ALASKA LEGISLATURE COMMITTEE FILES 1997-1998 8672

9735 SENATE STATE AFFAIRS

SB

90

Consumers Dental Choice Project

April 1997

Alaska Legislators
Alaska State Capitol Building
Juneau, Alaska 99801

I strongly support the add.. .5 AS 08.36 that will allow a dentist to recommend the removal and replacement of dental amalgam restorations with another approved dental material and not be faced with the threat of dental board sanction.

Yours very truly

Walter J. Hickel

Governor Walter Hickel

Consumers Dental Choice Project

April 1997

Alaska Legislators
Alaska State Capitol Building
Juneau, Alaska 99801

Dental Statute Additions

"Sec. 5. AS 08.36.315 is amended by adding a new subsection to read:

(b) Notwithstanding other provisions of this section, the board may not impose a disciplinary sanction on a dentist based solely on the grounds that the dentist removed or placed, or recommended the removal or placement of, a professionally recognized restorative material for a patient in the absence of demonstrable physical harm to the patient.

"Sec. 6. AS 08.36 is amended by adding a new section to read: **Sec. 08.36.355. Patient's right to choice in restorative material.** This chapter may not be construed to deprive a dental patient to the right to choose or replace a professionally recognized restorative material.

Dental Amalgam Restorations

Dental amalgam restorations consist of 50% mercury, 35% silver, 13% tin, 2% copper, and a trace amount of zinc. After an amalgam is installed in a tooth it slowly releases mercury and the other metals into the body. Mercury is the single most toxic non radioactive metal; the most minute amount damages human cells. This challenges systemic functions of every individual and of developing fetuses and can lead to health problems and birth defects. Mercury leakage and its subsequent pathophysiologic effects are slow processes. Most health problems caused by mercury poisoning are perceived many years after amalgams are installed.

Dentists have been installing amalgam restorations in patients teeth for more than 150 years. Ever sense they were first installed there has been an issue as to whether dental amalgam restorations cause adverse health effects.

Science Documenting Health Effects

In 1984 a group of conscientious dentists realized there was a need to scientifically explore the safety of amalgam restorations. Since then many renowned medical scientists at universities around the world have researched possible pathophysiologic effects associated with mercury leaking from amalgam restorations. Consequently there are a growing number of scientific studies that document pathophysiologic health effects associated with the amalgam. Some documented effects are summarized below.

- each amalgam leaks about 2 to 3 ug of mercury per day (i.e. from the amalgam into the body),
- more than 2/3 of excretable mercury in humans is derived from amalgams,
- mercury crosses the placenta into the tissue of a developing fetus,
- mercury is capable of inducing autoimmunity,
- mercury immediately and continually challenges the kidney's functioning,
- mercury can enhance the prevalence of multiple antibiotic resistant intestinal bacteria,
- people exposed to mercury on a sustained bases are at risk to lowered fertility,
- elevated levels of mercury are found in the brain tissue of Alzheimer's disease patients. In an on going study at the University of Kentucky, documentation is being developed which irrefutably connects many aspects of Alzheimer's disease to mercury leaking from dental amalgams.

Dental Board Disciplinary Action

The American Dental Association's (ADA) code of ethics makes the removal of serviceable mercury amalgam restorations for health reasons an issue of ethical conduct. According to the ADA's code of ethics a dentist who acknowledges that mercury amalgam restorations are toxic and recommends their removal for health reasons has acted unethically ("...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 of the dentist is improper and unethical...." ADA Resolution 42H-1986. Transaction 1986:536)

On the bases of the ADA's code of ethics, dental boards in other states have taken disciplinary action against dentists who have practiced their profession in accordance with current scientific knowledge and their conscience. The disciplinary action has ranged from restrictions placed on their practice to the loss of license. Today, more than 20 dentists in other states are under board review who remove amalgams for health reasons. The above dental statute additions will protect dentists in Alaska who want to inform patients of health risks associated with mercury leaking from amalgam restorations and then proceed with appropriate dental care if the patient desires. It is our belief that these dental statute additions will encourage a growth of both amalgam restoration removal and installation of the biological compatible composite restorations. With these dental statute additions our society will be healthier and its long term medical cost reduced.

More detailed information about "the dental amalgam issue" is presented on the world wide web at amalgam.org. We thank you in advance for considering this request. Please call if you have any questions.

Yours very truly,

G. Scott Crowther, P. E.

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HB1187_L.007

HOUSE COMMITTEE OF REFERENCE REPORT

Chairman of Committee Date

Committee on State, Veterans, and Military Affairs.

After consideration on the merits, the Committee recommends the following:

HB 97-1187 be amended as follows, and as so amended, be referred to the Committee of the Whole with favorable recommendation:

Amend printed bill, strike everything below the enacting clause, and substitute the following:

"SECTION 1. 12-35-118 (1) (ff), Colorado Revised Statutes, 1991 Repl. Vol., as amended, is amended, and the said 12-35-118 is further amended BY THE ADDITION OF A NEW SUBSECTION, to read:

12-35-118. Causes for denial of issuance or renewal - suspension or revocation of licenses - other disciplinary action - unprofessional conduct defined - immunity in professional review. (1) The board may deny the issuance or renewal of, suspend for a specified time period, or revoke any license provided for by this article or may reprimand, censure, or place on probation any licensed dentist or dental hygienist after notice and hearing, which may be conducted by an administrative law judge, pursuant to the provisions of article 4 of title 24, C.R.S., or it may issue a letter of admonition without a hearing (except

that any licensed dentist or dental hygienist to whom such a letter of admonition is sent may, within thirty days after the date of the mailing of such letter by the board, request in writing to the board a formal hearing thereon, and the letter of admonition shall be deemed vacated, and the board shall, upon such request, hold such a hearing) for any of the following causes:

(ff) Practicing outside the scope of ~~legitimate~~ dental or dental

hygiene practice.

(1.7) (a) NOTHING IN THIS SECTION SHALL BE CONSTRUED TO DEPRIVE ANY DENTAL PATIENT OF THE RIGHT TO CHOOSE OR REPLACE ANY PROFESSIONALLY RECOGNIZED RESTORATIVE MATERIAL, NOR TO PERMIT DISCIPLINARY ACTION AGAINST A DENTIST SOLELY FOR REMOVING OR PLACING ANY PROFESSIONALLY RECOGNIZED RESTORATIVE MATERIAL.

(b) NOTHING IN PARAGRAPH (a) OF THIS SUBSECTION (1.7) SHALL BE CONSTRUED TO PREVENT DISCIPLINARY ACTION AGAINST A DENTIST FOR PRACTICING DENTISTRY IN VIOLATION OF ARTICLE 35 OF THIS TITLE.

SECTION 2. Applicability. This act applies to all dentists licensed to practice dentistry pursuant to article 35 of title 12, Colorado Revised Statutes, who perform dental procedures that involve placement or replacement of dental restorative materials on and after the effective date of this act.

SECTION 3. Effective date. This act shall take effect upon the expiration of the period allowed for submitting a referendum petition pursuant to article V, section 1 (3) of the state constitution, unless a referendum petition is filed against this act within such period, in which case this act, if approved by the people, shall take effect on the date of the official declaration of the vote thereon by proclamation of the governor.".

** *** ** *** **

The Dental Amalgam Issue
prepared on April 1997 by the
Consumer Dental Choice Project
A Project of the National Institute for Science, Law and Public Policy
1424 16th Street, NW Suite 105
Washington, D.C. 20036

This display presents the following information regarding the dental amalgam issue.

I)Introduction of the Issue

In dental terminology *"silver"* is a euphemism for an amalgam which dentists place in our teeth as restoration material. Dental amalgam restorations consist of mercury, silver, tin, copper, and a trace amount of zinc. After an amalgam is installed in a tooth it slowly releases mercury and other metallic vapor into the body. Mercury is the single most toxic non radioactive metal; the most minute amount damages human cells. This challenges systemic functions of every individual and of developing fetuses and can lead to health problems and birth defects. Mercury leakage and its subsequent pathophysiologic effects are slow processes. Most health problems caused by mercury poisoning are perceived many years after amalgams are placed.

II)Historical Overview of Mercury Use in Dentistry

Lorscheider, F.L., Vimy, M.J., and Summers, A.O. *"Mercury Exposure from Silver Tooth Fillings: Emerging Evidence Questions a Traditional Dental Paradigm."* FASEB Journal (April 1995).

As early as the 7th century, the Chinese used a "silver paste" containing mercury (Hg) to fill decayed teeth. Throughout the Middle Ages, alchemists in China and

Europe observed that this mysterious silvery liquid, extracted from cinnabar ore, was volatile and would quickly disappear as vapor when mildly heated. Alchemist were fascinated that at room temperature Hg appeared to "dissolve" powders of other metals such as silver, tin, and copper. By the early 1800's the use of a Hg/silver paste as a tooth filling material was being popularized in England and France and it was eventually introduced into North America in the 1830s. Some early dental practitioners expressed concerns that the Hg/silver mixture (amalgam) expanded after setting, frequently fracturing the tooth or protruding above the cavity preparation, and thereby prevented proper jaw closure. Other dentists were concerned about mercurial poisoning, because it was already widely recognized that Hg exposure resulted in many overt side effects, including dementia and loss of motor coordination. By 1845, as a reflection of these concerns, the American Society of Dental Surgeons and several affiliated regional dental societies adopted a resolution that its members sign a pledge not to use amalgam. Consequently, during the next decade some members of the society were suspended for the malpractice of using amalgam. But the advocates of amalgam eventually prevailed and membership in the American Society of Dental Surgeons declined, forcing it to disband in 1856. In its place arose the American Dental Association (ADA), founded in 1859, based on the advocacy of amalgam as a safe and desirable tooth filling material. Shortly thereafter, tin was added to the Hg/silver paste to counteract the expansion properties of the previous amalgam formula.

There were compelling economic reasons for promoting dental amalgam as a replacement for the other common filling materials of the day such as cement, lead, gold, and tinfoil. Amalgam's introduction meant that dental care would now be within the financial means of a much wider sector to the population, and because amalgam was simple and easy to use, dentists could readily be trained to treat the anticipated large number of new patients. By 1895, the dental amalgam mixture of metals had been modified further to control for expansion and contraction, and the basic formula has remained essentially unchanged since then. Scientific concerns about amalgam safety initially surfaced in Germany during the 1920's, but eventually subsided without a clear resolution. At the present time, based on 1992 dental manufacturer specifications, amalgam (at mixing) typically contains approximately 50% metallic Hg, 35% silver, 9% tin, 6% copper, and a trace of Zinc. Estimates of annual Hg usage by U.S. dentists range from approximately 100,000 kg in the 1970's to 70,000 kg today. Hg fillings continue to remain the material preferred by 92% of U.S. dentists for restoring posterior teeth. More than 100 million Hg fillings are placed each year in the U.S. Presently, organized dentistry has countered the controversy surrounding the use of Hg fillings by claiming that Hg reacts with the other amalgam metals to form a "biologically inactive substance" and by observing that dentists have not reported any adverse side effects in patients. Long-term use and popularity also continue to be offered as evidence of amalgam safety.

III)Summary of Scientific Studies

III a)In 1984 a group of contentious dentists formed the International Academy of Oral Medicine and Toxicology (IAOMT). One of their objectives was to scientifically explore the safety of amalgam restorations. Since 1984 members of the IAOMT have inspired many renowned medical scientists at universities around the world to research possible pathophysiologic effects associated with mercury leaking from amalgam restorations. Consequently there are a growing number of

scientific studies that document pathophysiologic effects associated with the amalgam. Some of the more paramount scientific studies are summarized below.

III b)Lorscheider, F.L., Vimy, M.J., and Summers, A.O. *"Mercury Exposure from Silver Tooth Fillings: Emerging Evidence Questions a Traditional Dental Paradigm."* FASEB Journal (April 1995).

SUMMARY This document reviews results of animal and human studies of pathophysiologic effects related to mercury leaking from amalgam restorations. Some pertinent points presented include:

- every amalgam leaks about 15 ug of mercury per day,
- more than 2/3 of excretable mercury in humans is derived from amalgams,
- mercury crosses the placenta into the tissue of a developing fetus,
- mercury is capable of inducing autoimmunity,
- mercury immediately and continually challenges the kidney's functioning,
- murcury can enhance the prevalence of multiple antibiotic resistant intestinal bacteria,
- people exposed to mercury on a sustained bases are at risk to lowered fertility,
- elevated levels of mercury are found in the brain tissue of Alzheimer's disease patients.

III c)Vimy, M.J., Y. Takahashi, and F.L. Lorscheider *"Maternal-fetal distribution of mercury (203Hg) released from dental amalgam fillings."* Am. J. Physiol. 258 (Regulatory Integrative Comp. Physiol. 27): R939-R945 (1990).

ABSTRACT In humans, the continuous release of Hg vapor from dental amalgam tooth restorations is markedly increased for prolonged periods after chewing. The present study establishes a time-course distribution for amalgam, Hg in body tissues of adult and fetal sheep. Under general anesthesia, five pregnant ewes had twelve occlusal amalgam fillings containing radioactive 203Hg placed in teeth at 112 days gestation. Blood, amniotic fluid, feces, and urine specimens were collected at 1- to 3-day intervals for 16 days. From days 16-140 after amalgam placement (16-41 days for fetal lambs), tissue specimens were analyzed for radioactivity, and total Hg concentrations were calculated. Results demonstrate that Hg from dental amalgam will appear in maternal and fetal blood and amniotic fluid within 2 days after placement of amalgam tooth restorations. Excretion of some of this Hg will also commence within 2 days. All tissues examined displayed Hg accumulation. Highest concentrations of Hg from amalgam in the adult occurred in kidney and liver, whereas in the fetus the highest amalgam Hg concentrations appeared in the liver and pituitary glands. The placenta progressively concentrated Hg as gestation advanced to term, and milk concentration of amalgam Hg postpartum provides a potential source of Hg exposure to the newborn. It is concluded that accumulation of amalgam Hg progresses in maternal and fetal tissues to a stead state with advancing gestation and is maintained.

III d)Drasch et. al. *"Mercury Burden of Human Fetal and Infant Tissues"* European Journal of Pediatrics (August 1994).

ABSTRACT The total mercury concentrations in the liver (Hg-L), the kidney cortex (Hg-K) and the cerebral cortex (Hg-C) of 108 children aged 1 day- 5 years, and the Hg-K and Hg-L of 46 fetuses were determined. As far as possible, the mothers were interviewed and their dental status was recorded. The results were compared to mercury concentrations in the tissues of adults for the same geographical area. The Hg-K (n=38) and Hg-L (n=40) of fetuses and Hg-K (n=35) and Hg-C (n=35) of older infants (11-50 weeks of life) correlated significantly with the number of dental amalgam fillings of the mother. The toxicological relevance of the unexpected high Hg-K of older infants from mother with higher numbers of dental amalgam fillings is discussed. Conclusion Future discussion on the pros and cons of dental amalgam should not be limited to adults or children with their own amalgam fillings, but also include fetal exposure. The unrestricted application of amalgam for dental restorations in women before and during the child-bearing age should be reconsidered. Abbreviations Hg-C total mercury concentration in the cerebral cortex (ng/g wet weight). Hg-K total mercury concentration in the renal cortex (ng/g wet weight). Hg-L total mercury concentration in the liver (ng/g wet weight).

III e)An on-going study at the University of Kentucky has linked many aspects of amalgam mercury to brain tissue damage found in patients with Alzheimer's Disease. Two abstracts of this study are presented below.

III e1)Lorscheider, F. L., Vimy, M.J., Pendergrass, J.C., Haley, B.E., *"Mercury Vapor Exposure Inhibits Tubulin Binding to GTP in Rat Brain: A Molecular Lesion also Present in Human Alzheimer Brain."* FASEB Journal 9(4): A-3845. FASEB Annual Meeting, Atlanta, Georgia (March 10, 1995).

ABSTRACT Methyl mercury will interact with tubulin causing disassemble of microtubules that function to maintain neurite structure. Numerous reports also establish that mercury vapor (Hg0) is continuously released from "silver" amalgam tooth fillings into mouth air.

In this present study rats were exposed to Hg0 4 hr/day for 0, 2, 7, 14, and 28 days at 250 mcg Hg/m3 air, a concentration present in mouth of humans with large numbers of amalgam fillings. Average rat brain Hg concentrations increased significantly (40-100 fold) with duration of Hg0 exposure.

By day 14 of Hg0 exposure, photoaffinity labeling of the b-subunit of the tubulin dimer with (a32P)8N3GTP in brain hamogenates was decreased 75% , as seen on analysis of SDS-PAGE autoradiograms.

The identical neurochemical lesion of similar magnitude is evident in Alzheimer brain homogenates when compared to human age-matched controls. Since the rate of tubulin polymerization is dependent upon binding of tubulin dimers to GTP, we conclude that chronic inhalation of low-level Hg0 can inhibit polymerization of tubulin essential for formation of microtubules.

III e2)Pendergrass, J., Israel, M., and Haley, B. *"The Deleterious Effects of Low Micromolor Mercury on Important Brain and Cerebrospinal Fluid Proteins"* American Association of Pharmaceutical Scientists, Annual Meeting, Miami, Florida (November 1995).

ABSTRACT Alzheimer's Disease (AD) is the most common cause of adult onset dementia. There is no effective treatment or proven diagnostic indicator of AD. While the etiology and pathogenesis of AD are not known, there have been several

published reports of altered protein-nucleotide interactions.

Our laboratory developed the technique of nucleotide photoaffinity labeling as a method for identifying the nucleotide binding domains of several important enzymes. We have also shown this technique to be very sensitive and reliable tool for identifying changes in nucleotide-proteins interactions when comparing AD brain and CSF (cerebrospinal fluid) to non-demented control tissues. For example, we have shown using 32P8N3GTP and 32P8N3ATP that b-tubulin and creatine kinase (CK) interactions, respectively, are aberrant in AD brain homogenates relative to age-matched neurologic controls. This is despite both proteins being present near control levels, indicating that both tubulin and CK have been modified in the disease state.

Currently, photolabeling technology coupled with high resolution 2-D gels (IEF X SDS-PAGE) has been developed to enhance the ability to detect changes in protein-nucleotide interactions in brain and CSF samples. This approach shows what appears to be specific changes in the 32P8N3ATP photo labeling profile of 2D separated CSF proteins of AD patients versus those of non-demented control CSFs or in CSF of other neurodegenerative diseases.

This technology also shows that exposure of human control brain homogenates to 1-3 microM Hg2+-EDTA complex produces 32P8N3GTP-b-tubulin interactions comparable to that of AD brains.

IV)Patient Reports

IV a)Siblerud, R.L. *"Health Effects After Dental Amalgam Removal"* Journal of Orthomolecular Medicine. Vol. 5, No. 2, (1990).

SUMMARY A Utah dentist provided the names and addresses of approximately 300 people of who had their amalgams removed. A health questionnaire was sent to these people; 86 subjects responded. Eighty (80) % of the subjects reported that they felt better following amalgam removal. Nearly all of the subjects 91% said they were glad their amalgams had been removed and 88% said they would do it again. An increase in happiness and peace of mind was experienced by 58% of the subjects. This evidence suggests that the well being of these subjects improved immensely after amalgam removal.

IV b)Mary Davis editor *"Defense Against Mystery Syndromes"* Chek Printing Co. March 1994

SUMMARY This book presents patient reported case histories, where they associate their health problems to dental amalgam mercury. Case histories include: Chronic Fatigue Syndrome, Seizures, Memory Loss, Migraines, Multiple Allergies, Multiple Sclerosis, Depression, Lupus, Maldigestion, Chemical Sensitivities, Insomnia, Miscarriages, Paralysis, Sinus Problems, Emotional & Mental Disorders, Infertility, Endometriosis, Crohn's Disease, Rashes, Anxiety, Tremors & Spasms, Amyotrophic Lateral Sclerosis, Universal Reactor and many others.....

V)Proper Amalgam Removal

WARNING If you have a serious health problem consult a medical doctor who is informed on proper removal protocols before having your amalgams removed.

IAOMT Standards of Care, Preferred Procedure, *"Reducing Mercury Vapor*

Exposure for the Patient During Amalgam Removal." (September 1992)

The IAOMT has currently established the following amalgam removal protocols. If these protocols are followed then the amount of mercury released during amalgam removal is reduced.

- place a rubber dam around the tooth to isolate it from the body,
- provide an alternative source of air to the patient,
- place a saliva ejector under the dam to remove mercury vapor that penetrates the latex,
- use high volume evacuation with isolate attachment,
- section amalgams and remove in as large pieces as possible,
- remove and properly dispose of rubber dam and mercury after amalgam removal.

Other amalgam removal precautions in addition to the protocols listed above include:

- remove no more than two amalgams per appointment,
- time amalgam removal appointments at least one month apart.
- administer intervenes Vitamin C before removal (Hg has a greater affinity to Vitamin C that is present in the blood than it does for body tissue),

VI)Amalgam Removal Studies

VI a)This study measures the mercury level when amalgams are removed not following the protocols presented above in V.

Molin, M., Bergman B., Marklund, S.L., Schutz, A., Skerfving, S., *"Mercury, Selenium, and Glutathione Peroxidase Before and After Amalgam Removal in Man"* Acta Odontal Scandinavia; 48:189-202. Oslo. ISSN 0001-6357 (1990).

ABSTRACT In 10 healthy persons all amalgam fillings were replaced with gold inlays. Blood and urinary levels were measured on 10 occasions during a 4-month period before and a 12-month period after amalgam removal. These variables were also measured three times in 10 healthy controls. A strong statistically significant relation was found between plasma mercury values and both the total number of amalgam surfaces ($r=0.71$, $p=0.0006$) and the total surface area of the fillings ($r=0.73$, $p=0.004$). In the immediate post removal phase plasma mercury rose three- to four-fold, whereas the urinary and erythrocyte mercury rose about 50%. These peak values declined to the pre removal level at about 1 month after removal. Twelve months after the removal plasma and urinary mercury levels were reduced to 50% and 25%, respectively, of the initial values for the experimental group. Apart from the significantly lower plasma selenium values 5 and 10 days after removal no significant differences were found with regard to plasma selenium or erythrocyte glutathione peroxidase either within or between the experimental and the control groups. A large number of supplementary biochemical analyses did not show any influence on organ functions or any differences between the groups before or after the amalgam removal. Amalgam fillings considerably contributed to the plasma and urinary mercury levels.

VI b)This study measures the mercury level when amalgams are removed following the protocols presented above in V.

Molin, M., Berglund, J.R., Mackert, J.R., *"Kinetics of Mercury in Blood and Urine after Amalgam Removal."* J. Dental Research, 74:420,IADR abstract 159, (1995).

ABSTRACT Even through a number of studies have not been able to reveal any correlation between subjective symptoms and amalgam load there still are speculations whether patients with subjective symptoms related by the patients themselves to their amalgam fillings could have a changed pattern of elimination of mercury. The aim of the present investigation was to study the elimination half-time of mercury in plasma, erythrocytes and urine over an extended period of time after amalgam removal in a group of 10 patients with subjective symptoms by the patients themselves referred to their amalgam fillings and a group of 8 healthy subjects. The average number of occlusal and total amalgam surfaces in the patient group were 13.0 (range 4-20) and 44.4 (range 24-68), respectively. Corresponding figures in the control group were 12.9 (range 10-16) and 40.9 (range 24-63).

The amalgam removal using rubber dam, water spray cutting and high volume vacuum evacuator, was carried out at one and the same time. Blood and urine samples were collected at two occasions before the amalgam removal, then blood was collected at thirty two occasions and urine at forty three occasions during the following year. The mercury content was analyzed by CVAAS technique.

The measured P-, Ery- and U-Hg concentrations before amalgam removal were slightly higher in the control group 6.4+3.3 nmol/L, 19.4+6.6 nmol/L, and 2.7+1.3 nmol/nmol creatinine respectively than in the symptom group 5.6+1.8 nmol/L, 14.8+8.8 nmol/L, and 1.6+0.9 nmol/nmol creatinine respectively.

The Hg-concentrations did not significantly increase in the two groups after amalgam removal. Six days after the removal the plasma mean concentration was significantly decreased at P level and ten days after the decrease was at a permanent P level. The mean Ery-Hg level was significantly decreased after eleven days (p), a level that remained stable for the rest of the year. The mean U-Hg level was significantly decreased one month after the removal and after six months the mean level was reduced with 80 % compared to the initial level in both groups.

The conclusion to be drawn for the present study is that the symptom group did not have a changed pattern of elimination of mercury compared to the healthy group.

VII)Pregnancy Precaution

The continuous release of mercury from amalgam restorations may be responsible for a portion of birth defects seen today. While you might wish to avoid any further exposure to this material by having your fillings removed immediately, an unborn baby is very much at risk to mercury in its mother's blood. When amalgam filling are removed or an amalgam-filled tooth is extracted, a surge of mercury may be released into the bloodstream. So women who are pregnant should not have amalgam fillings removed. Women should have their amalgam fillings removed at least one year in advance of when they intend to become pregnant and discuss the risk with an informed medical doctor or dentist.

VIII)American Dental Association Positions'

VIII a)Journal of the American Dental Association (April, 1990).

The strongest and most convincing support we have for the safety of dental amalgam is the fact that each year more than 100 million amalgam fillings are placed in the United States. And since amalgam has been used for more than 150 years, literally billions of amalgam fillings have been successfully used to restore decayed teeth.

VIII b)The Superior Court of the State of California Case No. 718228, Demurrer (October 22, 1992).

The American Dental Association (ADA) owes no legal duty of care to protect the public form allegedly dangerous products used by dentists. The ADA did not manufacture, design, supply or install the mercury-containing amalgams. The ADA does not control those who do. The ADA's only alleged involvement in the product was to provide information regarding its use. Dissemination of information relating to the practice of dentistry does not create a duty of care to protect the public from potential injury.

VIII c)The American Dental Association's (ADA) code of ethics makes the removal of serviceable mercury amalgam restorations an issue of ethical conduct. In the ADA's point of view, it is ethical for a dentist to place mercury amalgam restorations in a patient and claim their safety. However, according to the ADA's code of ethics a dentist who acknowledges that mercury amalgam restorations are toxic and recommends their removal has acted unethically ("...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 of the dentist is improper and unethical..." ADA Resolution 42H-1986. Transaction 1986:536) On the bases of the ADA's code of ethics, state dental boards have taken disciplinary action against mercury free dentists who have practiced their profession in accordance with current scientific knowledge and their conscience. The disciplinary action has ranged from restrictions placed on their practice to the loss of license.

IX)Amalgam Lawsuit

Bio-probe Newsletter, Volume 12, Issue 6 (November 1996).

After considering evidence and extensive arguments from attorneys for the plaintiff and defendants, the judge in the California case of Tolhurst v. Johnson & Johnson Consumer Products, Inc. ruled that it is not generally accepted in the scientific community that mercury from amalgam dental fillings is capable of causing Guillain Barre' Syndrome, the affliction allegedly suffered by plaintiff Tolhurst. The judge therefore suppressed any evidence at the trial demonstrating that mercury was the cause of the plaintiff's illness. The evidentiary hearing was held in response to a defense motion based on the *Frye* rule. This rule requires a plaintiff to demonstrate that the scientific tests, techniques, and methods on which he/she intends to rely at trial are "sufficiently established to have gained general acceptance in the particular field in which it belongs." The test emphasizes a comparison of the members of the relevant scientific community who do or do not consider the proposed scientific test, method, or technique as valid and reliable.

X)Government Phase Outs

In the interest of protecting their citizens' health, Sweden, Germany, Denmark,

Austria, Finland and Canada have recently taken steps to limit and phase out the use of amalgam restorations.

The United States of America Food and Drug Administration has not recently reviewed the safety of amalgam restorations.

XI)To Take Action

To participate in this great work please write or speak to your congressman or other government officials and request that they review and investigate the dental amalgam issue.

XII)Organizations

XII a)Dental Amalgam Mercury Syndrome (DAMS)

A support group of dental mercury victims who feel a strong obligation to inform fellow citizens of the health hazards associated with amalgam fillings. Most of the dedicated individuals involved in DAMS are victims and volunteers. DAMS can be reached at:

DAMS, Inc.
1701 Buffalo Dancer Trail, NE
Albuquerque, NM 87112

XII b) International Academy of Oral Medicine and Toxicology (IAOMT)

If you are a mercury-free dentist or are contemplating going mercury-free, you need to join the IAOMT. The IAOMT has helped fund or has been the catalyst for much of the current scientific research demonstrating that dental amalgam is not the benign dental material that 150 years of use and the ADA would like you to believe. Furthermore, the IAOMT is doing something about Standards of Care and Protocols that protect you, your staff and the patient. For membership contact:

IAOMT
P.O. Box 608531
Orlando, FL 32860-8531

XII c)American College of Advancement in Medicine (ACAM)

An association of doctors who practice alternative or complementary medicine. Most of them also practice celation therapy, which is used to detoxify the body.

ACAM
P.O. Box 3427
Laguna Hills, CA 9265

XI d) Consumer Dental Choice Project (CDCP)

A project of the National Institute for Science, Law, and Public Policy created to "level the play field " between the powerful state Dental Boards and all licensed dentists, whether or not mercury-free. Furthermore, CDCP has grown to involve Governors, Attorney Generals, and Directors of Health in the fight to allow dentists to practice which ever way is safe, effective, and within their professional opinion.

CDCP
1424 16th Street, NW Suite 105

Washington, D.C. 20036

XIII)Books Available

Bio-Probe Inc. has several books pertaining to dental amalgam mercury. They advertise these books on the world wide web at http://www.bioprobe.com.

XIV)Newsletters

A quarterly International DAMS Newsletter is published at DAMS, Inc., 1701 Buffalo Dancer Trail, NE, Albuquerque, NM 87112. The subscription price is $25.00 per year.

The Bio-Probe Newsletter is published bi-monthly. Editorial office is at 5508 Edgewater Dr., Orlando, FL 32810. The subscription price is $65.00 per year for USA and Canadian subscribers, and $85.00 per year for other countries. Postage paid at Orlando.

XV)Hippocratic Oath

"...I will prescribe regimen for the good of my patients according to my ability and my judgment and never do harm to anyone. To please no one, will I prescribe a deadly drug nor give advice which may cause his death. If I keep this oath faithfully, may I enjoy my life and practice my art, respected by all men and in all times; but if I swerve from it or violate it, may the reverse be my lot."

Be kind and compassionate to one another, forgiving each other, just as in Christ God forgave you. Ephesians 4:32.

IAOMT
Standards of Care

Preferred Procedure

Reducing Mercury Vapor Exposure for the Patient During Amalgam Removal

Preferred Procedure Code	AGPTHYG.1
Received	9/4/92
Scientific Review	9/4/92
Standard of Care Review	9/6/92
IAOMT Board Review	9/27/92
Provisional Approval	
Approval	9/27/92
No Opinion	
No Approval	

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City: Arlington Heights **State:** Il. **Zip:** 60004 **Country:** USA

Are you a member of IAOMT? _XX_ Yes ____ No **Non-member Application Fee: $25.00.**

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1. **Name of preferred procedure:** Reducing Mercury Vapor Exposure to the Patient During Amalgam Remov
2. **Alternative name(s) of preferred procedure:**
3. **What is this preferred procedure related to?** ____ Medicine _XX_ Dentistry
4. **Is this preferred procedure a .....?** ____ Product _XXX_ Procedure ____ Equipment ____ Publication
5. **Briefly describe the preferred procedure:** Two basic clinical techniques are described to decrease the ris of mercury vapor exposure to the patient during mercury amalgam removal: A) With a Rubber Dam B) Without a Rubber Dam
6. **Technique of preferred procedure:**
   - A) With a Rubber Dam
     1) Place rubber dam in the usual way
     2) Provide alternative source of air (Oxygen, Nitrous oxide, Room air)
     3) Place saliva ejector under dam to remove mercury vapor that penetrates latex
        IAOMT Data: 0-20 mcg/m^3
     4) Use high volume evacuation with isolate attachment (enhance with 2 evacuation pumps and/or auxiliary evacuation)
        IAOMT Data:
     5) Use copious amount of water in spray
     6) Section amalgams and remove in as large pieces as possible
     7) Remove and dispose of rubber dam immediately after amalgam removal
     8) Rinse and evacuate mouth immediately after removal of dam (use mercury vapor analyzer to guide length and thoroughness of oral cleansing)
     9) Rinse all instruments of mercury vapor used during removal (mirror, handpieces. etc.)

IAOMT
Standards of Care

Preferred Procedure

Reducing Mercury Vapor Exposure for Doctor & Staff During Amalgam Removal

Preferred Procedure Code	DRSTHYG.1
Received	9/4/92
Scientific Review	9/4/92
Standard of Care Review	9/6/92
IAOMT Board Review	9/27/92
Provisional Approval	
Approval	9/27/92
No Opinion	
No Approval	

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City: Arlington Heights **State:** Il. **Zip:** 60004 **Country:** USA

Are you a member of IAOMT? _XX_ **Yes** ____ **No** **Non-member Application Fee: $25.00.**

---

1. Name of preferred procedure: Reducing Mercury Vapor Exposure for Doctor and Staff During Amalgam Removal

2. Alternative name(s) of preferred procedure:

3. What is this preferred procedure related to? ____ **Medicine** _XX_ **Dentistry**

4. Is this preferred procedure a .....? ____ **Product** _XXX_ **Procedure** ____ **Equipment** ____ **Publication**

5. Briefly describe the preferred procedure: Various clinical techniques are described to decrease the risk c mercury vapor exposure to Doctor & Staff during mercury amalgam removal.

6. Technique of preferred procedure:

1) Use high volume evacuation with isolate attachment (enhance with 2 evacuation pumps and/or auxiliary evacuation)
2) Wear protective mask during removal (see below for mask manufacturers)
3) Use copious amounts of water in spray
4) Section amalgams and remove in as large pieces as possible

IAOMT data: 4 quadrants amalgam removal, one at a time, 3 fillings/quad, without rubber dam, with HVE & isolate attachment. In mcg/m^3 (Allen 9/8/92)

High Vol Evac	= 0
Stop HVE	= 10-50
10 second rinse	= 5-30
30 second rinse	= 0-15
50 second rinse	= 0

CORRECTION

THE FOLLOWING DOCUMENT(S)
HAVE BEEN REFILMED TO
ASSURE LEGIBILITY OR PAGINATION

IAOMT
Standards of Care

Preferred Procedure

Reducing Mercury Vapor Exposure for the Patient During Amalgam Removal

Preferred Procedure Code	AGPTHYG.1
Received	9/4/92
Scientific Review	9/4/92
Standard of Care Review	9/6/92
IAOMT Board Review	9/27/92
Provisional Approval	
Approval	9/27/92
No Opinion	
No Approval	

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City: Arlington Heights **State:** Il. **Zip:** 60004 **Country:** USA

Are you a member of IAOMT? _XX_ **Yes** ____ **No** **Non-member Application Fee: $25.00.**

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1. **Name of preferred procedure:** Reducing Mercury Vapor Exposure to the Patient During Amalgam Remov

2. **Alternative name(s) of preferred procedure:**

3. **What is this preferred procedure related to?** ____ **Medicine** _XX_ **Dentistry**

4. **Is this preferred procedure a .....?** ____ **Product** _XXX_ **Procedure** ____ **Equipment** ____ **Publication**

5. **Briefly describe the preferred procedure:** Two basic clinical techniques are described to decrease the ris of mercury vapor exposure to the patient during mercury amalgam removal: A) With a Rubber Dam B) Without a Rubber Dam

6. **Technique of preferred procedure:**
   A) With a Rubber Dam
      1) Place rubber dam in the usual way
      2) Provide alternative source of air (Oxygen, Nitrous oxide, Room air)
      3) Place saliva ejector under dam to remove mercury vapor that penetrates latex
         IAOMT Data: 0-20 mcg/m^3
      4) Use high volume evacuation with isolate attachment (enhance with 2 evacuation pumps and/or auxiliary evacuation)
         IAOMT Data:
      5) Use copious amount of water in spray
      6) Section amalgams and remove in as large pieces as possible
      7) Remove and dispose of rubber dam immediately after amalgam removal
      8) Rinse and evacuate mouth immediately after removal of dam (use mercury vapor analyzer to guide length and thoroughness of oral cleansing)
      9) Rinse all instruments of mercury vapor used during removal (mirror, handpieces, etc.)

10) Immediately change patients protective wear and clean their face
11) Consider appropriate nutritional support before, during and after removal
12) Install room air purifiers or ionizers for everyone's well being

B) Without a Rubber Dam

1) Provide alternative source of air (Oxygen, Nitrous oxide, Room air)
2) Use high volume evacuation with isolate attachment (enhance with 2 evacuation pumps and/or auxiliary evacuation)
3) Use copious amounts of water in spray
4) Section amalgams and remove in as large pieces as possible
   IAOMT data: 4 quadrants amalgam removal, one at a time, 3 fillings/quad, without rubber dam, with HVE & Isolate attachment. In mcg/m^3 (Allen 9/8/92)

High Vol Evac	= 0
Stop HVE	= 10-50
10 second rinse	= 5-30
30 second rinse	= 0-15
50 second rinse	= 0

5) Rinse and evacuate mouth immediately after amalgam removal to remove vapor and chunks of amalgam (use mercury vapor analyzer to guide length and thoroughness oral cleansing)
6) Immediately change patients protective wear and clean their face
7) Consider appropriate nutritional support before, during and after removal
8) Install room air purifiers or ionizers for everyone's well being

7. Manufacturer(s):

1) Ionizer: American Environmental Systems, Colorado Springs, Co., (303) 530-7077
2) Jerome 411 Mercury Vapor Analyzer

8. Scientific Literature: Ochoa,1983; Gronka,1970; Roydhous,1985; Mantyla, 1976; Gordon, 1978; Schulein, 1984

9. Legal Aspects: 1990 USEPA Chronic Inhalation Concentration for Mercury: 0.3 micrograms / cubic mete of air

10. Historical Background: Common sense from scientific literature on mercury vapor and IAOMT data

AGPTHYG.1

IAOMT
Standards of Care

Preferred Procedure

Reducing Mercury Vapor Exposure for Doctor & Staff During Amalgam Removal

Preferred Procedure Code	DRSTHYG.1
Received	9/4/92
Scientific Review	9/4/92
Standard of Care Review	9/6/92
IAOMT Board Review	9/27/92
Provisional Approval	
Approval	9/27/92
No Opinion	
No Approval	

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City: Arlington Heights **State:** Il. **Zip:** 60004 **Country:** USA

Are you a member of IAOMT? _XX_ Yes ____ No **Non-member Application Fee: $25.00.**

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1. Name of preferred procedure: Reducing Mercury Vapor Exposure for Doctor and Staff During Amalgam Removal

2. Alternative name(s) of preferred procedure:

3. What is this preferred procedure related to? ____ Medicine _XX_ Dentistry

4. Is this preferred procedure a .....? ____ Product _XXX_ Procedure ____ Equipment ____ Publication

5. Briefly describe the preferred procedure: Various clinical techniques are described to decrease the risk c mercury vapor exposure to Doctor & Staff during mercury amalgam removal.

6. Technique of preferred procedure:

1) Use high volume evacuation with isolate attachment (enhance with 2 evacuation pumps and/or auxiliary evacuation)
2) Wear protective mask during removal (see below for mask manufacturers)
3) Use copious amounts of water in spray
4) Section amalgams and remove in as large pieces as possible

IAOMT data: 4 quadrants amalgam removal, one at a time, 3 fillings/quad, without rubber dam, with HVE & isolate attachment. In mcg/m^3 (Allen 9/8/92)

High Vol Evac	= 0
Stop HVE	= 10-50
10 second rinse	= 5-30
30 second rinse	= 0-15
50 second rinse	= 0

5) Rinse and evacuate mouth immediately after amalgam removal (use mercury vapor analyzer tc guide length and thoroughness of oral area cleansing)
6) Immediately remove Doctor's gloves and at least rinse hands, face, glasses, etc. thoroughly before proceeding .... then take off your mask
   IAOMT Data: Under gloves measurement, immediately after removal, HVE, without isolate attachment, without rubber dam, from 1 to 16 amalgams. 30-50 mcg/m^3 (1[illegible]2)
7) Change and/or clean patients protective wear and clean their face
8) Rinse mercury vapor from instruments exposed to mercury vapor (mirrors, han[illegible]pieces, etc.)
9) Consider appropriate nutritional support for Doctor & Staff before, during and after removals
10) Install room air purifiers or ionizers for everyone's well being

7. Manufacturer(s):
1) Ionizer: American Environmental Systems, Colorado Springs, Co., (303) 530-7077
2) 3M Mask: Special industrial mercury vapor mask. When not using place inside down, do not p into plastic bag
3) MSA Respirator: Mercury Vapor Respirator by Mine Safety Appliances, Pittsburgh, Pa.
4) Jerome 411 Mercury Vapor Analyzer

8. Scientific Literature: Ochoa,1983; Gronka,1970; Roydhous,1985; Mantyla, 1976; Gordon, 1978; Schulein, 1984

9. Legal Aspects: 1990 USEPA Chronic Inhalation Concentration for Mercury: 0.3 micrograms / cubic met of air and OSHA Work Place Exposure Limits

10. Historical Background: Common sense from the scientific literature on mercury vapor and IAOMT data

DRSTHYG.1

IAOMT
Standards of Care

Preferred Procedure

Reducing Mercury Vapor Exposure During Hygiene Procedures

Preferred Procedure Code MVEHYG.1

Received	9/15/91
Scientific Review	8/24/92
Standard of Care Review	8/24/92
IAOMT Board Review	9/27/92

Provisional Approval
Approval 9/27/92
No Opinion
No Approval

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City: Marietta **State:** Ga. **Zip:** USA **County:**

Are you a member of IAOMT? Yes **Non-member Application Fee $25.00.**

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1. **Name of preferred procedure:** Reducing Mercury Vapor Exposure During Hygiene Procedures

2. **Alternative name(s) of preferred procedure:**

3. **What is this preferred procedure related to?** ____ Medicine _xx_ Dentistry

4. **Is this preferred procedure a .....?** ____ Product _xxx_ Procedure ____ Equipment ____ Publicatio

5. **Briefly describe the preferred procedure:** Various clinical methods are described to decrease the risk of mercury vapor exposure from mercury dental amalgams during various hygiene procedures.

6. **Technique of preferred procedure:**
   1. Avoid touching amalgam fillings with a rubber prophy cup or prophy brush while polishing teeth.
      IAOMT Data:
   2. Avoid touching amalgam fillings with the ultrasonic scaler during scaling.
      IAOMT Data:
   3. Avoid direct spray of air/baking soda polishers onto amalgam surfaces.
      IAOMT Data:
   4. Avoid polishing (finishing) amalgam fillings unless absolutely necessary such as proximal surfac when preparing adjacent tooth for a crown. If you must polish use lots of water spray and high volume evacuation and any other room air precautions.
      IAOMT Data: during polishing interproximals with 3M disks
      without water spray and high volume evacuation – 500-900 mcg/m^3
      with water spray and high volume evacuation – 15-40 mcg/m^3
      upon stopping and after rinsing for 30 seconds – 0-5 mcg/m^3
      So rinse mouth thoroughly when finished with HVE.
   5. Use alternative source of air (O_2 or mask with room air) for patient for any procedure that may generate mercury vapors from existing dental amalgams.
   6. Use high volume evacuation and saliva ejector during procedures (patient may hold HVE near mouth and/or auxiliary evacuation system).
   7. Doctor/Hygienist/Staff should wear protective mask (see below) to minimize inhalation of mercur vapors.
   8. Patient should wear appropriate protection.

7. **Manufacturer(s):**
    1. 3M - Special industrial mercury vapor mask. When not using place inside down, do not put in plastic bag
    2. MSA - Mercury Vapor Respirator by Mine Safety Appliances, Pittsburgh, Pa.
    3. Jerome 411 Mercury Vapor Analyzer

8. **Scientific Literature:** Ochoa, 1983; Gronka, 1970; Roydhous, 1985; Mantyla, 1976; Gordon, 1978; Schulein, 1984; Skinner, Science of Dental Materials.

9. **Legal Aspects:** 1990 USEPA Chronic Inhalation Concentration: 0.3 micrograms / cubic meter of air

10. **Historical Background:** Common sense from the scientific literature on mercury vapor and IAOMT dat

MVEHYG.1

Eur J Pediatr (1994) 153:607–610

ORIGINAL PAPER

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Mercury burden of human fetal and infant tissues

Received: 18 November 1993
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Abstract The total mercury concentrations in the liver (Hg-L), the kidney cortex (Hg-K) and the cerebral cortex (Hg-C) of 108 children aged 1 day–5 years, and the Hg-K and Hg-L of 46 fetuses were determined. As far as possible, the mothers were interviewed and their dental status was recorded. The results were compared to mercury concentrations in the tissues of adults from the same geographical area. The Hg-K ($n = 38$) and Hg-L ($n = 40$) of fetuses and Hg-K ($n = 35$) and Hg-C ($n = 35$) of older infants (11–50 weeks of life) correlated significantly with the number of dental amalgam fillings of the mother. The toxicological relevance of the unexpected high Hg-K of older infants from mothers with higher numbers of dental amalgam fillings is discussed.

Conclusion Future discussion on the pros and cons of dental amlagam should not be limited to adults or children with their own amalgam fillings, but also include fetal exposure. The unrestricted application of amalgam for dental restorations in women before and during the childbearing age should be reconsidered.

Key words Mercury · Fetuses
Newborns · Infants · Dental amalgam

Abbreviations *Hg-C* total mercury concentration in the cerebral cortex (ng/g wet weight) · *Hg-K* total mercury concentration in the renal cortex (ng/g wet weight) · *Hg-L* total mercury concentration in the liver (ng/g wet weight)

Introduction

Recent investigations [1, 5] have shown in humans that dental amalgam fillings are the principal source of the mercury burden of adults, at least in geographic areas with a moderate consumption of fish and seafood. There is now widespread international focus on the pathophysiological significance of mercury that is continuously released from amalgam tooth fillings [6]. A result of one of these studies [5] was that some of the few infants investigated at that time showed relatively high mercury concentrations in their kidneys. To expand upon this finding, the objective of the present study was to determine the mercury concentration in tissues from a much larger population of infants and also from older children and fetuses. As far as possible the mothers were interviewed and their dental status determined.

Materials and methods

Liver and kidney specimens from 46 fetuses and liver, renal cortex and cerebral cortex from 108 children aged 1 day–5 years were collected during 1990–1992 from autopsies performed at the Pathological Institute and the Institute of Forensic Medicine of the University of Munich.

Abortions had mainly been induced for medical reasons. All infants had died suddenly and most were diagnosed as sudden infant death syndrome.

From 40 mothers of fetuses and 65 mothers of children, information on occupational, domestic or medical mercury burden were

available and the dental status of these mothers was recorded. In no case was an occupational exposure to mercury of the parents or an extreme fish consumption of the mother or the child reported. There was no case of an unusual mercury burden of the child (e.g. by a broken thermometer or the application of mercury containing pharmaceuticals).

Tissue samples of approximately 1 g were digested with 2 ml nitric acid (min. 65%, Supra pure grade, E. Merck, Darmstadt, FRG) for 6 h at 140°C in sealed Teflon lined pressure vessels (Parr Acid Digestion Bomb, H. Kürner, Rosenheim, FRG). After cooling the solutions were diluted with water to 10 ml and the concentrations of total mercury were determined by cold-vapour atomic absorption spectrometry after enrichment on a gold-platinum-net [19]. The accuracy of the method was established by standard reference materials (BCR reference material # 145, bovine liver and IAEA fish homogenate MA-A-2).

Total mercury concentrations were calculated as ng mercury per g tissue wet weight. Because the distribution of the values was nonparametric, medians were calculated. Subgroups were compared by the Mann-Whitney test. Correlations were determined by Spearman rank correlation.

In order to combine the results of fetuses and children into a single figure, the gestational age of the fetuses was converted to "negative weeks of life", i.e. 40 weeks minus gestation.

The group under investigation was classified in 4 subgroups according to the age:

1. Fetuses: from gestation until birth
2. Newborns and young infants: 0–10 weeks
3. Older infants: 11–50 weeks
4. Young children: 1–5 years

Table 1 Spearman rank correlation of the mercury concentrations in human tissues to the number of teeth with amalgam fillings of the mother

		Fetuses	Newborns and younger infants (0–10 weeks)	Older infants (11–50 weeks)	Younger children (1–5 years)
Liver	*n*	40	19	35	11
	r	+0.366	±0.000	+0.254	−0.163
	sig.	b	a	a	a
Renal cortex	*n*	38	19	35	11
	r	+0.537	+0.212	+0.454	+0.273
	sig.	d	a	c	a
Cerebral cortex	*n*	0	18	35	11
	r		+0.213	+0.372	−0.181
	sig.		a	b	a

Significance: a = < 95%; b = > 95%; c = > 99%; d = > 99.9%

Table 2 Comparison (Mann-Whitney-Test) of the mercury concentrations (ng Hg/g, medians) in tissues of human fetuses and older infants (age: 11–50 weeks) from mothers with either 0–2 or 10 or more teeth with amalgam fillings to age-matched adults (age: 16–45 years) with the same number of amalgam fillings as the mothers [5, 19]

		0–2 Teeth with amalgam	>10 Teeth with amalgam	Significan of differer
Liver	Fetuses	12.68 (n = 10)	25.85 (n = 14)	b
	Older infants	19.2 (n = 10)	34.4 (n = 8)	b
	Younger adults	18.7 (n = 41)	67.2 (n = 19)	d
Renal cortex	Fetuses	5.95 (n = 10)	10.3 (n = 11)	d
	Older infants	20.75 (n = 10)	115.6 (n = 8)	c
	Younger adults	47.3 (n = 41)	409.25 (n = 18)	d
Cerebral cortex	Older infants	2.05 (n = 10)	3.95 (n = 8)	a
	Younger adults	14.7 (n = 39)	25.7 (n = 19)	b

Significance: a = < 95%; b = > 95%; c = > 99%; d = > 99.9%

All results were compared parallel to those of 34 adults in th age range as the mothers (16–45 years) having at least tw with dental amalgam [5, 19].

Results

Statistical correlations between the mercury concent in various organs and the number of maternal teeth dental amalgam fillings are shown in Table 1.

In fetuses the mercury concentration in the liver L) was significantly correlated with the number of r nal teeth with amalgam fillings. No such correlatio found for Hg-L in the other age groups.

The mercury concentration in the renal cortex (H and maternal teeth with amalgam fillings were si cantly correlated in fetuses and older infants but not other age groups.

The mercury concentration in the cerebral cortex C) was significantly correlated with the number of n nal teeth with amalgam fillings in older infants only.

In fetuses and older infants significantly higher mercury concentrations in the liver and the renal c were found, if the mothers had ten or more teeth with tal amalgam in comparison to fetuses or older in from mothers with a maximum of two teeth with ama fillings (Table 2). Figures 1–3 illustrate the range of vidual mercury concentrations in liver, kidney cortex cerebral cortex, respectively, of all fetuses and child compared to the range of adults without dental amalg Many older infants have rapidly acquired a tissue bu of mercury in the kidney that is equivalent to or which ceeds the range of mercury in adults who do not h amalgam fillings.

Discussion

The mercury concentration in different tissues of fetu and infants has been rarely studied and has never been lated to maternal amalgam fillings. Suzuki et al. [20] ported the mercury concentrations in five brain and f liver specimens of fetuses and Markesbery et al. [14] two fetal, one term and three infant brains. Their rest lie within the same range of concentrations that we fou.

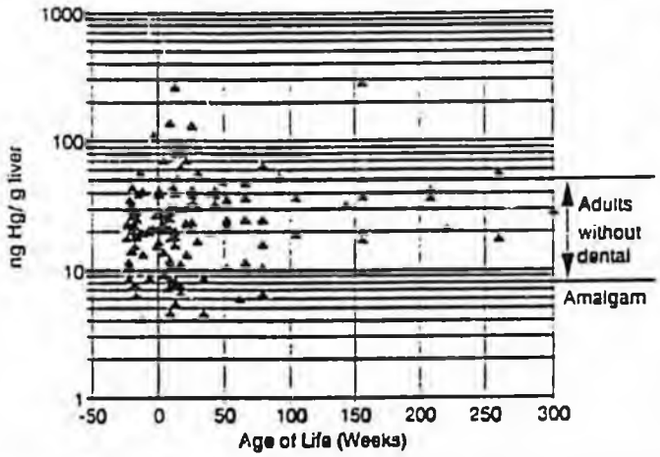

Fig. 1 Total mercury concentration in the liver of human fetuses and infants related to age of life

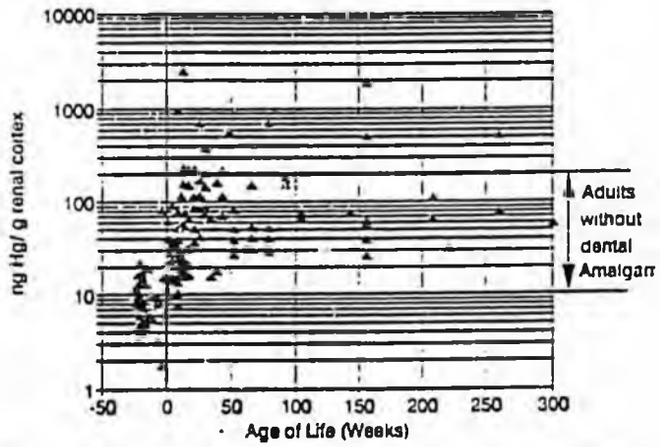

Fig. 2 Total mercury concentration in the renal cortex of human fetuses and infants related to age of life

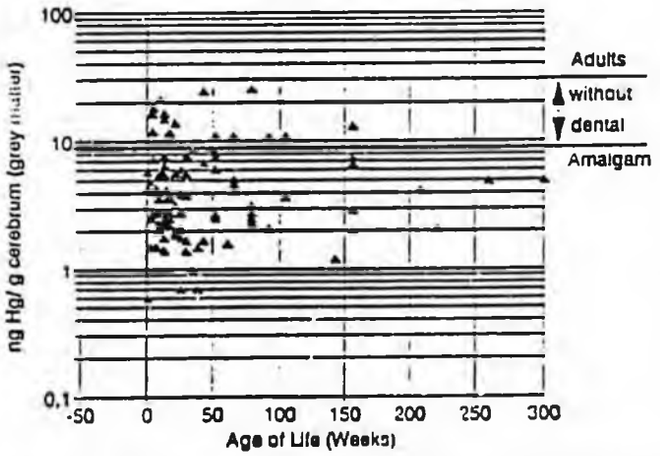

Fig. 3 Total mercury concentration in the cerebral cortex of human infants related to age of life

Data from earlier investigations [15, 16] are less reliable due to the limitations of analytical methods at that time.

Exposure of pregnant guinea pigs to mercury vapour [25, 26] or pregnant ewes to amalgam fillings (containing radioactive ^{203}Hg) [22] resulted in an increase of the mercury concentrations of the fetuses and the newborn. The placental transfer of mercury from the mother to the fetus depends on the maternal mercury burden [7, 10, 12, 21]. Since the number of dental amalgam fillings is significantly related to the mercury concentration in the maternal tissues of animals [22] and humans [5] the number of maternal amalgam fillings should also influence the mercury concentration in human fetal tissues. We were able to confirm this relationship with respect to the fetal liver and kidney. The avidity of maternal kidneys for mercury documented in Table 2 can be explained by the storage function of the maternal kidney for mercury. It can be assumed that the "mobile" mercury, available for a transfer through the placenta, derives predominantly from the maternal liver (and comparable compartments) and not from the maternal kidney. Moreover, the fetal liver seems to trap the transferred mercury to some extent [8, 12, 25, 26] and thus prevents a higher accumulation in the fetal kidney. The present findings in humans compare favourably with similar results reported earlier in sheep [22].

The mercury concentrations in the tissues of newborns and young infants were not well correlated with the number of maternal teeth with amalgam fillings. This may be explained by a superposition of the initial influence of the maternal dental amalgam on the mercury concentration in the infant tissues during pregnancy by a redistribution of mercury from the infant liver to the infant kidney and other tissues in the first months of life and a simultaneous new intake of mercury in this transient period of life [12, 26].

Maternal amalgam fillings appears to influence the Hg-C in older infants approximately as much as they influence Hg-C in adults. The influence on the Hg-K in older infants is approximately half so great as that of own fillings of adults (see Table 2).

Most of the babies under investigation were not nursed or nursed only for a few weeks. Hence it follows that the higher Hg-K and Hg-C of offspring from mothers with amalgam fillings is due at least partly to an exposure derived in utero and not from breastmilk. If and to what extent nursing by mothers with multiple amalgam fillings contributes to the mercury burden of the baby should be further investigated. Dental amalgam mercury does concentrate in sheep milk [22], however, Klemann et al. [9] found no statistically significant correlation between the mercury concentration in human breastmilk and the number of amalgam fillings of the mothers.

At the present time, the toxicity of mercury vapour from dental amalgams is being assessed through a variety of investigations [1]; however, the toxicological consequence of the relatively high mercury concentrations in the renal cortex of infants, as found in the present study, has not been determined. In contrast to the well-known vulnerability of the developing brain to an exposure to mercury vapour (most of the mercury from dental amalgam is released in this form) or methyl-mercury, there are

no reports that the infant kidney is more sensitive to inorganic mercury than the adult kidney [6, 10, 11, 13, 21, 23, 24, 27]. On the other hand, current evidence suggests that the nephrotic syndrome following absorption of mercury compounds results from an immunotoxic response [24]. Amalgam mercury has also been shown to alter several indices of kidney function in sheep [2]. Possible differences in the binding form of the mercury in the kidney of fetuses, infants and adults, e.g. to metallothionein or selenium, are presently not known [4, 17, 18].

The present findings clearly demonstrate that further discussion on the pros and cons of dental amalgam should not be focused exclusively on adults or children with their own amalgam fillings [3, 27], but also on the offspring.

From our results it can be concluded that infants can accumulate mercury, apparently derived from maternal amalgam fillings, in their kidneys to a similar extent as older children or adults do from their own fillings. Therefore the unrestricted application of amalgam for dental restorations in women before and during the child-bearing age should be reconsidered in analogy to the recommendation of the German Health Authorities from 1992 [3], which argued that because of a higher vulnerability of infants to mercury, amalgam cannot be further recommended for dental restorations for children up to 6 years and notably not during the first 3 years of life. At the very least, high numbers of amalgam fillings should be avoided for women before and during child-bearing age. In 1991, the WHO confirmed an earlier statement from 1980: "The exposure of women of child-bearing age to mercury vapour should be as low as possible" [24].

Acknowledgements The authors wish to acknowledge the financial support of this investigation by the Degussa AG, Frankfurt/Main and the generous assistance in the collecting of the fetal samples by the I. Gynaecological Clinic and the Institute of Pathology of the Ludwig-Maximilians-University, Munich.

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Maternal-fetal distribution of mercury (^{203}Hg) released from dental amalgam fillings

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VIMY, M. J., Y. TAKAHASHI, AND F. L. LORSCHEIDER. *Maternal-fetal distribution of mercury (^{203}Hg) released from dental amalgam fillings.* Am. J. Physiol. 258 (Regulatory Integrative Comp. Physiol. 27): R939–R945, 1990.—In humans, the continuous release of Hg vapor from dental amalgam tooth restorations is markedly increased for prolonged periods after chewing. The present study establishes a time-course distribution for amalgam Hg in body tissues of adult and fetal sheep. Under general anesthesia, five pregnant ewes had twelve occlusal amalgam fillings containing radioactive ^{203}Hg placed in teeth at 112 days gestation. Blood, amniotic fluid, feces, and urine specimens were collected at 1- to 3-day intervals for 16 days. From *days 16–140* after amalgam placement (16–41 days for fetal lambs), tissue specimens were analyzed for radioactivity, and total Hg concentrations were calculated. Results demonstrate that Hg from dental amalgam will appear in maternal and fetal blood and amniotic fluid within 2 days after placement of amalgam tooth restorations. Excretion of some of this Hg will also commence within 2 days. All tissues examined displayed Hg accumulation. Highest concentrations of Hg from amalgam in the adult occurred in kidney and liver, whereas in the fetus the highest amalgam Hg concentrations appeared in liver and pituitary gland. The placenta progressively concentrated Hg as gestation advanced to term, and milk concentration of amalgam Hg postpartum provides a potential source of Hg exposure to the newborn. It is concluded that accumulation of amalgam Hg progresses in maternal and fetal tissues to a steady state with advancing gestation and is maintained. Dental amalgam usage as a tooth restorative material in pregnant women and children should be reconsidered.

mercury vapor; mercury exposure; fetal mercury exposure; tooth fillings

IT IS WELL established in humans that the continuous release of Hg vapor from in situ dental amalgam, "silver" tooth restorations, is markedly increased for prolonged periods after chewing or tooth brushing (13, 15, 17, 18). The weight composition of these Hg-silver tooth fillings is typically 50% elemental Hg metal (14), and the levels of Hg vapor in the mouth are correlated with the number of such fillings (17, 18).

A very recent study in sheep has demonstrated by whole body image scan that radioactive Hg vapor released from dental amalgam fillings is initially absorbed at lung, gastrointestinal, and jaw tissue sites (6). However, the pattern of tissue distribution of such Hg over time remains unknown. Therefore, the primary objective of the present study was to establish a time-course distribution for amalgam Hg in body tissues of adult sheep.

Although it has long been known that Hg from sources other than dental amalgam can cross the placental barrier and be taken up by the fetus (2, 3), no evidence exists that fetal exposure to Hg will occur because of the presence of dental amalgam in the mother. Therefore, another objective of this investigation was to determine the extent to which dental amalgam Hg will accumulate in fetal tissues during the latter one-third of pregnancy.

METHODS

Five adult ewes (Dorset/Suffolk cross) of 3–5 yr of age, with an average body weight of 68.4 ± 7 kg were bred, and the day of mating was considered to be *day 0* of gestation. At ~112 days gestation ewes were prepared for fetal and dental surgery. Halothane general anesthesia was administered through an endotracheal tube fitted to a Narkovet-2 gas anesthetic machine, and the maternal jugular vein, fetal femoral and jugular veins, and the amniotic sac were cannulated with Tygon catheters that were treated with 7% tridodecylmethylammonium chloride (TDMAC) heparin complex solution (Polysciences, Warrington, PA). Catheters were exteriorized using procedures that we have previously employed in sheep (8). These chronic indwelling catheters permitted serial sample collection throughout the course of gestation. Ewes were placed in individual metabolic cages 48 h after surgery so that fecal and urine specimens could be monitored intermittently over 2 wk for Hg excretion. Fetal venous blood gases were monitored for pH, P_{CO_2}, and P_{O_2} at 2-day intervals after surgery to confirm viability and health of the fetus (Instrumentation Laboratory System, Lexington, MA, model 1301 pH blood gas analyzer). All animals were provided with water ad libitum and fed fresh hay twice daily throughout the course of the experiments.

At the time of fetal lamb surgery 12 radioactive occlusal amalgam fillings were placed in teeth of the ewe (three molars in each quadrant of the mouth). Dental procedures were as employed previously (6), and each trimmed and finished filling had a total alloy mass of ~850 mg of which 50% was pure elemental Hg. Before amalgam mixing, ^{203}Hg, which had a specific activity of 13 mCi/g (New England Nuclear, Boston, MA), was diluted 11-fold with nonradioactive elemental Hg. Each ewe received a total of ~7 mCi ^{203}Hg. After amalgam placement and trimming of the tooth fillings the oral

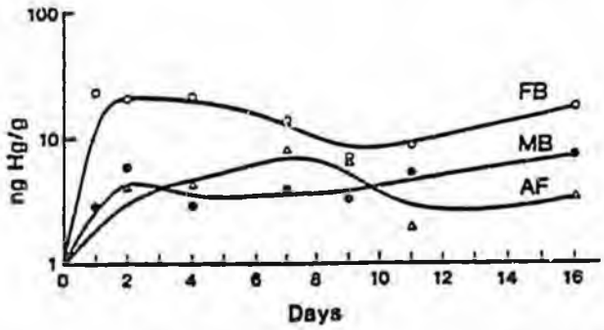

FIG. 1. Average concentration of Hg from dental amalgam in maternal blood (MB), fetal blood (FB), and amniotic fluid (AF) for 16 days after amalgam placement. Each point represents mean of 5 animals.

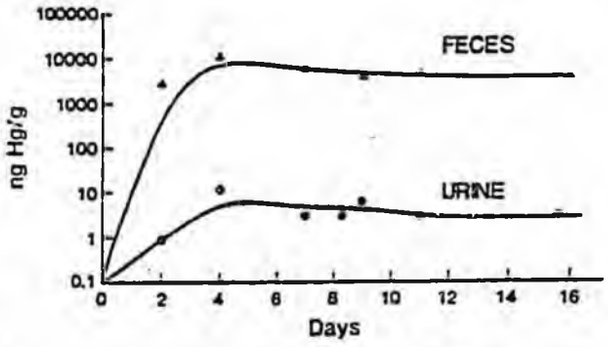

FIG. 2. Average concentration of Hg from dental amalgam excreted in maternal urine and feces for 16 days after amalgam placement. Each point represents mean of 5 pregnant animals.

cavity was flushed thoroughly with water and aspirated several times to remove amalgam particles.

Blood, amniotic fluid, feces, and urine specimens were collected at 1- to 3-day intervals, and the corresponding 24-h fecal mass and urine volume were recorded. Intraoral air Hg vapor was monitored intermittently in the ewe by procedures described previously (17). Animals were euthanized with pentobarbital sodium-saturated KCl on *days 16, 29, 73, 100,* and *140* (*days 16, 23, 25, 34,* and *41* for fetal lambs) after dental surgery, and tissue specimens were taken from a variety of maternal and fetal organs and weighed. Gastrointestinal tract samples were washed in isotonic saline to remove gut contents from the tissue specimens. Plasma was obtained by centrifugation, and separated red cells were washed with two volumes of saline. Total blood volume in the ewe was estimated to average 74 ml/kg (19). Within 48 h after parturition a 5-ml sample of milk was expressed from the breast of each ewe.

All tissue and fluid specimens were analyzed for radioactivity, and total Hg concentrations were calculated as previously described (6); corrections were made for isotopic decay ($t_{\frac{1}{2}} = 47$ days) and isotope specific activity; the dilution factor for nonradioactive Hg was added before mixing the amalgam. The final calculation value represented the total Hg from dental amalgam per gram (wet wt) of tissue or fluid. Data were plotted with average values as a function of days after amalgam placement using a best-fit-curve method to graphically depict patterns of Hg distribution (Harvard Graphics version 2.1, Software Publishing, Mountain View, CA).

RESULTS

The average intraoral air Hg vapor level in the five ewes during the present experiments was 44 μg Hg/m^3 (range 13–98) from 12 new amalgam restorations, which compares with average vapor levels in 10 human subjects after chewing of 43–45 μg Hg/m^3 from 12 occlusal amalgam restorations of variable age (18).

Figure 1 shows the average concentration of Hg (ng/g) from dental amalgam in maternal blood, fetal blood, and amniotic fluid during a 16-day period after amalgam placement for five pregnant ewes and their fetuses. Amalgam Hg was evident in all three fluids within 48 h when it reached a peak concentration. Elevated Hg levels were maintained for the 2-wk duration of specimen collection at ~4 ng/g in maternal blood (range 3–7) and amniotic fluid (range 2–8) and at ~16 ng/g (range 7–23) in fetal blood.

Figure 2 shows the average concentration of Hg (ng/g) from dental amalgam excreted in maternal urine and feces during a 16-day period after amalgam placement in

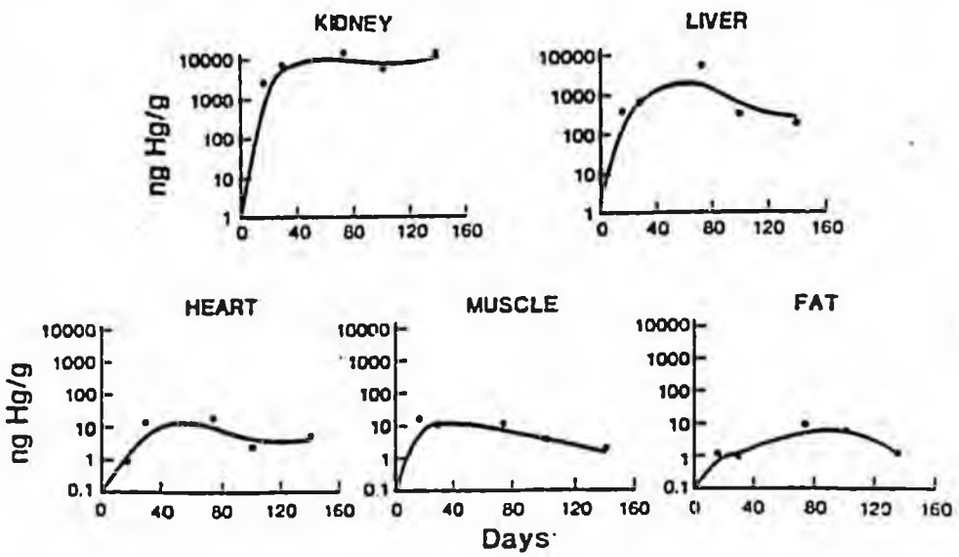

FIG. 3. Concentration of Hg from dental amalgam in kidney, liver, heart, muscle, and fat for each of 5 adult ewes autopsied at different times after amalgam placement.

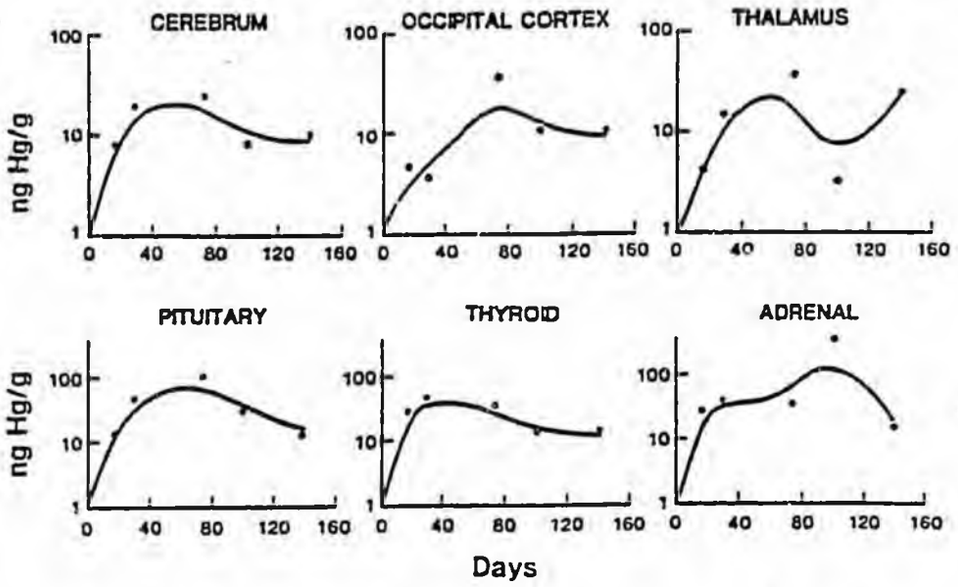

FIG. 4. Concentration of Hg from dental amalgam in brain cerebrum, occipital cortex, and thalamus and in pituitary, thyroid, and adrenal glands for each of 5 adult ewes autopsied at different times after amalgam placement.

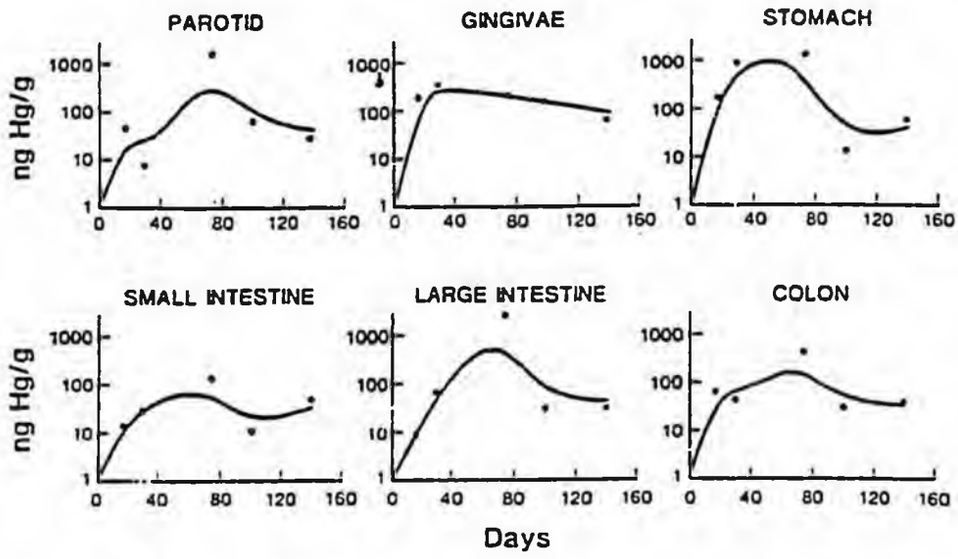

FIG. 5. Concentration of Hg from dental amalgam in oral and gastrointestinal tissues: parotid gland, gingivae, stomach, small intestine, large intestine, and colon for each of 5 adult ewes autopsied at different times after amalgam placement.

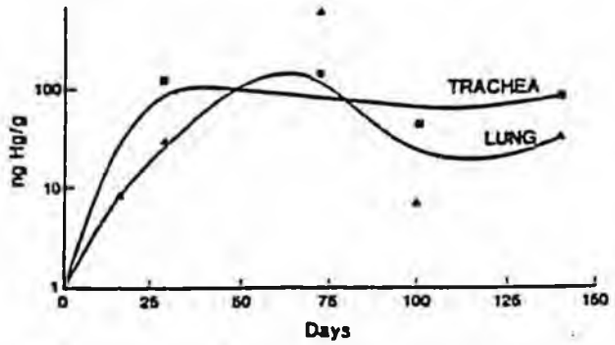

FIG. 6. Concentration of Hg from dental amalgam in lung and trachea for each of 5 adult ewes autopsied at different times after amalgam placement.

five pregnant ewes. Urinary levels rose rapidly and after *day 4* tended to plateau. The average urine value for this period was 5 ng/g (range 1–12) which, based on an average 24-h urine volume of 840 ml, would mean that as much as 10 μg Hg from amalgam was eliminated daily by the renal route. In contrast, the initial fecal Hg concentrations averaged 3,800 ng/g which, when corrected for an average fecal mass of 2,030 g/day, would mean that ~7.7 mg Hg from amalgam could be eliminated daily from the gastrointestinal tract during this 2-wk period. Thereafter, fecal Hg concentration measurements taken at time of autopsy showed a gradual decline such that by *day 73* after amalgam placement fecal Hg levels were less than one-half of the initial concentrations.

Figure 3 illustrates the concentration of Hg from dental amalgam in kidney, liver, heart (ventricle), gluteus muscle, and mesentery fat for each of five ewes autopsied at different times after amalgam placement. By 29 days, kidney Hg levels rose to ~9,000 ng Hg/g, and these levels were maintained throughout the 140-day duration of the study. A similar pattern of Hg concentration was observed in liver but with lower levels remaining at ~1,000 ng Hg/g until 140 days. This is in contrast to heart and muscle, which had Hg levels that plateaued at ~10 ng Hg/g, and fat, which had lower levels of Hg ranging from 1 to 5 ng/g.

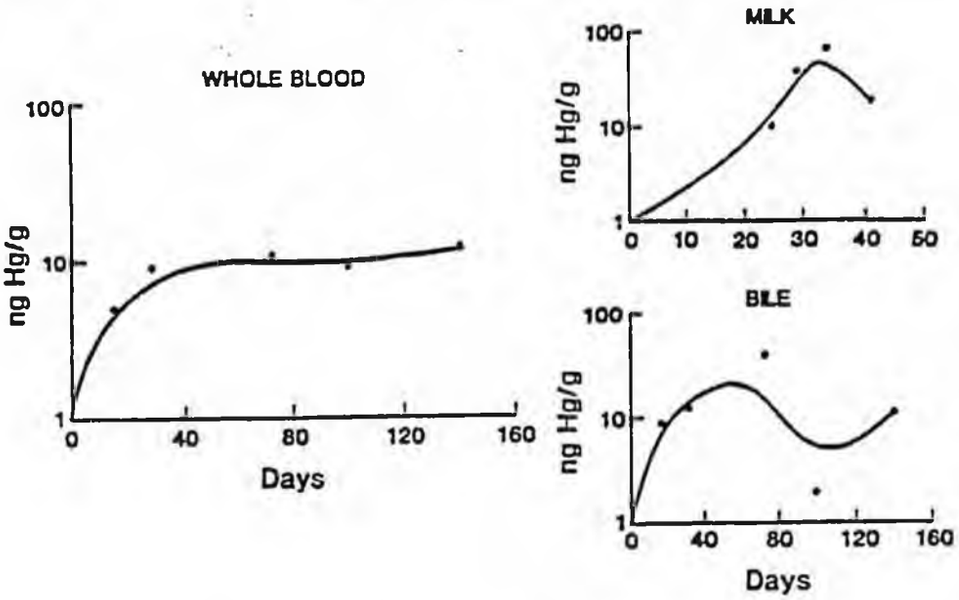

FIG. 7. Concentration of Hg from dental amalgam in whole blood, milk, and bile for each of 5 adult ewes autopsied at different times after amalgam placement.

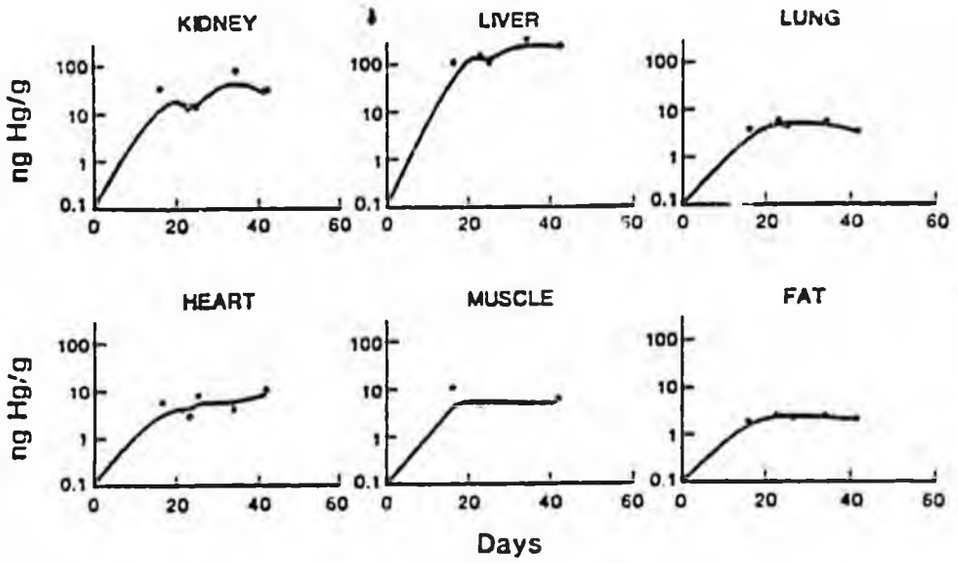

FIG. 8. Concentration of Hg from maternal dental amalgam in kidney, liver, lung, heart, muscle, and fat of 3–5 fetal lambs exposed in utero for various times after amalgam placement.

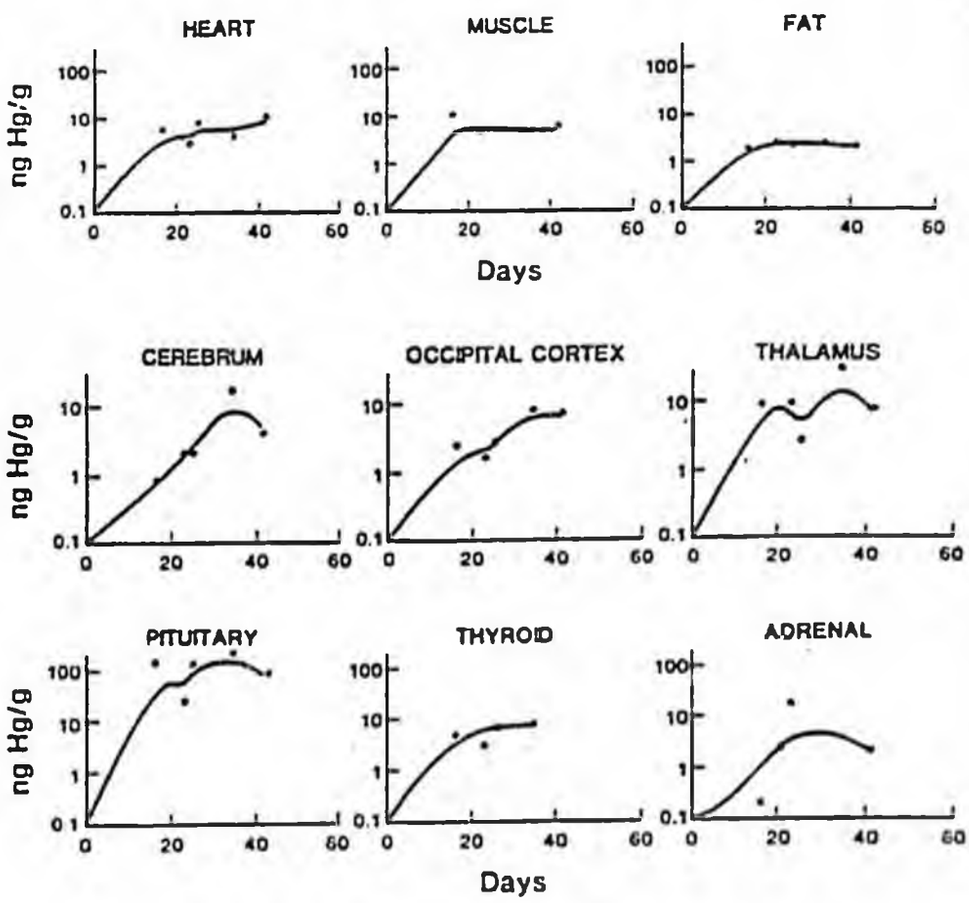

FIG. 9. Concentration of Hg from maternal dental amalgam in brain cerebrum, occipital cortex, and thalamus, and in pituitary, thyroid, and adrenal glands of 3–5 fetal lambs exposed in utero for various times after amalgam placement.

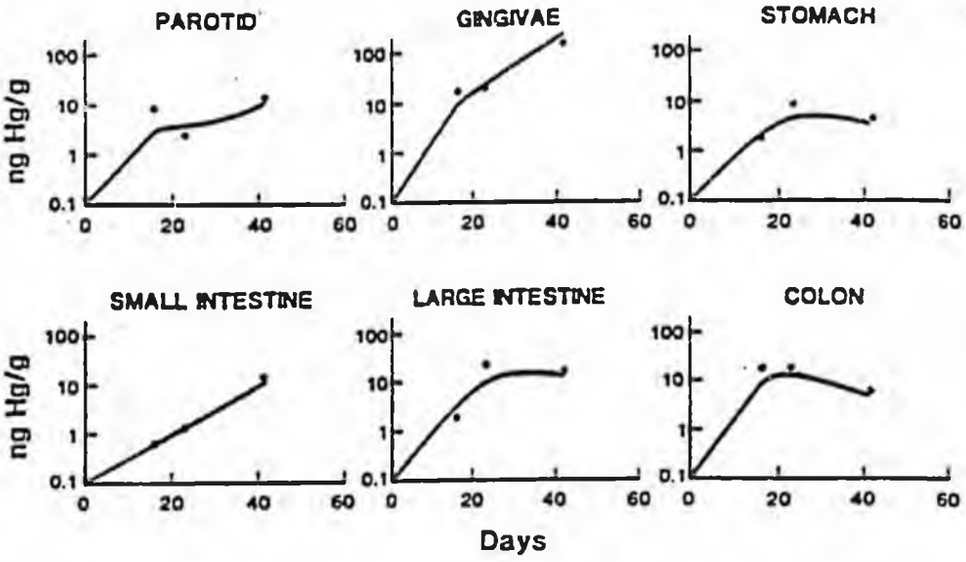

FIG. 10. Concentration of Hg from maternal dental amalgam in oral and gastrointestinal tissues: parotid gland, gingivae, stomach, small intestine, large intestine, and colon of 3–5 fetal lambs exposed in utero for various times after amalgam placement.

Figure 4 shows the concentration of Hg from dental amalgam in three regions of the brain and in three endocrine gland tissues in each of five ewes autopsied at different times after amalgam placement. Brain cerebrum, occipital lobe, and thalamus showed evidence of Hg concentration as early as 16 days, and from 29 to 140 days Hg levels ranged from 3 to 13 ng/g. After 29 days, pituitary, thyroid, and adrenal glands maintained somewhat higher Hg concentrations, ranging from ~10 to 100 ng/g.

Figure 5 depicts the concentration of Hg from dental amalgam in oral and gastrointestinal tissues from each of five ewes autopsied at different times after amalgam placement. Parotid gland had Hg levels ranging from 10 to 1,000 ng/g, whereas gingivae maintained a plateaued level of 200–300 ng Hg/g until 140 days. Stomach had Hg levels as high as 1,000 ng/g during the 140-day period, in contrast to small intestine, large intestine, and colon in which Hg levels ranged from ~10 to 200 ng/g.

Figure 6 shows the concentration of Hg from dental amalgam in respiratory tissues for each of five ewes autopsied at different times after amalgam placement. Lung had variable Hg levels ranging from 20 to 600 ng/g, and trachea cilial lining had Hg levels of between 50 and 120 ng/g throughout the 140-day period of the study.

Figure 7 illustrates that amalgam Hg levels in whole blood of five ewes averaged 10 ng/g and remained relatively constant during the 140-day period. Based on an average blood volume of 4,800 ml per ewe, this would mean that by 29 days after amalgam placement the total circulating pool of Hg in blood at any given time was at least 48 μg. Bile in these ewes at autopsy had levels of Hg that ranged from 3 to 40 ng/g during this same period. Milk obtained within 2 days after birth, at 25–41 days after amalgam placement, contained levels of Hg from dental amalgam that reached as high as 60 ng/g.

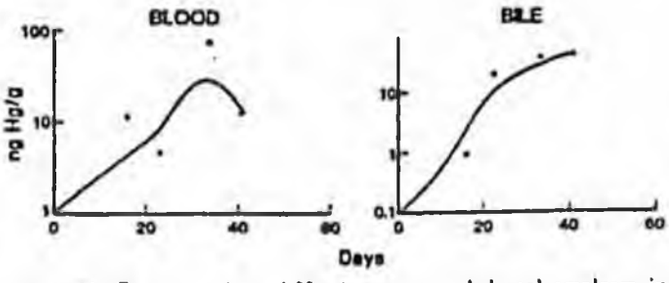

FIG. 11. Concentration of Hg from maternal dental amalgam in blood and bile of 3–5 fetal lambs exposed in utero for various times after amalgam placement.

Figure 8 demonstrates the concentration of amalgam Hg in kidney, liver, lung, heart, gluteus muscle, and mesentery fat of three to five fetal lambs exposed in utero to Hg from maternal dental amalgam for 16–41 days after amalgam placement. Fetal kidney had Hg levels of 10–14 ng/g in contrast to liver, which had higher levels of 100–130 ng Hg/g. Fetal lung, heart, and muscle had levels of Hg that were <10 ng/g, and fat had the lowest concentration at 1–2 ng Hg/g.

Figure 9 displays the concentration of amalgam Hg in regions of brain and in three endocrine glands of 3–5 fetal lambs exposed in utero to Hg from maternal dental amalgam for 16–41 days after amalgam placement. The highest Hg levels in cerebrum, occipital cortex, and thalamus were ~10 ng/g. This was in contrast to the fetal pituitary, which contained >100 ng Hg/g compared with thyroid and adrenal glands with <10 ng Hg/g.

Figure 10 shows the concentration of amalgam Hg in oral and gastrointestinal tissues of 3–5 fetal lambs exposed in utero to Hg from maternal dental amalgam for 16–41 days after amalgam placement. Fetal parotid gland had Hg levels that did not exceed 10 ng/g compared with levels in gingivae of 10–120 ng/g. Stomach, small intestine, large intestine, and colon had Hg levels of 10 ng/g or less.

Figure 11 demonstrates amalgam Hg concentration in blood and bile of 3–5 fetal lambs exposed in utero to Hg from maternal dental amalgam for 16–41 days after amalgam placement. Fetal blood Hg levels were variable and ranged from 3 to 75 ng/g, whereas bile Hg levels ranged from 1 to 47 ng/g.

Other data obtained in these experiments revealed that placental cotyledon concentration of amalgam Hg was 24, 161, and 289 ng/g after 16, 25, and 34 days, respec-

tively, of in utero exposure to maternal dental amalgam. The red blood cell-to-plasma ratio of amalgam Hg in the ewes from 16 to 140 days was 0.44 and in the fetal lambs was 0.97 after 16 to 41 days in utero exposure. Cerebrospinal fluid concentrations of amalgam Hg in the ewes averaged 4.6 ng/g and in the fetuses 5.1 ng/g.

DISCUSSION

The results of these experiments demonstrate that Hg from dental amalgam will appear in maternal and fetal blood and amniotic fluid within 2 days after placement of amalgam tooth restorations in the mother. Excretion of some of this Hg will also commence within 2 days through fecal and urinary elimination. Highest concentrations of Hg from amalgam in the adult occur in kidney and liver with substantial levels also present in endocrine glands, oral tissues, stomach, and the respiratory tract. In the fetus the highest amalgam Hg concentrations appear in liver and pituitary gland during the latter one-third of pregnancy when the placenta also progressively concentrates Hg as gestation advances to term. Finally, milk concentration of amalgam Hg postpartum can provide a potential source of Hg exposure to the newborn.

In the present study the average intraoral Hg vapor level released from 12 dental amalgam fillings in sheep was nearly identical to average vapor measurement levels obtained in humans with the same number of occlusal amalgam restorations (18). Justification for using the sheep as an experimental model to study the metabolism of dental amalgam Hg has been detailed in an earlier report (6). Although in vivo radioisotope experiments of this nature are perhaps more difficult to perform because of animal containment requirements than nonisotopic studies employing mass spectroscopy, neutron activation analysis, or autometallography analyses of Hg, our design has the distinct advantage that all of the Hg measured originates only from dental amalgam and cannot be attributed to food, water, or background environmental sources. Extension of these studies beyond 140 days would be limited by the physical half-life for ^{203}Hg of 47 days. All amalgam restorations remained intact during the 140-day duration of this study.

The general pattern of tissue concentration of Hg from dental amalgam reveals that, in the early phase from 16 to 29 days, a progressive increase in Hg uptake is at least partially dependent on the length of time elapsed after amalgam placement. After 29 days, concentration levels tended to remain in a plateau pattern suggesting that at least for the first 140 days after amalgam placement, tissue uptake of Hg will replace tissue turnover at a relatively constant steady-state rate.

The total circulating pool of amalgam Hg in blood was substantially higher than most tissue levels at any given time during the course of the experiment, implying that tissues have ready access to a regenerating Hg supply as it is continuously released from dental amalgam fillings. In this study the red blood cell-to-plasma ratios of Hg from amalgam in both the ewe and fetal lamb were less than one. This indicates that most of the amalgam Hg that is absorbed by several previously illustrated routes into sheep tissues (6) has remained in the elemental or inorganic form, since methyl Hg will preferentially accumulate in red blood cells with a resultant RBC-to-plasma ratio of 9:1 (1).

The large amount of amalgam Hg excreted daily in the feces may be caused by swallowing Hg with saliva or food and its subsequent concentration by the colon, and also by biliary concentration of blood Hg and secretion of Hg into the gut. It has been demonstrated in rats that inorganic Hg complexed to protein in bile is not readily reabsorbed and therefore is mostly excreted (10). Although by 140 days after amalgam placement we estimate as much as 13% of the amalgam Hg might be lost through the fecal route, the rate of loss rapidly declines. We would expect that the Hg loss would be much less than this amount over the next 140-day period if the present study had been extended. The placement and condensation of amalgam results in a tooth restoration that initially has a higher Hg concentration in the superficial biting surface area. Thus chewing forces on the new restorations would be expected to release greater amounts of elemental Hg vapor and amalgam microparticles containing proportionately higher amounts of Hg during the initial 2-wk phase.

The maternal tissue data suggest that chewing stimulation of the dental amalgams resulted in the release of Hg vapor, some of which was inhaled. Since ~80% of inhaled Hg vapor is absorbed across the lung and retained (9), this would explain the elevation in maternal blood levels of Hg and the resultant high concentration of amalgam Hg in maternal kidney and liver. Both kidney and liver were shown to be major sites of Hg deposition when human subjects inhaled radioactive Hg vapor from a nonamalgam source, and kidney and brain are considered to be critical target organs for Hg vapor effects (7). The data also suggest that some amalgam Hg may be absorbed across the lining of the maternal gastrointestinal tract, since Hg was found in high amounts in both the mucosal lining and contents of the tract. This Hg could have entered the tract as vapor swallowed with food and dissolved in saliva or as microparticles of amalgam and mercuric ions from the chewing and grinding action of the teeth. Although ~10% of Hg in the inorganic form (divalent and monovalent Hg) is absorbed across the gastrointestinal tract (16), the large amount of amalgam Hg present in the tract may, nevertheless, present a substantial challenge to the mother. Fetal colon concentration of amalgam Hg may indicate that meconium is the vehicle for transferring Hg to amniotic fluid.

In the adult ewe the high levels of Hg from amalgam that are concentrated in kidney are approximately ninefold greater than Hg levels found in adult liver. This is in marked contrast to the fetal lamb in which kidney concentration of Hg was ~0.1 times that of the liver. This may simply reflect the functional status of the adult kidney, whereas in the fetus the liver serves as a functional erythropoietic organ. Fetal liver erythropoiesis may also explain why Hg levels in fetal blood tended to be higher than levels in adult blood. Also, high Hg levels in fetal liver may be a consequence of most umbilical vein blood first passing directly to the fetal hepatic circulation. Sheep adult kidney levels of Hg from amal-

gam observed in this study are higher than levels reported in human kidney (12). However, our results were observed for only 140 days from 12 new amalgam fillings all placed in the mouth at the same time. This is in contrast to human data obtained in subjects in whom levels of Hg may have declined somewhat over an 8 to 10-yr duration from a variable number of amalgams of unknown age (12).

Maternal brain levels of Hg released from amalgam in this study were 3–13 ng Hg/g during a relatively brief duration of 16–140 days after amalgam placement. This agrees with net Hg levels found in autopsy specimens of human brain cortex of 7.2 ng/g from subjects with dental amalgams (4, 12), after subtraction of brain Hg levels in control (nonamalgam) subjects of 5.7 ng/g.

It is interesting to note that adult ewe pituitary gland concentration of Hg from amalgam was severalfold higher than brain concentration. This differential tendency was even more exacerbated in the fetal lamb. This finding is in agreement with Nylander (11), who reported relatively higher concentrations of Hg in pituitary compared with occipital brain of dentists. The endocrinological significance of amalgam Hg concentration in pituitary, thyroid, and adrenal glands in the present study should warrant further attention in future studies.

The present demonstration of selective concentration of amalgam Hg in cotyledon tissue with advancing gestational age is consistent with earlier evidence that elemental Hg from a nonamalgam source will traverse the placenta (2). This observation is supported by fetal blood Hg levels that are fourfold higher than maternal levels during the initial 2-wk phase after amalgam placement in this study. The sheep epitheliochorial placenta has six tissue layers separating fetal and maternal blood compared with the human hemochorial placenta with only three tissue layers, the latter placental barrier having transfer properties that can enhance its permeability (5). On this histological basis alone one might expect a human fetus to receive a greater proportion of a given dose of dental amalgam Hg than would a sheep fetus.

We conclude that Hg released from dental amalgam tooth fillings will begin to selectively accumulate in maternal and fetal tissues soon after amalgam placement. Accumulation of amalgam Hg progresses in tissues to a steady state with advancing gestation and is maintained for as long as 20 wk. Amalgam restorations are a source of continuous Hg exposure to both the mother and fetus. In view of the experimental evidence presented herein, continued employment of dental amalgam as a tooth restorative material in pregnant women and children should be reconsidered.

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Mercury exposure from "silver" tooth fillings: emerging evidence questions a traditional dental paradigm

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Abstract: For more than 160 years dentistry has used silver amalgam, which contains approximately 50% Hg metal, as the preferred tooth filling material. During the past decade medical research has demonstrated that this Hg is continuously released as vapor into mouth air; then it is inhaled, absorbed into body tissues, oxidized to ionic Hg, and finally covalently bound to cell proteins. Animal and human experiments demonstrate that the uptake, tissue distribution, and excretion of amalgam Hg is significant, and that dental amalgam is the major contributing source to Hg body burden in humans. Current research on the pathophysiological effects of amalgam Hg has focused upon the immune system, renal system, oral and intestinal bacteria, reproductive system, and the central nervous system. Research evidence does not support the notion of amalgam safety.—Lorscheider, F. L., Vimy, M. J., Summers, A. O. Mercury exposure from "silver" tooth fillings: emerging evidence questions a traditional dental paradigm. *FASEB J.* 9, 504–508 (1995)

KeyWords: mercury toxicity • dental amalgam

HISTORICAL OVERVIEW OF MERCURY USE IN DENTISTRY

As early as the 7th century, the Chinese used a "silver paste" containing mercury (Hg) to fill decayed teeth. Throughout the Middle Ages, alchemists in China and Europe observed that this mysterious silvery liquid, extracted from cinnabar ore, was volatile and would quickly disappear as a vapor when mildly heated. Alchemists were fascinated that at room temperature Hg appeared to "dissolve" powders of other metals such as silver, tin, and copper. By the early 1800s, the use of a Hg/silver paste as a tooth filling material was being popularized in England and France and it was eventually introduced into North America in the 1830s. Some early dental practitioners expressed concerns that the Hg/silver mixture (amalgam) expanded after setting, frequently fracturing the tooth or protruding above the cavity preparation, and thereby prevented proper jaw closure. Other dentists were concerned about mercurial poisoning, because it was already widely recognized that Hg exposure resulted in many overt side effects, including dementia and loss of motor coordination. By 1845, as a reflection of these concerns, the American Society of Dental Surgeons and several affiliated regional dental societies adopted a resolution that members sign a pledge not to use amalgam. Consequently, during the next decade some members of the society were suspended for the malpractice of using amalgam. But the advocates of amalgam eventually prevailed and membership in the American Society of Dental Surgeons declined, forcing it to disband in 1856. In its place arose the American Dental Association, founded in 1859, based on the advocacy of amalgam as a safe and desirable tooth filling material. Shortly thereafter, tin was added to the Hg/silver paste to counteract the expansion properties of the previous amalgam formula (1–3).

There were compelling economic reasons for promoting dental amalgam as a replacement for the other common filling materials of the day such as cement, lead, gold, and tinfoil. Amalgam's introduction meant that dental care would now be within the financial means of a much wider sector of the population, and because amalgam was simple and easy to use, dentists could readily be trained to treat the anticipated large number of new patients. By 1895, the dental amalgam mixture of metals had been modified further to control for expansion and contraction, and the basic formula has remained essentially unchanged since then (2, 3). Scientific concerns about amalgam safety initially surfaced in Germany during the 1920s, but eventually subsided without a clear resolution. At the present time, based on 1992 dental manufacturer specifications, amalgam (at mixing) typically contains approximately 50% metallic Hg, 35% silver, 9% tin, 6% copper, and a trace of zinc. Estimates of annual Hg usage by U.S. dentists range from approximately 100,000 kg in the 1970s to 70,000 kg today. Hg fillings continue to remain the material preferred by 92% of U.S. dentists for restoring posterior teeth (4,5). More than 100 million Hg fillings are placed each year in the U.S. Presently, organized dentistry has countered the controversy surrounding the use of Hg fillings by claiming that Hg reacts with the other amalgam metals to form a "biologically inactive substance" and by observing that dentists have not reported any adverse side effects in patients. Long-term use and popularity also continue to be offered as evidence of amalgam safety (6).

In light of the medical research evidence that has accumulated primarily over the past decade, the purpose of this review is to examine the traditional dental paradigm that maintains that amalgam is a biologically safe and appropriate tooth restorative material.

MERCURY EXPOSURE FROM AMALGAM FILLINGS

During the early 1980s several laboratories established that Hg vapor (Hg^0) is continuously released from amalgam tooth fillings, and that the rate of release into human mouth air is increased immediately after chewing (7–9) or tooth brushing (10). Mouth air levels of Hg^0 correlate significantly with the number of occlusal (biting) amalgam surfaces in molar teeth. Continuous chewing for 10–30 min results in a sustained elevation of the mouth Hg^0 level, which eventually declines to a baseline level 90 min

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after chewing cessation (11). Blood Hg levels also display a positive correlation with the number and total surface area of amalgam fillings (12).

A single amalgam filling with an average surface area of only 0.4 cm^2 is estimated to release as much as 15 μg Hg/day primarily through mechanical wear and evaporation, but also through dissolution into saliva (13). Recent electron microscopy images and electrochemistry data show direct evidence of amalgam Hg corrosion and leakage into saliva as free ions (14). Thus, for an average individual with eight occlusal amalgam fillings (11), a total of 120 μg Hg could be released daily into the mouth and a portion of this amount would be inhaled or swallowed. These estimations are consistent with a recent report showing that human subjects with an average number of amalgam fillings excrete approximately 60 μg Hg/day in feces (15), a portion of which is microparticles of amalgam. Various laboratories have estimated that the average daily body absorption of amalgam Hg in humans ranges between 1.2 and 27 μg (16), with levels for some individual subjects being as high as 100 μg/day. At the present time the consensus average estimate is 10 μg of amalgam Hg (range 3–17 μg) absorbed per day (17), an uptake amount corroborated by a more recent daily estimate of 12 μg (15). By way of contrast, estimates of the daily absorption of all forms of Hg from fish and seafood is 2.3 μg, and from other foods, air, and water is 0.3 μg (17). Thus, it is now proposed that dental amalgam tooth fillings are the major source of Hg exposure for the general population (17, 18). This position has been clearly validated by a recent demonstration that at least 65% of excretable Hg in human urine is derived solely from dental amalgams, and that amounts of Hg excreted also correlate with total amalgam surface area (19).

BODY TISSUE UPTAKE OF AMALGAM MERCURY

The degree to which body tissues can sequester amalgam Hg after exposure has been demonstrated in a variety of human and animal experiments. Human autopsy studies reveal significantly higher Hg concentrations in brain and kidney of subjects with aged amalgam fillings than in subjects who had no amalgam tooth restorations (20). When amalgam fillings containing a radioactive Hg tracer were placed in sheep molar teeth, a whole-body image scan performed 4 wk later demonstrated several possible uptake sites for Hg including oral tissues, jaw bone, lung, and gastrointestinal tract, with major localization of Hg in the kidney and liver (21). A similar whole-body image study repeated in a monkey (whose teeth, diet, feeding regimen, and chewing pattern more closely resemble those of humans) clearly demonstrates high levels of amalgam Hg in kidney, intestinal tract, and other tissues. The brain/CSF Hg ratio had increased threefold by 4 wk after amalgam fillings had been installed (22). The primate kidney will continue to accumulate amalgam Hg for at least 1 year after installation of such fillings (23).

Repeated observations in adult sheep (21, 24) demonstrate that after placement of amalgam fillings the blood Hg levels remain relatively low even though the surrounding body tissue concentrations of Hg become many fold higher than blood. This suggests that tissues rapidly sequester amalgam Hg at a rate equivalent to its initial appearance in the circulation. Such a phenomenon may explain why monitoring blood levels of Hg in humans is a poor indicator of the actual tissue body burden directly attributable to continuous low-dose Hg exposure from amalgam.

In pregnant sheep, which received amalgam fillings containing a radioactive Hg tracer, it was demonstrated that both maternal and fetal tissues began to accumulate amalgam Hg within several days after such fillings were installed. Maternal-fetal transfer of amalgam Hg was progressive with advancing gestation, and amalgam Hg also transferred to breast milk postpartum (24). More recently, human fetal/neonatal studies have likewise demonstrated that Hg concentrations in fetal kidney and liver, and cerebral cortex of infants, correlate significantly with the number of amalgam filled teeth of their mothers (25). This latter finding is consistent with previous animal studies that show greater Hg concentration in rat fetal tissues (and less placental retention) when the source of exposure was Hg^0 rather than mercuric salts (26).

CELL METABOLISM OF MERCURY

Major metabolic pathways

Figure 1 illustrates the major metabolic pathways for the three species of Hg. The principal source of Hg^0 is vapor from dental amalgam tooth fillings, whereas organic Hg (Hg^+) is derived principally from fish and seafood, and inorganic Hg (Hg^{2+}) originates from other foods, water, and air. Approximately 80% of inhaled Hg^0 is absorbed across the lung and converted to Hg^{2+} intracellularly by catalase oxidation. In contrast to other Hg species, the high lipid solubility of Hg^0 permits it to cross cell membranes readily, including the blood–brain barrier, and easily enter the brain. However, the kidney eventually becomes the major site of Hg accumulation during compartmental redistribution after exposure to Hg^0. Some Hg^0 is also dissolved in saliva and swallowed, converted to Hg^{2+} by peroxidase oxidation, and the majority is eliminated by fecal excretion. Other Hg^{2+} that is ingested in the diet is poorly absorbed across the intestinal tract and most is excreted in the feces. Although the majority of Hg^+ from the diet is also eliminated in the feces, a substantial portion is absorbed intracellularly as methyl-Hg^+. Both intracellular Hg^{2+} and Hg^+ are ultimately bound covalently to glutathione (GSH) and protein cysteine groups. Hg^{2+} is the toxic product responsible for the adverse effects of inhaled Hg^0. Body tissues have various retention half-lives for Hg^+ and Hg^{2+} ranging from days to years (15, 17, 26–28). After Hg is released from tissues, fecal excretion becomes the predominant route for elimination of Hg from the body. Human fecal excretion of

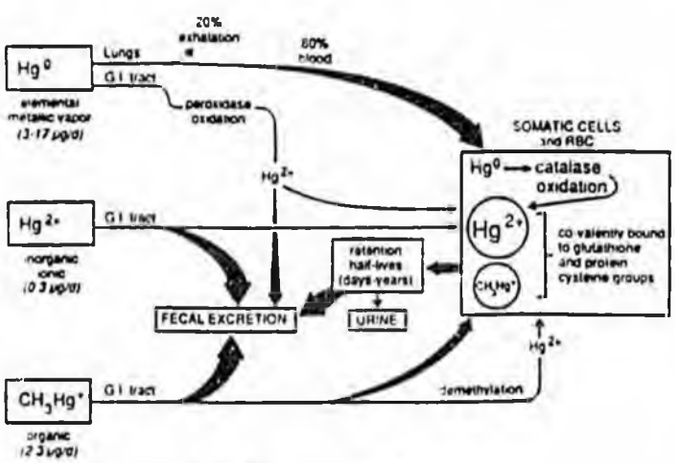

Figure 1. Metabolism of mercury species.

crease in the proportion of Hg-resistant bacteria in the floras of the intestine and oral cavity soon after installation of dental amalgam tooth fillings, an increase that persisted until the amalgam fillings were removed. The majority of these primate Hg resistant bacteria were also resistant to one or more commonly used antibiotics. Results show that Hg released from dental amalgam can enhance the prevalence of resistance to multiple antibiotics in the bacteria of the primate normal flora (40).

Reproductive system

The relationship of occupational exposure to Hg^0 and fertility of female dental assistants has recently been examined, because it is well established that long-term exposure to Hg^{2+} will alter reproductive cyclicity in rodents. Epidemiological screening by questionnaire of 7000 dental assistants showed that within an eligible subgroup of 418 women who were subsequently interviewed, fertility was reduced to only 63% that of control women not occupationally exposed to Hg^0. The study, while open to the criticism of all data that rely upon subject observation and opinion, concluded that dental assistants who prepared 30 or more amalgam fillings per week, and who also had poor Hg hygiene habits, were at risk of lowered fecundity (41).

Central nervous system

Initially suggestions occurred within medicine that neurodegenerative diseases could perhaps be linked to Hg from dental amalgam, but no experimental evidence was available at that time (42). However, it is now established that uptake and accumulation of amalgam Hg occur in monkey and human brain tissues (22, 27). Studies have demonstrated that Hg is selectively concentrated in human brain regions (medial basal nucleus, amygdala, and hippocampus) involved with memory function, and have suggested that Hg may be implicated (by mechanisms as yet unexplained) in the etiology of Alzheimer's disease (AD) (43, 44). Abnormal microtubule formation in AD brains has been associated with a defect in the tubulin polymerization cycle (45), which may increase the density of neurofibrillary tangles. A similar tubulin defect can be induced in the brain of $HgCl_2$-treated rats (46, 47), suggesting a connection between exposure to inorganic Hg and AD. $HgCl_2$ also markedly inhibits in vivo ADP-ribosylation of two rat brain cytoskeletal proteins, tubulin and actin, and thus alters a specific neurochemical reaction involved in maintaining brain neuron structure (48).

It is well established that Hg^+ will interact with tubulin resulting in disassembly of microtubules, and that microtubules function to maintain neurite structure (49). In a current investigation, recently reported, rats were exposed to Hg^0 4 h/day for as long as 14 consecutive days. Vapor exposure was maintained at 300 μg Hg/m³ air, a level detectable in mouths of some human subjects with large numbers of amalgam fillings. Average brain Hg concentrations increased significantly with duration of Hg^0 exposure. Photoaffinity labeling of the β-subunit of the tubulin dimer with $[\alpha^{32}P]8N_3GTP$ in brain homogenates was diminished by 75% after 14 days of Hg^0 exposure. An identical neurochemical lesion of similar magnitude was seen in human AD brain homogenates, but no direct evidence exists to prove that this lesion is the result of human exposure specifically to amalgam Hg. Because the rate of tubulin polymerization is dependent on binding of tubulin dimers to GTP, it was concluded that chronic inhalation of low-level Hg^0 in rats can inhibit the polymerization of tubulin essential for formation of microtubules (50).

Another recent report demonstrates subclinical neuropsychological and motor control effects from occupational exposure to Hg^0 over 1 year in a subpopulation of dentists with high urinary Hg levels (51). A more extensive report, evaluating dental technicians and dentists who received occupational exposure to Hg^0 and non-dental personnel controls, demonstrated that after a chelation drug (DMPS) challenge test urinary Hg levels were 16-fold higher in technicians and 6-fold higher in dentists compared to control subjects. Baseline urinary porphyrin levels measured before DMPS treatment were associated with urinary Hg levels obtained after the DMPS challenge. Urinary Hg was also adversely associated with several neurobehavioral changes in Hg-exposed subjects including impairment of attention tasks and motor perceptual tasks. The utility of a DMPS challenge to assess renal Hg burden was established (52).

CONCLUSIONS

The collective results of numerous research investigations over the past decade clearly demonstrate that the continuous release of Hg^0 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 (4). Based on recent immunology investigations (35), electrochemical corrosion experiments (14), and human metabolic studies (15) it appears that the use of silver in amalgam may be almost as questionable as is Hg, and this evidence suggests that it may be inappropriate to alternatively use recently developed Hg-free silver-containing dental metals (53) to fill teeth. It would seem that now is the time for dentistry to use composite (polymeric and ceramic) alternatives (4) 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 (54). EJ

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Hg correlates significantly with the number of amalgam fillings, and the excretion rate for Hg in feces is 20 times higher than its corresponding excretion rate in urine. Even though fecal excretion of amalgam Hg predominates, this principal excretory route in humans shows a high correlation with urinary excretion of Hg. Fecal excretion rates for Hg in human subjects with amalgam tooth fillings can be as much as 100-fold higher than in subjects without such fillings (15).

Significance of glutathione and other sulfhydryl compounds

The major low molecular weight sulfhydryl compound in mammals is GSH, present at approximately 5 mM in cells, serum, and bile (29). Other low molecular weight sulfhydryls present at lower concentrations in cells include cysteine, biotin, lipoic acid, and coenzyme A. The major targets in proteins for binding of transition metals, including Hg, are the sulfhydryl group of cysteine and the imino nitrogen of histidine. The aromatic ring nitrogens of the nucleotide bases also form Hg complexes, with thymine and uracil being more reactive than cytosine, guanine, and adenine (30).

Whereas Hg^0 from amalgam is lipid soluble and freely passes through cell membranes, methyl and ionic Hg from food and other sources are both charged and therefore must be complexed with counter-ions or low molecular weight sulfur compounds in order to pass freely through the cell membrane.

The major cellular reaction potentiating the toxicity of Hg^0 is its oxidation by catalase, an enzyme found in all normal mammalian cells (31). This oxidation process can take place in any of the "barrier tissues" of the body as well as in the blood. Once generated within the cell by catalase, highly reactive Hg^{2+} will interact with a variety of nucleophilic ligands, the most abundant single nucleophile reactant being GSH. The sulfhydryl groups of proteins are next in abundance and avidity for Hg^{2+}, with the imino nitrogens of histidine and the nucleobases being substantially less reactive.

Despite the large molar excess of GSH, many proteins compete very effectively for binding of transition metals such as Zn, Ni, and Cu. The precise chemical basis for the high affinity of such metalloproteins is not understood: many of the currently well-defined members of this group, including important regulatory proteins, use cysteines and histidines as ligands to their respective metal cofactors (32). Thus, these proteins may exchange metals, including Hg, bound to GSH.

Once bound to GSH, Hg can leave the cell to circulate in serum or lymph and be deposited in other organs or tissues. GS-Hg-SG is eventually eliminated via either the kidney or downloaded via bile into the intestinal lumen and excreted in feces. After Hg leaves cells, its major route of elimination in any form (inorganic or organic) is via feces, with less than 10% of Hg normally exiting the body in urine (26). Experiments in sheep (21, 24) and monkey (22) indicate that 99% of amalgam Hg is excreted in feces, and in humans with 30 amalgam surfaces the average 24 h excretion rate for Hg in feces is 60 μg (95% of total daily excretable Hg) in contrast to 3 μg/24 h in urine (15). In mammals, half-lives from acute single doses of Hg^{2+} or methyl-Hg^+ range from months to years. Half-lives may differ with chronic Hg exposure as a result of compromised cellular function (e.g. kidney Hg turnover deceases with age and duration of exposure) (17, 26).

EFFECTS OF AMALGAM MERCURY ON CELL AND ORGAN SYSTEM FUNCTION

The overt clinical effects resulting from toxic exposure to the three species of Hg have been described (26, 28). Various animal and human experiments over the past several years have addressed the possibility of more subtle pathophysiological effects of amalgam Hg upon the function of several organ systems or cell types, including the immune system, renal system, oral and intestinal bacteria, reproductive system, and central nervous system.

Immune system

Ionic Hg has been shown to be antigenic and capable of inducing autoimmunity in rats (33, 34). In a very recent report, gelatin-encapsulated dental amalgam pieces were implanted intraperitoneally in an inbred strain of mice known to be genetically susceptible to Hg-induced immune pathology. Within 10 wk to 6 months the animals displayed hyperimmunoglobulinemia, serum autoantibodies that targeted nucleolar proteins, and systemic immune complex deposits. Similar changes were observed when only dental alloy (not containing Hg) was implanted, and these immune aberrations were attributed to the silver component of the alloy. This study concluded that both Hg and silver dissolution from dental amalgam can chronically stimulate the mouse immune system with subsequent induction of systemic autoimmunity (35). In humans, fecal excretion of silver is also correlated with the number of amalgam fillings (15). This would suggest that further investigation of the potential molecular effects of amalgam metals on the human immune system is warranted.

Renal system

Because human (20), monkey (22, 23), and sheep (21) kidney display significantly increased Hg concentrations after exposure to dental amalgam, some investigations have focused on what these concentrations may imply for renal function. Sheep with amalgam tooth filling implants show a reduced filtration rate of inulin, increased urinary excretion of sodium, and a decrease in urinary albumin (36). An increased sodium excretion has also been observed in monkeys similarly treated with amalgam fillings (unpublished data). Because Hg^{2+} accumulates primarily in the proximal tubule of rat (37) and rabbit (38) kidney and amalgam Hg in the proximal tubule of monkey kidney (23), where the majority of sodium is normally reabsorbed, increased excretion of sodium after placement of amalgam fillings in sheep (36) may reflect a reduced tubular capacity to conserve sodium selectively. Urinary albumin levels increased 1 year after removal of amalgam fillings in humans (12), whereas urine albumin levels fell in sheep after amalgam placement (36). It is uncertain whether these differences in albumin excretion patterns may reflect a Hg-induced reduction in renal blood flow due to the presence of amalgam fillings.

Oral and intestinal bacteria

It is well established that some human intestinal bacteria carry plasmids encoding resistance to both Hg and antibiotics (39). In a population subgroup of 356 persons who had no recent antibiotic exposure, those individuals with a high prevalence of Hg resistant bacteria in their intestinal flora were significantly more likely to display multiple antibiotic resistance in these same bacteria. A parallel investigation in monkeys demonstrated a marked in-

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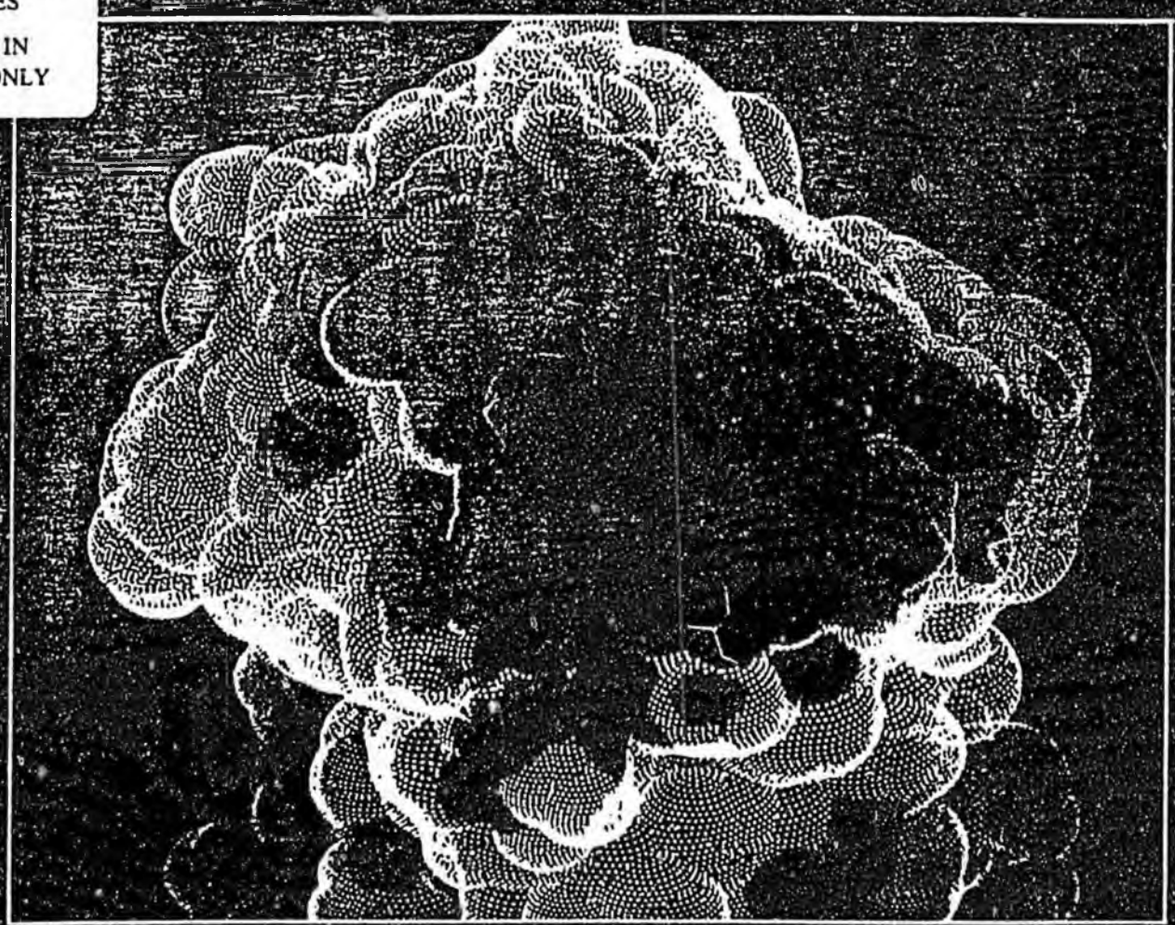

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April 1995, Volume 9, Number 7

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Protein motifs 5. Zinc fingers. A. Klug and J. W. R. Schwabe

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Guanylin: a peptide regulator of epithelial transport. L. R. Forte and M. G. Currie

Caco-2 cells as a model for intestinal lipoprotein synthesis and secretion. E. Levy, M. Mehran, and E. Seidman

COVER: One subunit of p-hydroxybenzoate hydroxylase. The image highlights the surface of the protein, which is cut away in one segment to reveal the flavin, substrate, and key active-site residues inside. (Image generated by Domenico L. Gatti.) See Entsch and van Berkel, pages 476-483.

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The Federation of American Societies for Experimental Biology (FASEB) is a coalition of nine biomedical research societies in the disciplines of physiology, biochemistry and molecular biology, pharmacology and experimental therapeutics, investigative pathology, nutrition, immunology, cell biology, biophysics, and anatomy. *The FASEB Journal* is an official publication of the Federation designed to report on rapidly changing developments in the life sciences, and publishes state-of-the-art reviews and brief research communications in areas of interest to members of the FASEB Societies. Reviews focus on interdisciplinary aspects of growth points in life sciences research, and research communications emphasize innovative advances in methodology. In addition, the Journal features articles on public affairs and news items about research funding; people and institutions; a calendar of scientific meetings; and lists of currently released books and new products.

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cc:Mail for: Senator Lyda green

Subject: SB 90

From: rjcook@ptialaska.net ("Richard Cook") at CC2MHS1 4/4/97 5:22 PM

To: Senator Lyda Green at LAA_TRANS

Dear Senator Green,

SB 90

It has been suggested that the dental practice act be amended to allow dentists and patients to choose the restoration of their choice. I can tell you from personal experience, that there have been no problems whatsoever with a dentist such as myself or with my patients having the ability to place any restoration material they want. I am specifically referring to the choice of amalgam vs. other materials such as golds, porcelains, glass ionomers, any of the new glasses or composites.

I DO NOT USE AMALGAMS

I have not used amalgam in my practice for nearly 15 years. The last amalgam I placed was at the Alaska State Board exam many years ago. If a person in my practice needs to have a tooth restored or have an old amalgam replaced, I
usually suggest gold or porcelain. I always let my patients know what I would do for my own or my family's mouth as a preferred option.

AMALGAMS ARE SAFE AND EFFECTIVE

Amalgam restorations are safe, effective and relatively easy and cheap to do. The seems to be as well proven as anything can be well proven. That is the opinion of myself. As far as I know, that is the opinion of every dental and medical school in the world and of every legitimate world health organization.

I do have amalgam fillings in my own mouth and they have served me well for many
years. As long as there is no decay or corrosion or fractures, they will stay in my mouth. The same for my wife. I would never replace a perfectly good amalgam in my own family's mouth. If a replacement would be needed
however, I will choose gold.

FREEDOM OF CHOICE ALREADY EXISTS

Dentists or patients that do not use amalgam are not a problem to organized dentistry. Look at my practice. I replace amalgams every day with other materials. But I have a moral and ethical commitment to care for my patients with the same standards that I would my own family. If a patient wants to have amalgam fillings replaced for the "fun of it", I think that they have that right as long as the dentist has properly
informed the patient of the morbidity risks of removing a sound amalgam or any other perfectly good restoration. There is a small risk inherent in nearly any invasive dental procedure. Some of the risks are nerve damage, tooth sensitivity to hot and cold, and tooth weakening. If a tooth is perfectly OK, I do everything in my power to talk a person OUT OF replacing a filling. I tell them what I would do for myself or my family. Most people can relate to that easily.

Even though the risks are small, a procedure as simple as replacing an amalgam with a composite has some risks. Injections have risks. Each and

every time a restoration has been replaced it reduces the amount and strength of the remaining tooth structure.

PATIENTS HAVE FREEDOM TO CHOOSE, BUT DENTISTS DON'T HAVE FREEDOM TO DEFRAUD

However, and this is an important distinction, most mainstream dentists such as myself *do* have a problem with dentists who use their position of public trust to misrepresent what amalgam will or will not do. That is a polite way of saying that we strongly feel that a dentist should not be fraudulent. This why the legislature needs to maintain a Board of Dentists who can discipline those who are not being honest. There is a near hysteria that takes place from time to time in the media in which otherwise good people choose emotional appeal over scientific logic and proof. We believe that a dentist is unethical and dishonest if he uses the patients' emotional fears to influence his patients to replace sound restorations and produce more cash flow for his office. Being dishonest like that is just like the old-time elixir and snake oil salesmen who went from town to town selling the sure cure to everything. The salesman knows what he is doing is wrong but he just cannot resist the allure of more money.

THE (L&C) AMENDMENTS APPEAR REDUNDANT TO WHAT NOW EXISTS

If you look at the intent (as I perceive the intent) of the two amendments from the Labor and Commerce Committee, there is no change from what is now occurring. If a dentist is honest and open with his patients, and truthfully discusses the options with them, then there is no problem with organized dentistry or the Board of Dentists. Unfortunately not all dentists are 100% candid about the risks of removing sound restorations. That is why you have a Board of Dentists.

THE AMENDMENTS DO POSE A RISK IN INTERPRETATION

Care should be taken in any language of any bill so that it cannot be construed to prevent the Alaska Board of Dentists from protecting the public. I believe that the language of the amendments as they are now proposed present some problems. How do you demonstrate physical harm when it exists? I think that it would be difficult except in the rarest of cases. Even if the harm was the need to do a root canal six months later, how could you demonstrate that to a court of law? How could one prove it in a court of law? We do know that in general "drilling weakens teeth" and the more you drill, the less natural tooth structure is left. To me that is harm. But to a court, I just don't know.

Thank you for listening.

Richard J. Cook DDS
President, Juneau Dental Society
712 West 12th Street
Juneau, AK 99801
rjcook@ptialaska.net

SB

91

LEGAL SERVICES

DIVISION OF LEGAL AND RESEARCH SERVICES
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STATE OF ALASKA

(907) 465-3867 or 465-2450
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Juneau, Alaska 99801-2105

MEMORANDUM March 22, 1997

SUBJECT: CSSB 91(L&C)

TO: Senator Loren Leman
Attn: Annette

FROM: Terri Lauterbach
Legislative Counsel

Enclosed is a corrected CS for SB 91 for the Senate Labor and Commerce Committee.

The addition of a new paragraph (3) in AS 08.84.032(b), and the renumbering of the subsequent paragraphs, probably makes the references in AS 08.84.065(a)(1)(B) inaccurate. Currently, AS 08.84.065(a) reads as follows:

> (a) The board may issue a nonrenewable temporary permit to an applicant for licensure by acceptance of credentials or by examination who
> (1) meets the requirements of
> (A) AS 08.84.030(a)(1) or (b)(1); or
> (B) AS 08.84.032(a)(2) and (4) or ***(b)(2) and (3)***; and
> (2) pays the required fee.

The issue for consideration is whether, in light of the new paragraph (3) in AS 08.84.032(b), the reference italicized above should be "(b)(2) and (4)" or "(b)(2) - (4)".

Please let me know if I can be of further assistance.

TML:glc
97-201.glc

Enclosure

April 7,1997

To: Senators Green, Ward, Mackie, Miller, and Duncan of the Senate State Affairs Committee

From: Pauline Bennett-Gannon
Alaska Occupational Therapy Association- President
1076 Willow Grouse Road (home address)
Fairbanks, AK 99712
(907) 452-2000, x441 (messages)

Re: **SB 91 Physical Therapists and Occupational Therapists**

I wish to express my **support of SB 91.** I will be out of town on the date it is scheduled for your committee. I was able to testify and request some minor amendments in order to add clarity and accuracy to the law when SB 91 was in the Labor and Commerce Committee. It is my understanding that those changes were adopted in the version you have before you (A copy of proposed amendments is attached for reference). I also testified on the HB 136 version of the bill regarding the same amendments.

Prior to the Labor and Commerce Committee Hearing, the proposed amendments were reviewed with Jean McCarthy, Alaska Physical Therapy Association(APTA) President; and Larry Seethaler, President of the State Board for Physical Therapy and Occupational Therapy, to insure that they had no problems with these proposed changes.

Thank you

cc: L.S. AK PT & OT Board
AkOTA Licensure and Legislative Committees
APTA President

SB

103

TONY KNOWLES
GOVERNOR

P.O. Box 110001
Juneau, Alaska 99811-0001
(907) 465-3500
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STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

February 24, 1997

The Honorable Mike Miller
President of the Senate
Alaska State Legislature
State Capitol
Juneau, AK 99801-1182

Dear President Miller:

In our efforts to reduce budgets, some actions that save money also create efficiencies which better meet public service goals. That is the case with this bill regarding the Human Rights Commission. This proposal provides the Commission more flexibility in its operations and helps the body perform its essential work for the state.

The bill would allow the Human Rights Commission to hold hearings at its office in Anchorage rather than where the alleged discrimination occurred, as is required under current law. This will save time and money in travel costs. The Commission would continue to ensure that complainants may participate in the hearings.

This bill would also allow the Commission to charge fees to cover the costs of services, information and materials and to provide tapes rather than transcriptions of the hearings, as currently required.

These changes would reduce the cost and time involved in resolving cases, helping the Commission to work through its tremendous backlog of cases, and better respond to the public's increased requests for its services. The result will be better human rights protection for Alaskans.

Sincerely,

Tony Knowles
Governor

SB

105

Alaska State Legislature

Select Committee on
Legislative Ethics

716 W. 4th, Suite 230
Anchorage AK
(907) 258-8172
FAX: 258-2106

Mailing Address:
P.O.Box 101468
Anchorage, AK
99510 - 1468

DATE: April 16, 1997

TO: Senator Tim Kelly, Chair
Senate Rules Committee

FROM: Susie Barnett, Staff
Select Committee on Legislative Ethics

RE: **Review of Ethics Bill, CSSB 105 (FIN)**

An Act relating to legislative and executive branch ethics; relating to campaign finances for candidates for the legislature; relating to the conduct of lobbyists with respect to public officials; relating to the filing of disclosures by certain state employees and officials; making a conforming amendment to the definition of 'public official for employment security statutes and providing for an effective date.

This document is intended to supplement the bill, relating to changes to the Legislative Ethics Code, AS 24.60, the Executive Branch Ethics Act, AS 39.52 and the State Personnel Act, AS 39.25, the State Elections Act, AS 15.13.. The purpose of this document is to provide an ethics committee analysis of the bill. (Herein, "committee" refers to ethics committee.)

The following sections were amended by the Senate Finance Committee: 1, 2, 3, 6, 8, 24, 45, 60, 63, 65, 111, 112, 113. Note comment re: Section 78.

SECTION 1: AS 15.13.072.(d) RESTRICTIONS ON SOLICITATION AND ACCEPTANCE OF CONTRIBUTIONS. Amends the State Elections Act to allow incumbent legislators and certain legislative employees to solicit and accept contributions for <u>non-legislative</u> campaigns during session. This amendment corresponds to the restrictions set out in AS 24.60.031(a), session fundraising restrictions in the legislative ethics code, and, with the exception of not allowing the governor or lt. governor to fundraise for any state office during session, corresponds to the proposed executive branch session fundraising restrictions set out in AS 39.52.132 of this bill. **(Added in Sen. Fin.)**

Sub-para: (a)2)(C): As amended by Senate Finance, allows "facsimile" use for a nongovernmental use or private benefit if the use does not carry a special charge. **(Amended by Sen. Fin.)**

Sub-para:(a)(5)(A): As amended by Senate Finance, the use of state resources for political fundraising or campaigning purposes would be allowed if the use does not interfere with the performance of public duties and either the cost is nominal or the user reimburses the state for the cost. **(Amended by Sen. Fin.)**

Sub-para:(a)(5)(C): As amended by Senate Finance, allows "facsimile" use for political fundraising or campaign uses if the use does not carry a special charge. **(Amended by Sen. Fin.)**

Sub-para:(a)(5)(D): Allows storing and maintaining campaign records (such as APOC reports) in a legislator's office. The Senate Finance Committee deleted the language in the Sen. State Affairs CS which set out that the records could not be displayed publicly. **(Amended in Sen. Fin.)**

SECTION 9: AS 24.60.030(c) MASS MAILING: The ethics code currently prohibits use of state funds to print or distribute a mass mailing from or about *a legislator who is a candidate for state office*, during the period 90 days before the primary and ending the day after the general election. The proposed language expands the prohibition to include legislators and legislative employees who are candidates for federal and municipal offices or to telephone and electric cooperatives. While other sections of the ethics code clearly prohibit use of state funds for campaign purposes, this section highlights what are considered to be a critical periods and provides a guideline for those who issue mailings during those times. *This prohibition does not apply to a legislator's office allowance.*

SECTION 10: AS 24.60.030(d) CAMPAIGN LITERATURE: The proposed change adds fundraising notices to the list of current prohibitions on distributing or posting campaign literature in state facilities. The prohibitions currently apply only to legislators or someone acting on behalf of a legislator. This expands that prohibition to include legislative employees. Allows legislators to post materials related to a past election in his/her private legislative office.

SECTION 11: AS 24.60.030(f) BOARD MEMBERSHIP: The amendment would change the board membership disclosure period from 30 days to 60 days and would require the committee to publish the disclosures in the journal.

SECTION 12: AS 24.60.030(g) CONFLICTS OF INTERESTS: The amendments to this section have the effect of changing the *prohibition* on taking legislative, administrative or political action to a *disclosure requirement* prior to taking action if one has any of the "interests" listed in the amendment, which are expanded beyond equity or ownership interest to include employment, contracts and membership on a board. It also sets out that the disclosure is to be publicly announced if the action is being taken in a committee meeting or on the floor. Actions being taken other than in committee or on the floor, e.g. drafting a bill or testifying in an administrative hearing, would be disclosed, in writing to the ethics committee within 7 days. Disclosures, whether oral or written, must include the nature of the financial interest and a short description of how the action affects the interest.

CORRECTION

THE FOLLOWING DOCUMENT(S)
HAVE BEEN REFILMED TO
ASSURE LEGIBILITY OR PAGINATION

Alaska State Legislature

Select Committee on Legislative Ethics

716 W. 4th, Suite 230
Anchorage AK
(907) 258-8172
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Mailing Address:
P.O.Box 101468
Anchorage, AK
99510 - 1468

DATE: April 16, 1997

TO: Senator Tim Kelly, Chair
Senate Rules Committee

FROM: Susie Barnett, Staff
Select Committee on Legislative Ethics

RE: **Review of Ethics Bill, CSSB 105 (FIN)**

An Act relating to legislative and executive branch ethics; relating to campaign finances for candidates for the legislature; relating to the conduct of lobbyists with respect to public officials; relating to the filing of disclosures by certain state employees and officials; making a conforming amendment to the definition of 'public official for employment security statutes and providing for an effective date.

This document is intended to supplement the bill, relating to changes to the Legislative Ethics Code, AS 24.60, the Executive Branch Ethics Act, AS 39.52 and the State Personnel Act, AS 39.25, the State Elections Act, AS 15.13.. The purpose of this document is to provide an ethics committee analysis of the bill. (Herein, "committee" refers to ethics committee.)

The following sections were amended by the Senate Finance Committee: 1, 2, 3, 6, 8, 24, 45, 60, 63, 65, 111, 112, 113. Note comment re: Section 78.

SECTION 1: AS 15.13.072.(d) RESTRICTIONS ON SOLICITATION AND ACCEPTANCE OF CONTRIBUTIONS. Amends the State Elections Act to allow incumbent legislators and certain legislative employees to solicit and accept contributions for <u>non-legislative</u> campaigns during session. This amendment corresponds to the restrictions set out in AS 24.60.031(a), session fundraising restrictions in the legislative ethics code, and, with the exception of not allowing the governor or lt. governor to fundraise for any state office during session, corresponds to the proposed executive branch session fundraising restrictions set out in AS 39.52.132 of this bill. **(Added in Sen. Fin.)**

SECTION 2: AS 15.13.116(a) DISBURSEMENT OF CAMPAIGN ASSETS As amended by the Senate Finance Committee, the language increases the portion of the unused campaign contribution that may be transferred to a future election account, from $10,000 to $30,000 for candidates for senate and from $5,000 to $15,000 for candidates for the house. Secs. 111 and 112 allow this section and the section below to take effect immediately and to be retroactive to December 31, 1996. **(Added Sen. Fin.)**

SECTION 3: AS 15.13.116 DISBURSEMENT OF CAMPAIGN ASSETS New subsection (d) allows, but does not require, a legislator-elect to transfer $5000 per year from the future election account to a legislative office account. Current law 15.13.116 (9)(D) allows a one time transfer of funds to an office account at $5000 multiplied by the number of years in the term ($20,000 per senator, $10,000 per representative). Secs. 111 and 112 allow this section and the section above to take effect immediately and to be retroactive to December 31, 1996. **(Added by Sen. Fin.)**

SECTION 4: AS 23.20.526(d) EXCLUSIONS FROM DEFINITION OF EMPLOYMENT. Conforming amendment based on changes in this bill to the executive branch employment security statutes to ensure that the people who are not eligible for unemployment compensation remain ineligible.

SECTION 5: AS 24.25.010(e) SUBPOENA POWERS: The ethics code specifically grants the ethics committee the authority to subpoena witnesses under AS 24.60.150(b)(2). The statute to be amended by this bill sets out general authority for legislative subpoenas and includes a reference requiring the concurrence of the Senate President or Speaker of the House. Subsection(e) currently provides that the section does not apply to the Legislative Council or the Legislative Budget and Audit Committee. Like the ethics committee, both the council and LBA are permanent interim committees and both have express grants of authority to subpoena witnesses. It is the opinion of the ethics committee and the committee's legal counsel, that not including the ethics committee in the AS 24.25.010(e) exemption was an oversight, given the specific grant of authority to subpoena witnesses in the ethics code itself.

SECTION 6: AS 24.45.041(b) LOBBYING: REGISTRATION. The new language, as amended by Senate Finance at the request of APOC, would streamline the reporting requirements set out in AS 24.60.070(d) and AS 39.52.155 of this bill, for legislators, legislative employees and state officials. This language adds a requirement that the lobbyist report on the lobbyists registration form, whether their spouse or spousal equivalent is a legislator, legislative employee or state official. **(Added by Sen. Fin.)**

SECTION 7: AS 24.45.171(12) DEFINITIONS. Adds "another legislative employee subject to disclosure" to the definition of public official or public officer in relation to lobbying statutes. (see AS 24.60.990(a)(15) in this bill)

SECTION 8: AS 24.60.030 PROHIBITIONS/Legislative Ethics Code

Sub-para: (a)2)(A): As amended by Senate Finance, the use of state resources for personal purposes would be allowed if the use does not interfere with the performance of public duties and either the cost is nominal or the user reimburses the state for the cost. **(Amended by Sen. Fin.)**

Sub-para: (a)2)(C): As amended by Senate Finance, allows "facsimile" use for a nongovernmental use or private benefit if the use does not carry a special charge. **(Amended by Sen. Fin.)**

Sub-para:(a)(5)(A): As amended by Senate Finance, the use of state resources for political fundraising or campaigning purposes would be allowed if the use does not interfere with the performance of public duties and either the cost is nominal or the user reimburses the state for the cost. **(Amended by Sen. Fin.)**

Sub-para:(a)(5)(C): As amended by Senate Finance, allows "facsimile" use for political fundraising or campaign uses if the use does not carry a special charge. **(Amended by Sen. Fin.)**

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SECTION 11: AS 24.60.030(f) BOARD MEMBERSHIP: The amendment would change the board membership disclosure period from 30 days to 60 days and would require the committee to publish the disclosures in the journal.

SECTION 12: AS 24.60.030(g) CONFLICTS OF INTERESTS: The amendments to this section have the effect of changing the *prohibition* on taking legislative, administrative or political action to a *disclosure requirement* prior to taking action if one has any of the "interests" listed in the amendment, which are expanded beyond equity or ownership interest to include employment, contracts and membership on a board. It also sets out that the disclosure is to be publicly announced if the action is being taken in a committee meeting or on the floor. Actions being taken other than in committee or on the floor, e.g. drafting a bill or testifying in an administrative hearing, would be disclosed, in writing to the ethics committee within 7 days. Disclosures, whether oral or written, must include the nature of the financial interest and a short description of how the action affects the interest.

SECTION 13: AS 24.60.030 GOVERNMENT TIME Under the proposed language, when determining in a complaint proceeding whether an employee was performing a task on government time, the committee would consider the schedule set by the employee's supervisor. Requires an employee to take leave for the period of time he/she is engaged in political campaign activities, other than incidental campaign activities. Political campaign activities are permissible on government time if the activities are part of the normal legislative duties, including answering phone calls and handling incoming correspondence.

SECTION 14: AS 24.60.031(a) FUNDRAISING DURING SESSION The proposed language clarifies that the restrictions on fundraising during session are in effect on a day when either house is in regular or special session. (This would change the committee's current interpretation of "gavel to gavel") The proposed language retains the restrictions on fundraising during session for state legislative political purposes and by eliminating the term "campaign purposes", it makes clear it is limited to state legislative political purposes.

SECTION 15: AS 24.60.039 EMPLOYMENT DISCRIMINATION The Ethics Committee shares jurisdiction with the Human Rights Commission on complaints filed against a legislator or legislative employee concerning violations of the employment discrimination statute, AS 18.80.220. Current law requires the committee to deal with a complaint alleging a violation of that statute in the same manner they would deal with any other complaint. The proposed language gives the committee the option to refer those who file a complaint of employment discrimination to the Human Rights Commission and defer consideration of the complaint until after the commission has completed its proceedings.

SECTION 16: AS 24.60.040(a) CONTRACTS AND LEASES The proposed language broadens the contract and lease criteria beyond the current code, which restricts a legislator or legislative employee from having a financial interest in a state contract or lease unless:

- ~it is let through competitive bidding in accordance with the Procurement Code or
- ~it is worth $1000 or less annually or
- ~it is standardized, under publicly established guidelines and generally available to the public at large.

The new language allows participation in contracts or leases that are let under AS 36.30, the State Procurement Code, which addresses a variety of award methods, including sole-source. It also allows participation in contracts and lease that are let under similar procedures to those in AS 36.30 which addresses such agencies as the University, the railroad and the legislature. The new language sets a new reporting threshold at $5000, changed from the previous $1000.

This bill eases the 'family member' disclosure requirement to generally read; A legislator or legislative employee who knows, or reasonably ought to know, that a family member is participating in a state contract or lease must disclose that participation.

This relaxing of prohibitions is balanced by the new disclosure requirement. Currently a legislator or legislative employee does not disclose to the ethics committee participation in contracts or leases permitted by the code. The proposed language requires disclosure by the legislator, legislative employee and family members of participation in any state contract or lease over $5000 annually.

SECTION 17: AS 24.60.040, CONTRACTS AND LEASES. The new subsection clarifies that a grant, contract or lease that falls under one of the State Loan or Benefit Programs in AS 24.60.050, is not subject to this section. (The committee publishes a list of programs that do not meet the criteria in AS 24.60.050 and requires disclosure of participation in any of the listed programs.) It also clarifies that for the purposes of complying with the ethics code, a grant that results in a contract is subject to this section.

SECTION 18: AS 24.60.050(c) REFRAIN FROM PUBLICATION Allows the committee to protect an individual's right to privacy concerning participation in state loan and benefit programs and sets confirming disclosure date. This follows an advisory opinion issued by the committee in 1994 explaining that it chose to not publish the name of a person who received a benefit from the Violent Crimes Compensation Committee but did publish that a person covered by the ethics code had received a benefit.

SECTION 19: AS 24.60.060(b) PROTECTIVE ORDER The subject of an ethics complaint would be in violation of the code for releasing information deemed confidential under a protective order issued by the committee. This change would allow the committee to broaden discovery by the subject while still protecting any innocent, or 'not involved' parties.

SECTION 20: AS 24.60.070(b) DEADLINE FOR CLOSE ECONOMIC ASSOCIATION: The current code required disclosure of close economic associations but did not set a deadline. New deadline is set deadlines in AS 24.60.105 of this bill. The February 15 deadline is in line with others and the 60 day disclosure for new associations matches the new language for disclosures throughout the bill.

SECTION 21: AS 24.60.070. SPOUSAL/SPOUSAL EQUIVALENT LOBBYIST. This new section would require legislators and legislative employees who are married to or who are the spousal equivalents of a lobbyist, to disclose, under Close Economic Association, the name and address of each of the lobbyist's clients and the total monetary value received from each client annually. Changes to the list would have to be reported within 48 hours.

SECTION 22: AS 24.60.080(a): GIFTS The bill increases the gift limit from $100 to $250 annually. The language also clarifies that those gifts that come under subsection (c); hospitality, discounts, food shared as a cultural norm, travel/hospitality for obtaining information on legislative matters, gifts from immediate family and gifts not connected to legislative status are exceptions to the general prohibition on accepting gifts. Gifts on behalf of a charitable organization (new subsection (h)) are exempted from both "accepting and soliciting" prohibitions. New language has been added that restricts legislators and legislative employees from accepting, from a lobbyist during

session, anything of monetary value other than food or beverage for immediate consumption.

SECTION 23: AS 24.60.080(c) GIFT EXEMPTIONS The amendment to sub-paragraph(1)(A) clarifies that a stay in a vacation home located outside the state, is not an exempted gift. Amendment to sub-paragraph (2)(B) would allow legislators and legislative employees to accept discounts while on state business if the discount benefits the state. Paragraph (7) allows legislators and personal staff of legislators (not other legislative employees) to accept discounts and welcoming gifts in the capitol city during session.

SECTION 24: AS 24.60.080(d) GIFT REPORTING The changes in this section correspond to those made in previous sections e.g. $250 limit and changing reporting date for gifts not related to legislative status to February 15 deadline and the change from reporting gifts to APOC.

Currently, a legislator or legislative employee who receives a gift of over $100 "not related to legislative status" is required to report, confidentially, the name of donor and description of the gift received under this category. If the gift has a value of over $250, the actual value must also be reported. The new language requires reporting, confidentially, only the name of donor and description of gift for all gifts over $250 not related to legislative status.

Proposed changes to Sections 200-260 (discussed further down in this document) of the ethics code, remove APOC out from under the responsibility of dealing with reports of gifts received by legislators and legislative directors. This is an effort to ease confusion over what is reported to whom. Under the proposed changes, all gifts would be reported to the ethics committee. Copies of the non-confidential gift disclosures will be forwarded to APOC. Senate Finance, at the request of APOC, added the disclosures of gifts of "legislative employees" who are required to file financial disclosure statement to those that the ethics committee must provide copies of to APOC. **(As amended by Sen. Fin.)**

SECTION 25: AS 24.60.080(e) Low Budget Campaigns This is a technical change in response to the new campaign finance reform law, to allow certain contributions to "small budget" campaigns to fall within the "contribution" definition.

SECTION 26: AS 24.60.080(f) Government Gifts Allows acceptance of gift from a foreign government, the U.S. government or another state government for protocol purposes so long as the gift is delivered to the legislative council within 60 day. This bill increases the threshold to $250 to correspond with other changes relating to gifts.

SECTION 27: AS 24.60.080(g) FAMILY Defines the terms in the Gifts Section "Immediate family or family member", which includes cohabitators. when used in relation to gifts received from immediate family and the new subsections in AS 24.60.080: inheritance from a family member (i) or gifts received by a family member (k).

SECTION 28: AS 24.60.080 GIFTS. New Subsections

(h) Permits soliciting and accepting gifts on behalf of charitable organizations. which is in accordance with an advisory opinion issued by the

committee. Allows the committee to set guidelines concerning these types of gifts.

(i) Requires reporting of receipt, but not value of, an inheritance from a person other than a family member. The current statute does not address inheritance. This information is currently required under APOC reporting of gifts. The bill reflects the change from reporting gifts to APOC.

(j) Sets out that gifts of volunteer services for legislative purposes may be accepted by a legislator, legislative committee or legislative agency as a gift to the state, so long as the person donating the services is not paid by another source. Allows a legislator, legislative committee or legislative agency to accept a UA Intern or JTPA trainee as well as any other educational trainees the committee approves. To maintain confidentiality, the ethics committee is not permitted to accept volunteer services.

This subsection requires volunteers, interns, and educational trainees to generally comply with the ethics code, with the exceptions of the following sections: contracts and leases, close economic associations, nepotism or representation before state agencies. The nepotism exemption allows family members to volunteer their time to legislative offices.

(k) The current law does not specifically address whether gifts, from another source, to a family member or spousal equivalent of a legislator or legislative employee fall within the restrictions and/or reporting requirements. The proposed language requires disclosure by a legislator or legislative employee who knows, or reasonably ought to know, that a family member has received a gift because of the family member's connection to the legislator or legislative employee. The bill provides this guideline: if the gift was given directly to the legislator or employee and if it would have to be reported by the legislator or employee, then the same gift, if the gift was given to a family member because of his/her connection to a legislator or legislative employee, would require disclosure. In other words, gifts of travel for matters of legislative concern given to allow the spouse to travel with the legislator, would have to be reported. The same holds true for gifts that legislators or legislative employees would be prohibited from accepting, that are received by family members. For example, gift of over $250 given to the spouse of a legislator, primarily because of the connection to the legislator, would have to be reported.

The language, "or reasonably ought to know", concerning family members reduces the burden on those covered by the ethics code to research gifts provided to family members with whom there is little or no contact.

(l) Sets out that the value of the gift is fair market value, to the extent that fair market value can be determined. An example of how this might apply is: a tourism company provides a one hour helicopter ride to show a legislator the area in which they would like to expand their tours. The legislator would use the rate charged to helicopter passengers for a one hour tour in reporting the gift.

SECTION 29: AS 24.60.085(a) EARNED INCOME AND HONORARIA The amendments in this section would allow legislators and legislative employees to accept compensation that is less than fees generally charged. The effect of this change would be to allow an attorney to do pro bono work or an engineer to charge a reduced rate for review of plans for a non-profit organization.

SECTION 30: AS 24.60.100 REPRESENTATION Current law does not set reporting deadlines for representation before a state agency. This change

corresponds to the other changes of February 15 and 60 days for new representation, see new section 24.60.105 of this bill.

SECTION 31: AS 24.60.105 DEADLINES FOR FILING DISCLOSURES Sets out a reporting deadline of February 15 for disclosures of interests in state contracts, leases, programs and loans, representations of clients, close economic associations and membership on a board. Interests begun or acquired during the regular session (except for the last 30 days) must be reported within 30 days.

SECTION 32: AS 24.60.130(f). COMMITTEE PER DIEM AND TRAVEL The language corrects a drafting oversight by formalizing the public members' entitlement to receive per diem and travel compensation, as has been customary with legislative committees that have non-legislative members, such as the Code Revision Committee. The public members are not entitled to be paid for their time in service to the committee. AS 39.20.180 sets the rates and terms for per diem and travel for state boards and commissions. The change would apply those rates and terms to the public members of the committee.

SECTION 33: AS 24.60.130(h). MEMBER DISQUALIFICATION
The new language prohibits an ethics committee member from participating in a complaint proceeding against a subject of a complaint who is supervised by the member. The process for appointing a new member to serve on the ethics committee in the place of a disqualified member is in new subsection AS 24.60.130(o) of this bill.

SECTION 34: AS 24.60.130(o) APPOINTMENT OF COMMITTEE ALTERNATES The current law sets out that if a member is disqualified during session, the presiding officer, with 2/3 concurrence, appoints another member for that proceeding. If disqualification is during interim, the presiding officer appoints a new member with the concurrence of that house's subcommittee. Involving either body of the legislature defeats confidentiality and allows public knowledge that the disqualified member may be the subject of the complaint. The new language directs the presiding officers to appoint alternates to the committee who will serve when the chair of the committee or subcommittee designates them, due to a legislative member being disqualified in a complaint proceeding. The designation of the alternate by the chair is confidential.

SECTION 35: AS 24.60.134(a) RESTRICTIONS ON THE COMMITTEE. The proposed language strengthens the political restrictions on the public members, staff to the committee and those under contract to the committee, by clarifying that prohibitions of participation in political management or in a political campaign extend to ballot initiatives and to campaigns for federal, state and local offices, regardless of whether the campaign is partisan or nonpartisan. A public member, employee or contractor to the committee may not attend a fundraiser or make a contribution to a political party, a candidate for the legislature, an incumbent legislator or legislative employee who is a candidate for another public office or a person running for another office against an incumbent legislator or legislative employee. The restriction on lobbying activities also remains the same as current law.

SECTION 36: AS 24.60.134(c) RESTRICTIONS: NEW SUBSECTION The proposed language permits a contractor with the ethics committee to request

the committee to exempt some members of the corporation or partnership from having to comply with some or all prohibitions against political activity. The committee has contracted for outside legal counsel with an attorney who is part of a large firm with branch offices outside of Alaska. A strict reading of current law might mandate all employees of that law firm to comply with the restrictions in the Alaska legislative ethics code.

SECTION 37: AS 24.60.150(b) GUIDELINES Permits the committee to adopt guidelines to implement this entire chapter under a public process. A person who acted within the guidelines could not be penalized for violating the ethics code. The current procedure of issuing Advisory Opinions allows interpretations based only on the facts presented by a requester. Situations have come up wherein the committee feels guidelines, based on a broad set of circumstances and an interpretation of the law, would assist those covered by the code in avoiding inadvertent violations.

SECTION 38: AS 24.60.160 ADVISORY OPINIONS The proposed language in this section allows the committee to issue an advisory opinion to a person who anticipates becoming a legislative employee, 45 days prior to employment. Current law restricts the committee to issuing advisory opinions to those already in legislative employment, legislators and legislators-elect. Current law sets 30 days as the response time for the committee to a request for an advisory opinion. The proposed change allows the committee 60 days to respond.

The new language in subsection(b) clarifies that the committee retains the authority to restrict attendance during deliberations in executive session on an advisory opinion.

SECTION 39: AS 24.60.170(a) COMPLAINTS: COMMITTEE JURISDICTION Current law requires the committee to process a complaint received, even if against all members of the legislature or all members of one house of the legislature. The proposed change, prohibiting the committee to consider a complaint of that nature, would allow the committee to return the complaint without action. Current law prohibits considering a complaint against a terminated legislative employee. Proposed language would allow the committee to reinstate a complaint that was closed upon an employee's termination, if the employee was rehired within five years of date the complaint was filed. In other words, if an employee quit to avoid complaint proceedings and the employee was rehired 6 months later, the committee may take up the initial complaint again. New language also allows the committee to follow the same procedure with a former legislator who resumes legislative service within five years of the date of the complaint. This change would affect former staffers who have been elected to the legislature and former legislators who have been employed as staffers.

SECTION 40: AS 24.60.170(b) COMPLAINANT New language clarifies that the complainant must sign a statement that he/she has reason to believe that a violation has occurred and places a responsibility on the committee to notify the complainant that he/she may have to testify during proceedings.

SECTION 41: AS 24.60.170(c) COMPLAINTS: PRELIMINARY EXAM/DISMISSAL The proposed change would put into law the current adopted procedure of the committee, which is to assign complaints to staff for preliminary examination for legal sufficiency and credibility of information.

Staff would then make a recommendation to the committee based on information and evidence contained in the complaint. Staff and the committee would be specifically permitted to solicit additional information from the complainant and the subject. The subject is not obligated to provide information. The new language clarifies that the committee is permitted to dismiss frivolous complaints and complaints that lack credible information. Further clarifies, as is current practice, that proceedings under this subsection are confidential and that confidentiality may be waived by the subject in compliance with AS 24.60.170(i), the subsection dealing with discovery by the subject.

SECTION 42: AS 24.60.170(f) LACK OF PROBABLE CAUSE Clarifies that the deliberations and vote on the dismissal order and decision on a finding of "lack of probable cause that a violation of the ethics code occurred" are not open to the public or to the subject of the complaint.

SECTION 43: AS 24.60.170(g) CORRECTIVE ACTIONS: Clarifies procedures in the event a person, after a finding of probable cause of a violation of the ethics code, agrees to comply with the committee's recommended corrective actions but later fails to complete the corrective action. Under the new language the committee may formally charge the person or refer the matter to the appropriate house of the legislature or appointing authority. It empowers the legislature or the appointing authority to enforce the actions or to decline to enforce and refer the matter back to the committee. If it is referred back to the committee, the committee retains the power to formally charge the person.

SECTION 44: AS 24.60.170(h) CORRECTIVE ACTIONS Conforms sub-paragraph (h) to the new language in AS 24.60.170(g), empowering the committee to formally charge a person who fails to complete corrective actions.

SECTION 45: AS 24.60.170(i) DISCOVERY Subsection (i) in current law is unclear as to when the subject of a complaint may engage in discovery. The committee feels the appropriate time for discovery and what seems to be the intent of the code, is at the point a person is formally charged. The change from subsection (b) to subsection (h) would clarify that intent. However, the new language permits the committee to adopt procedures concerning discovery which include allowing discovery at an earlier stage than formal charges and imposing reasonable restrictions on release of information to the subject of a complaint, to protect the privacy of persons not under investigation. The Senate Finance Committee amended subsection (i)(3) by adding a requirement that the committee could not impose restrictions on discovery by the subject unless the person agreed to be bound by similar restrictions concerning release of information and the person has not made public the information in or about the complaint or the filing of the complaint. The committee notes that they usually do not have jurisdiction over the complainant nor is the complainant involved in discovery.**(Amended by Sen. Fin.)**

SECTION 46: AS 24.60.170(l) ATTENDANCE AT EXECUTIVE SESSIONS and WAIVER OF CONFIDENTIALITY. The Uniform Rules set out that a legislator may not be excluded from an executive session. The proposed language clarifies that all meetings of the committee concerning complaints are closed to the public and to legislators who are not committee members. Under this

amendment, the committee may permit the subject of a complaint to attend a meeting, unless the committee is in deliberations on probable cause that a violation occurred. The language limits the power of the complainant to waive confidentiality for others.

SECTION 47: AS 24.60.174(a) TIMETABLE FOR SANCTIONS This sets out a procedure for the ethics committee and the legislature to follow concerning sanctions on legislators. The committee must include a timetable for compliance reports when it submits a report recommending sanctions to a legislative body to consider imposing on a legislator who was found in violation of the ethics code. The report may also include recommended fines that the legislative body may impose if the legislator does not comply in a timely manner.

SECTION 48: AS 24.60.174 TIMETABLE FOR SANCTIONS This subsection requires the legislative body to report to the committee the sanctions and timetable for compliance it has adopted. It further requires the legislator to report compliance with the sanctions according to the timetable to the committee. If the committee determines the legislator or former legislator has not complied fully and in a timely manner, the committee may recommend that the legislative body impose a fine or additional sanctions.

SECTION 49: AS 24.60.176: RECOMMENDATIONS WHERE VIOLATOR IS A LEGISLATIVE EMPLOYEE. The current code sets out that the "appointing authority" determines sanctions to be imposed on a violator who is an employee. (Appointing authority is defined in AS 24.60.176(b) of this bill.) The proposed language in this section establishes that those listed in AS 24.60.176(b) have the authority to impose sanctions on violators who are legislative employees.

SECTION 50: AS 24.60.176(b): APPOINTING AUTHORITY. This new subsection defines which body or person is the appointing authority for each set of legislative employees.

SECTION 51: AS 24.60.178 SANCTIONS Current law does not set out possible sanctions that could be recommended by the committee. The new section lists sanctions the committee may make to the legislature for violations of the ethics code. The list includes; fines on members who violated the code, divestiture of specified assets or withdrawal from certain associations, additional disclosure, suspension or termination from legislative employment (if an employee), restitution or reimbursement, public or private written reprimand, censure, removal from committee positions, probation, expulsion or any other appropriate measure. Subsection (c) clarifies that the committee may recommend that the subject be required to pay all or some of the costs related to the investigation or adjudication of a complaint. The committee's intent is to allow those covered by the code to be aware of possible sanctions and to empower the legislature to impose or require any of the above sanctions on legislators, including fines.

SECTION 52: AS 24.60.200 FINANCIAL DISCLOSURE BY LEGISLATORS, LEGISLATIVE DIRECTORS AND RANGE 19 AND ABOVE LEGISLATIVE EMPLOYEES Under current law, legislators and legislative directors are required to annually file a complete financial disclosure statement to APOC. This statement is similar to the conflict of interest statements filed by statewide

and local elected officials. The proposed changes tc the APOC Legislative Financial Disclosure statement deal only with gifts. All other reporting under this section remains the same and remains the responsibility of APOC. The new language removes the responsibility for dealing with reports of any gifts from APOC. The corresponding change described above in AS 24.60.080(d) places that responsibility solely with the ethics committee. The amendment adds the same reporting requirements for Range 19 and above legislative employees and public members of the ethics committee and adds the requirement that spousal equivalent income is also reported.

SECTION 53: AS 24.60.210 DEADLINES FOR FILING. Adds Range 19 and above employees and public members of the ethics committee to the reporting deadline, and changes the deadline from April 15 to February 15. For those employees hired at a Range 19 after January 1, the reporting deadline is 60 days from date of being hired, or promoted, to a Range 19.

SECTION 54: AS 24.60.240. CIVIL PENALTY FOR LATE FILING. Adds Range 19 and above employees and public members of the ethics committee to those subject to civil penalties fo late filing.

SECTION 55: AS 24.60.250 FAILURE TO FILE. Adds Range 19 and above employees and public members of the ethics committee to those who could forfeit nomination to office for failure to file report. (See 2/18/97 Cramer memo for discussion of this section)

SECTION 56: AS 24.60.260(a) FINES Current law does not include any penalty for late disclosures to the ethics committee. The proposed changes in this subsection and the new subsection AS 24.60.260(c) in this bill, would allow a person to file a late disclosure but that person would be subject to a fine or to having a complaint filed against them.

SECTION 57: AS 24.60.260(c) FINES Permits the committee to impose fines for late disclosures. Fines are not to exceed $2 per day to a maximum of $100 per late disclosure.

SECTION 58: AS 24.60.990(a)(5) IMMEDIATE FAMILY The change to the definition of immediate family affects, in current law, the contracts and leases section (24.60.040) and the section on nepotism, AS 24.60.090. The changes here conform with changes made in AS 24.60.080(g) of this bill.

SECTION 59: AS 24.60.990 · LEGISLATIVE EMPLOYEE AND SPOUSAL EQUIVALENT Adds Range 19 employee and public members of the ethics committee to the definitions of who is required to filc the annual Legislative Financial Report to APOC. Adds spousal equivalent to the list of those whose income must be reported if the reporter is required to filed the annual Legislative Financial Report to APOC.

SECTION 60: AS 39.25.070: POWERS AND DUTIES OF THE PERSONNEL BOARD. Reflects the changes made in later sections of this bill, which replace the Attorney General with the Personnel Board for many of the duties related to handling executive branch ethics complaints. **(Added in Sen. Fin at suggestion of the drafter.)**

SECTION 61: AS 39.25.160 New subsection:**(j) STATE PERSONNEL ACT.** Amends the State Personnel Act by adding a specific prohibition on state employees engaging in campaign activities on behalf of political candidate on government time. Clarifies that Division of Election employees may carry out duties related to elections and members and employees of the Commission on Judicial Conduct may carry out duties related to evaluation of judges.

SECTION 62: AS 39.50.020 REPORT OF FINANCIAL AND BUSINESS INTERESTS. Subsection (a) Amends the non-legislative Conflict of Interest statutes. This section sets out that the public officials listed in AS 39.50.200 must file a financial report within 30 days after taking office as a public official. In reference to filing requirements for candidates, deletes the 30 day grace period for a "person who becomes a candidate by any other means" thereby requiring immediate filing. Subsection **(b)** sets outs that public officials are to file with APOC.

SECTION 63: AS 39.50.030(a) CONTENTS OF FINANCIAL STATEMENTS. Deletes the unnecessary reference to assets or liabilities under $500, household goods and personal effects, to clarify that only those items listed in subsection (b) and (d) are to be reported. **(Amended by Sen. Fin to include (d))**

SECTION 64: AS 39.50.030(b) CONTENTS OF FINANCIAL STATEMENTS. Changes the reporting requirements for the executive branch public officials to the same level of legislators; interests over $1000. Previous reporting level was $100 for most income/interests and $500 for loans. Adds requirement for public officials to report any income of over $250 that is a *gift*. Deletes requirement for reporting of a state contract or natural resource lease held, bid or offered by the official's mother or father, adds reporting of state contract held, bid or offered by a partnership or professional corporation of which the official is a member. Adds official's spouse to the list of those the official must report if the spouse holds a natural resource lease.

SECTION 65: AS 39.50.030 CONTENTS OF FINANCIAL STATEMENTS. Added by Senate Finance at the request of APOC, this language provides a way for state officials to report a close economic association (as required in AS 39.52.155 of this bill) along with their conflict of interest statements on April 15, as opposed to filing a separate report on February 15. **(Added by Sen. Fin.)** Note overlap with Sections 6 and 78

SECTION 66: AS 39.50.070 FAILURE TO REPORT BY CERTAIN STATE EMPLOYEES. Amends language to conform with changes on who must report, in Sections AS 39.50.020 and AS 39.50.200.

SECTION 67: AS 39.50.080 FAILURE TO REPORT BY A COMMISSION OR BOARD CHAIR OR MEMBER. Amends language to conform with changes on who must report, in Sections AS 39.50.020 and AS 39.50.200.

SECTION 68: AS 39.50.200((a)(8) DEFINITIONS. Combined with following section, changes the definition of who must file a financial report. Adds to the current list, all state employees in the executive branch in the exempt or partially exempt service who are at a Range 19 or above or who earn more than $4200 per month.

SECTION 69: AS 39.50.200(a)(10) DEFINITIONS. Combined with above section, changes the definition of who must file a financial report. Adds to the current list, all state employees in the executive branch in exempt or partially exempt service who are at a Range 19 or above or who earn more than $4200 per month.

SECTION 70: AS 39.52.010(a) FINDINGS AND PURPOSE. Generally adds the findings of the legislative ethics act to those in the executive branch ethics code.

SECTION 71: AS 39.52.110(c) SCOPE OF CODE. Conforming change related to removal of Attorney General from certain actions related to administering the executive ethics code.

SECTION 72: AS 39.52.120(b) MISUSE OF OFFICIAL POSITION. This section clarifies that the Governor and Lt. Governor may accept campaign contributions and that public officers and Lt. Governor and Governor may accept lawful gifts.

SECTION 73: AS 39.52.125 MISUSE OF OFFICIAL POSITION BY STATE OFFICIALS. New section. Adds a new section to the executive branch ethics code which sets out additional prohibitions for state officials (as defined at the end of this bill), as generally found in the legislative ethics act, and includes changes made to the legislative ethics act through this legislation.

SECTION 74: AS 39.52.130(c). GIFTS This section and other sections change the reporting, advising and enforcing authority relating to gifts for the executive branch from the Attorney General's office to the Personnel Board.

SECTION 75: AS 39.52.130(e-n) GIFTS . New subsections. Changes language regarding state officials to match legislative gift restrictions and reporting. Sets out the list of gifts that are exempted from restrictions, including voluntary services, to the executive branch. The list matches the exempt list for the legislature, as proposed in this bill. Gifts from another government to be delivered to the Office of the Governor.

SECTION 76: AS 39.52 RESTRICTIONS ON FUNDRAISING. New Subsections. Section 39.52.132: Sets restrictions on campaign fundraising during session for state officials including the governor and lieutenant governor. **Section 39.52.134** prohibits a state official, other than the Governor or Lt. Governor, in the exempt or partially exempt service from filing a letter of intent or declaration of candidacy for the legislature. **Section 39.52.136** adds state officials to those that must comply with the open meetings law.

SECTION 77: AS 39.52.150(d) IMPROPER INFLUENCE IN STATE GRANTS, CONTRACTS, LEASES, LOANS. Requires reporting to the Personnel Board as well as to supervisor, a report of participation in state contracts, grants, leases, loans.

SECTION 78: AS 39.52.155 DISCLOSURE OF CLOSE ECONOMIC ASSOCIATIONS. New Section: Requires state official to disclose, to supervisor and APOC, close economic associations with those listed in this

section. Sets disclosure deadlines to conform with legislative ethics act. Subsection (c) requires state officials who are married to or living with a lobbyist to report the name of each employer of the lobbyist and the total monetary value received from the employer. Changes must be reported within 48 hours. APOC shall maintain a public record of the disclosures. Note overlap with Section 6 and 65.

SECTION 79: AS 39.52.170 OUTSIDE EMPLOYMENT RESTRICTED. (a) Adds a clause that restricts state officials from accepting outside employment if the compensation is significantly greater than the value of the services. Conforms with legislative ethics language. (b) Requires those who receive compensation for another job to report to both supervisor and Personnel Board.

SECTION 80: AS 39.52.170 (c) OUTSIDE EMPLOYMENT. Adds an honorarium restriction for state officials which matches legislative ethics act restriction.

SECTION 81: AS 39.52.180(b) RESTRICTIONS ON EMPLOYMENT AFTER LEAVING STATE SERVICE. This references change in new subsection (d) below, restricting agencies from contracting with a former state official for lobbying services before a state agency or the legislature.

SECTION 82: AS 39.52.180(c) RESTRICTIONS ON EMPLOYMENT AFTER LEAVING STATE SERVICE. References new subsection (d) below and sets a one year limit on waiving restrictions set out in this section regarding lobbying.

SECTION 83: AS 39.52.180 RESTRICTIONS ON EMPLOYMENT AFTER LEAVING STATE SERVICE. New subsection. (d) restricts agencies from contracting with a former public officer for services which would include lobbying before a state agency or the legislature.

SECTION 84: AS 39.52.210(a-c) DECLARATION OF POTENTIAL VIOLATIONS. Requires public employees to report potential violations to Personnel Board as well as to supervisor. Requires supervisor to provide a copy of written determination of potential violation to public employee and personnel board.

SECTION 85: AS 39.52.220 DECLARATION OF POTENTIAL VIOLATIONS BY MEMBERS OF BOARDS AND COMMISSIONS. Requires members of boards or commissions to disclose a matter that may result in a violation on the public record and in writing to supervisor and to the personnel board. Replaces AG office with Personnel Board as advisors in matters of potential violation.

SECTION 86: AS 39.52.230 REPORTING OF POTENTIAL VIOLATIONS. A complaint against a state official is filed with the supervisor. The supervisor is required to file a copy of the complaint with the personnel board.

SECTION 87: AS 39.52.240(a) ADVISORY OPINIONS. Adds state officials to those that may request an advisory opinion and sets the personnel board as the body to issue the opinion.

SECTION 88: AS 39.52.240(b) ADVISORY OPINIONS. Replaces the AG office with the personnel board as the body offering oral advice.

SECTION 89: AS 39.52.240(c) ADVISORY OPINIONS. Replaces the AG office with the personnel board as the advising body.

SECTION 90: AS 39.52.240(e) ADVISORY OPINIONS. Replaces the AG office with the personnel board as the advising body

SECTION 91: AS 39.52.240(h) ADVISORY OPINIONS. Replaces the AG office with Personnel Board for purpose of publishing advisory opinions.

SECTION 92: AS 39.52.250 ADVICE TO FORMER PUBLIC OFFICERS. Replaces the AG office with the personnel board as the advising body.

SECTION 93: AS 39.52.260 DESIGNATED SUPERVISOR'S REPORT AND PERSONNEL BOARD REVIEW. Replaces the AG office with the personnel board as the body accepting reports of potential violations.

SECTIONS 94 -103: AS 39.52.310, 320,330,340. COMPLAINTS: The changes in these sections have the effect of removing the AG from handling complaints and placing that responsibility with the Personnel Board.

SECTION 104: AS 39.52.350: PROBABLE CAUSE FOR A HEARING Changes the current role of the AG from determining probable cause and initiating hearings to that of "prosecutor" in the hearing. Establishes the Personnel Board as the body to conduct the preliminary review, determine probable cause and initiate hearings.

SECTION 105: AS 39.52.920 AGENCY POLICIES Replaces the AG office with the Personnel Board as the body which reviews and approves agency policies that restrict a public officers acquisition of personal interest in certain entities and acceptance of gifts.

SECTION 106: AS 39.52.950. REGULATIONS. Limits the AG office to adopting regulations relating to complaints (for this act) and sets out that the personnel board may adopt regulations necessary to interpret and implement sections other than complaints,

SECTION 107: AS 39.52.960(11) DEFINITION OF IMMEDIATE FAMILY. Changes definition in the executive act to match the legislative act, as proposed in this bill.

SECTION 108: AS 39.52.960 (23) DEFINITION OF STATE OFFICIAL. Means governor, lieutenant governor, a person hired or appointed as the head or deputy head of a department in the executive branch or as the director of a division in a department in the executive branch, the chair or member of a state commission or board, the executive director of the Alaska Tourism Marketing Council, an assistant to the governor or lieutenant governor, a state investment officer, the state comptroller in the Department of Revenue, and a state employee who is not otherwise listed in this definition who is employed in a position in the executive branch of state government in the exempt or

partially exempt service and who is compensated at Range 19 A or above on the state salary schedule or at more than $4200 per month. (This may affect people at lower ranges who are further out in step) Does not include an employee who is a member of collective bargaining unit e.g. state ferry workers.

SECTION 109: AS 44.62.175(a) ALASKA ADMINISTRATIVE JOURNAL. Adds advisory opinions of the personnel board to the list of those things to be published in the journal.

SECTION 110: Temporary Law: AG OPINIONS. Sets out that a public officer or former public officer may rely upon the opinion of the AG's office prior to this act taking effect.

SECTION 111: Temporary Law: DISBURSEMENT OF UNUSED CAMPAIGN CONTRIBUTIONS Allows current legislators to transfer $5000 per year from unused campaign contributions to a legislative office account and requires the money transferred to be accounted for under AS 15.13.110(a)(4).

SECTION 112: Temporary Law. Retroactive Date for Secs. 1, 2 and 111. Allows the increase in transfer to future election account and subsequent transfer of a portion of that increase to the office account to be retroactive to December 31, 1996.

SECTION 113: Temporary Law. Immediate Effective Date for Secs. 1, 2, 111 and 112.

SECTION 114: EFFECTIVE DATE: APOC has recommended that a January 1 effective date would correspond to their calendar year reporting and would avoid confusion for those who have to file the financial disclosure to APOC for the period of time between January 1 and whatever other date might be selected.

Alaska State Legislature

Corrected Version
4pm 19 MAR 97

Select Committee on Legislative Ethics

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Anchorage AK
(907) 258-8172
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Mailing Address:
P.O.Box 101468
Anchorage, AK
99510 - 1468

DATE: March 19, 1997

TO: Senator Lyda Green, Chair
Senate State Affairs Committee

FROM: Susie Barnett, Staff
Select Committee on Legislative Ethics

RE: SB 105: **Review of Amendment 0-LS0074\B.2, Cramer**

Pages 1, 2 and a portion of 3 of Amendment:

Changes title to read: An Act relating to legislative and executive branch ethics; relating to the conduct of lobbyists with respect to public officials; relating to the filing of disclosures by certain [LEGISLATIVE] state employees and officials; making a conforming amendment to the definition of 'public official for employment security statutes and providing for an effective date.

New Section: **AS 23.20.526(d) EXCLUSIONS FROM DEFINITION OF EMPLOYMENT.** Conforming amendment to employment security statutes to ensure that the people who are not eligible for unemployment compensation remain ineligible.

Page 3 of Amendment:

New Section. **AS 24.45.171(12) DEFINITIONS.** Adds "another legislative employee subject to disclosure" to the definition of public official or public officer in relation to lobbying statutes. (see AS 24.60.990(a)(15) in this bill)

Page 4 and a portion of 5 of Amendment:

New Section: **AS 39.25.160** New subsection:(j) **STATE PERSONNEL ACT.** Amends the State Personnel Act by adding a specific prohibition on state employees engaging in campaign activities on behalf of political candidate on government time. Clarifies that Division of Election employees may carry out duties related to elections and members and employees of the Commission on Judicial Conduct may carry out duties related to evaluation of judges.

AS 39.50.020 REPORT OF FINANCIAL AND BUSINESS INTERESTS. Subsection (a) Amends the non-legislative Conflict of Interest statutes. This section sets out that the public officials listed in AS 39.50.200 must file a financial report within 30 days after taking office as a public official. In reference to filing requirements for candidates, deletes the 30 day grace period for a "person who becomes a candidate by any other means" thereby requiring immediate filing. Subsection (b) sets outs that public officials are to file with APOC.

Page 19 of the Amendment:

AS 39.52.220 DECLARATION OF POTENTIAL VIOLATIONS BY MEMBERS OF BOARDS AND COMMISSIONS. Requires members of boards or commissions to disclose a matter that may result in a violation on the public record and in writing to supervisor and to the personnel board. Replaces AG office with Personnel Board as advisors in matters of potential violation.

AS 39.52.230 REPORTING OF POTENTIAL VIOLATIONS. A complaint is filed against a state official with the supervisor. The supervisor is required to file a copy of the complaint with the personnel board.

Page 20 of the Amendment:

AS 39.52.240(a) ADVISORY OPINIONS. Adds state officials to those that may request an advisory opinion and sets the personnel board as the body to issue the opinion.

AS 39.52.240(b) ADVISORY OPINIONS. Replaces the AG office with the personnel board as the body offering oral advice.

AS 39.52.240(c) ADVISORY OPINIONS. Replaces the AG office with the personnel board as the advising body.

AS 39.52.240(e) ADVISORY OPINIONS. Replaces the AG office with the personnel board as the advising body

AS 39.52.240(h) ADVISORY OPINIONS. Replaces the AG office with Personnel Board for purpose of publishing advisory opinions.

Page 21 of the Amendment:

AS 39.52.250 ADVICE TO FORMER PUBLIC OFFICERS. Replaces the AG office with the personnel board as the advising body.

AS 39.52.260 DESIGNATED SUPERVISOR'S REPORT AND PERSONNEL BOARD REVIEW. Replaces the AG office with the personnel board as the body accepting reports of potential violations.

Pages 21,22,23 of the Amendment:

AS 39.52.310, 320,330,340. COMPLAINTS: The changes in these sections have the effect of removing the AG from handling complaints and placing that responsibility with the Personnel Board.

Page 24 of the Amendment:

AS 39.52.350: PROBABLE CAUSE FOR A HEARING Changes the current role of the AG from determining probable cause and initiating hearings to that of "prosecutor" in the hearing. Establishes the Personnel Board as the body to conduct the preliminary review, determine probable cause and initiate hearings.

AS 39.52.920 AGENCY POLICIES Replaces the AG office with the Personnel Board as the body which reviews and approves agency policies that restrict a public officers acquisition of personal interest in certain entities and acceptance of gifts.

Page 25 of the Amendment:

AS 39.52.950. REGULATIONS. Limits the AG office to adopting regulations relating to complaints (for this act) and sets out that the personnel board may adopt regulations necessary to interpret and implement sections other than complaints.

AS 39.52.960(11) DEFINITION OF IMMEDIATE FAMILY. Changes definition in the executive act to match the legislative act.

AS 39.52.130(e-n) GIFTS . New subsections. Changes language regarding state officials to match legislative gift restrictions and reporting and adds the list, as proposed in this bill, of exempted gifts under the legislative ethics code, including voluntary services, to the executive branch ethics act. Gifts from another government to be delivered to the Office of the Governor.

Page 15 of the Amendment

AS 39.52 RESTRICTIONS ON FUNDRAISING. New Subsections. Section 39.52.132: Sets the same restrictions on campaign fundraising for state officials including the governor and lieutenant governor as for legislators and legislative employees. **Section 39.52.134** prohibits a state official, other than the Governor or Lt. Governer, in the exempt or partially exempt service from filing a letter of intent or declaration of candidacy for the legislature. **Section 39.52.136** adds state officials to those that must comply with the open meetings law.

Page 16 of the Amendment:

AS 39.52.150(d) IMPROPER INFLUENCE IN STATE GRANTS, CONTRACTS, LEASES, LOANS. Requires reporting to the Personnel Board as well as to supervisor, a report of participation in state contracts, grants, leases, loans.

AS 39.52.155 DISCLOSURE OF CLOSE ECONOMIC ASSOCIATIONS. New Section: Requires state official to disclose to supervisor and APOC, which shall maintain a public record, close economic associations with those listed in this section. Sets disclosure deadlines to conform with legislative ethics act. Subsection (c) requires state officials who are married to or living with a lobbyist to report the name of each employer of the lobbyist and the total monetary value received from the employer. Changes must be reported within 48 hours.

Page 17 of the Amendment:

AS 39.52.170 OUTSIDE EMPLOYMENT RESTRICTED. (a) Adds a clause that restricts state officials from accepting outside employment if the compensation is significantly greater than the value of the services. Conforms with legislative ethics language. (b) Requires those who receive compensation for another job to report to both supervisor and Personnel Board.

AS 39.52.170 (c) OUTSIDE EMPLOYMENT. Adds an honorarium restriction for state officials which matches legislative ethics act restriction.

Page 18 of the Amendment:

AS 39.52.180(b) RESTRICTIONS ON EMPLOYMENT AFTER LEAVING STATE SERVICE. This references change in new subsection (d) below, restricting agencies from contracting with a former state official for services which would include lobbying before a state agency or the legislature.

AS 39.52.180(c) RESTRICTIONS ON EMPLOYMENT AFTER LEAVING STATE SERVICE. References new subsection (d) below and sets a one year limit on waiving restrictions set out in this section regarding lobbying.

AS 39.52.180 RESTRICTIONS ON EMPLOYMENT AFTER LEAVING STATE SERVICE. New subsection. (d) restricts agencies from contracting with a former public officer for services which would include lobbying before a state agency or the legislature.

AS 39.52.210(a-c) DECLARATION OF POTENTIAL VIOLATIONS. Requires public employees to report potential violations to Personnel Board as well as to supervisor. Requires supervisor to provide a copy of written determination of potential violation to public employee and personnel board.

Pages 5 and 6 of Amendment:

AS 39.50.030(a) CONTENTS OF FINANCIAL STATEMENTS. Deletes the unnecessary reference to assets or liabilities under $500, household goods and personal effects, to clarify that only those items listed in subsection (b) are to be reported.

AS 39.50.030(b) CONTENTS OF FINANCIAL STATEMENTS. Changes the reporting requirements for the executive branch public officials to the same level of legislators; interests over $1000. Previous reporting level was $100 for most income/interests and $500 for loans. Adds requirement for public officials to report any income of over $250 that is a *gift*. Deletes requirement for reporting of a state contract or natural resource lease held, bid or offered by the officials mother or father, adds reporting of state contract held, bid or offered by a partnership or professional corporation of which the official is a member. Adds official's spouse to the list of those the official must report if the spouse holds a natural resource lease.

Page 7 of amendment:

AS 39.50.070 FAILURE TO REPORT BY CERTAIN STATE EMPLOYEES. Amends language to conform with changes on who must report, in Section AS 39.50.020 and AS 39.50.200.

AS 39.50.080 FAILURE TO REPORT BY A COMMISSION OR BOARD CHAIR OR MEMBER. Amends language to conform with changes on who must report, in Sections AS 39.50.020 and AS 39.50.200.

Page 8 of amendment:

AS 39.50.200((a)(8) DEFINITIONS. Combined with following section, changes the definition of who must file a financial report. Adds to the current list, all state employees in the executive branch in the exempt of partially exempt service who are at a Range 19 or above or who earn more than $4200 per month.

AS 39.50.200(a)(10) DEFINITIONS. Combined with above section, changes the definition of who must file a financial report. Adds to the current list, all state employees in the executive branch in exempt or partially exempt service who are at a Range 19 or above or who earn more than $4200 per month.

Pages 8 and 9 of Amendment:

AS 39.52.010(a) FINDINGS AND PURPOSE. Generally adds the findings of the legislative ethics act to those in the executive branch ethics code.

AS 39.52.110(c) SCOPE OF CODE. Conforming change related to removal of Attorney General from certain actions related to administering the executive ethics code.

Pages 10 and 11 of Amendment:

AS 39.52.120(b) MISUSE OF OFFICIAL POSITION. This section clarifies that the Governor and Lt. Governor may accept campaign contributions and that public officers and Lt. Governor and Governor may accept lawful gifts.

AS 39.52.125 MISUSE OF OFFICIAL POSITION BY STATE OFFICIALS. New section. Adds a new section to the executive branch ethics code which sets out additional prohibitions for state officials (as defined at the end of this bill), as generally found in the legislative ethics act, and includes changes made to the legislative ethics act through this legislation.

Pages 12,13,14,15 of the Amendment

AS 39.52.130(c). GIFTS This section and other sections change the reporting, advising and enforcing authority relating to gifts for the executive ethics code from the Attorney Generals office to the Personnel Board.

AS 39.52.960 (23) DEFINITION OF STATE OFFICIAL. Means governor, lieutenant governor, a person hired or appointed as the head or deputy head of a department in the executive branch or as the director of a division in a department in the executive branch, the chair or member of a state commission or board, the executive director of the Alaska Tourism Marketing Council, an assistant to the governor or lieutenant governor, a state investment officer, the state comptroller in the Department of Revenue, and a state employee who is not otherwise listed in this definition who is employed in a position in the executive branch of state government in the exempt or partially exempt service and who is compensated at Range 19 A or above on the state salary schedule or at more than $4200 per month. (This may affect people at lower ranges who are further out in step) Does not include an employee who is a member of collective bargaining unit e.g. state ferry workers.

Page 26 of the Amendment:

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