

## Hazardous Waste Reduction for Medical Laboratories

**Reduce the generation of hazardous waste and save money through improvements in chemical purchasing, inventory and storage, and laboratory practices**



### Chemical Purchasing

**Consolidate purchasing through a single person or system<sup>1 2</sup>**

When multiple employees or departments order chemicals independently, miscommunication can lead to excess orders or failure to order necessary chemicals on time. Excess chemicals have the potential to go unused and expire, leading to additional waste generation while missed orders can delay testing. Centralized purchasing can simplify the process and also promotes coordination of chemical use between different departments with similar needs.

**Choose a supplier that will help minimize waste generation<sup>1 2</sup>**

Chemical orders can lead to waste in the form of unwanted or damaged raw materials, empty containers and packaging, and expired chemicals. Look for a supplier who will help reduce these waste streams by accepting returns of unopened or damaged shipments and empty containers. Encourage reduction

of packaging materials or reusable containers where possible. Some suppliers may even accept returns of chemicals past their expiration date.

**Purchase chemicals in the smallest amounts needed<sup>1 2 3</sup>**

Bulk ordering can be appealing economically but may increase waste and costs in the form of expired excess chemicals. Order smaller quantities and use the “just in time” system to eliminate overstock and store only as much as needed.

**Consider disposal costs in addition to purchase price<sup>3</sup>**

The real cost to manage a chemical through receiving, processing, and disposal can be much higher than the advertised price, especially if the chemical may lead to the generation of hazardous waste. Instruct employees to purchase only necessary chemicals and prefer those with lower disposal costs.

### Inventory and Storage

**Train employees to prevent spills and contamination in the storage area<sup>1 8</sup>**

Reduce the risk of spills by restricting traffic through the storage area and limiting manual transfer or pouring of chemicals. When spills do happen, minimize waste generation by training employees in proper spill response procedures and storing hazardous and nonhazardous materials separately so that contamination does not occur. Record the causes of major spills and update spill prevention guidelines accordingly.

**Label each chemical with the date received and expiration date<sup>1 2 3</sup>**

Follow a “first in, first out” system by storing chemicals with the earliest expiration date in front so that they are used up first. Routinely inspect chemical inventory for upcoming expiration dates as well as any signs of leakage or container damage.

## Laboratory Practices

### Institute a laboratory-wide goal for waste reduction<sup>3</sup>

Ensure that each department is aware of the goal and how it will benefit them through increased efficiency, reduced disposal costs, or otherwise. Appoint a waste management officer who can coordinate efforts and share best management practices and process improvements between departments. Promote a waste exchange where excess chemicals or other waste generated by one department can be claimed for use in other areas of the lab.

### Segregate waste streams at the point of generation<sup>3</sup>

Clearly differentiate between hazardous and nonhazardous wastes as early as possible to avoid mixing. Separate waste ready for disposal from spent material that may be used beneficially. Some spent solvents, for example, should be kept clean to facilitate reclamation and reuse.

### Use less solvent to clean glassware<sup>1 4</sup>

Solvent use may be eliminated by switching to ultrasonic cleaners or aqueous based detergents. If solvent cleaning is necessary, consider countercurrent cleaning, in which spent solvent is used for the initial rinse and fresh solvent for successive rinses. Washing glassware first with soapy water and a scrub brush may limit the need for multiple solvent rinses.

### Evaluate the possibility of on-site reclamation of spent solvents<sup>1 5 7 8</sup>

Solvents such as xylene, ethanol and formalin can be recovered through distillation and reused to reduce the need for fresh solvent and the amount of solvent waste generated. Distillation may be possible for segregated solvent waste streams, while mixed solvents may require more expensive fractional distillation. Always test the reclaimed solvent to ensure that quality control standards are met.



For more information about reducing specific waste streams, consult the California Department of Toxic Substances Control's *Pollution Prevention Guide for Hospitals* or the City of Toronto's *Resource for Greening Medical Laboratories*.<sup>1 6</sup>

## Success Story

CellNetix, a pathology laboratory in Seattle, recycled 407 gallons of xylene, 522 gallons of ethanol, and 539 gallons of formalin and saved more than \$7,000 over a seven month period in 2012.<sup>7</sup>

See *Toxic Substance Reduction for Medical Laboratories*<sup>9</sup> for more information.

## References

- <sup>1</sup> [California EPA Department of Toxic Substances Control. Pollution Prevention Guide for Hospitals.](#)
- <sup>2</sup> [Healthcare Environmental Resource Center. Laboratory Chemicals.](#)
- <sup>3</sup> [Ohio EPA Division of Environmental and Financial Assistance. Laboratory Pollution Prevention.](#)
- <sup>4</sup> [Pollution Prevention in an Organic Chemistry Research Laboratory.](#)
- <sup>5</sup> [EPA. P2 Assessment in Histopathology Lab.](#)
- <sup>6</sup> [Toronto ChemTRAC. Greening Medical Laboratories.](#)
- <sup>7</sup> [Washington Department of Ecology. CellNetix Pathology and Laboratories. Solvents in the Workplace: How to Determine if They Are Hazardous Waste.](#)<sup>8</sup>
- <sup>8</sup> [ADEQ. Toxic Substance Reduction for Medical Laboratories.](#)

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