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ECRI Top 10 Health Hazards

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The Top 10 Health Technology Hazards for 2014 will be published in HealthManagement in two parts

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ECRI's annual Top 10 list highlights the technology safety topics that we believe warrant particular attention, and is intended as a starting point for patient safety discussions and for setting health technology safety priorities. These generic hazards reflect use errors that our research shows are being repeated by clinicians or that our experts determine may become more prevalent.

Alarm Hazards (no. 1)

A clinical alarm hazard is one that results in staff failing to be informed of a valid alarm condition in a timely manner or to take appropriate action in response to the alarm. Excessive numbers of alarms can lead to alarm fatigue, and ultimately patient harm. Caregivers may be overwhelmed, distracted or desensitised. Patients may also be at risk, from noise from excessive alarms, alarms not activating when they should, staff not responding and alarms not working properly. Staff in general may be at risk from noise from excessive alarms as they can create a more stressful work environment for staff. Such factors may prompt caregivers to take unsafe actions, such as decreasing the alarm volume to an inaudible level or even turning off the alarm completely.

Goals for an alarm management programme will include minimising the number of clinically insignificant or avoidable alarms so that the conditions that truly require attention can better be recognised and optimising alarm notification and response protocols so that the patient receives the appropriate care at the time it's needed.

Recommendations

- Recognise that alarm hazards are not just a technology problem, but involve issues of organisational culture and processes.

- Address the problem through a coordinated, multidisciplinary effort.
- Invest the time to understand how alarms are used at your facility.
- Consider the needs of each care area individually.
- Involve frontline staff in identifying and implementing improvement strategies.
- Assess the effect of the strategies that are implemented, and revise or refine as needed.
- Promote your successes.

Infusion Pump Medication Errors (no. 2)

Infusion safety is often discussed in terms of the “Rights of Medication Administration,” namely the right patient, the right drug, the right dose, the right route, and the right time. Pumps equipped with “smart” technology— onboard drug libraries that trigger alert limit warnings for gross misprogrammings —do a good (but not perfect) job of helping to get the dose correct. However, they don’t help ensure the other “rights.” Infusion pump integration—that is, connecting the servers for the infusion pumps with other information systems— can help achieve a few of the other “rights.”

Recommendations

- During selection and purchasing, assess the human factors of prospective infusion devices during trials.
- When implementing a new system, take advantage of vendor consulting programmes.
- Emphasise to clinicians the importance of infusion pump technology safeguards. Recognise that the introduction of new infusion technologies may necessitate some changes in workflow.
- Dedicate resources to regular training and assessment for routine users, incoming staff members and infrequent users.
- Identify inappropriate practices by staff and rectify as soon as possible.
- When using smart pumps:
- Develop and maintain appropriate drug libraries. Invest in resources to analyse infusion pump to improve work practices and policies. Develop a procedure that identifies the staff member responsible for data analysis and that describes how and when infusion pump data will be captured, analysed, and disseminated.
- Begin (or continue) t o implement infusion pump integration with information systems for checking orders and documenting administration.
- Implement a roadmap for integration, recognising that this is a multistep, multiyear process.
- When selecting new infusion pumps, consider the technology’s ability to be integrated with electronic ordering, administration, and documentation systems (both current and anticipated within the pumps’ life span).

Occupational Radiation Hazards in Hybrid ORs (no. 5)

If a hybrid OR is to be implemented, healthcare facilities must have in place a radiation protection programme that provides staff with the knowledge and technology they need to minimise occupational radiation exposures in this unique environment. The programme should include training, shielding and monitoring.

1. Training educates staff about the risks of ionising radiation and the protective measures that should be taken— some of which may not be intuitive. For example, the angulation of the imaging system can affect the radiation dose received by the staff.

2. Shielding: this can include lead and additional lead barriers, such as those suspended from the ceiling.

3. Monitoring: Radiation monitoring badges are used to keep track of clinician exposure to radiation so that regulatory dose limits are not exceeded. Effective monitoring requires that the badges be properly worn, maintained, and reviewed, and employers must plan to assess and verify badge compliance. To augment the use of traditional badges, facilities may also choose to institute the use of electronic badges that provide real-time readings of the dose rate. While real-time electronic badges do not replace traditional badges (because they lack traditional badges’ ability to record a permanent radiation record), they can be used to aid clinicians in immediately adjusting their behaviour (e.g., repositioning themselves) to comply with occupational radiation safety procedures and reduce their exposure.

Recommendations

- Verify that all hybrid OR staff (including surgeons) obtain OR-specific radiation protection training and that they put this training into action. Consult with a medical or health physicist when developing your radiation protection and safety programme.
- Nominate a member of the hybrid OR team to assume day-to-day responsibility for verifying that radiation protection policies and procedures are being followed. This role is not to be confused with that of the radiation safety officer (who oversees procedures for the entire organisation).
- Assess the adequacy of existing built in radiation protection infrastructure. Consider implementing additional personal radiation safety equipment as needed, such as specialised radiation shield garments.
- Consider implementing real-time monitoring to ascertain the effectiveness of radiation safety training, particularly if the analysis of badges proves ineffective at determining the cause of—and steps needed to correct—clinician overexposure.

Inadequate Reprocessing of Endoscopes and Surgical Instruments (no. 6)

When reprocessing is not performed properly patient cross-contamination is possible. In addition incidents involving improperly reprocessed instruments can damage an organisation’s reputation, reduce patient satisfaction, prompt review by accrediting agencies, and lead to citations and fines from regulatory bodies or lawsuits from patients. A variety of factors can contribute to improper reprocessing, including:

- The intricacy of the instruments;
- Lengthy manufacturer instructions for cleaning, or incomplete or missing instructions;
- Time pressures on reprocessing staff;
- After-hours requests for instrument reprocessing, possibly performed by insufficiently trained personnel;

- The lack of standardisation of processes among multiple reprocessing areas;
- Coordination and cooperation issues between OR and reprocessing staff.

Recommendations

- Provide adequate space, equipment, trained staff, instructional materials, and resources for the reprocessing function to be performed effectively.
- Verify that an appropriate reprocessing protocol exists for all relevant instrument models in your facility's inventory.
- Develop a protocol to ensure that loaner instruments go through the same reprocessing processes as hospital owned instruments before initial use and between uses (following manufacturer recommendations for each device).
- Ensure that current documented protocols are readily available to staff and that staff are trained to understand and follow them.
- Monitor adherence to protocols and quality of instrument cleaning.
- Periodically review protocols to ensure that they are clear and comprehensive and that they reflect the current environment.
- When developing or reviewing protocols, ensure that all steps are addressed and documented in adequate detail— from precleaning of equipment at the site of use, when appropriate, to safe and aseptic transport of equipment back to that site for subsequent use.
- Seek input from reprocessing department staff when assessing instruments for purchase to identify devices that may require additional time, steps, or resources to reprocess effectively.
- Foster communication and collaboration between reprocessing personnel and the departments they support so that the groups understand each other's needs. *(Nos. 7 & 8 will be in HealthManagement's next issue)*

Robotic Surgery Complications due to Insufficient Training (no. 9)

Robot-assisted surgery involves the use of robotic arms that are fully controlled by the movements of a surgeon located at a control console several feet from the patient. The control console incorporates a video display on which the surgeon views 3D video of the surgical site, as well as hand and foot controls that the surgeon uses to control the position and functions of the robot's arms, instruments, and endoscope.

Recommendations

- Before conducting unsupervised robotic surgery procedures, surgeons should do the following (note that the number of cases or sessions below are minimum values based on our discussions with large teaching hospitals; facilities should establish appropriate requirements to help ensure that surgical staff have the necessary procedure-specific skills):
- Complete initial training sessions provided by or recommended by the device supplier.
- Observe at least two cases, including room and instrument setup.
- Serve as a bedside assistant for a minimum of five surgeries.
- Perform simulation training and training on appropriate inanimate or cadaver models.
- Complete a minimum of three proctored sessions. Note that if issues arise during the surgery that require the proctor's assistance, that session should not be counted as a completed, proctored session. Also be aware that if an external proctor is used—for example, if the hospital does not have an inhouse surgeon who can serve as a proctor—the external proctor is unlikely to have surgery credentials within the hospital and thus would not be able to directly intervene in the procedure if there's a problem.

- In addition:
- Facilitate team training. Surgeons and nurses will each require their own training because of their different responsibilities. However, teamwork is essential during robot-assisted surgeries, and some users have found that the safest surgeries are those that have been performed by a team that has experience working together. Therefore, we recommend that joint training sessions also be conducted, including interdisciplinary dry lab, cadaver, and simulation training that involves the OR nurses.
- Verify sustained proficiency. If the caseload for a particular procedure is insufficient to fulfill this requirement, consider whether simulation training would be adequate to maintain the necessary skills to manoeuvre the robot arms and EndoWrists.

Retained Devices and Unretrieved Fragments (no. 10)

Reports of surgical items unintentionally left inside patients following surgery or an interventional diagnostic procedure (which may take place outside the OR) typically involve one of the following:

- A retained device, in which an entire device (including soft goods like a surgical sponge or towel) is unknowingly left behind.
- Unretrieved device fragments, in which a portion of a device (e.g., catheter tip, forceps jaw) breaks away and remains inside the patient. Clinicians may be aware that a device fragment has been left in the patient, but decide that the fragment's location within the anatomy makes retrieval too risky. In such cases, risks to the patient can include (1) prolonged or additional surgery, as would occur when an RSI is discovered and its removal is deemed appropriate, or (2) future complications, some potentially serious, as could occur when an RSI leads to infection or causes damage to the surrounding tissue. For example, retained metal could rotate if the patient undergoes a magnetic resonance examination; the result could be damage to internal tissue or structures.

Recommendations

- Visually inspect devices just before use.
- Be alert for significant resistance during device removal, which could indicate that the device is trapped and at risk of breakage; consider what options are available (e.g., repositioning the patient) before continuing.
- Visually inspect devices as soon as they are removed from the patient. If a portion of the device appears to be missing, immediately take appropriate action (e.g., examine the treatment site, request radiologic evaluation).
- Adhere to accepted surgical count procedures.

- Consider whether adjunct technologies (e.g., surgical sponge detection systems) should be adopted. Cleaning and reprocessing staff should be cognisant of obvious damage to reusable instruments and devices and should pull suspect devices for evaluation.

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