Dental Office
P2

WRPPN • 2005
Presenters

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Today’s Topics

**Presentations**
- Dental Office Types, Staffing, & Trends
- Chemicals Used
- CDA Outreach Programs
- Agency Programs

**Discussion Groups**
- Working w/ Local Dental Society
- Amalgam Issues
- X-Ray Issues
- Infection Control Issues
Dental Office Types & Trends

Teresa Pichay, CDA

- General Dentistry
- Other Practice Types
- Office Staff
- Industry Trends
Who’s Who In A Dental Office

- General Dentist
- Endodontist
- Pediatric Dentist
- Oral & Maxillofacial Surgeon
- Prosthodontist
- Orthodontist
- Oral & Maxillofacial Radiologist
- Periodontist
- Public Health Dentist
- Oral Pathologist

- Dental Assistant
- Registered Dental Assistant/Certified Dental Assistant
- Registered Dental Hygienist
- Lab Tech
- Office Manager/Patient Coordinator
- Receptionist
Continuing Education

**Sources**
- Dental associations, local dental societies, ADA
- Study clubs
- Dental schools
- Community colleges
- Regional occupational programs

**Subjects**
- Clinical courses, e.g., pharmacology,
- Mandated courses or courses that instruct on legal requirements, e.g., infection control
Issues Impacting Dentistry

Access to Dental Care
- Licensure of internationally trained professionals
- Changing scope of practice
- Public funding

Third-Party Payer Issues
- Adequate reimbursement
- Market economics
- Quality assurance

Regulatory Compliance
- Cal/OSHA
- Waste management – medical & hazardous
- Radiation
- Wastewater
Pollution Prevention & Dentistry

- Proposed regulation
- Research
- Educational outreach
- Selective regulation
Dental Office Chemical Use

Tom Barron

- Radiography
- Work Surface Disinfection
- Instrument Cleaning
- Instrument Sterilizing
Chemicals Dentists Use • 1

- Photography
- Infection Control
- Hygiene Work
- Restoration Work
- Lab Work
- Pharmaceuticals
- Cleaning & Maint.

- Hydroquinone
- Silver
- Glutaraldehyde
- Potassium Hydroxide
- Potassium Sulfite
- Sodium Thiosulfate
- Acetic Acid
• Photography
• **Infection Control**
• Hygiene Work
• Restoration Work
• Lab Work
• Pharmaceuticals
• Cleaning & Maint.

**Sanitizers**
- Ethyl Alcohol
- Triclosan

**Disinfectants**
- Alcohols (Ethyl, Isopropyl)
- Quat. Ammonium Chloride
- Oxidizers (Bleach, H₂O₂)
- Phenylphenol

**Sterilizers**
- Glutaraldehyde
- Orthophthaldehyde (OPA)
- Formaldehyde
Chemicals Dentists Use • 3

- Photography
- Infection Control
- **Hygiene Work**
- **Restoration Work**
- **Lab Work**
- **Pharmaceuticals**
- Cleaning & Maint.

- Amalgam (Hg, Ag, Cu)
- Glass Ionomer
- Resin Composite
- Gold
- Porcelain
- Tooth Whitener
- Adhesives
- Disinfectants
- Antibiotics
Chemicals Dentists Use • 4

- Photography
- Infection Control
- Hygiene Work
- Restoration Work
- Lab Work
- Pharmaceuticals
- Cleaning & Maint.

Typical Cleaners With:
  - Detergents
  - Surfactants
  - pH Adjusters
  - Builders
  - Disinfectants

Concerns About:
  - Endocrine Modifiers
  - Low & High pH
  - Bleach
Dental Radiography

- Two Kinds
  - IntraOral
  - Panoramic
- Exposures/Week
- Chemicals Used
- P2 Opportunities
  - Processing
  - Film vs Digital

Photo: US Navy
# Developer Chemistry

<table>
<thead>
<tr>
<th>Components-Chemical Name &amp; Common Name</th>
<th>CAS Number</th>
<th>Range % (wt)</th>
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<tbody>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>80-85</td>
</tr>
<tr>
<td>*Sodium Sulfite</td>
<td>7757-83-7</td>
<td>5-10</td>
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<tr>
<td><em>Hydroquinone</em>*</td>
<td>123-31-9</td>
<td>1-5</td>
</tr>
<tr>
<td>*Potassium Hydroxide</td>
<td>1310-58-3</td>
<td>1-5</td>
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<tr>
<td>p-Methylaminophenol sulfate</td>
<td>55-55-0</td>
<td>&lt;1</td>
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Source: Neo-Flo
# Hydroquinone Hazards

<table>
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<tr>
<th>Common Name:</th>
<th>HYDROQUINONE</th>
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<tr>
<td>CAS Number:</td>
<td>123-31-9</td>
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<tr>
<td>DOT Number:</td>
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</table>

## HAZARD SUMMARY

* **Hydroquinone** can affect you when breathed in.
* **Hydroquinone** can cause fatal poisoning when **swallowed**.
* **Hydroquinone** may cause mutations. Handle with extreme caution.
* **Hydroquinone** can irritate and may burn the eyes. Repeated exposure can cause a staining and discoloration of the eyes and eyelids and may cause clouding of the eyes (corneal opacities), affecting vision.
* Contact can irritate the skin and cause a rash and changes in skin color.
* Exposure can cause headache, nausea, vomiting, abdominal cramps, dizziness, and muscle twitching.
* **Hydroquinone** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
* **Hydroquinone** may affect the liver and kidneys.

Source: State of New Jersey
X-Ray Developer Use

Source: Barron (2005)
X-Ray P2 Opportunities

- Change to Digital
- Reduce Spoiled Exposures
- Reduce Chemical Use
  - Change By Need
  - Buy Pre-measured
  - Self-contained
Film vs Digital X-Ray

Film = 76% of Practices
Digital = 19%
Both = 5%

Trend to Digital
20% More in Next 2 yrs

Source: Barron (2005)
Spoiled X-Ray Exposures

- Developing Problems: 25%
- Patient Movement: 29%
- Wrong Film Orientation: 32%
- Under / Over Exposed: 4%
- Other: 8%
- Bad Film: 2%

Source: Barron (2005)
Infection Control

• Instruments
  – Cleaning
  – Sterilization

• Work Surfaces
  – Operatories
  – Other Work Areas

• Vacuum Systems

• Hand Sanitizers

Photo: US Navy
Work Surface Disinfection

Source: Barron (2005)
# Glutaraldehyde Hazards

<table>
<thead>
<tr>
<th>Common Name:</th>
<th>GLUTARALDEHYDE</th>
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<tbody>
<tr>
<td>CAS Number:</td>
<td>111-30-8</td>
</tr>
<tr>
<td>DOT Number:</td>
<td>None</td>
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</tbody>
</table>

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## HAZARD SUMMARY

* **Glutaraldehyde** can affect you when breathed in and by passing through your skin.
* Contact with the liquid and vapor can severely irritate the eyes. At higher concentrations **Glutaraldehyde** can irritate and burn the skin.
* Breathing **Glutaraldehyde** can irritate the nose and throat causing coughing and wheezing.
* **Glutaraldehyde** can cause headache and nausea.
* **Glutaraldehyde** may cause a skin allergy. If allergy develops, very low future exposure can cause itching and a skin rash.
* **Glutaraldehyde** may cause an asthma-like allergy. Future exposure can cause asthma attacks with shortness of breath, wheezing, cough, and/or chest tightness.

Source: State of New Jersey
Surface Disinfectant Use

More Info: Dental P2 Website
Disinfection - P2 Measures

• Minimize Contamination
• Evaluate Active Ingredients
• Buy Pre-Measured Units
• Review Mixing
• Review Tools, Techniques, & Timing
CDA Outreach Programs

Rosanne Harding, CDA

- Operatory Wastes
- Other Wastes
- Outreach Steps
- The P2 Universe
- Waste Option Tables
- CDA Outreach To Date

**BEST MANAGEMENT PRACTICES**

**AMALGAM WASTE**

- Follow regular or lesser frequencies. Paying for destruction of waste and separation of contact and non-contact amalgam.
- Collect and transport in an appropriate container.
- Do not use water to separate contact amalgam.
- Collect and transport in an appropriate container.
- Change or clean, change the water to flush, before operation of amalgam.
- Change water pump filters at least once a week by the manufacturer.
- Check the pump each day for the presence of any amalgam containing waste.

**MANDATORY PER CALIFORNIA CODE OF REGULATIONS TITLE 22**

- Do not use amalgam as reagents, recover, or containers in the sink.
- Do not store amalgam, either in contact or in the tooth. Use an amalgam separator, etchant with amalgam, or amalgam containing and filters with medical waste or regular solid waste.
- Keep amalgam waste in an airtight condition.

The California Dental Association
CDA Member Conduct Guide (0160 - 253 - 0060)
Operatory Waste Streams

X-RAY & PHOTO
- Developer
- Fixer
- Machine cleaners
- Foil
- Spent film

MEDICAMENTS
- Anesthetics
- Antibiotics
- Analgesics

STERILANTS
- Surface cleaners
- Ultrasonic detergents
- Cold & hot sterilants
- Water tx chemicals

RESTORATIVES
- Amalgam
- Composites
- Cements
Other Waste Streams

- Electronic wastes *(computer components, etc)*
- Outdated equipment *(e.g. - xray machines being replaced with digital equipment)*
- Outdated furniture
- Construction debris from remodel projects
- Office paper, cardboard
- Medical wastes
Outreach Steps

1. RESEARCH LOCAL RESOURCES
2. DEVELOP PRESENTATION WITH LOCAL DATA
3. MEET WITH LOCAL DENTAL SOCIETY
4. PROVIDE OVERVIEW OF ALL WASTE STREAMS AND OPTIONS
Expanding The P2 Universe

- Dental Practice
- Purchasing
- Onsite Capture
- Substitution
- Municipal Events
- Recycling Vendors
- P2 Options
<table>
<thead>
<tr>
<th>Waste Material</th>
<th>Disposal option</th>
<th>P2 Option</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Amalgam</td>
<td>Haz Waste</td>
<td>Mail-back or pick-up</td>
<td></td>
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<tr>
<td>Lead Foil</td>
<td>Haz Waste</td>
<td>Mail-back or pick-up</td>
<td></td>
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<tr>
<td>Resins/cements</td>
<td>Solid waste</td>
<td>None</td>
<td></td>
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<tr>
<td>Fixer</td>
<td>Haz Waste</td>
<td>Pick-up by recycler or onsite recovery</td>
<td></td>
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<tr>
<td>Developer</td>
<td>Wastewater or haz waste</td>
<td>None</td>
<td>Depends on formula</td>
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<tr>
<td>Cold Sterilant</td>
<td>Wastewater or haz waste</td>
<td>None</td>
<td>Depends on ingredients</td>
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<td>Waste Material</td>
<td>Disposal option</td>
<td>P2 Option</td>
<td>Notes</td>
</tr>
<tr>
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<td>-----------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
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<tr>
<td>Equipment</td>
<td>Haz Waste or solid waste</td>
<td>Metal recycler or donate to others (clinics, Mexico)</td>
<td>Many metal recyclers will take xray equipment if lead removed &amp; segregated</td>
</tr>
<tr>
<td>Electronics</td>
<td>Haz Waste</td>
<td>Community events, donate or local vendors</td>
<td></td>
</tr>
<tr>
<td>Outdated furniture/fixtures</td>
<td>Solid waste</td>
<td>Metal or plastic recycler</td>
<td>Depends on materials</td>
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<tr>
<td>Office paper/cardboard</td>
<td>Solid Waste</td>
<td>Local recycler or community prgm</td>
<td></td>
</tr>
<tr>
<td>Construction waste</td>
<td>Solid waste</td>
<td>Local recycler or community prgm</td>
<td>Disposal option depends on formula</td>
</tr>
</tbody>
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CDA Outreach To Date

• Presentations have been given to over 8 Dental societies over the past year
  • Presentations are about 1.5 hours long
  • Attendance varied from 25 to 100 attendees at each event
  • Outreach is available to all dental societies in California
  • In some cities, the public works departments have offered similar outreach programs
  • More presentations are scheduled for next year
Agency Outreach Programs

Sushma Dhulipala, SFE

- Amalgam Management
- Other Wastes
- Green Business
- SF Workshops
  - For Dental Offices
  - For Agency Staff

Don't Flush Mercury Down the Drain!

Mercury-containing waste are a fact of life in dental offices. But washed down the drain or otherwise improperly disposed, they can find their way into San Francisco Bay, impairing its quality and contaminating fish. Ending these practices is especially harmful to pregnant women, children, and developing fetuses. Your local wastewater treatment facilities are working to reduce mercury discharges to the Bay... and you can help:

- **Bath mercury** – Place contaminated waste in an unlined container labeled “Bath Mercury” and recylce through one of the Bay Area-based banks.
- **Scrap amalgam** – Place waste containing at the end of a procedure in an unlined container labeled “Scrap Amalgam.” Remove this waste on scrap metal or similar as above.

**Amalgam waste collected in traps** – Collect waste from traps in an unlined metal-lined container labeled “Amalgam for Recycling.” Place disposable traps directly into the container. These waste amalgams, such as extracted teeth with amalgam restorations, should also be placed in the container, recylpe or disposed as hazardous waste.

**More Tips**

1. Never chase traps in the sink. The trapped mercury-containing amalgam will go directly to the sewer and wastewater treatment plant, where no equipment is handled.
2. Don’t put mercury-containing waste in medical waste containers. Incinerate and solid waste disposal services recycle mercury directly into the environment.
3. Used amalgam capsules should be put in your recycling container.
4. Don’t place other materials in your mercury waste or recycling containers. Hazards will not occur and may make disposal or recycling more difficult.
5. Don’t mix waste streams without dealing with your waste handler first. Mixing may limit recycling and disposal options and result in higher costs.
6. Talk to your waste handler about specific handling requirements for such mercury-containing waste items.
Agency Outreach

- Partnerships
- Amalgam Separators
  - Approved Listing
  - Amalgam Separator Vendor Fair
  - Rebate Program
- Outreach Tools
  - Dental workshops
  - Inspector Cross training
  - Fact sheets
- Lessons Learned
Partnerships: POTWs, Dental Societies

**SFPUC – BERM**  
*(Regulation)*

- Permit Design
- Database of SF dentists
- Issuing Permits
- Inspections
- Monitoring Mercury reductions

**SFE**  
*(Education)*

- Rebate Program
- Clearing House of information
  - Fact sheets
  - Approved Separator listing
- Outreach -
  - Amalgam Separator Vendor expo
  - Dental workshops
  - Inspector Cross training
San Francisco’s Permit System

- **OPTION 1** – Install amalgam separator + Implement Amalgam BMPs
- **OPTION 2** – Monitor wastewater discharge for mercury content + Implement Amalgam BMPs
- **Exemptions??**

http://pollutionprevention.sfwater.org

San Francisco Dental Mercury Reduction Program

Dental practices that place or remove amalgam fillings (which can contain from 40% to 50% mercury) are a controllable source of mercury impacting the City’s sewer systems. Consequently, as of January 1, 2004, dental offices that are connected to the City and County of San Francisco’s sanitary sewer system are required to reduce their discharge of dental amalgam wastes to the lowest practicable level. Dental offices must file an application for a wastewater discharge permit with the City. This permit requires offices to implement mercury reduction Best Management Practices (BMPs) and to choose between installing an approved amalgam separator device or monitoring their wastewater discharges.
Amalgam Separators: Approved Listing & Vendor Fair

• Approved Separator Listing
  – ISO certification
  – 95% efficiency

• Vendor Fair
  – ~300 attendees
  – 9 manufacturers represented
Amalgam Separators: Rebates

- Early-bird Rebates
  ($200 each to 100 dentists)

- Community Service Rebates
  ($400 each to 25 dentists)
Outreach: Beyond Mercury

- **Hazardous Wastes**
  - Photo processing wastes
  - Chemical sterilants
  - Line cleaners

- **Universal Wastes**
  - Amalgam wastes
  - Hg lamps
  - Computers etc.

- **Medical Wastes**
  - Sharps
  - Biohazardous
  - Pharmaceuticals
Outreach: Tools & Timelines

- **Materials**
  - Hazardous waste factsheet
  - Universal waste factsheet
  - Medical waste factsheet

- **Workshops**
  - 6 workshops
  - ~ 10% of dental offices

- **Inspector Training**

- **Websites**

- **Onsite Consultations**

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<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<td>07/03</td>
<td>Program Launch</td>
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<tr>
<td>10/03</td>
<td>Vendor Fair</td>
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<tr>
<td>10/03 – 12/03</td>
<td>Early-bird rebates</td>
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<tr>
<td>1/04 – 6/04</td>
<td>6 Workshops</td>
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<tr>
<td>1/04 – 6/04</td>
<td>Community Service rebates</td>
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</table>
Environmentally Responsible Dentistry Program

Many people do not realize that dental offices use and generate potentially hazardous substances. In dental practices, the most common hazardous substance is amalgam, a material used in “silver” fillings that contains 40-50 percent mercury by weight. Mercury is a toxic pollutant that accumulates in the body and is well known to cause harm to human health and the environment.

Other hazardous substances associated with dental offices include lead and silver from x-ray processing and compounds used to chemically sterilize equipment. These substances can NEVER be placed in the trash or poured down the drain.

Hazardous wastes mistakenly thrown in the trash contaminate air if the waste is incinerated, or land and ground water if sent to landfill. Wastewater containing mercury and other regulated substances may end up in the Bay where it accumulates in the tissues of fish, making them unsafe for human consumption, and devastates aquatic systems. Mercury is of particular concern in San Francisco Bay where the California Department of Health Services has issued fish consumption warnings due to the high mercury levels.

In an effort to reduce the amount of mercury entering the Bay, the City and County of San Francisco’s Public Utilities Commission (SFPUC) and Department of the Environment (SF Environment) have worked with the San Francisco Dental Society to design a program to
Lessons Learned

• **Provide Incentives**
• **Cross train**

- Start with Partnerships ➔ POTWs, Public Health & Dental Societies
- Develop Strategies ➔ Voluntary vs. Mandatory
- Outreach Outreach Outreach
- Handholding
- Measure success
Discussion Groups

- Working w/ Local Dental Society
- X-Ray Issues
- Amalgam Issues
- Infection Control Issues
Wrap - Up

- Discussion Results
- What We Covered
- Open Issues
- Finding More Info
- Acknowledgements
Dental P2 - Where To Get More Info

American Dental Association
http://www.ada.org/

State Dental Associations
http://www.azda.org/
http://www.cda.org
http://www.hawaiidentalassociation.net/
http://www.nvda.org/

EPA Region IX - Dental P2 Project
http://www.westp2net.org/dental/index.cfm

SF Environment
http://www.sfenvironment.com/aboutus/toxics/dentistry/resources.htm

SF Water

City of Palo Alto
http://www.city.palo-alto.ca.us/cleanbay/dental.html

City of San Francisco - P2 Workshop Series

Seattle / King County
http://dnr.metrokc.gov/wlr/indwaste/

State of Washington
http://www.ecy.wa.gov/dentalbmps/

Union Sanitary District
http://www.unionsanitary.com/environmentalprograms/commercial/mer_red_prog.htm