

Medical Laboratory Observer

Clinical Issues

Take pride in SAFETY: A comprehensive lab-safety program

By Leonard K. Dunikoski, PhD, DABCC

Because of the nature of the work, most labs have a combination of biological, chemical, physical and, sometimes, even radiological hazards. As a result, the lab is often the most safety-conscious department in a hospital. Many laboratorians see safety as an inherent part of what they do. The recent new emphasis on hospital-wide safety programs, however, increased the need for the laboratories at Raritan Bay Medical Center's two hospitals to formalize a comprehensive laboratory-wide safety program. Our four-part laboratory safety program can be used as a model for almost any laboratory. The program uses a simple acronym — SAFE — to delineate the major areas of focus:



- Select equipment and supplies to maximize safety
- Annual mandatory staff education
- Formal, documented six-month inspections
- Evaluate monthly safety documentation

Safe equipment and supplies heads the list

The first part of the program ("S") emphasizes selection of safe equipment and supplies. Sometimes this is already a regulatory requirement, such as selecting phlebotomy supplies to reduce possible blood exposures during phlebotomy. We require staff members to document their evaluations any time a new phlebotomy device is evaluated, and we prefer "passive" devices that blunt the sharp end before the needle is withdrawn from the patient's vein.

Voluntary adoption of a safety device often includes an evaluation of whether the additional expense is cost-effective. Several years ago, after two blood exposures involved cracked glass vacuum tubes, we voluntarily replaced the glass vacuum tubes with plastic tubes, even though the plastic tubes were more expensive.

In another example, based on the high risk of any transfusion reaction, we have voluntarily added the extra expense of using the BloodLoc device on every unit of blood that is dispensed. This device is a small, plastic, three-letter combination lock that is placed on the outer bag holding a unit of blood for transfusion. The lock's combination is set when the person who draws the sample for cross matching identifies the correct patient, selects from a set of 20,000 three-letter sequences, and places the code on both the patient's wristband and on the specimen. When the blood bank releases the cross-matched unit of blood, the BloodLoc is set with the code written on the cross-match sample. The nurse who hangs the unit of blood uses the three-letter sequence that is written on the patient's wrist band (and nowhere else) to try to open the lock. If the lock does not open, the blood cannot be transfused and must be returned to the blood bank. Anyone who cuts the bag to defeat the device is subject to termination. This safety device adds both additional labor and cost, but we, particularly nursing, view its use as an essential part of quality control for the blood-transfusion service. The hospital's legal/risk manager views it as "cheap insurance" to help prevent the wrong patient from receiving a unit of blood.

Laboratorians are accustomed to selecting major new instruments based on test menu, precision, cost, throughput and other factors. Many times there is no clear cut "winner" in such an evaluation, and we believe that safety must be added as an important criterion when making capital equipment decisions.

When we needed new major clinical chemistry analyzers, we considered instruments from six different instrument vendors. We selected the LX20 PRO because (in addition to its menu, precision and other features) it features closed tube sampling (CTS). Since CTS pierces the specimen tube cap and extracts samples automatically, no healthcare worker is faced with the risk of exposure to a cracked tube or the aerosol produced when the cap is removed. Like the Vanish Point phlebotomy device, CTS works as a "passive" safety feature, working every time and requiring no human intervention. We have seen a slight increase in productivity because we eliminated one step (cap removal) from the pre-analytical process. Our two-year experience with CTS has been so successful, we are upgrading the instrument into an LXi, adding a CTS immunochemistry module.

Even though we are only a medium-size laboratory, we also have a pre-analytical automation system, the Power Processor, at our Perth Amboy location. Laboratory automation will partially address the coming shortage of qualified laboratory technologists. We chose pre-analytical automation as the most cost-effective addition for our lab. Our primary concern was to automate the labor-intensive steps involved in centrifuging specimens, removing caps and sorting specimens into areas for different workstations. No one looks forward to doing these mundane tasks, and there is always the possibility of a blood exposure during several of the steps. We also believe that automation improves patient safety, since it relies on dependable electronic transfer of testing and demographic information for all barcoded specimens. Initially, we set the Power Processor to centrifuge, decap and sort all of our routine chemistry and immunochemistry samples. After we added CTS however, we disabled the decapper module, because now only a small minority of our specimens have caps that need to be removed.

Annual education for staff follows

The second part of the program ("A") involves annual mandatory staff education. Most labs already have mandatory yearly staff in-service education sessions for topics such as the chemical hygiene plan and corporate compliance. Faced with staffing shortages and less than optimal training facilities, many labs merely require a person to fill in a sign-in sheet stating that he attended the program or viewed the videotape. We believe these activities are not enough, so we use color-coded sheets listing specific learning objectives for the educational session, and we use written post-session tests that must be completed by 100% of the staff.

The contents of mandatory safety education should be mirrored in the lab's written policy and procedure manuals. We try to write all of the safety policies as if they were for a newly hired technologist or phlebotomist with no prior experience in our lab. Since the goal of the written post-session tests is to reinforce knowledge, they are given as "open-book, this-is-already-a-regulatory-requirement" exams, and everyone is encouraged to refer to the written policy manuals when they are unsure of the test answers. In fact, we include questions asking staff to identify the specific written policies that involve safety.

Some recent questions we have used in our chemical hygiene quiz are shown in **Figure 1** (see below). Such questions have multiple benefits: they require staff to actually use the policy manual, so staff members sometimes point out portions of policies that need to be clarified. They encourage the supervisor to develop an easy-to-use alphabetical index that cross references key topics. Anyone who has struggled to find a specific topic in a large policy and procedure manual knows the frustration of hunting through multiple policies before finding the appropriate material. The best-written lab safety policies in the world will not help unless the technologist or phlebotomist can easily find what he is looking for. We still require sign-in sheets for the educational sessions, and maintain a staff education book that documents 100% staff compliance. Anyone who does not achieve a minimum acceptable score on the test is given an additional one-on-one session with the supervisor, and must retake the written exam until a passing score is achieved.

Figure 1: Questions from the Chemical Hygiene Plan Quiz

1. What written policy requires you to wear eye protection when troubleshooting

2. Policy C-H-4, "Chemical Safety: Housekeeping, Maintenance and Inspections" gives instructions on when not to use a fume hood when working with chemicals. When would you not use a fume hood?
3. Give two of the most common routes of entry that chemicals enter the body.
4. In case of a chemical spill, whom do you call, and at what extension? In what policy do you find the information?
5. Where is the spill cleanup kit nearest to your routine work station? Where is the formaldehyde neutralizer?

Formal checklists document inspections

Formal, documented periodic (six-month) inspections by both laboratory and nonlaboratory personnel constitute the third ("F") part of the safety program. For many years, our hospital-wide safety committee has used written checklists for periodic interdisciplinary team inspections of all hospital departments. Nondepartmental personnel walk through all areas and compare actual conditions against the checklist's expectations. Sometimes people who work in a given area are so accustomed to the day-to-day situation that they do not realize that certain conditions might compromise safety. A new pair of eyes often spots problems that we may have overlooked. Newly hired employees are also a vital source of information and may have a different and valuable viewpoint.

We developed our own departmental inspection checklists to address both potential hazards, as well as the staff's ability to verbalize knowledge. Inspections are scheduled for specific months of the year, and we try to tie the inspection topic to a similar in-service education topic; for example, the bloodborne pathogens inspection is scheduled for May, the same month as mandatory standard precautions training. **Figure 2** (see below) shows a portion of our monthly inspection schedule.

Figure 2: Formal Monthly Inspection Schedule

- **January:** Chemical safety inspection
- **February:** Life safety inspection (interdisciplinary team)
- **March:** Formaldehyde safety inspection
- **April:** Fire/electrical/waste inspection
- **May:** Bloodborne pathogens inspection
- **June:** Alarm/eyewash/safety shower inspection

We use separate color-coded inspection checklists for areas such as bloodborne pathogens, hazardous waste, fire safety and so forth, and keep records of the inspections for two years. **Figure 3** (see below) shows some sample questions from our fire safety inspection checklist.

Figure 3: Questions from the Fire Safety Inspection Checklist

- Are evacuation routes posted in visible locations?
- Can the fire alarm (overhead page) be heard in all parts of the laboratory, including storage areas and lavatories?
- Do all fire exits have an exit sign that is illuminated by a reliable light source?
- If gallon bottles of flammables are used, does the nearest fire extinguisher have a minimum rating of Class 10:B or higher?
- Can all staff give the code number of the policy for the evacuation of disabled employees?

We evaluate all of the checklists annually, and add new questions in response to revised requirements by regulatory or accreditation agencies, problems discovered in the prior year, as well as checklists used by other laboratories (often available on the Internet).

Evaluations identify trends and prompt action

The last part of the program ("E") focuses on monthly evaluation of safety documentation, including evaluation of accident reports, blood exposures, incident reports, overtime hours, patient complaints, staff turnover and turnaround time data. We document such monthly data in a spreadsheet. When trends are identified, we take appropriate actions and look for opportunities for improvement. The spreadsheet makes it easy to perform an annual evaluation of how successful any interventions have been, as well as documentation of compliance, when annual reviews are required by accrediting agencies such as the College of American Pathologists and the Joint Commission on Accreditation of Healthcare Organizations.

We require all supervisors to hold a mandatory monthly meeting with all staff, documented with written minutes. These meetings provide a formalized mechanism to share hospital- or lab-wide news to ensure that all personnel are cognizant of all issues discussed. Each month, safety is a specific agenda item, and we talk about any needlesticks that occurred during the prior month and explain any changes in written policies, among other items. At those monthly meetings, we also specifically reserve time for upward communication. Staff members are encouraged to give suggestions, input and feedback. No one knows their jobs better than front-line workers, and phlebotomists and technologists are those who have the most to gain by any improvements in the safety program.

The legacy of a "culture of safety"

This simple, four-part safety program can be adapted. In order to produce a "culture of safety," however, senior management must show that lab safety is a clear priority, basically by taking a leadership role in promoting and articulating safety. Employees know very well which values are important to their immediate supervisor by the questions he asks, by the time he spends on any given topic, by the decisions he makes. If you as a lab manager were to leave your present employer tomorrow, how would you like to be remembered by your staff? I would like to think all of us would best be remembered if our employees could honestly say, "He really cared about two things: the lab's role in providing the best possible patient care, and providing a safe place for us to work."

Dr. Dunikoski is director of operations at New Jersey's Raritan Bay Medical Center, at Old Bridge, NJ, location. In addition to directing the lab, he administers admitting, cardiology, physical therapy, respiratory therapy and the sleep center.

October 2003: Vol. 35, No. 10