exposure in the office air could have come from other sources.¹⁵⁶ Kerr supported this assertion by stating that because Dr. Barnes normally placed new fillings without the aid of a drill, he would not, therefore, be exposed to mercury when placing new fillings.¹⁵⁷

¹⁴⁷*Id.* at 60.

¹⁴⁸3-58 MICHAEL J. STEEL, CALIFORNIA ENVIRONMENTAL LAW & LAND USE PRACTICE § 58.13 (2004). Additionally, plaintiffs alleged that it was unclear whether the warning referred to zinc or mercury. *See Wykle*, 134 Cal. App. 4th at 60.

¹⁴⁹*See Wykle*, 134 Cal. App. 4th at 60.

¹⁵⁰*Id.*

¹⁵¹*Barnes v. Kerr Corp.*, 418 F.3d 583, 585 (5th Cir. 2005).

¹⁵²*Id.* at 587.

¹⁵³*Id.*

¹⁵⁴*Id.*

¹⁵⁵*Id.*

¹⁵⁶*Id.*

¹⁵⁷*Id.*

Additionally, Kerr accused Barnes' expert witness of "inject[ing] untested, unreliable, and speculative 'courtroom science' into these proceedings. . . ."¹⁵⁸ The district court held the expert witness testimony, which endorsed "a strong minority view that dental amalgam containing mercury is both unreasonably dangerous and hazardous to human health," was admissible.¹⁵⁹ Unfortunately, the court granted summary judgment in favor of Kerr Corporation stating that Barnes did not meet the test for proximate cause.¹⁶⁰ Further, the court ruled that Kerr's warnings were sufficient.¹⁶¹ Historically, reactive mercury amalgam litigation has not provided redress for those harmed by mercury amalgam fillings. Although some of the cases were dismissed on procedural grounds, proactive legislation is the best way to protect the patient and the dentist.

VII. REMOVAL IS AN INSUFFICIENT REMEDY

Although the debate over the use of mercury amalgams continues, most experts on either side agree that there is no need to remove silver fillings that are intact.¹⁶² There are two reasons to avoid removing dental amalgams. First, incorrect removal may be more harmful than leaving the amalgam in the mouth.¹⁶³ The amount of mercury swallowed or leaked into the mouth through improper removal methods may be higher than that released from the intact dental amalgams.¹⁶⁴ Consumers for Dental Choice warns, "[o]nce the removal has begun, the mercury vapor will be continuously released from the tooth. During the removal or placement of amalgam the patient can be exposed to amounts which are a thousand times greater than the Environmental Protection Agency's allowable concentration."¹⁶⁵ Further, there are cases penalizing dentists for removing patients' mercury amalgam fillings "without an independent diagnosis of mercury toxicity or other valid diagnostic evidence."¹⁶⁶ The ADA states "[b]ased on current scientific data, the ADA has determined that the removal of amalgam restorations from the non-allergic patient for the alleged purpose of removing toxic substances from the body, when such treatment is performed solely at the recommendation or suggestion of the dentist, is improper and

¹⁵⁸*Id.*

¹⁵⁹*Id.*

¹⁶⁰*Id.* at 588.

¹⁶¹*Id.*

¹⁶²Garrett Condon, *Department of Environmental Protection Won't Act to Ban Mercury Fillings*, THE HARTFORD COURANT (Conn.), Sept. 9, 2005, at 1. For a DVD demonstration of the history of mercury, the adverse health effects, and a demonstration for safe removal, refer to a documentary entitled *Quecksilber: The Strange Story of Dental Amalgam* which is available for purchase online. Klotter, *supra* note 67, at 107.

¹⁶³*CBS News: Debate Over Dental Fillings* (CBS News broadcast Aug. 12, 2005).

¹⁶⁴*Id.*

¹⁶⁵International Academy of Oral Medicine and Toxicology, Protocol for Amalgam-Mercury-Silver Filling Removal, <http://www.toxicteeth.org/safeprotocol.cfm> (last visited Aug. 5, 2006).

¹⁶⁶*Bd. of Dental Exam'rs v. Hufford*, 461 N.W.2d 194, 198 (Iowa 1990). See also *Berger v. Bd. of Regents of the State of N.Y.*, 577 N.Y.S.2d 500 (N.Y. App. Div. 1991).

unethical.”¹⁶⁷ One dentist only advises patients to have mercury amalgams removed if the fillings are large and may make the tooth weak over time.¹⁶⁸ The dentist also advises that only one quarter of the fillings in the mouth be removed and replaced at a time.¹⁶⁹ The second reason to avoid removal of intact amalgam filling is that removal is costly.¹⁷⁰ Although removal is not a recommended remedy in most cases, in some cases removal may be the only way for patients to gain relief from their symptoms.

If a patient decides to have a mercury amalgam removed, the International Academy of Oral Medicine and Toxicology offers the following guidelines, which may help reduce mercury exposure during the removal process.¹⁷¹ Removal should be done under a cold water spray to keep the temperature low and reduce the vapor pressure within the mercury.¹⁷² A high volume evacuator should be kept next to the patient’s tooth so that it may suction out mercury vapor and any amalgam particulates.¹⁷³ After the old amalgams are removed, the tooth needs to be washed with cold water for at least sixty seconds.¹⁷⁴ To protect the dentist and the staff, nitrile rubber gloves should be used because nitrile is a better barrier against mercury vapor than rubber or vinyl gloves.¹⁷⁵ Also, staff should wear respirators to prevent them from inhaling the mercury particulates or vapor.¹⁷⁶ Once the source of the mercury exposure is removed (i.e., mercury amalgams are removed from patients’ teeth or environmental exposure ceases), there are many effective ways to remove the mercury remaining in patients’ bodies.

Mercury removal from the body is usually done through a process called chelation.¹⁷⁷ Some doctors recommend natural remedies like chlorella or cilantro to remove mercury from the body, but dimercaptosuccinic acid (DMPS) and sodium dimercaptopropane sulfonate (DMSA) are the two most popular remedies to remove

¹⁶⁷AM. DENTAL ASS’N PRINCIPLES OF ETHICS & CODE OF PROF’L CONDUCT § 5A.1 (2005).

¹⁶⁸*CBS News*, *supra* note 163.

¹⁶⁹*Id.*

¹⁷⁰Condon, *supra* note 162, at 1. One source quotes each replacement filling as costing between seventy-five to two hundred dollars, not including the office visit fee. Further, many times these replacements are not covered by insurance companies. Julie Deardorff, *Are Your Teeth Toxic? The Mercury in 'Silver' Fillings Would Be Hazardous Waste in a River - Yet It's Sitting in Your Mouth*, CHICAGO TRIBUNE, Dec. 11, 2005, at Q.

¹⁷¹Stephen M. Koral, *Safe Removal of Amalgam Fillings* (2005), available at <http://www.iaomt.org/articles/files/files271/Safe%20Removal%20of%20Amalgam%20Filling%20s1.pdf> (last visited Apr. 15, 2007).

¹⁷²*Id.*

¹⁷³*Id.*

¹⁷⁴*Id.*

¹⁷⁵*Id.*

¹⁷⁶*Id.*

¹⁷⁷JEROME, *supra* note 79. See also Do & Kinghardt, *supra* note 6.

mercury from the body.¹⁷⁸ DMPS (Sodium 2, 3-mercaptopropane-1-sulfonate) binds with heavy metals such as copper, zinc, and mercury, and it has been demonstrated that DMPS can eliminate these metals from the connective tissues in the human body.¹⁷⁹ DMSA (meso-2, 3-dimercaptosuccinic acid) is another acid used as a mercury chelation agent. DMSA penetrates the brain cells and removes mercury both through the kidneys and through bile.¹⁸⁰ Although both DMPS and DMSA remove mercury from the body, neither is one hundred percent effective, and both processes can be time consuming and painful.¹⁸¹

VIII. ENVIRONMENTAL IMPACT

“Dental offices contribute approximately fifty-four tons of toxic mercury to the environment each year.”¹⁸² “Even if amalgam placement stopped today, mercury-bearing amalgam would continue to be removed and put into the waste stream for the next twenty to thirty years.”¹⁸³ Both the unused dental amalgam fillings and

¹⁷⁸Do & Klinghardt, *supra* note 6. See also Jan Aaseth et al., *Treatment of Mercury and Lead Poisonings with Dimercaptosuccinic Acid and Sodium Dimercaptopropanesulfonate*, 3 ANALYST 853 (1995); H.V. Aposhian et al., *Human Studies with the Chelating Agents, DMPS and DMSA*, 30 J. TOXICOLOGY & CLINICAL TOXICOLOGY 505 (1992); H.V. Aposhian & M.M. Aposhian, *Meso-2,3 Dimercaptosuccinic Acid: Chemical, Pharmacological and Toxicological Properties of an Orally Effective Metal Chelating Agent*, 30 ANN. REV. TOXICOLOGY 279 (1990); F.L. Lorscheider & M.J. Vimy, *Evaluation of the Safety Issue of Mercury Release from Dental Fillings*, 7 FED’N AM. SOC’Y FOR EXPERIMENTAL BIOLOGY J. 1432-33 (1993); V.K. Aposhian, *Mobilization of Mercury and Arsenic in Humans by Sodium 2,3 Dimercapto-1-propane Sulfonate (DMPS)*, 106 ENVTL. HEALTH PERSP. 1017 (1998); Walter Crinnion, *Environmental Medicine, Part Three: Long-Term Effects of Chronic Low-Dose Mercury Exposure*, 5 ALTERNATIVE MED. REV. 209 (2000).

¹⁷⁹Do & Klinghardt, *supra* note 6. DMPS also binds with arsenic, cadmium, lead, silver, and tin. DMPS is water soluble and has been used as an effective treatment of metal intoxication since the 1960s. It is not recommended that DMPS be administered to patients who still have any mercury fillings in their mouths. *Id.* But see LIFE SCIENCES RESEARCH OFFICE, INC., REVIEW AND ANALYSIS OF THE LITERATURE ON THE HEALTH EFFECTS OF DENTAL AMALGAM, (2004), http://www.lsro.org/articles/amalgam_report.html (last visited Feb. 23, 2007) (claiming that DMPS agents mobilize mercury from the kidneys but not from the brain).

¹⁸⁰Do & Klinghardt, *supra* note 6. Other alternative remedies for removing mercury are through the use of chlorella, an algae, which absorbs toxic metals from the environment; cilantro, an herb, which moves the mercury, aluminum, lead, and tin that has accumulated in the brain and spinal cord to the connective tissue where it is believed to be excreted from the body; vitamin E seems to act as a protective agent when the brain is exposed to mercury; vitamin C helps move mercury from storage in cells so that it may be excreted from the body. *Id.* Chelation therapy with DMPS or DMPA are recognized to have adverse side effects including headaches, dizziness, nausea, and loss of other metals, which are important to body functioning. LIFE SCIENCES RESEARCH OFFICE, *supra* note 179.

¹⁸¹Do & Klinghardt, *supra* note 6.

¹⁸²Mercury in Dental Filling Disclosure and Prohibition Act, H.R. 4011, 109th Cong. (2005).

¹⁸³KEN ARMSTRONG ET AL., MERCURY IN KING COUNTY, at 34 (2002), <http://www.govlink.org/hazwaste/publications/MercuryFinal.pdf> (last visited Feb. 23, 2007).

amalgams that have been removed must be treated as toxic waste.¹⁸⁴ Scrap amalgam cannot be “thrown in the trash, buried in the ground or incinerated.”¹⁸⁵ Rather, there are special disposal procedures that must be followed. Some states are in the process of proposing legislation that would mandate the use of advanced filtration devices in dental offices.¹⁸⁶ These filtration devices are known as amalgam separators.

Other states have already passed the mercury disposal legislation and the deadlines for compliance are near.¹⁸⁷ A Washington state law requires that dentists capture and recycle dental mercury.¹⁸⁸ For example, an ordinance in King County, Washington, requires that amalgam separators be installed in dental offices.¹⁸⁹ Originally, in 1994, King County dentists could voluntarily remove mercury from dental wastewater; however, in 2001, King County made it a mandatory requirement to remove mercury-containing dental amalgam from wastewater.¹⁹⁰ San Francisco also requires dental offices have amalgam separators installed.¹⁹¹ New York has proposed amalgam separator legislation that also includes extracted teeth as a source of dental amalgam waste.¹⁹² It seems the King County mercury reduction program is successful. Approximately, ninety-seven percent of the dental offices in King County have amalgam separators and, thus far, the level of mercury entering the County wastewater treatment system decreased by fifty percent.¹⁹³

Amalgam separators use a variety of techniques to remove mercury from wastewater.¹⁹⁴ The techniques are sedimentation, filtration, centrifugation, and ion exchange.¹⁹⁵ Most separators use some form of sedimentation technology; many times sedimentation is coupled with another removal technique.¹⁹⁶ Amalgam

¹⁸⁴Give Kids a Smile, *supra* note 82.

¹⁸⁵*Id.*

¹⁸⁶H.B. 3898, 2005-2006 Sess. (Ma. 2005).

¹⁸⁷John Dodge, *Dentists Face Deadline on Mercury*, OLYMPIAN (Olympia, Wash.), July 26, 2005, at 1A.

¹⁸⁸*Id.*

¹⁸⁹*Dentists Reminded to Keep Mercury Out of Their Waste Water*, U.S. FED. NEWS, Aug. 1, 2005. Vermont has enacted a comprehensive mercury management statute. VT. STAT. ANN. tit. 10, § 7101-7115 (2005).

¹⁹⁰Gail Savina, *Mercury in Waste Dental Amalgam: Why Is It Still a Problem?* (2003), available at http://www.govlink.org/hazwaste/publications/WasteAmalgamProblems_03.pdf (last visited Feb. 23, 2007).

¹⁹¹Shira R. Toeplitz, *Mercury Disposal by Dentists Becomes Focus of DEP Review*, PHILADELPHIA INQUIRER (Pa.), Aug. 22, 2005, at B02.

¹⁹²N.Y. Environmental Conservation Law § 27-0926 (McKinney 2003). There is also proposed New York legislation which would regulate the management of mercury and dental amalgam wastes at dental facilities. 6 NYCRR Part 374-4.

¹⁹³*Dentists Reminded to Keep Mercury Out of Their Waste Water*, *supra* note 189.

¹⁹⁴P.L. Fan et al., *Laboratory Evaluation of Amalgam Separators*, 133 J. AM. DENTAL ASS'N 577 (2002).

¹⁹⁵*Id.* at 582.

¹⁹⁶*Id.*

particles are heavier than water; thus, they settle easily from suspension in water.¹⁹⁷ In one study, ninety percent of amalgams settled from water within two hours.¹⁹⁸ Even though sedimentation is the most common removal technique followed by filtration, all of the techniques have at least a ninety-five percent removal effectiveness according to international standards.¹⁹⁹ A 2005 study reported that amalgam separators only require a modest increase in operating expenses.²⁰⁰ The study estimates that amalgam separators can be purchased for \$215 to \$6000 and can be operated for \$47 to \$100 per month.²⁰¹

Another environmental problem arises when people die with mercury amalgam dental fillings. Approximately thirty percent of adults choose cremation.²⁰² In 1999, a joint study by the EPA and the Cremation Association of North America found that crematoria released approximately 238 pounds of mercury that year.²⁰³ There is no national legislation requiring removal of amalgam fillings before cremation nor are there regulations requiring filtration devices on crematoria incinerators. Although two states introduced legislation regarding mercury emission from crematoria, neither bill passed.²⁰⁴

In Scotland, where cremation is one of the biggest sources of mercury pollution, the Scottish Government is taking action.²⁰⁵ The government's requirement of filtration devices on crematoria incinerators will reduce emission from crematoria by fifty percent by 2012.²⁰⁶ A temporary solution to the problem of pollution by crematoria is to require filtration devices. However, a permanent solution would be a ban on the use of mercury amalgam fillings; thus, in the future, pollution by the crematoria would cease to be a problem.

"To restrict the supply of mercury to society . . . is an effective way to reduce the risks to human health and the environment instead of using pollution control

¹⁹⁷*Id.*

¹⁹⁸M.D. Cailas et al., *Physico-chemical Properties of Dental Wastewater*, In Proceedings of the Water Environment Federation, 67th Annual Conference and Exhibition (Oct. 15-19, 1994).

¹⁹⁹Fan et al., *supra* note 194, at 585.

²⁰⁰New England Zero Mercury Campaign, *Taking a Bite Out of Dental Mercury Pollution* 18 (2005), http://www.mercurypolicy.org/new/documents/NEZMC_Report_Card_on_Dental_MercuryFINAL.pdf (last visited Feb. 23, 2007).

²⁰¹*Id.*

²⁰²Mercury in Dental Filling Disclosure and Prohibition Act, H.R. 4011, 109th Cong. § 2(b)(13) (2005).

²⁰³*See id.* § 2(b)(12).

²⁰⁴S. 616, 2005 Leg., 122nd Sess. (Me. 2005); H 661, 2005-2006 Leg., 84th Sess. (Minn. 2005).

²⁰⁵Alan Simpson, *Dead May Need Fillings Out Before Cremation*, DAILY MAIL (London), Dec. 13, 2004, at 22.

²⁰⁶*Id.*

measures and collecting and taking hazardous waste into safekeeping.”²⁰⁷ Although environmental legislation is good, it is not sufficient to solve the problem at hand. Federal legislation will address the problem at the source before it enters the human body or contaminates the environment.

IX. LEGISLATION IN OTHER COUNTRIES

Many countries have taken steps to limit the use of mercury amalgams and to protect their citizens. Sweden was the first country to ban all amalgam fillings.²⁰⁸ Sweden banned the use of amalgam in both adults and children since 1997.²⁰⁹ Austria, Denmark, and Norway also have a complete ban on the use of mercury amalgams.²¹⁰ A 1995 Canadian health report noted that “[d]ental amalgam contributes detectable amounts of mercury to the human body and is the largest source of mercury exposure for average Canadians.”²¹¹ The report concluded that “exposure [from dental amalgams] is not causing illness in the general population.”²¹² Currently, Canada recommends “mercury fillings not be given to children, pregnant women, or people with kidney problems, braces, or mercury hypersensitivity,” but Canada does not ban all amalgam filling.²¹³

Germany has a partial ban on mercury amalgams prohibiting the use of amalgams in patients with kidney impairment and strongly advising against the use of amalgams in children and pregnant women.²¹⁴ Further, the world’s leading amalgam manufacturing company, German-owned Degussa, has ceased manufacturing mercury amalgams entirely and has switched all of its production to alternative filling materials.²¹⁵ Many countries have banned mercury amalgams, but the United States, Canada, and many other Western European countries have yet to definitively follow the lead; however, legislation enacted at the state level indicates a shift in public opinion toward a ban on mercury amalgams.²¹⁶

²⁰⁷Pamela J. Anderson, *Ban Mercury Amalgam*, BANGOR DAILY NEWS (Bangor, Me.), Jan. 12, 2006, at A8.

²⁰⁸*BBC Panorama: The Poison in Your Mouth* (BBC television broadcast July 11, 1994).

²⁰⁹*Id.*

²¹⁰Philip P. Sukel, *Mercury Amalgam Fillings are Unsafe Viewpoint*, <http://www.Midwestdentistry.com/mercury%20amalgam%20silver%20fillings%20unsafe.asp> (last visited Aug. 1, 2006).

²¹¹67 Fed. Reg. 7620 (Feb. 20, 2002) (to be codified at 21 C.F.R. pt. 872).

²¹²*Id.*

²¹³Brown letter, *supra* note 102.

²¹⁴*BBC Panorama: The Poison in Your Mouth*, *supra* note 208. A 2002 study of both animals and humans revealed gender difference in the toxicokinetics of mercury. BERLIN, *supra* note 108, at 25.

²¹⁵*BBC Panorama: The Poison in Your Mouth*, *supra* note 208.

²¹⁶*Id.*

X. STATE-LEVEL LEGISLATION

California was the first state to address the mercury amalgam issue, albeit indirectly, with the passage of Proposition 65.²¹⁷ Because of the general language of Proposition 65, the statute applied to mercury amalgams and survived preemption by the Medical Device Amendment of the Food, Drug and Cosmetics Act.²¹⁸ Proposition 65 requires people who used certain identified reproductive toxins to warn patients and employees of the toxins' harm.²¹⁹ The list of identified toxins included mercury; thus, the warning requirement applied to mercury amalgams.²²⁰ When a group of amalgam manufacturers challenged Propositions 65's application to dental amalgam, the Court of Appeals for the Ninth Circuit upheld the statute's warning requirements as applicable to dental amalgams.²²¹

Other states have tried to regulate mercury amalgams through a more circuitous route. Connecticut passed the Mercury Reduction and Education Act of 2002.²²² This legislation "bans or phases out mercury-containing products" but does not specifically address dental amalgams.²²³ Mark Breiner, a Connecticut dentist, said his state banned mercury because it was dangerous to the environment. He said:

What's toxic to the environment doesn't belong in the mouth. You don't even have to have any science. All you have to have is common sense. If I take a filling out of a patient's mouth, that filling has to be treated as hazardous waste. I cannot throw that in the garbage...I could be fined and arrested. And before it goes in the mouth, it's treated as a toxic substance
²²⁴

After a group of environmentalists asked for clarification of the state's position on dental amalgams, the commissioner of the State Department of Environmental Protection announced that the state cannot legally ban dental amalgams.²²⁵ The commissioner reviewed the legislative history and the phrasing of the Act and concluded that the lawmakers' intent was not to ban mercury-containing dental amalgams through this legislation.²²⁶

²¹⁷Safe Drinking Water and Toxic Enforcement Act of 1986 ("Proposition 65"), CAL. HEALTH & SAFETY CODE §§ 25249.5-.13 (West 1999).

²¹⁸Medical Device Amendments of 1976 (MDA), 21 U.S.C. §§ 360(c)-(k) (2006).

²¹⁹Safe Drinking Water and Toxic Enforcement Act of 1986, §§ 25249.5-.13.

²²⁰*Id.*

²²¹*Comm. of Dental Amalgam Mfr. & Distrib. v. Stratton*, 92 F.3d 807, 813 (9th Cir. 1996).

²²²Mercury Reduction and Education Act of 2002, CONN. GEN. STAT. § 22a-616 (2006).

²²³Condon, *supra* note 162, at 1.

²²⁴Nancy Cohen, *Connecticut Weighs Health Risk of Dental Fillings* (National Public Radio Talk of the Nation radio broadcast Aug. 28, 2005).

²²⁵*Id.*

²²⁶*Id.*

The Pennsylvania Department of Environmental Protection started its Mercury Reduction Initiative in January 2004.²²⁷ The initiative aims to reduce mercury in the environment by collecting leftover elemental mercury from dental offices and offering best management practices for mercury-bearing amalgam waste.²²⁸

While Proposition 65's language was not specific to mercury amalgams, many other states including Maine,²²⁹ New Hampshire,²³⁰ Arizona,²³¹ Ohio,²³² and Washington²³³ have enacted legislation specifically addressing the mercury amalgam issue.²³⁴ There are two problems with this amalgam-specific state-level legislation. First, amalgam-specific state-level legislation may not survive federal preemption.²³⁵ While Proposition 65 evaded preemption due to its non-specificity with regard to mercury amalgams, amalgam-specific state-level legislation could be preempted if the statute were specific to a particular device.²³⁶ Second, although state-level legislation aims to protect patients, it does not extend far enough. Most of the state-level legislation requires dentists only to warn patients about the harmful effects of mercury.²³⁷ A mere warning is insufficient. A warning does not prevent dentists from continuing to use mercury amalgams in their practices. The state-level amalgam-specific legislation also does not require insurance companies or Medicaid to pay for alternative filling materials nor does it offer any sanctions for dentists who violate the statutes.²³⁸ Federal legislation would address and correct these shortcomings. For these reasons, federal legislation is the best solution to the mercury amalgam problem.

²²⁷PA DEP Partners with Pennsylvania Dental Association to Reduce Mercury Discharges, PR NEWSWIRE, July 21, 2005.

²²⁸*Id.*

²²⁹ME. REV. STAT. ANN. tit. 32, § 1094-C(1) (2002).

²³⁰H.B. 1251, 157th Gen. Ct., 2d. Reg. Sess. (N.H. 2002).

²³¹H.B. 2536, 45th Leg., 2d Reg. Sess. (Ariz. 2002).

²³²H.B. 598, 124th Gen. Assemb., Reg. Sess. (Ohio 2002).

²³³H.B. 2786, 57th Leg., Reg. Sess. (Wash. 2002).

²³⁴Chirba-Martin & Welshhans, *supra* note 10.

²³⁵*Id.* at 319. Preemption is the "principle that a federal law can supersede or supplant any inconsistent state law or regulation." BLACK'S LAW DICTIONARY 712 (8th ed. 2004).

²³⁶Chirba-Martin & Welshhans, *supra* note 10, at 320.

²³⁷ME. REV. STAT. ANN. tit. 32, § 1094-C (2001). *See also* N.H. REV. STAT. ANN. § 317-A:38 (2002) (requiring dentists to present patients with standardized pamphlets outlining the harmful effects of mercury amalgams and listing alternative dental filling options).

²³⁸Chirba-Martin & Welshhans, *supra* note 10, at 316.

XI. NATIONAL LEGISLATION

Representative Diane Watson of California first introduced federal legislation to combat mercury amalgam in 2002.²³⁹ The bill did not pass but was referred to the House Subcommittee on Health where it expired.²⁴⁰ The bill was reintroduced to the 109th Congress and, again, it was referred to the House Subcommittee on Health.²⁴¹ The current bill would amend the Food, Drug and Cosmetics Act to prohibit the “introduction into interstate commerce . . . mercury intended for use in a dental filling” effective January 1, 2009.²⁴² During the transition period, effective December 31, 2006, mercury intended for use in dental fillings must bear a label stating the following:

Dental amalgam contains approximately fifty percent mercury, a highly toxic element. Such product should not be administered to children less than eighteen years of age, pregnant women, or lactating women. Such product should not be administered to any consumer without a warning that the product contains mercury, which is a highly toxic element, and therefore poses health risks.²⁴³

Although Representative Watson’s legislation is commendable, it is lacking in two areas. The Mercury in Dental Filling Disclosure and Prohibition Act, similar to the amalgam-specific state-level legislation discussed above, fails to require insurance companies or Medicaid to pay for alternative filling materials and does not provide sanctioning for dentists who violate the statute. The solution to the first loophole in the legislation is to add language similar to that proposed in Washington that requires a “modification of dental insurance coverage to include mercury amalgam dental restorative alternatives.”²⁴⁴ Requiring insurance companies that provide dental benefits to cover non-mercury fillings to at least the same extent they cover mercury fillings would be beneficial. This change in the legislation would allow low income families on Medicaid to choose a desirable filling material, since currently under Medicaid their only choice is “mercury fillings or no fillings at all.”²⁴⁵ Persuading insurance companies to cover alternative materials would also aid

²³⁹Mercury in Dental Filling Disclosure and Prohibition Act, H.R. 4163, 107th Cong. (2002) (proposing a ban on mercury dental fillings and requiring warnings on mercury amalgams during the interim).

²⁴⁰*Id.*

²⁴¹Mercury in Dental Filling Disclosure and Prohibition Act, H.R. 4011, 109th Cong. (2005) (proposing a ban on mercury dental fillings effective January 1, 2009, and requiring warning labels on amalgams manufactured or sold during the interim).

²⁴²*Id.*

²⁴³*Id.*

²⁴⁴H.B. 2786, 57th Leg., Reg. Sess. (Wash. 2002). Further, the ADA’s own Principles of Ethics state “contract obligations (i.e. with insurance companies) do not excuse dentists from their ethical duty to put the patients’ welfare first.” AM. DENTAL ASS’N PRINCIPLES OF ETHICS & CODE OF PROF’L CONDUCT § 3 (2005). *See also* Fecteau v. State Employee Health Comm’n, 690 A.2d 500 (Me. 1997) (discussing the failure of insurance companies to provide coverage for removal of amalgam fillings).

²⁴⁵*Consumer Choice Hearing, supra* note 74.

moderate income families who are often forced to pay out-of-pocket for alternative filling materials because they are not covered by most insurance companies.²⁴⁶ Patients must not be induced into receiving mercury amalgams because they cannot pay for alternative filling materials; patients must be given a choice. Allowing patients a choice in their treatment alternative is not akin to giving authority to every alternative school of thought.²⁴⁷ "Without doubt, it is reasonable for the State to outlaw witch doctors, voodoo queens, bee-stingers and various other cults which no reasonably intelligent man would choose for the treatment of his ills. . . ."²⁴⁸ Continuing the analysis further to determine where the dividing line is between good medicine and quackery, the *England* court held "[u]nder all of the cases, we think it is that the State cannot deny to any individual the right to exercise a *reasonable choice* in the method of treatment of his ills, nor the correlative right of practitioners to engage in the practice of a useful profession."²⁴⁹ It is not unreasonable to fully inform dental patients of their treatment options for their tooth fillings. In addition to including insurance coverage of alternative filling materials in the statute, a section punishing dentists who violate the statute should also be added.

To address the oversight in sanctioning, the statutes must be amended to add a three-tiered penalty structure starting with a fine for the first violation, moving to a three-month suspension of the dental license for a second offense, and resulting in permanent suspension of the dental license for a third violation. This penalty structure may seem harsh, but failing to warn a patient of the potentially life-altering and debilitating effects of mercury before placing amalgams in their mouths is a breach of the dentists' fiduciary duty to their patients,²⁵⁰ and this failure should be punished.

A benefit of federal legislation, as opposed to state-level legislation, is uniformity. The same is true for the sanctions for violation of the statute. By stating the sanctions within the statute, it ensures that all offenders will be punished equally. It may seem like sanctioning dentists who violate this statute is an area which should be left to the states to regulate. However, *United States v. Dicter* held that the "right to practice medicine was property subject to forfeiture under 21 U.S.C. § 853."²⁵¹ While other professional licenses have been forfeited under federal law, Dicter was

²⁴⁶*Id.*

²⁴⁷American College for Advancement in Medicine, Position Paper on EDTA Chelation Therapy (1989).

²⁴⁸*England vs. Bd. of Med. Exam'rs*, 259 F.2d 626, 627 (5th Cir. 1958).

²⁴⁹*Id.* at 627.

²⁵⁰ AM. DENTAL ASS'N PRINCIPLES OF ETHICS & CODE OF PROF'L CONDUCT § 1 (2005). "The dentist has a duty to respect the patient's rights to self-determination and confidentiality." *Id.* "The dentist should inform the patient of the proposed treatment and any reasonable alternatives in a manner that allows the patient to become involved in treatment decisions." *Id.*

²⁵¹Wesley M. Oliver, *A Round Peg in a Square Hole: Federal Forfeiture of State Professional Licenses*, 28 AM. J. CRIM. L. 179, 183 (2001). "Property subject to forfeiture under § 853 includes tangible and intangible personal property, including rights, privileges, interests, claims, and securities." *United States v. Dicter*, 198 F.3d 1284, 1290 (11th Cir. 1999) (quoting 21 U.S.C. § 853(b)(2) (2006)).

the first appellant to challenge a federal court's statutory and constitutional authority to forfeit his license to practice.²⁵² *Dicter* lost his case and his medical license was revoked. The court held defendant's medical license is forfeitable to the government "irrespective of any provision of state law."²⁵³ Dentists, like medical doctors, receive their licenses to practice from the state. Therefore, even though a dental license is state-issued, it is likely that § 853 would still apply, and the federal government would be able to usurp a dental license from a dentist who violates federal law.

XII. CONCLUSION

Mercury amalgam use is waning as governments and the public become aware of the deleterious effects of mercury. However, the mercury amalgam controversy continues. As of now, litigation is an insufficient remedy for injured patients because it is hard for the patient plaintiff to meet the burden of proof with regard to proximate cause. Further, injured patients may not choose removal of amalgams because the removal process may be more harmful than living with daily exposure to mercury. In addition to an injurious effect of mercury in the mouth, amalgam waste from dental office wastewater and from crematoria are harming the environment. Other countries regulate or completely prohibit the use of mercury in some or all of their populations. Further, some states have recognized the risks of mercury amalgams and have enacted state-level legislation to combat the problem. The above remedies are helpful, but they are not completely adequate.

Congress must pass comprehensive national legislation to completely ban the use of mercury amalgam dental fillings in the United States. If dentists stop using mercury as a filling material now, the harm does not end. There will still be people injured from previously placed mercury fillings, and the issue of mercury amalgam waste removal still remains. Immediate action by Congress to ban mercury in future dental fillings would be valuable. As each session of Congress closes without the passage of the Mercury in Dental Filling Disclosure and Prohibition Act, the longer dentists are able to place a toxic substance into their unsuspecting patients' mouths. Congress needs to act quickly to amend the legislation to include insurance coverage of alternative materials and to include sanctions for those who violate the statute. Congress must pass legislation regulating the use of mercury amalgams in order to

²⁵²*Oliver*, *supra* note 251; *see, e.g.*, *United States v. Dekle*, 165 F.3d 826 (11th Cir. 1999) (medical license); *United States v. Cooper*, 880 F.2d 415 (6th Cir. 1989) (pharmacy license).

²⁵³*Dicter*, 198 F.3d at 1290. *Dicter* challenged the forfeiture of his medical license asserting that:

- (1) the district court improperly permitted an eleven-person jury to return the forfeiture verdict;
- (2) the district court erroneously instructed the jury that the elements of forfeiture must be proven by a preponderance of the evidence;
- (3) Defendant's medical license is not property subject to forfeiture under 21 U.S.C. § 853(a)(2);
- (4) the forfeiture of Defendant's medical license required compliance with state administrative procedures governing the revocation of a license by the Georgia medical licensing board;
- (5) the district court's conduct of forfeiture proceedings, while the state licensing board was investigating the revocation of Defendant's medical license, violated the Younger abstention doctrine;
- (6) the forfeiture of Defendant's medical license violates the Tenth Amendment; and
- (7) the forfeiture of Defendant's medical license violates the Eighth Amendment.

Id.

stop the perpetuation of harm on the American people by the hands of dental professionals.

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