Virtual Mercury Elimination

Patrick Wooliever
Tetra Tech EM Inc.
Take Home Message

1. Raise the alarm.

2. Most facilities have taken some formal first steps - the next step is to document and sustain these efforts.

3. Cost justification - focus on cost avoidance.

4. 80/20 rule applies: Tools for prioritizing and tracking Hg elimination to focus effort/resources.
2002 Total Number of Fish Consumption Advisories
(Change from 2001)

Mercury Deposition

Connecting Mercury to Hospitals

- **Mercury is a known and ubiquitous hazard**
  - CDC - 1 in 12 women of childbearing age risk giving birth to infants with neurological disorders due to mercury exposure in-utero.
  - Children and pregnant women limited to one 6-ounce can of tuna/week
  - Nat’l Academy of Science – 60,000 children may be born in the U.S. with neurological problems due to their mother eating mercury-containing fish
Declining Threshold of Harm

**Diagram Description:***

- **X-axis (YEAR):** Year range from 1970 to 2000.
- **Y-axis (DAILY INTAKE):** Dose in micrograms/kg/day Hg, ranging from 0.001 to 100.
- **Data Points:**
  - FDA: Data points scattered across the graph, indicating different levels of daily intake.
  - WHO: Similar to FDA, with some data points clustered around specific years.
  - ATSDR: Data points presenting a trend towards lower daily intake over time.
  - EPA: Points showing a gradual decrease in daily intake.

**Legend:**
- **Blue Squares:** Level associated with harmful effect.
- **Red Triangles:** Regulatory standard (maximum safe exposure or high end exposure from allowed fish contamination).

**Graph Notes:**
- The graph illustrates the declining threshold of harm over time, with regulatory standards and levels associated with harmful effects indicated by the respective markers.
Why Focus on Hospitals?

Hospitals - concentrated sources and relatively few in number

Other sources:

- **Dental** – many offices/facilities with wide range of practices
- **Residential sources** - more numerous and diverse
- **Atmospheric Mercury Contributions:** Power Generation, Boilers, Incinerators
Mercury in Hospitals

- Proactive, preventative means have proven effective
- Mercury-Free alternatives exist
  - Thermometers
  - Sphygmomanometers (sphygs)
  - Gastrointestinal tubes (GI Tubes)
  - Staining solutions and laboratory reagents
  - Fluorescent lamps
Step-by-Step Prescription

Step 1. Know where it is
  – Medical Devices
  – Building Sources
  – Reagents/Chemicals

Step 2. Conduct an inventory

Step 3. Prioritize removal projects

Step 4. Document the location of remaining devices

Step 5. Work with GPOs to prohibit new Hg purchases

Step 6. Share and reward success!
Step 1. **Know Where the Mercury Is**
(2001-2 Data from 7 California Hospitals)

See resources for more lists.
Prioritizing Your Search

Where's The Mercury?

- Sphymomanometers
- Thermometers
- Gastroenterology
- Other Clinical Devices

Pounds of Hg

Number of Hg-Containing Equipment
Mercury in Health Care Organizations

**The Obvious**
- Thermometers
- Sphygs
- Cantor, Miller-Abbott tubes
- Esophageal bougies
- Laboratory chemicals
- Thermostats
- Fluorescent lamps
- Batteries
- Dental amalgams

**The Not So Obvious**
- Caustic soda
- Laundry chemicals-bleach
- Antibacterial soaps
- Boiler & air conditioning chemicals
- Reagents
- Plastics
Finding the Mercury

Clinical Thermometers

Bougies

Cantor, Miller-Abbott tubes

Sphygs

Pressure Gauges

Thermostats (wall and equip.)

Fixatives

Reagents

Dental Amalgams

Soaps and Detergents

Switches

Other Lab Chemicals

Lab Thermometers

Batteries

Legacy Sources

Fluorescent Lamps

Electronics

Dents and Detergents

Switches

Other Lab Chemicals

Lab Thermometers

Batteries

Legacy Sources

Fluorescent Lamps

Electronics

Dental Amalgams

Finding the Mercury

Easy

Eliminating the Mercury

Difficult
Step 2. Conduct an Hg Inventory

- Locate and catalog each source of mercury in the facility
- Unforeseen sources often discovered
- Include sampling of plumbing: p-traps and sumps
- Use the mercury assessment “tool kit” Excel spreadsheet available at:
  www.ciwmb.ca.gov/WPIE/HealthCare/Mercury.htm
### Mercury Assessment Worksheet, Page 1

**Facility name:**
**Survey Date:**

<table>
<thead>
<tr>
<th>Source Class</th>
<th>Hg Item</th>
<th>Approximate Weight Per Unit (gm unless noted)</th>
<th>Location 1</th>
<th>Location 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gastroenterology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Gastroenterology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Bougies (set)</td>
<td>5,700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Blakemore tube</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sphygmometry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Sphygmometry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Trimline sphygmomanometers</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Baum or Baxter sphyg.</td>
<td>83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Empire sphygmomanometer</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Non-Clinical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Non-Clinical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Sphyg.repair kit</td>
<td>Bulk Hg, Lb. (30 ml* bottle)</td>
<td>454</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>Bulk Hg, ml.</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td>Bulk Hg, fl.oz.</td>
<td>394.4</td>
<td></td>
</tr>
</tbody>
</table>
Step 3. Prioritize Removal Projects

- Include impacted staff and stakeholders:
  - Purchasing (to prevent reintroduction)
  - Engineering
  - Maintenance
  - Physicians and Nurses
  - Regulators (POTW, CUPA)

- Consider capital resources

- Weigh exposure pathways and likelihood
  - Wastewater
  - Air
  - Workers/Patients
  - Solid/Haz/Medical Waste

- Prepare a “Mercury Punch List”
Focus On Cost Avoidance

- **Collect data on past spills**
  - Cleanup cost
  - Lost work
  - Worker health impacts
  - Potential liability
  - Patient room downtime

- **Review current practices for maintenance and accuracy**

- **Turn the question around – How many spills can we afford?**
Spill Costs: Preparation & Cleanup

- Preparation: $650
  - Spill kit
  - Training (trainer + 3 staff)

- Cleanup:
  - Spill kit
  - Labor
  - Disposal

- Thermometer Spill: $860 – $1,655
- Sphyg Spill: $990 - $1,785
UCLA Spill Data

- **1997 – 1999 Spills**
  - Therms: 55% (3.4 spills/100 beds)
  - Sphygs: 17%
  - Sink Traps: 13%
  - Other: 15%

- **Hg**: 42% of Hazmat responses

- **$10K/year**

- **Sphyg Spill**: $990 - $1,785
Focus: Sphygs

- Contain 70-90 grams
- Often the largest source and located in heavily-used areas
- Often thought of as the “gold standard, but 2000 study examined 444 sphygs and found:
  - 55% showed zero level between 10 and 20 mm Hg
  - 38% had dirty columns obscuring readings
  - 20% of columns were not vertical
Mercury-Free Sphygs

**Aneroid Sphyg:**
- ✓ Cost -- $150 (wall unit) to $275 (mobile unit)
- ✓ Same calibration schedule – 1/6 months
- ✓ +/- 3mm Hg accuracy conforms to AAMI standard

**Vital Signs Monitor:**
- ✓ Cost varies - $1,250 to $3,000
- ✓ Measures multiple parameters
Focus: **Thermometers**

- Fever type contain 0.5 gram (lab type contain 2-10 grams)
- Manufacture and sale of mercury thermometers **banned in CA**
- Not a large component of hospital mercury, but...
  - Widely used
  - More frequently mishandled
  - Readily available alternatives (see EPA Region 9 mercury factsheet)
- **Hardest replacement areas:** Neonate/NICU, isolation rooms
Mercury-Free Thermometers

- **Liquid-In-Glass**

- **Digital and Tympanic Models**
  - Purchase: Digital -- $186, Tympanic -- $296
  - Probe Covers: $30 for 500
  - Batteries: $5 every 5,000 uses

- **Dot Matrix**
  - Good for disposable use
  - < $10 for 100
Focus: Lab Reagents

- B-5 Fixatives – use products with zinc chloride instead of mercuric chloride
- Secondary antibodies bound to HRP – ELISA and Western Blot Kits not using alkaline phosphate
- Reagents with potassium (KCl, KOH) generally contain ppb ranges of Hg
- Equipment used with mercury-containing solutions
  - baskets
  - reagent containers
  - metal fittings on tubing
  - metal sinks
  - electrophoresis chambers
Thimerosal Synonyms/Trade Names

(Compiled by Melissa McCullough, Dana Farber Cancer Institute)

Aeroaid
Curativ
Ethyl (2-mercaptobenzoato-S) mercury sodium salt
[(o-carboxyphenyl)thio] Ethylmercury sodium salt
o-(Ethylmercurithio)benzoic acid sodium salt
Elcide 75
Eliche
Estivin
Ethylmercurithiosalicylic acid, sodium salt
Ethylmercurithiosalicylate sodium
Ethylmercurithiosalicylate sodium salt
Mercurothiolate
Mercurate(1-), {ethyl[o-mercaptobenzoato(2-)]-}, sodium
Mercurate(1-), {ethyl[2-mercaptobenzoato(2-)-O,S]-}, sodium
Mercurochrome®
Mercural
Mercury, ethyl(hydrogen o-mercaptobenzoato)-, sodium salt
Mercury, ethyl(2-mercaptobenzoato-S)- sodium salt
Mercury {[(o-carboxyphenyl)thio]ethyl}-sodium salt
Merphol
Merseptyl (VAN)
Merthiolate®Merthiolate salt
Merthiolate sodium
Merzonin sodium
Merzonin, sodium salt
Nosemack
Sodium ethylmercurithiosalicylate
Mercurothiolate
Mertorgan
Mefamin
Septicol
SET
Sodium ethylmercuric thiosalicylate
Sodium ethylmercurithiosalicylate
Sodium merthiolate
Sodium o-(ethylmercurithio)benzoate
Sodium salt of 2-(carboxyphenyl)thioethylmercury
Sodium 2-(ethylmercurithio)benzoate
Thimerosal
Thimerosal solution
Thimerosalate
Thimerosol
Thimerosal solution
Thimersalate
Thiomersal
Thiomersalat
Thiomersalate
Thiomersalate
Certificate of Analysis

- MSDSs do not typically list components less than 1% (preservatives)
- Many resources for identifying low-level mercury lab chemicals
- Request a certificate of analysis from suppliers (see handout)
Focus: Batteries

• **Mercuric Oxide (mercury zinc):**
  - 10-year shelf life; may remain in hospital stock in older equipment:
    - cardiac monitors
    - pH meters
    - oxygen analyzers and monitors
    - telemetry instruments

• **Button Batteries**
  - Replace with zinc air button battery (may contain up to 25 mg Hg)
  - FDA and Underwriter’s Laboratory certification: Contact equipment manufacturer to ensure that alternative batteries are OK
**Item Details**

Cleaning & Painting > Receptacles and Containers > Recycling Kits

**Battery Recycling Kit**


<table>
<thead>
<tr>
<th>Grainger Item</th>
<th>Ship Qty B</th>
<th>Sell Qty (Will-Call) B</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>5KH65</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Price (ea): $102.05

Manufacturer: ONYX

SPECIAL SERVICES

Model #: 531

**Quantity:**

- Add to Personal List
- Add to Order

Price shown may not reflect your price. Log-in above, or click here to register.

**NOTES & RESTRICTIONS**

This item has been restricted from sale in the following state:

- ME

See Catalog 395 Page 637 for application and/or safety information.

**TECHNICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Item</th>
<th>Recycling Container</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length (in)</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>Width (in)</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>For Use With</strong></td>
<td>Miscellaneous sized batteries that contain toxic materials</td>
</tr>
<tr>
<td><strong>UN Approval No.</strong></td>
<td>UN1H2/Y1 5/30/99</td>
</tr>
</tbody>
</table>
Focus - Plumbing

- Piping of older hospitals may contain “legacy” mercury from old practices
- Laboratory rinsing of mercury-containing reagents
- Disposal of old, surplus pharmaceuticals
- Mercury spill cleanup using the sink drain
Sacramento Area Hospitals

Mercury Concentrations in Area Hospitals

Parts per Trillion

71 133 322 620 761

2927 3919

0 500 1000 1500 2000 2500 3000 3500 4000
Recent Plumbing Sampling

- 3 sumps from Sacramento hospitals (~80 years old)
  - Sump 1 320 and 380 ppm
  - Sump 2 4.0 and 4.4 ppm
  - Sump 3 0.17 and 0.087 ppm

- Residue from 24 p-traps in older sections of the hospital had 0.240 and 3.200 ppm.

- Older hospitals/buildings = typically more mercury
Focus - Hg-Free Pharmaceuticals

Pharmaceuticals can also be a source of mercury to wastewater:
(www.premierinc.com/all/safety/resources/mercury/downloads/HG_drug_list_08-23-02.xls)

• Premier’s list is historical – listed products at some time in the product's history contained a mercury compound...

...therefore current products formulations may or may not contain mercury compound.

• Older formulations may still be in distribution and therefore no deletions have been made unless the product has been discontinued.
Step 4. Keep Track of What Remains

- Label and locate remaining mercury-containing devices, equipment, etc.

- Review list during:
  - remodel/construction
  - routine maintenance
  - repair

WARNING: MERCURY HAZARD
Step 5. Working with GPOs

- Most GPOs recognize healthcare’s initiative to avoid Hg-containing products
  - In 2002, many of the top GPOs announced plans to enhance labeling, contracting, and customer education
  - Premier and Consorta have EPP (including Hg) information readily available on their website
  - Novation has incorporated Hg, DEHP, and other environmental considerations into its decision criteria award matrix

Consorta’s EPP Program
Environmentally Preferable Purchasing

Our shared values demand that we conduct business in a socially responsible and ethical manner that protects the safety of its employees and patients and employees, as well as the environment. In support of this commitment, Consorta has implemented a comprehensive program for environmentally responsible purchasing. This program will identify environmentally preferred purchasing alternatives and evaluate the quality, functionality and price of alternative products. The initiative will focus on communication and education in specific areas of environmental concern.

Consorta is contracting for environmentally safe products that:

- Do not contribute to other health issues.
- Are manufactured by companies that are committed to reducing the manufacturing waste stream.
- Combine environmentally friendly features with economy.
- Are of high quality.
- Offer the same or better functionality than current products.
- Are readily and reliably available at reasonable prices.

Components of Consorta’s EPP Program

Collaborating with the Catholic Health Association, the American Hospital Association, Hospitals for a Healthy Environment, Health Care Without Harm, and other organizations to advance shareholders’ environmental concerns.
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>APPLICATION</th>
<th>ALTERNATIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANALYTICAL INSTRUMENTS (mercury as reagent)</td>
<td>Sequential Multi-Channel Auto-analyzer (SMCA) AU 2000</td>
<td>Ion Selective Electrode</td>
</tr>
<tr>
<td>BAROMETERS AND MANOMETERS</td>
<td>Monitoring air pressure, weather conditions. Flow meters and controllers for natural gas supplies. Commercial, industrial &amp; laboratory</td>
<td>Bourdon tube gauge, electronic gauges, non-mercury flow meters gauge</td>
</tr>
<tr>
<td>BATTERIES mercuric oxide silver oxide in: alkaline, zinc carbon, silver oxide, zinc air, mercury zinc batteries</td>
<td>Hearing aids Pacemakers Defibrillators Fetal monitors Holter monitors Pagers Picker calibers Spirometer alarms Telemetry transmitters Temperature alarms Blood analyzers</td>
<td>Lithium, zinc, low-mercury alkaline. Note: Mercury content in alkaline, zinc carbon, silver oxide, zinc air is being reduced or discontinued.</td>
</tr>
<tr>
<td>BLOOD GAS ANALYZER (Reference Electrode)</td>
<td>Radiometer (brand)</td>
<td>Equipment without a mercury reference electrode</td>
</tr>
<tr>
<td>CATHODE RAY OSCILLOSCOPE</td>
<td>Recording electrical signals over time on a fluorescent screen</td>
<td></td>
</tr>
</tbody>
</table>
Section home

Introduction
Common uses of mercury in the healthcare setting
Memo of understanding
Solutions and strategies for pollution prevention
Mercury substitution
Mercury spill prevention
Mercury spill response
Pharmaceuticals containing mercury

Introduction

Mercury is a toxic metal that occurs naturally in the environment. The silvery-white inorganic form is most familiar because of its widespread use in fever thermometers. The proper disposal of inorganic mercury...
Mercury pollution prevention

- Mercury-free pharmaceuticals and products
  - Pharmaceuticals with mercury
  - Mercury-free products under contract with Premier
  - Other sites providing information on mercury free products

Mercury-free pharmaceuticals and products

Pharmaceuticals containing mercury

The EPA and AHA entered into a voluntary partnership, a Memorandum of Understanding (MOU), in June of 1998 with the agreement to “virtually eliminate” all mercury-containing waste from hospitals by 2005. As part of this MOU, tools and resources for mercury elimination were made available through Hospitals for a Health Environment (H2E) and are available on the organization’s Web site at: http://www.h2e-online.org.
<table>
<thead>
<tr>
<th>Current National Drug Code #</th>
<th>Old National Drug Code #</th>
<th>Obsolete Date</th>
<th>First DataBank Manufacturer Distributor</th>
<th>First DataBank Generic Name</th>
<th>First DataBank Brand Name</th>
<th>First DataBank Strength</th>
<th>First DataBank Dosage Form</th>
<th>First DataBank Dosage Form Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>00944293501</td>
<td></td>
<td></td>
<td>HYLAND LABS.</td>
<td>ANTIHEMOPHILIC FACTOR.HUMAN</td>
<td>HEMOFILM</td>
<td>850U(+)</td>
<td>VIAL</td>
<td>HS</td>
</tr>
<tr>
<td>00006408400</td>
<td></td>
<td></td>
<td>MERCK &amp; CO.</td>
<td>ANTIVENIN LACTRODECTUS</td>
<td>ANTIVENIN LATRODECTUS</td>
<td>MACTANS</td>
<td>COMBO_PKG</td>
<td>ZD</td>
</tr>
<tr>
<td>00003206001</td>
<td>48642304101</td>
<td>3/16/1999</td>
<td>ORGANON PHARM.</td>
<td>BCG.VACCINE</td>
<td>TICE BCG</td>
<td></td>
<td>AMPUL</td>
<td>HR</td>
</tr>
<tr>
<td>00077065804</td>
<td></td>
<td></td>
<td>AKORN INC.</td>
<td>BORIC ACID</td>
<td>BLINK EYE WASH</td>
<td></td>
<td>IRRIG_SOLN</td>
<td>SW</td>
</tr>
<tr>
<td>00008076901</td>
<td>000000688702</td>
<td></td>
<td>WYETH AYERST</td>
<td>BORIC ACID</td>
<td>COLLYRIUM FRESH EYES</td>
<td></td>
<td>IRRIG_SOLN</td>
<td>SW</td>
</tr>
<tr>
<td>1/31/199602</td>
<td></td>
<td></td>
<td>AMBU</td>
<td>CALUMEL</td>
<td>CALUMEL</td>
<td></td>
<td>POWDER</td>
<td>PA</td>
</tr>
<tr>
<td>17317008804</td>
<td></td>
<td></td>
<td>AMEND</td>
<td>CALOMEL</td>
<td>CALOMEL</td>
<td></td>
<td>POWDER</td>
<td>PA</td>
</tr>
<tr>
<td>17470028109</td>
<td></td>
<td>4/1/1997</td>
<td>AKORN INC.</td>
<td>CHLORAMPHENICOL</td>
<td>AK-CHLOR</td>
<td>0.5%</td>
<td>DROPS</td>
<td>SO</td>
</tr>
<tr>
<td>00006335032</td>
<td></td>
<td>3/20/2000</td>
<td>MERCK &amp; CO.</td>
<td>CHLOROTHIAZIDE SODIUM</td>
<td>DIURIL SODIUM</td>
<td>500MG</td>
<td>VIAL</td>
<td>HS</td>
</tr>
<tr>
<td>11000052300</td>
<td>00011034100</td>
<td></td>
<td>AKORN INC.</td>
<td>DIMERCAPROL</td>
<td>BAL IN OIL</td>
<td></td>
<td>AMPULE</td>
<td>HH</td>
</tr>
<tr>
<td>00011834109</td>
<td></td>
<td>3/16/2000</td>
<td>TAYLOR PHARM</td>
<td>DIMERCAPROL</td>
<td>BAL IN OIL</td>
<td></td>
<td>AMPULE</td>
<td>HH</td>
</tr>
<tr>
<td>51559386800</td>
<td></td>
<td></td>
<td>ALLSCRIPTS</td>
<td>DIP,PERT,TET,HAEM,CONJ.VACC</td>
<td>TETRAMUNE</td>
<td></td>
<td>VIAL</td>
<td>HV</td>
</tr>
<tr>
<td>51000343000</td>
<td></td>
<td></td>
<td>PHYSICIANS TC.</td>
<td>DIP,PERT,TET,HAEM,CONJ.VACC</td>
<td>TETRAMUNE</td>
<td></td>
<td>VIAL</td>
<td>HV</td>
</tr>
<tr>
<td>00005196301</td>
<td></td>
<td></td>
<td>WYETH AYERST</td>
<td>DIP,PERT,TET,HAEM,CONJ.VACC</td>
<td>TETRAMUNE 10 DOSE</td>
<td></td>
<td>VIAL</td>
<td>HV</td>
</tr>
<tr>
<td>54569474600</td>
<td></td>
<td></td>
<td>ALLSCRIPTS</td>
<td>DIPHTH,FERTUSS(ACELL),TET_PED</td>
<td>TRIPEEDIA</td>
<td></td>
<td>VIAL</td>
<td>HV</td>
</tr>
<tr>
<td>62448401201</td>
<td></td>
<td></td>
<td>NORTH AMER VACC</td>
<td>DIPHTH,FERTUSS(ACELL),TET_PED</td>
<td>CERTIVA</td>
<td></td>
<td>VIAL</td>
<td>HV</td>
</tr>
<tr>
<td>Product Category</td>
<td>Business Partner</td>
<td>Product Name</td>
<td>Product Description</td>
<td>Contract Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>------------------</td>
<td>--------------</td>
<td>---------------------</td>
<td>-----------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermometers</td>
<td>Alaris Medical Systems</td>
<td>Alaris 2080 Thermometer</td>
<td>Standard Electronic Thermometer</td>
<td>PP-CE-008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alaris Turbo Temp</td>
<td>Advanced electronic thermometer (reads in 5 sec)</td>
<td>PP-CE-008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alaris Core Check</td>
<td>Infrared tympanic (ear) thermometer</td>
<td>PP-CE-008</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3M Health Care</td>
<td>Temp a Dot</td>
<td>Available in Farenheit and Celsius; oral, axillary &amp; rectal</td>
<td>PP-MS-022K</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sphygs</td>
<td>GEMS/IT (formerly Critikon)</td>
<td>Dinamapp BP monitor</td>
<td>Electronic noninvasive BP monitor</td>
<td>PP-CE-030A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>World Health</td>
<td>Large Face Aneroid Sphygmomanometers</td>
<td>Numerous models (eg; wall mounted, stand up, adult/peds cuff sizes; latex free)</td>
<td>PP-MS-048</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hand Held Pocket Aneroid BP Kits</td>
<td>Numerous models with latex free cuffs</td>
<td>PP-MS-048</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disposable Aneroid BP Kits</td>
<td>Numerous models (eg; thigh or arm cuffs; latex free)</td>
<td>PP-MS-048</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>World Health/Hader</td>
<td>Hader Pump Aneroid BP</td>
<td>Pocket Size BP Kit</td>
<td>PP-MS-048</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>World Health/Bainbridge</td>
<td>Bainbridge Aneroid BP</td>
<td>Pocket Size BP Kit</td>
<td>PP-MS-048</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balloon GI Dilators (non-mercury)</td>
<td>CR Bard, Inc.</td>
<td>Endoscopic Devices</td>
<td>Dilation Balloon Catheter</td>
<td>PP-OR-069</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boston Scientific</td>
<td>Endoscopic Devices</td>
<td>Balloon Dilators</td>
<td>PP-OR-124</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Batteries</td>
<td>Gillette Commercial Operations North America</td>
<td>Batteries</td>
<td>Range of battery types with no mercury added (eg; Zinc-Air, Voltage, Silver Oxide, Lithium, Alkaline, Flashlight, Telemetry)</td>
<td>PP-SS-012</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Energizer Battery Company</td>
<td>Batteries</td>
<td>Range of battery types with no mercury added (eg; Zinc-Air, Voltage, Silver Oxide, Lithium, Alkaline, Flashlight, Lantern)</td>
<td>PP-SS-013</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Step 6. **Share and Reward Success!**

- Measure and share progress with those involved
- Pursue continual improvement
- Consider promotional efforts to
  - Employees
  - Patients
  - Community
- Apply for awards
Making Medicine Mercury Free Award Facts

- You have to be an H2E partner.
- You can apply any time during the year.
- This is a one-time award.
- You don’t have to be 100% mercury free to be eligible.
- H2E can walk you through the process.
- H2E will inform you in 30-60 days.
1. Replaced thermometers
2. Replaced at least 75% sphygs
3. Replaced at least 75% clinical devices
1. Recycle fluorescent bulbs
2. Battery collection
3. Inventoried and labeled Hg-containing devices and plan to replace
MMMF Award: Labs

1. Replaced B5/Zenkers stains
2. Inventoried mercury-containing lab chemicals with plan to substitute.
3. Inventoried thermometers, replaced at least 75% and phase-out plan in place
4. Other chemicals - Pharmacy, dental, cleaning chemicals
Progress is being made...

- Kaiser Permanente and Catholic Healthcare West have mercury elimination plans
- Mercury-free medical facilities:
  - UCLA
  - Beth Israel Deaconess Medical Center
  - California community clinics
Take Home Message

1. Raise the alarm.

2. Most facilities have taken some formal first steps - the next step is to document and sustain these efforts.

3. Cost justification - focus on cost avoidance.

4. 80/20 rule applies: Tools for prioritizing and tracking Hg elimination to focus effort/resources.
Hospital P2 Resources

CA DHS (with EPA Region 9 Factsheets):

www.ciwmb.ca.gov/WPIE/HealthCare/

Hospitals for a Healthy Environment:

www.h2e-online.org

- Program Templates
- Mercury-Containing Items
- Mercury-Free Products
- Vendor Information
Hospital P2 Programs
(continued)

Mercury Wastewater Data:
- Sacramento Region. WWTS – data not yet avail.
- Masco Study (1995-6) – Old, but good data
  (www.masco.org/mercury/phase2/index.html)
- City of Palo Alto – 1999
  (www.city.paloalto.ca.us/cleanbay/mercurypubs.html#mercury)

Sustainable Hospitals – Web Site
- Sphygs: Mercury vs. Aneroid
  (www.sustainablehospitals.org/HTMLSrc/IP_Merc_Tools_CompSphyg.html)
- Removing Mercury from Laboratories
  (www.sustainablehospitals.org/HTMLSrc/IP_mercury_removelabs.html)
- Is there Mercury in your Coulter Counter
  (www.sustainablehospitals.org/HTMLSrc/IP_Merc_Coulter.html)