INFORM Strategies for a better environment

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Mercury-Containing Products and Alternatives in the Health Care Setting

Product	Substitute	Incentives to Use	Barriers to Use	Resources
Patient Care Areas				
Cantor Tubes	Andersen Products (800-523-1276) AN20 weighted with tungsten.	Between 1991 and 2000 in the US, 59 reported incidents occurred in which these devices burst and released mercury inside patients.	Tungsten products usually well accepted. Air-weighted tubes may take longer to go through; cannot be seen with X-ray without additive to saline solution.	See http://www.p2000.umich.edu/mercury_reduction/mr1.htm for a case study of switching to tungsten devices; see http://www.state.ma.us/ota/pubs/eppjan00.htm#Dilators for further information.
Miller Abbot Tubes	Andersen Products (800-523-1276) AN21 weighted with tungsten; some brands, such as Bard-Davol and Rusch, can be weighted with air or saline instead of mercury, but mercury-free tubes must be specially requested when ordering.			
Bougie Tubes	Pilling (800-523-6507) makes Maloney-style and Hurst-style bougies weighted with tungsten gel.			
Feeding Tubes	Most modern feeding tubes use tungsten as a weight.	Reduced risk of bedside mercury spill or internal spill inside patient.	Clinicians trained on mercury devices may not want to change.	
Sphygmomanometers	Aneroid sphygmomanometers are available from American Diagnostic Corp. (631-273-9600, http://www.adctoday.com) and Trimline Medical Products (800-526-3538, http://www.trimlinemed.com). Electronic vital signs monitors, which measure blood pressure, are available from Alaris Medical Systems (800-482-4822, http://www.alarismed.com) and Pulse Metric, Inc. (619-546-9461, http://www.pulsemetric.com). Welch Allyn Medical Products (315-685-4100, http://www.welchallyn.com) offers both aneroid and electronic sphygmomanometers.	One mercury spill from a sphygmo can cost hundreds of dollars to clean up properly.	Some clinicians believe non-mercury devices are less accurate; however, studies have shown that this is not true, and that hospitals must regularly calibrate all mercury and other devices to maintain their accuracy.	See http://www.state.ma.us/ota/pubs/eppjan00.htm#Non-Mercury Sphygmomanometers for Hartford Hospital Case Study; see http://www.state.ma.us/ota/pubs/eppmarch01.htm#tips for tips on procuring aneroid sphygmos.
Sphygmomanometer Calibrating Equipment	DigiMano 1000 and DigiMano 2000, available from NETECH (800-547-6557, http://www.GoNetech.com), are calibrated to NIST-traceable standards.	Less mercury in the hospital.	Capital expense of buying new equipment.	Contact the Sustainable Hospitals project, shp@uml.edu or 978-934-3386, for more information on this topic.

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Patient Care Areas (cont'd.)				
Sphygmomanometer Service Kits	Many of these kits come with bottles of elemental mercury. If mercury sphygmomanometers are not used in the hospital, there is no need to keep them on hand; in any case, they should be stored securely.	Less mercury in the hospital.	Engineers may want to keep mercury on hand if mercury devices are still used in the hospital.	For a list of mercury recyclers, see http://www.almr.org/members.htm or http://abe.www.ecn.purdue.edu/~mercury/src/recyclers.htm.
Thermometers for Measuring Patient Temperature	Mercury-free electronic, tympanic, infrared, basal, and digital thermometers are available from a variety of vendors, including Exergen (800-422-3006, http://www.exergen.com), R.G. Medical Diagnostics (888-596-9498, http://www.1thermometer.com), Omron Healthcare, Inc. (800-231-3434, http://www.omronhealthcare.com), Becton Dickinson (201-847-4200, http://www.bd.com), PolyMedica (800-521-4503), Alaris Medical Systems (800-482-4822, http://www.alarismed.com), Welch Allyn Thermometry Products (800-854-2904, http://www.welchallyn.com), Braun (800-327-7226, http://www.braun.com), Medical Indicators, Inc. (888-930-4599, http://www.medicalindicators.com), 3M Health Care (800-228-3957, http://3m.com/healthcare).	Less mercury in the hospital and around patients.	Most clinicians now accept non-mercury thermometers.	See http://www.state.ma.us/ota/pubs/eppjan00.htm and http://www.sustainablehospitals.org/HTMLSrc/IP_Merc_FTNonmerc.html for information on specifying accuracy and other attributes when purchasing non-mercury thermometers.
Mercuric Oxide Batteries Used in Blood Analyzers, Defibrillators, ECG Monitors, Fetal Monitors, Hearing Aids, Hofler Monitors, Oxygen Monitors, Pacemakers, and Pagers	When buying new equipment, find out whether products with mercury-free batteries are available. All rechargeable batteries should be recycled. Contact the Rechargeable Battery Recycling Corp. (1-800-8-BATTERY or http://www.rbrc.org) for information on sending your batteries to be recycled. If pagers and other equipment are out-sourced, write a requirement that vendors take back and recycle spent batteries into the outsourcing contract.	Less mercury entering the environment.	Must review battery needs of equipment individually.	See http://www.sustainablehospitals.org for more information on alternatives; see http://www.nema.org/index_nema.cfm/666/#recycle for information on battery recycling.
Laboratories	See http://www.nih.gov/od/ors/ds/nomercury/equipment.htm for more examples of mercury-containing laboratory equipment.			
Laboratory Solutions	Various	Less mercury exposure for lab personnel.	Must do survey to identify solutions containing mercury.	See http://www.sustainablehospitals.org/cgi-bin/DB_Report.cgi?px=W&rpt=Subcat&id=18!20 for more information on mercury-free laboratory chemicals.
Fixatives	Histo-Fix from Trend Scientific, Inc. (div. of Richard-Allan) (800-522-7270)	Less mercury exposure for lab personnel.	Must do side-by-side pilot to ensure personnel can make accurate diagnosis.	See http://www.sustainablehospitals.org/cgi-bin/DB_Report.cgi?px=W&rpt=Subcat&id=18!20 for more information on mercury-free laboratory chemicals.
B5 Fixative	Zinc B-5, available from Anatech Ltd. (800-ANATECH, http://www.anatechltdusa.com) or Zinc Formal-Fixx from Shandon, Inc. (800-245-6212, http://www.shandon.com)	Less mercury exposure for lab personnel.	Zinc in these solutions may cause disposal considerations.	See http://www.state.ma.us/ota/pubs eppmarch00.htm#VA for case study.

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Hematoxylin (solution A)	Substitute .37 g sodium iodate for each 2.5 g of mercuric oxide, or buy mercury-free from Anatech Ltd. (800-ANATECH, http://www.anatechltdusa.com)	Less mercury exposure for lab personnel.	Must do side-by-side pilot to ensure personnel can make accurate diagnosis.	See http://www.state.ma.us/ota/pubs/eppmarch00.htm#VA for case study.
Reagents: Carnoy-Lebrun, Helly, Ohlamacher, Shardin, Zenker's Solution, Camco, Cajal's, Carbol Gentian Violet, Gomori's, Golgi's, Gram Iodine, Hitergent, Immu-sal, Solutions used in Autoanalyzers, Mercuric Oxide, Stabilur Tablets, Mercury Sulfate, Mercuro-chrome, Mercurophyline, Million's Reagent, Nessler's Solution, Phenol Mercuric Acetate, Takata's Reagent, Mucolex, and more	Check current methods books.	Less mercury exposure for lab personnel.	Laboratory personnel must be motivated to find alternatives and switch.	See http://www.sustainablehospitals.org for more information on mercury-free laboratory chemicals; see http://www.masco.org/mercury (click on database) to view database of mercury-content test results for hospital reagents.
Coulter Cell Counters	Not all models and years contain mercury. Request mercury-free when buying a new cell counter. Contact Beckman Coulter to find out whether you can switch your mercury gauge for a mercury-free one in your existing cell counter.	Mercury in counters must be disposed of as hazardous waste when decommissioning equipment.	Contact Beckman Coulter or your local sales representative to find out whether your model and year contains mercury.	See http://www.sustainablehospitals.org/HTMLSrc/IP_Merc_Coulter.html for more information.
Laboratory and Institutional Size Ovens, Refrigerators, Stoves, and Freezers	Many industrial ovens, refrigerators, and freezers have mercury temperature-control devices. Gas stoves with standing pilot lights have mercury flame-sensor devices. Specify non-mercury components when buying new equipment.	Less risk of a mercury spill.	Researchers and clinicians are often picky about brand and may not want to consider mercury-free.	See http://abe.www.ecn.purdue.edu/~mercury/src/devicepage.htm for information on removal and alternatives.
Laboratory Thermometers	Almost all vendors now offer alcohol, digital, and electronic thermometers for laboratory applications.	Reduction of expensive mercury spills and risk of mercury washed down the sink.	Researchers are often picky and can be hard to convince.	
PVA Parasitology Transport Vials	Use zinc PVA vials instead of mercury, available from many vendors including Medical Chemical Corp. (800-252-1125), Remel (800-255-6730), and Meridian Diagnostics (800-543-1980).	Since hazardous and infectious wastes are no longer mixed, these vials are now much cheaper to dispose of (30 cents per pound for zinc vs. $8 per vial for mercury in New England region in 1998).	Must add disposal and purchase costs to show that zinc vials are cheaper in the long run.	See http://www.state.ma.us/ota/pubs/eppmarch00.htm#lab for case study.
Building, Equipment, and Instrument Maintenance				
High-Pressure Sodium Lamps, Fluorescent Lamps, Metal Halide Lamps, and Ultraviolet Lamps	Most energy-efficient lamps contain mercury and should be recycled instead of thrown away at the end of their life. Because these lamps contribute so markedly to energy efficiency, they should not be replaced with mercury-free traditional light bulbs, but instead should be sent, unbroken, to a qualified recycler.	For most facilities, failing to send lamps to a recycler or hazardous waste company is a violation of hazardous waste laws.	Most lamp recycling firms charge a fee to recycle.	See http://www.kdhe.state.ks.us/waste for explanation of regulations in Kansas.

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Building, Equipment, and Instrument Maintenance (cont'd)				
Electrical Equipment, Relays, Switches, Boilers	Label all mercury-containing parts with bright tags so proper measures can be taken if something breaks or equipment must be discarded. When buying replacement or new equipment, specify mercury-free switches, temperature devices, and relays. If current equipment has a history of mercury spills, contact vendor to see if a mercury-free part is available to switch out.	Avoid costly mercury spills or liability for improper disposal of old mercury-containing equipment.	It takes time to identify mercury in this equipment.	See http://www.state.ma.us/ota/pubs/eppdec00.htm #mercury, http://www.sustainablehospitals.org/ HTMLSrc/IP_Mercurygauges.html,and http:// abe.www.ecn.purdue.edu/~mercury/src/devicepage. htm for more guidance.
Spent Mercury-Containing Lamps	Spent fluorescent and other mercury-containing lamps should be recycled.	Keep mercury out of the environment.	Most lamp recycling firms charge a fee to recycle.	See http://www.lamprecycle.org for a list of companies accepting lamps for recycling; see http://www.nema.org/government/environment/ for more information on lamp recycling in general.
Manometers	Mercury-free digital manometers for measuring pressure are available from most major vendors, including INFILTEC (http://www.infiltec.com), Topac (http://www.topac.com/pressure.html), and Dwyer (http://www.dwyer-inst.com/ htdocs/pressure.html).	Reduced risk of a mercury spill.	Capital expense of replacement.	See http://abe.www.ecn.purdue.edu/~mercury/src/ devicepage.htm for information on removal and alternatives.
Sink Sewage Traps	In most hospitals built before 1995, elemental mercury is present in drain traps because it was thought safe to pour mercury down the sink. All drains must be cleaned out properly and within regulations. Mercury in traps could be adding large amounts of mercury to the facility's wastewater.	Avoid tripping water treatment facility violation fees for sending too much mercury down the drain; avoid liability for mercury during remodeling or renovation.	Nobody wants to do this job.	See http://www.masco.org/mercury/infra/pp6.html for trap cleaning protocol.
Barometers	Digital and other mercury-free barometers are available from many vendors, including Dingens Barometers (http://www.barometers.com/baromet.htm).	Broken decorative barometers can release pounds of mercury.	Digital barometers are not as decorative and impressive as glass mercury barometers.	See http://abe.www.ecn.purdue.edu/~mercury/src/ devicepage.htm for information on removal and alternatives.
Thermostats	Mercury-free thermostats are available from most major building supply vendors, including Home Depot and Robert Shaw (http://www.maplechase.com/robertshaw/).	No risk of mercury spills in patient areas or mercury releases during renovation.	Although the cost of mercury-free thermostats is not substantial, a capital outlay cost is required to purchase replacements.	See http://abe.www.ecn.purdue.edu/~mercury/ src/devicepage.htm for information on removal and alternatives.

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Building, Equipment, and Instrument Maintenance (cont'd.)				
Laboratory and Institutional Size Ovens, Refrigerators, Stoves, and Freezers	Many industrial ovens, refrigerators, and freezers have mercury temperature control devices. Gas stoves with standing pilot lights have mercury flame-sensor devices. Specify non-mercury components when buying new equipment.	Less risk of a mercury spill.	Researchers and chefs are often picky about brand and may not want to consider mercury-free.	See http://abe.www.ecn.purdue.edu/~mercury/src/devicepage.htm for information on removal and alternatives.
Outdated Mercury-Containing Equipment	Mercury-containing equipment that is no longer useful should be sent to a mercury recycling firm immediately to limit the risk of a mercury spill.	Avoid costly mercury spills.	Cost of disposal.	See http://abe.www.ecn.purdue.edu/~mercury/src/recyclers.htm for a list of companies accepting elemental (free-flowing) mercury devices.
Spent Batteries	Spent batteries should be recycled.	Improper disposal of hazardous materials may result in environmental violations.	It is much easier to put batteries in the trash.	Contact the Rechargeable Battery Recycling Corp. (1-800-8-BATTERY or http://www.rbrc.org) for information on recycling batteries.
Spent Mercury-Containing Thermostats	Mercury-containing thermostats should be recycled through the Thermostat Recycling Corp. See http://www.nema.org/government/environment/ for more information.	Improper disposal of mercury-containing thermostats can result in liability and environmental fines.		See http://www.nema.org/government/environment/.
Weather Thermometers	Available from Streck (402-333-1982, http://www.streck.com/products.html), Ertco (EveReady Thermometer Co., http://www.ertco.com), American Weather (http://www.americanweather.com/thermometers.html).	No risk of a mercury spill.	Can be hard to locate these devices on hospital grounds.	See http://www.sustainablehospitals.org/cgi-bin/DB_Report.cgi?px=W&rpt=Cat&id=16 for more information on available thermometers.
Cleaning Chemicals	Bleach and other cleaning chemicals can contain trace contaminant mercury. Unless your facility is having mercury discharge violations with the local water treatment facility, pursuing mercury-free products may not be worthwhile.	Avoid water treatment facility violations.	Makers of most commercial products do not test for contaminant mercury and since it is not intentionally added, may not know it is present.	See http://www.masco.org/mercury for case studies of Boston-area hospitals that had to find mercury-free cleaners to avoid mercury discharge violations with local water treatment facility.
Demolition Waste	When remodeling hospital areas, remove all hazardous components before dismantling structures. Mercury may be present in drain traps, light switches, and other locations.	Avoid liability and environmental fines.	Most people think of this as extra work.	See www.enveng.ufl.edu/homepp/townsend/Research/DemoHW/Guide/DHW99_12_30.pdf for guidelines on removing hazardous materials, including mercury, before demolition.

Source: This table was compiled from many sources, including documents from the Sustainable Hospitals Project, Florida Center for Solid and Hazardous Waste Management, Purdue University/EPA Region 5 Mercury In Buildings, and the Massachusetts Office of Technical Assistance.