Reducing Medical Drug Errors

Appropriate technology and facilities solutions can reduce the potential for medication errors.

By Constance Nestor

Two of the most important challenges facing healthcare providers today are achieving favorable patient outcomes and further reducing the potential for sentinel events. With the arrival of Internet-based comparative benchmarking patient outcomes data, now available to all, performance is even more critical to provider success.

According to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), the physical environment continues to play an important role in patient outcomes. Fifteen percent of the root causes of sentinel events reported to JCAHO between 1995 and 2004 involved environmental safety and security.

Invest in Technology

Medication errors may be related to professional practice, healthcare products, procedures and systems, including prescribing, order communication, product labeling, packaging and nomenclature, compounding, dispensing, distribution, administration, education, monitoring and use. Miscommunication of drug orders can involve poor handwriting, confusion between drugs with similar names, misuse of zeroes and decimal points, confusion of metric and other dosing units and inappropriate abbreviations.

Technology can address these issues by improving drug preparation and administration accuracy. When pharmacy construction programs and budgets are being developed, remember to provide generous resources for technology and corresponding infrastructure. Minimally, the following technologies are recommended:

- Pharmacy information systems that identify drug dosage discrepancies and automatically alert the pharmacy staff are key. Ideally, such computerized order entry and review systems will interface with the hospital-based electronic patient records, ordering, reporting and billing systems.
- Robotics and automated carousels are recommended for large volume pharmacies and will serve to increase drug pick efficiencies, accuracy and seamless linkage to par level reordering systems. Blister strip packing systems that barcode individual patient doses are a cost effective alternative to expensive robots.
- Automated pharmaceuticals and supplies dispensing systems that automatically send a patient charge to the billing department should be located centrally in designated patient care areas, including acute care floors, the catheterization lab, radiology, surgery, emergency and endoscopy services.
- Bedside administration software is needed to verify bar-coded patient doses when scanned along with the patient's wristband and nurse ID.
- Computerized physician order entry (CPOE) is a must in reducing the potential for drug errors. Handheld or wireless devices are likely to be the most convenient for physicians. The CPOE system should suggest recommended drugs and doses to the physician, also enabling the pharmacist to expeditiously verify the order.

Special orders should require clinical justification and additional review by the pharmacist. Once the pharmacist has electronically authorized the physician drug order, it should immediately register on seamless information systems, including the patient electronic medication administration record, billing and the computerized quality and benchmarking data management with standardized reporting.

Pharmacy Facilities

Sentinel events, including medication errors, are attributable to a host of issues. These may include staff fatigue, distractions, noise, room temperature, interruptions, equipment malfunctions, crowded working conditions and stress. Observing a few simple space planning guidelines can aid in reducing staff distractions, inefficiencies, fatigue and stress that contribute to drug errors.

Sentinel Events

The problem of inpatient sentinel events was identified by the Institute of Medicine in 1999. It's report, To Err Is Human, found medical errors to be a leading cause of death in the United States and highlighted adverse drug events as a major source of medical errors. The majority of sentinel events investigated resulted in death or loss of bodily function. It is believed that at least 50,000 Americans die annually as a result of medication errors.

Despite the identification of this problem, the number of annual sentinel events reported to JCAHO has steadily risen. Between 1995 and 2004, the total number of sentinel events reviewed by JCAHO was 3,197 – the total climbing from 1,541 in 2002 to twice that amount in 2005. All sentinel events, including medication errors, are preventable. FC

Pharmacies must be sized adequately for work, circulation and collaboration. Quiet work zones should be acoustically separated from noisy breakdown or staff break areas. Quiet work stations should never double as internal staff circulation corridors. Indirect, non-glare lighting fixtures are recommended to reduce eye strain. Resilient flooring materials will serve to soothe tired feet and legs. Noisy overhead paging systems should be avoided. Individual temperature controls are recommended when affordable. Ample staff break areas, conferencing space and toilets must be planned within the secure department. Typically, the following guidelines apply:

- Central hospital pharmacies should be located proximate to perioperative services, critical care and emergency services. Pharmacist assistance, stat IVs and medications are often ordered for these services. A vertical adjacency to the acute care floors is adequate. An exterior entrance for daily deliveries should be located nearby. Satellite pharmacies are ideally located in surgery, critical care buildings and in conjunction with cancer therapy services.

• The central pharmacy should be designed around the night or off-peak shift and then adjusted for the morning or peak shift. Chances are, if the pharmacy plan works well for the smallest complement of staff, it will work even better for peak volumes. A flexible, modular open plan is recommended in the central pharmacy for flexible adaptations in the future. Do not forget to plan security for secluded night shift staff.

• Labeling/processing, unit dose dispensing, cart-pick and check areas should be collocated for optimal efficiencies, adjacent to active storage.

• A pneumatic tube system is necessary for delivery of stat requests, first doses, and other quick response needs. Pneumatic tubes with priority classification will often serve remote sites effectively. Tube carriers are available that are spill-safe for cytotoxic drug transport. Pneumatic tube stations and fax machines should be collocated — within hand's reach and visible sight-lines — to the order entry work and fill areas. Two-way, redundant tube systems improve productivity.

• IV admixture robotics is recommended to eliminate human error. IV preparation and chemo-meds IV preparation areas should be collocated for ease of access. A pneumatic send-station should be accessible from the IV area without disrobing. A "clean" distraction-free environment is needed here with positive air flow. The IV storage room is typically accessed by non-pharmacy clinical staff during the night shift and should be planned accordingly. Dense storage systems are effective space savers for these fluids.

• An alarm system that indicates temperature issues within refrigerators and pharmacy areas should alarm into the facilities management system.

• Remember to provide a work surface or table adjacent to automated dispensing machines for staff medication staging and organization convenience.

• Inpatient floor medication rooms require counter space for preparations, a cabinet for non-automated items and supplies storage for syringe storage and unit dose preparation. The rooms must be quiet so that staff concentration is possible. Sound attenuation insulation is often required in partitions. Key-card access or comparable security is needed for these rooms in addition to a telephone and sink.

• A centralized inventory stock area is more efficient than scattered storage areas. Just-in-time inventories with automated dense storage systems are most efficient.

• Product preparation and dispensing areas should be designed flexibly to accommodate potential changes to current distribution systems.

• Infection control policies and guidelines must be strictly observed during construction projects.

Conclusion

Safe drug administration is the responsibility of healthcare providers and drug regulatory authorities. Medication errors occur even among the most conscientious medical professionals. If healthcare professionals, including facility managers and planners, do not demand reasonable patient safeguards to reduce the likelihood of medication errors, no one else will. FC

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Quiz Box

Self Test — True or False

1. Two of the most important challenges facing healthcare providers today are achieving favorable patient outcomes and further reducing the potential for sentinel events.

2. Special drug orders should require clinical justification and additional review by the pharmacist.

3. Satellite pharmacies are not recommended for security reasons.

4. An alarm system that indicates temperature issues within refrigerators and pharmacy areas does not need to alarm into the facilities management system.

5. Product preparation and dispensing areas should be designed flexibly to accommodate potential changes to current distribution systems.

Answers: 1. True 2. True 3. False 4. False 5. True