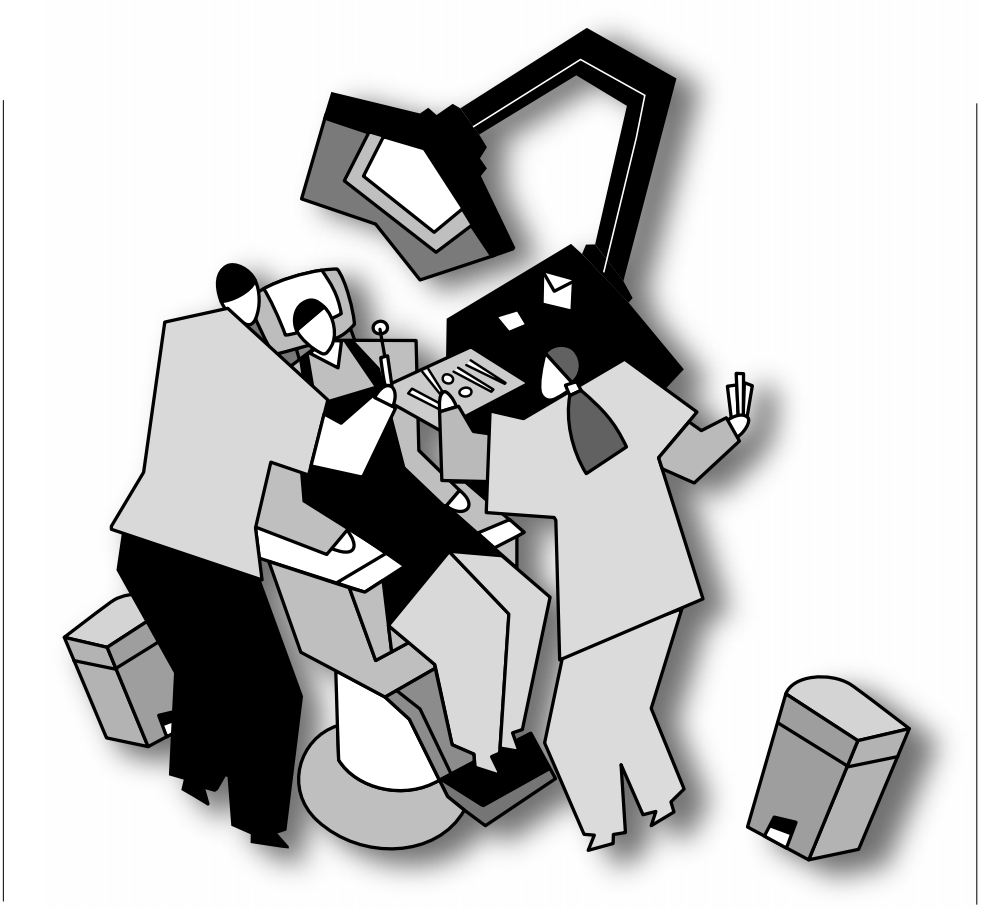
A Guide for Dentists

425.SB.9602

How to Manage Waste



From Your Dental Practice

University of Wisconsin—Extension

is providing this fact sheet to assist you in the proper management of wastes created in your dental practice. Reduction of toxic substances at the source is a mandate of the United States Environmental Protection Agency; it is often the most cost-effective manner of reducing the toxicity of a discharge. The USEPA goal is the virtual elimination of toxics from point sources. Mercury discharged to the sewer system when dealing with old or new amalgam is of vital concern because mercury cannot be removed from wastewater discharge at the wastewater treatment plant. In addition to recommendations for reducing mercury discharge, suggestions are also given here for managing other wastes that may be generated in your practice.

Introduction - Mercury

Mercury is a naturally occurring element found in rocks, soil, water, the air and living organisms. Its applications are everywhere - in light switches, solvents, and pesticides; in batteries, in lamps, in preservatives and in dental fillings. But, if mercury is omnipresent, so is its toxicity, and its danger to the environment.

Not all mercury that we use remains in the facility. Some of it escapes into the environment, undergoes change, and is eaten by fish. Mercury contaminated fish are the most likely source of mercury's potentially adverse effects on human health.

It is recommended that mercury's use in the dental setting be minimized, not because its presence makes the dental office a dangerous place to be, but to help keep mercury out of the environment. The amount of mercury may be quite small, but any release is costly and may add to mercury's buildup in the environment. The guidelines in the pamphlet will help you minimize or eliminate mercury releases from your dental facility.

Amalgam Waste

In order to meet Wisconsin's goal of maintaining a clean environment, it is necessary to reduce the amount of mercury entering the sewage system or the garbage. Dental amalgam particles are a potential source of mercury in the sewer. Amalgam particles are created when old fillings are removed and new fillings are mixed. Because mercury and other heavy metals cannot be effectively removed by local wastewater treatment plants, it is recommended that any amalgam particle that is captured on screens or in traps be recycled.

For your reference, a list of recyclers is given in the appendix. These companies will take **clean unused amalgam and old amalgam that may be mixed with other contaminants** caught in traps or on screens. If disposable filters are being used, recyclers may accept the entire filter for recycling. The material must be chemically disinfected prior to shipment. Check with your recycler for instructions.

To minimize the amount of mercury vapor emitted to the office from waste amalgam, the American Dental Association recommends that it be stored under a small amount of photographic fixer in a closed container labeled **Scrap Amalgam.** However, most recyclers of amalgam want the material as dry as possible. Before sending waste amalgam to a recycler, you must decant off the fixer and blot the amalgam dry with paper towel.

Most recyclers pay for clean scrap amalgam, but may not pay for amalgam that is mixed with other wastes from traps. The recyclers request that clean and mixed amalgam be kept separate to aid in ease of recycling. You can send waste amalgam to the recycler via common carrier (e.g. UPS) in a strong suitable container. For proper transport and handling, contact your amalgam recycler.

The American Dental Association recommends that small amounts of elemental mercury can be made into amalgam by reacting it with alloy. This results in an amalgam scrap which can be added to the scrap jar and recycled. Contaminated elemental mercury from spills, and absorbents from cleaning up spills of mercury, are accepted by some recyclers of amalgam. This material should be managed as a hazardous waste, with proper labeling, storage, manifesting, and shipping.

Used empty amalgam capsules have been determined to be nonhazardous, based on toxicity test results. Empty amalgam capsules may be placed in the garbage.

Systems are available to treat rinse waters contaminated with old amalgam that is too fine to be caught in traps or on screens. These systems are used in Europe and are being evaluated by several U.S. organizations at the present time. Until use of such systems is feasible, recycling of amalgam that can be captured is the major objective of regulatory agencies.

X-ray Fixer

X-ray fixer is considered a hazardous waste because of its high silver content. However, fixer is easily recyclable. Recycling is the management method recommended by regulatory agencies. There are two suitable methods of managing fixer waste: **1.)** You may use a **silver recovery unit** for your developing system if you comply with the hazardous waste recycling requirement, (NR625, Wis. Administrative Code); or **2.)** you may **give, sell, or pay someone that operates a silver recovery unit to take your fixer.** If you dispose of your fixer off-site, collect and store it in a closed plastic container labeled: Hazardous Waste - Used Fixer. The liquid that has run through a recovery unit may be sewered if approved by your wastewater treatment plant operator.

Hazardous waste rules still require you to report the fixer waste on your Hazardous Waste Annual Report and the Notification of Hazardous Waste Activity. If shipped as a hazardous waste, it must be properly manifested. If you are not required to use a ***hazardous waste*** manifest, ask for a receipt from the person who accepts your fixer for recycling in order to verify that you are managing your waste in a proper manner.

X-ray Developer

Developer solutions should not be mixed with fixer solutions. Waste developer can typically be sewered if it is not mixed with fixer (again, check with your local wastewater treatment plant operator). Flush the drain thoroughly as you discharge developer down the drain. Some units mix the fixer and developer after they are spent. The resulting solution is hazardous. However, you may purchase an adapter kit to keep the fixer and developer separate. The fixer can be recycled and the developer can be sewered.

Lead Foil or Lead Shields

Lead foil that shields X-ray film or protective lead shields should not be disposed of in the garbage. These materials are hazardous waste unless they are recycled for their scrap metal content. A recent survey by the Western Lake Superior Sanitary District, with cooperation of the Northeast District Dental Society, indicated that a high percentage of dentists are presently recycling lead foil. Companies which recycle amalgam or fixer may also accept lead waste.

Cleaners for X-ray Developer Systems

Many cleaners for X-ray developer systems contain chromium. You can check the Material Safety Data Sheet (MSDS) to see if the cleaner you use contains chromium. If your cleaner does contain this metal, the wastes from cleaning should be managed as a hazardous waste and require a hazardous waste disposal service. It is easier and cheaper to use a system cleaner that does not contain chromium. According to photo industry representatives, the environmentally safe cleaners are as effective as the chromium-based cleaners.

Disinfectants

Used disinfectants my be discharged directly to the sewage system. Residue left in containers may be rinsed down the drain; the container may be disposed of in the garbage or recycled through your local recycling program. Flush the drain well when disposing of any disinfectant. Straight alcohols, ethers, and peroxides are considered flammable and should not be sewered because of the possibility of explosion.

Chemiclave Waste

Used chemical sterilizer waste may be discharged to the sewer system. Flush the drain well when disposing of this waste. Any ***unused*** chemical is a ***hazardous waste*** if it has a flash point below 140 degrees Fahrenheit, or if it contains high concentrations of formaldehyde. Buy only the amount of chemical sterilizer that you need; this will eliminate the need to dispose of the excess material.

Other Wastes

Blood: Flowable quantities of **blood** may be sewered; however, bulk amounts of blood should not be disposed of into a septic system. Swabs or dressings that are bloody and dripping need to be treated as infectious medical waste. If they contain only a small amount of blood that will not drip out of the material, they can be placed in the garbage.

Sharps: Needles, scalpels, reamers, broaches, and other sharp objects that could cause a puncture wound should **not** be placed in the garbage **even if they are sterilized.** This type of waste should be placed in a rigid puncture-resistant labelled container, designed to prevent the loss of the contents and labelled with a visible biohazard emblem or with the visible words “biohazard,” “sharps,” or “infectious waste.” A heavy-walled detergent bottle with screw-on cap is acceptable for WIDNR and OSHA standards. Disposal should be through a licensed **infectious waste transporter** or a registered sharps collection station .

Office waste: Although office waste is usually not hazardous, we wish to remind you that aluminum, glass, plastics, newspaper, corrugated paper, and office paper must be recycled through your garbage hauler or recycling center. It is mandatory to do so under the Wisconsin Recycling Law.

CHECKLIST

Waste Type	Source	Option
Amalgam particles	Traps, screens, excess mix	1) Send to a recycler or, 2) Dispose of as a hazardous waste
Waste mercury	Spills, spill cleanup	1) Manage as hazardous waste by sending to a recycler
Empty amalgam capsules		1) Dispose of in the garbage
Fixer	X-ray processing	1) Contract to have silver reclaimed 2) Install silver recovery system 3) Dispose of as a hazardous waste
Developer	X-ray processing	1) Discharge to sewer
Combined fixer and developer	X-ray processing	1) Purchase kit from x-ray manufacturer to separate, and use methods listed for fixer and developer
Chromium containing x-ray system cleaners	X-ray system cleaning	1) Switch to non-chrome cleaners 2) Dispose of as a hazardous waste
Disinfectants	Used	1) Discharge to sewer
Chemiclave chemicals	Used	1) Discharge to sewer
	New	1) Call your local sewer treatment plant
Lead foils and shield	X-ray processing protective shields	1) Send to metal reclaimer 2) Dispose of as a hazardous waste
Blood **Liquid**		1) Discharge to the sewer
Dripping swabs, etc.		1) Dispose of as infectious waste
Non-dripping swabs, etc.		1) Dispose of in garbage
Sharps		1) Infectious waste treatment facility or registered sharps collection station
Office waste		1) Recycle as much as possible

This manual was originally developed by the Western Superior Sanitary District, Duluth, Minnesota, with the Wisconsin edition by Steven Brachman and Jack Annis of the Solid and Hazardous Waste Education Center.

ALTERNATIVES

Though amalgam is considered to be the preferred material for fillings, there are several alternatives which contain no mercury that are detailed in the table below. The ultimate goal should be to eliminate the mercury from the amalgam mixture. Until this goal is achieved, these alternatives should be considered based on a patient's situation.

Critical Parameters	Amalgam	Composite	Glass Ionomer	Gold Foil	Gold Alloy (Cast)	Metal-Ceramic Crowns
Median Longevity Estimation	8 to 12 years	6 to 8 years	No Data: 5 years predicted	No Data: 10 to 15 years estimated	12 to 18 years	12 to 18 years
Relative Surface Wear	Wears slightly faster than enamel	Excessive wear in stress bearing situations	Excessive wear in stress bearing situations	Excessive wear in stress bearing situations	Wears similar to enamel	Porcelain surface may wear opposing tooth
Resistance to fracture	Fair to excellent	Poor to excellent	Poor	Fair to good	Excellent	Excellent
Marginal Integrity (leakage)	Fair to excellent-self sealing through corrosion products	Poor to excellent Polymerization shrinkage can cause poor margins	Poor to excellent	Poor to excellent	Fair to good Depends upon fit and type of buting agent used	Poor to excellent Depends upon fit and type of buting agent used
Conservation of Tooth Structure	Good	Excellent	Excellent-if initial restoration, not if replacement	Good	Poor	Poor
Esthetics	Poor	Excellent	Good	Poor	Poor	Excellent
Indications:						
Age range	All ages	All ages	All ages	Adults	Adults	Adults
Occlusal stress	Moderate stress	Low-stress bearing	Adult-class V and low-stress primary teeth	Class III and V and crown repair	High-stress areas	High-stress areas
Extent of caries	Incipient to moderate size cavity	Incipient to moderate size cavity	Class I and II child incipient to moderate size cavity	Incipient to moderate size cavity	Severe tooth destruction	Severe tooth destruction or esthetic considerations
Cost to Patient	1X	1.5X	1.4X	4X	3X + gold	8X

Adopted from: Dental Amalgam: A Scientific Review & Recommended Public Health Service Strategy for Research, Education & Regulation, Dept. HHS January, 1993.

FOR YOUR REFERENCE

Amalgam Recyclers

Acme Scrap Iron & Metal
7588 N. Syvania Avenue
Sturtevant, WI 53177
(414) 835-2662

D. F. Goldsmith
909 Pitner Avenue
Evanston, IL 60202
(708) 869-7800

Made Ltd.
Rt. 1 Box 127a
Hillman, MN 56338
(612) 277-3981

Maguire & Strickland Refining Co.
1290 81st Avenue NE
Minneapolis, MN 55432
(800) 486-2858

Mercury Refining Company Inc.
1218 Central Avenue
Albany, NY 12205
(518) 459-0820

Mercury Recyclers

Bethleham Apparatus
890 Front Street
Hellerton, PA 18055
(215) 838-7034

Inmetco
PO Box 720
Ellwood City, PA 16117
(412) 758-5515

Mercury Refining Company (MERECO)
790 Wateruliet-Shaker Rd.
Latham, NY 12110
(800) 833-3505

Mercury Waste Solutions
21211 Durand Avenue
Union Grove, WI 53182
(414) 878-2599

COUNTY EXTENSION INFORMATION

SHWEC OFFICES

UW–GREEN BAY
University of Wisconsin
Environmental Science 317
2420 Nicolet Drive
Green Bay, WI 54311
414 / 465-2707
Fax: 414 / 465-2143

UW–MADISON
610 Langdon Street, Rm. 529
Madison, WI 53703
608 / 262-6250
Fax: 608 / 262-6250

UW–MILWAUKEE
SHWEC
161 W. Wisconsin Ave., Ste. 6000
Milwaukee, WI 53203-2602
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