How technology

Computerized order-entry systems and other technologies are supposed to make medication administration safer. But if poorly designed or used incorrectly, they can actually introduce errors. Keep your patients safe by avoiding the pitfalls we'll discuss here.

BY MATTHEW GRISSINGER, RPH, FASCP, AND NANCY J. GLOBUS, PHARMD

IN THE BEST CIRCUMSTANCES, drug therapy helps patients; in the worst, it threatens their lives. Welcome to the world of medication therapy.

Administering drugs can be labor-intensive and error-prone. But thanks to rapid advances in technology, the process is becoming safer and more efficient. In this article, you'll learn about new technologies that can help you give better patient care, such as automated dispensing cabinets (ADCs), computer prescriber order entry (CPOE), and bar-code-enabled systems designed for use at the point of care.

Although these advances can improve the way you administer medications, they're useful only if properly applied. Meticulous planning, correct implementation, and consistent use are key to preventing errors and ensuring success.

Use of ADCs is up

A recent survey by the American Society of Health-System Pharmacists (ASHP) showed that 58% of hospitals have switched from traditional unit-dose dispensing by the pharmacy to a decentralized system of ADCs containing stock medications in patient-care areas. These systems can streamline drug distribution, track drug charges, and help reduce costs—but they can't improve safety unless system design and use are carefully planned and properly implemented. More than 126 medication errors involving the use of ADCs submitted to the U.S. Pharmacopeia/Institute for Safe Medication Practices (USP-ISMP) Medication Errors Reporting Program revealed several unsafe practices.

Adhering to the guidelines that follow can help your facility reduce errors. Case studies illustrate some important points.

Avoid storing high-alert medications in ADCs. Drugs considered "high alert" are those likely to cause serious injury or death if given incorrectly, including heparin, warfarin, morphine, and concentrated electrolyte solutions, such as potassium chloride. Although these drugs aren't necessarily implicated in more errors than less dangerous drugs, errors involving them can have devastating consequences. High-alert drugs should never be stored in ADCs.

Make sure that a pharmacist reviews every medication order. This screening helps ensure that the right drug is prescribed at the right dose via the appropriate administration route. Unless an ADC system is set up to require pharmacist approval, medications can be dispensed without order screening and the safeguard of an independent double check is lost. If your facility *does* store high-alert medications in ADCs, failure to review orders compounds the risk of serious injury or death from these drugs.

A nurse received an order to administer 1 gram calcium gluconate I.V. to a patient. Each of the six calcium gluconate vials stored in the ADC in the unit contained 980 mg in 10 ml, but the nurse misread the label and believed that each vial contained only 98 mg. Thinking she needed 10 vials to administer the dose, she contacted a pharmacist at home because the pharmacy was closed. The pharmacist detected the error and prevented a tenfold overdose.

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affects your risk of medication errors

Never place medications in an ADC without a pharmacist's independent double check and don't return unused doses to the ADC. An incorrectly stocked system doesn't protect anyone. The process of restocking medications is primarily a pharmacy function, but studies have shown that pharmacies don't consistently use independent double checks. In one study, 56% of respondents reported that a pharmacist always checks medications to be restocked in an ADC; 15% reported that such checks never take place. Over half of the respondents (54%) never verify correct drug placement after restocking.

A pharmacy technician pulled what she thought were vials of furosemide, 40 mg/4 ml, from pharmacy stock and, without a pharmacist check, left and placed the medication in an ADC. A nurse in the unit preparing to administer 240 mg of furosemide took six vials from the ADC and drew them into a syringe. As she was drawing fluid from the sixth vial, she noticed precipitation in the syringe. Checking the vials, she found that five contained furosemide, 40 mg/4 ml, and one contained phenylephrine 1%, 5 ml. Both medications were in similar-looking amber bottles of the same size.

Never place medications with similar names or packages next to each other in the same drawer or bin. Look-alike drug names and packages are a root cause of more than half the errors reported through the USP-ISMP Medication Errors Reporting Program. "Confirmation bias" is commonly involved: Someone reading a drug name on an order or package is most likely to "see" what's most familiar to him and unlikely to question the validity of what he's reading. This can occur when the pharmacy restocks the ADC or when a nurse removes medications.

A physician ordered ephedrine, but a hurried nurse picked epinephrine from the ADC, drew it into a syringe, and handed it to the primary nurse, who administered the epinephrine. The patient suffered a period of hypertension and chest pain but recovered.

Make sure the medication you select is the one your patient needs. In many systems, the nurse scrolls through a computer menu on the ADC and selects a medication from an alphabetic list on the screen. Look-alike drug names pose an error risk, especially when they appear consecutively.

One facility reported three mix-ups between diazepam and diltiazem withdrawn from ADCs in the intensive care units. In one case, the patient received diazepam at the ordered diltiazem dose. In another, a physician noted the amber diazepam vial as the nurse was drawing up what she thought was diltiazem (which comes in a clear vial). In the third case, the nurse caught her own mistake. The facility investigated these errors and concluded that once the wrong drug was chosen and the cabinet "confirmed" that it was correct, the nurse removed the drug from the drawer that opened and didn't check the vial.

Don't "work around" an ineffective or inefficient system. In some cases, a facility chooses an ADC system without asking the nurses for input. Then if the

system poses problems, the nurses find various ways to work around it, a practice that increases error risk.

For example, a facility may establish "overrides" to let nurses get emergency medications fast without review by a pharmacist. Unfortunately, allowing overrides cancels out this important safeguard. Other "work-arounds" include using the *Inventory* function to get patient doses without approved orders and removing extra medications for one patient or multiple medications for multiple patients while the nurse has access to the cabinet. (For recommendations on safely using an ADC system, see *Good Practices for Using an ADC*.)

Computer prescribing decreases risk

Ambiguous and unclear orders are a common source of medication errors. To eliminate the problem, some facilities have introduced CPOE, an electronic system designed to accept orders in a standard format and conforming to strict criteria. This technology reduces error risk and eliminates time wasted when nurses and pharmacists must call prescribers for clarification.

All CPOE systems use computer software and the complexity depends on the facility's needs. Typical packages include a clinical data repository, order communication, nursing medication administration, and a "rules" engine. During order entry, certain prompts alert the prescriber to potential problems. In some cases, the prescriber can request drug information or ask why the system is making a recommendation.

Most facilities customize the CPOE system to balance safety with ease of use. The sophistication of the software and the facility's needs determine how many of the following elements are included:

- default values for drug doses, routes, and frequency
- help with calculations
- warnings about drug allergies, interactions, overdose, or contraindications based on the patient's lab values, other diagnostic studies, age, and weight
- reminders about corollary orders, such as the need for blood glucose levels when prescribing insulin
- drug-specific information, such as actions and indications
- a need for electronic documentation if the prescriber wants to override the system's default values
- alerts about drug costs.

Nobody's perfect

Although CPOE may seem like a panacea, you can't assume it's perfect. Computer glitches and software instability pose risks. And although the intent of most CPOE systems is to accept only clear and complete orders, even this safeguard may not prevent a prescriber from entering an order into the wrong patient record or selecting the wrong medication.

Less than 5% of health care institutions currently use CPOE. Implementation is very expensive. A facility must make a strong commitment to the system and support prescribers while they learn how to use it. Any facility considering CPOE should involve a multidisciplinary team to carefully compare whether a commercial or a self-developed system will best suit the facility's needs. The ideal way to launch a CPOE sys-

Good practices for using an ADC

Your facility can follow these recommendations to help safeguard medication practices:

- Purchase an automated dispensing cabinet (ADC) system that allows patient profiling so pharmacists can enter and screen orders for high-alert medications before they're removed and administered. A system that uses bar-coding technology during stocking, retrieval, and drug administration is especially helpful.
- Carefully select which drugs to stock, based on the needs and characteristics of each patient-care unit, including the age and diagnoses of patients treated there. If possible, minimize the variety of drug concentrations, avoid bulk supplies, and stock drugs in ready-to-use unit doses.

PHOTO COURTESY OF MEDSELECT, INC.

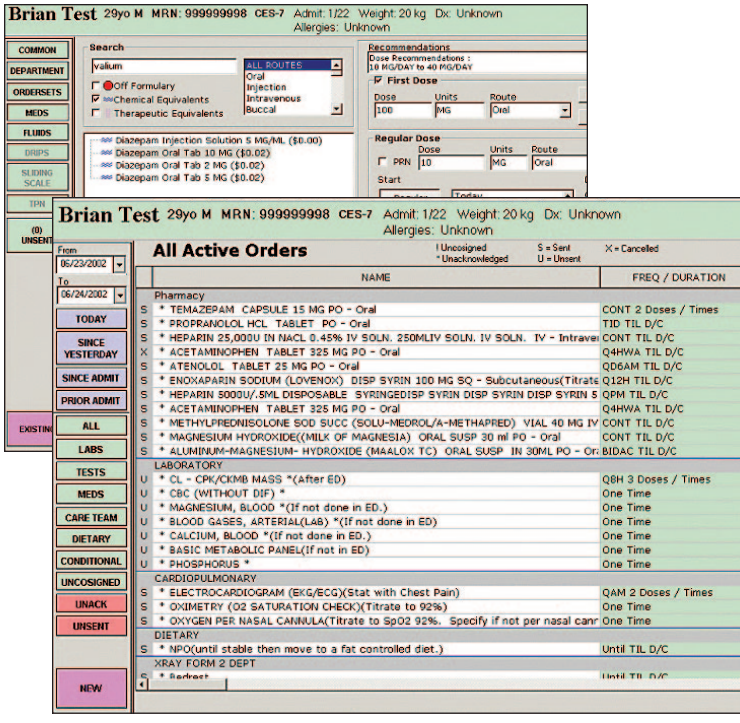
- Place drugs that can't be accessed without pharmacy order entry and screening in individual compartments. Store all drugs that don't require pharmacy screening together in a drawer, in a way that someone retrieving them can't gain access to the drugs that require screening.
- Separate pediatric and adult medications by placing them in individual cabinets.
- Periodically reassess the drugs stocked in each unit's cabinet. Remove low-usage medications and multiple concentrations.
- Educate nurses to remove only one dose of a medication ordered. If a dose isn't used, the nurse should return it to the pharmacy, not the cabinet.
- Develop a policy of checking to ensure accurate stocking. Someone from the pharmacy or a nurse in the unit can verify accuracy if the pharmacy provides a daily list of items added to the cabinet.
- Place allergy reminders for specific drugs, such as antibiotics, opioids, and nonsteroidal anti-inflammatory drugs, on drug cabinets. Some systems let pharmacy and nursing staff create alerts to appear on screen when someone tries to access the drug.
- Routinely run and analyze override reports to help track and identify problems.

tem is to use it in just one patient-care unit so the facility can study the results and iron out wrinkles before introducing it to other areas.

Bar codes come to the bedside

In the supermarket, bar-code technology speeds checkout and improves accuracy, documentation, and inventory control. Bar-code technology is available for health care applications too, but few hospitals are using it except for Veterans Affairs (VA) facilities. According to an ASHP national survey, only 5% to 6% of hospitals use bar-code technology for drug administration. In a survey by the ISMP in 2000, fewer than half of 1,435 hospitals responding had even discussed the possibility. Among facilities using the technology at all, most didn't use it throughout the facility.

Lack of standards for bar-code medication systems may be a key reason the technology hasn't caught on. Many medications don't have bar codes on their labels, and hospitals must apply their own. Recognizing the risks involved, the Food and Drug Administration is advancing a rule to mandate bar coding by manufacturers. (See *In Search of Bar-Code Standards*.) Within a few years, hospitals may find bar coding more appealing and you may be involved in adopting a system. Read on to learn the pros and cons.



Computer prescriber order entry provides current patient information and clinical decision support to guide the prescriber in complete, accurate, and appropriate ordering. The structure guides choices and reduces the risk of common ordering errors.

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Benefits of bar coding medication delivery

Bar-code medication systems offer several levels of function. The most basic systems help verify that the right patient receives the right dose of the right drug by the right route at the right time. Generally, each patient and each nurse wears ID with a unique bar code to identify the individual. Each drug should have a bar code that includes its National Drug Code number uniquely identifying the form and dosage, such as "10-mg capsule." Lot number and expiration date may be included.

A nurse preparing to administer a medication using bar-code technology scans his own ID, the patient's wristband, and each package of medication to be administered. The system confirms the nurse's dispensing authority and the patient's identity, matches the patient with his pharmacy medication profile, records in an online medication administration record (MAR) that the patient is receiving the medication, and stores the information. For this reason, even the most basic bar-code systems improve documentation.

A more complex bar-code system may include some or all of the following features:

- inventory control with accurate drug counts
- information from online medication reference libraries, including photographs of tablets and capsules, recommended dosages, contraindications, adverse reactions, warnings, pregnancy risk, and administration details
- customized comments or alerts, such as warnings about look-alike/sound-alike drug names and key clinical actions for administering certain medications
- a rules engine to check pharmacy and nursing actions and to provide the staff with alerts or reminders. For example, it could check for cumulative dosing of medications with established maximum doses, such as colchicine.
- order reconciliation for pending or stat orders (such as a prescriber's order not yet verified by a pharmacist). Letting the nurse enter a stat order into the system before the pharmacy receives the order links the information to the pharmacy order and helps prevent duplicate dosing.
- the ability to capture data to monitor trends (such as late doses and omissions). This analysis should *not*, however, be used to assess employee performance and trigger punitive action.
- the ability to verify identification of lab specimens and administration of blood products.

Unexpected problems

As the pioneer in hospital bar coding, the VA system has provided a testing ground for the technology. A study of the VA's bar-code use revealed five significant problems clinicians need to consider when implementing a bar-code system.

Automated actions sometimes caught the VA nurses off guard. The VA's bar-code system would remove medications from a patient's drug profile 4 hours after

the scheduled administration time, even if a medication *wasn't* administered. So, for example, if a patient underwent a procedure and returned to the unit more than 4 hours after the scheduled administration time, the nurses had no indication that an ordered medication had been removed from the profile and the patient hadn't received it.

Coordinating information between prescribers and nurses seemed more difficult. With a traditional paper-based system, prescribers could pick up the chart and review the handwritten MAR at the patient's bedside or the nurses' station. With bar coding, the prescriber had to gain access to the nearest computer for this information, and someone else may have been using it.

Deviating from the routine made more paperwork. The bar-code system documented a medication as given when scanned. If a patient then refused it, the nurse had to manually document the change—a time-consuming process. The VA had the software revamped so that nurses could easily document a change by selecting the medication and a menu option to indicate administration status.

Pressure to administer medications on time led to "work-arounds" and new risks. Using the bar-code system, nurses had to type in an explanation whenever they gave a medication late, even if by only a few minutes. To avoid the extra task, some nurses scanned and poured medications when patients were unavailable so medication administration would appear timely in the record. As a result, unlabeled medication cups sat open and the nurses had to remember to administer the drugs when the patients returned, compounding the risk of errors.

Time-saving strategies defeated the system's purpose. When scanning was ineffective (for example, the curve of the patient's wristband prevented the bar code from registering), typing seemed more efficient. So instead of repeated attempts at scanning, some nurses routinely typed in patients' social security numbers rather than scanning the bar-coded wristbands.

Safety first

Bar-coding safeguards reflect well-established principles of safe drug administration, including proper identification practices, documentation, double-checking administration of high-alert drugs, and avoiding preparation of medications for multiple patients at one time. Although work-arounds are tempting ways to compensate for an ineffective or inefficient bar-code system, they undermine the system's built-in safeguards. Avoid these shortcuts:

- Don't remove patients' wristbands for scanning.
- Don't scan surrogate bar codes, such as those found on a sheet of paper with multiple bar codes of commonly prescribed drugs.
- Don't bypass system checks designed to ensure that the correct medication is administered.

To develop an effective, efficient system, any facility planning to institute bar coding needs to involve nurses in decisions on purchasing, training, implementing, and using the technology. With ongoing help from nurses, the facility can anticipate potential problems, develop contingency plans, and perform stringent testing to assess for sources of breakdowns, work-arounds, or new types of medication errors.

Potential errors

Because few organizations outside the VA system currently use bar-code technology for medication administration, relatively few errors have been reported. However, errors can certainly occur, especially in systems with only very basic functions. Consider the following problems and scenarios.

- ***Omissions.*** If the nurse scans the patient's wristband and the medication, then inadvertently drops the medication on the floor, getting a new dose will create a time lapse because the drug has been documented as administered.
- ***Extra dose.*** This could occur if the prescriber orders different routes for the same drug and the system isn't programmed to raise an alert if multiple routes are selected. For example, if one nurse gives the patient an oral dose and is called away,

In search of bar-code standards

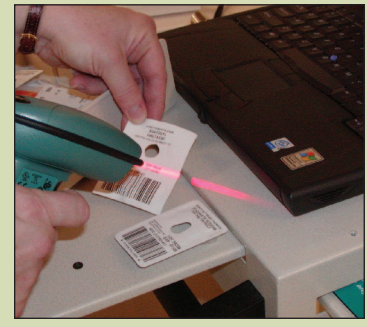

Photo courtesy of Lehigh Valley Hospital and Health Network and IDX Systems Corp.

Drug manufacturers' unwillingness to adopt universal bar-code standards and lack of unit-dose packaging for some drugs can impede bar-code safety and acceptance. Hospitals that use the technology must repackage and relabel many medications with bar codes. Ironically, this costly and work-intensive task increases the chance of errors.

The Food and Drug Administration (FDA) has proposed a rule that's expected to be final this year requiring manufacturers to place standardized bar codes on all prescription drug products, vaccines, blood, and over-the-counter drugs packaged for hospital use. Within 3 years of the final rule, standardized bar codes will be mandatory. Although the FDA won't require hospitals to adopt bar-code systems, it expects many to find the technology more attractive once universal standards are in place.

To learn more about the FDA's position, go to **http://www.fda.gov/oc/initiatives/barcode-sadr/fs-barcode.html**.

another nurse could administer another dose by the intravenous route without getting a warning.

• ***Wrong drug.*** This is especially possible when a medication doesn't have a bar code.

• ***Wrong dose documented.*** If the nurse has difficulty scanning and inadvertently scans a medication twice, the system may record a double dose even if the patient receives only one.

• ***Unauthorized drug dose.*** The prescriber may order a medication to be given only when a certain lab value, such as blood glucose, reaches a certain level. If the system isn't programmed to check glucose results, it may fail to raise an alert and the patient may receive the drug when he shouldn't or fail to receive it when he should.

• ***Documentation errors.*** Depending on how the prescriber writes an order, the system may not be able to distinguish the reason a medication is administered. For example, if she writes, *Tylenol, 650 mg P.O. four times a day as needed for pain or temperature greater than 101° F,* the documentation may not include which indication the drug was administered to treat.

• ***Wrong dosage form.*** Drug shortages may force the pharmacy to dispense a different strength or concentration (such as mg/ml) than what's programmed in the bar-code software.

Recognizing promises and pitfalls

Many medication errors can go undetected during drug administration, but the use of technology has been shown to reduce errors. Now that you recognize the promises and pitfalls of ADCs, CPOE, and bar coding, you can help your facility select and implement these systems to protect patients and improve the way you deliver drug therapy. N

SELECTED REFERENCES

Barker, K., et al.: "Medication Errors Observed in 36 Healthcare Facilities," *Archives of Internal Medicine.* 162(16):1897-1903, September 9, 2002.

Cohen, H., and Mandrack, M.: "Application of the 80/20 Rule in Safeguarding the Use of High-Alert Medications," *Critical Care Nursing Clinics of North America.* 14(4):369-374, December 2002.

Johnson, C., et al.: "Using BCMA Software to Improve Patient Safety in Veterans Administration Medical Centers," *Journal of Healthcare Information Management.* 16(1):46-51, Winter 2002.

Patterson, E., et al.: "Improving Patient Safety by Identifying Side Effects from Introducing Bar Coding in Medication Administration," *Journal of the American Medical Informatics Association.* 9(5):540-553, September-October 2002.

Pedersen, C., et al.: "ASHP National Survey of Pharmacy Practice in Hospital Settings: Dispensing and Administration—2002," *American Journal of Health-System Pharmacy.* 60(1):52-68, January 1, 2003.

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SELECTED WEB SITES

Healthcare Information and Management Systems Society
http://www.himss.org/ASP/index.asp

The Leapfrog Group for Patient Safety
http://www.leapfroggroup.org

Last accessed on December 1, 2003.

CE Test

How technology affects your risk of medication errors

Instructions:

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How technology affects your risk of medication errors

GENERAL PURPOSE To provide nurses with an overview of technology's role in medication administration and error prevention. **LEARNING OBJECTIVES** After reading the preceding article and taking this test, you should be able to: **1.** Identify the benefits of using new technologies in medication administration. **2.** Indicate potential problems and risks related to the use of these new technologies. **3.** Identify measures to increase patient safety and reduce medication errors.

1. According to a recent survey, what percentage of hospitals has switched to a decentralized system of ADCs?
a. 38%
b. 58%
c. 78%
d. 98%

2. Carefully planned and properly implemented ADC systems lead to
a. increased costs.
b. lost drug charges.
c. inefficient drug distribution.
d. improved safety.

3. Which is a high-alert medication?
a. acetaminophen
b. aspirin
c. warfarin
d. ibuprofen

4. Identify one step to ADC safety.
a. storing high-alert drugs in ADCs
b. placing drugs in an ADC without a pharmacist's independent double check
c. having a pharmacist review every medication order
d. returning unused drug doses to the ADC

5. Who has primary responsibility for restocking ADC medications?
a. nurse-manager
b. nursing assistant
c. pharmacist
d. nursing supervisor

6. A root cause of more than half the errors reported through the USP-ISMP Medication Errors Reporting Program involves
a. high-alert drugs.
b. look-alike drug names and packages.
c. medication omissions.
d. lack of bar coding.

7. What type of bias occurs if you read a drug name on a package and "see" what's most familiar to you?
a. selection
b. performance
c. detection
d. confirmation

8. ADC guidelines to help reduce medication errors include
a. making sure the selected drug is the one the patient needs.
b. working around an ineffective system.
c. using overrides to get emergency drugs fast.
d. placing drugs with similar names next to each other in the same bin.

9. Which system is designed to accept only complete orders typed in a standard format and conforming to strict criteria?
a. ADCs
b. CPOE
c. bar-code technology
d. handwritten MARs

10. What's an example of a corollary order reminder featured in some CPOE systems?
a. the need for blood glucose levels when prescribing insulin
b. warnings about drug interactions
c. default values for drug doses
d. warnings about drug allergies

11. Which statement accurately describes most CPOE systems?
a. Implementation is inexpensive.
b. Over 25% of health care institutions currently use CPOE.
c. CPOE prevents selection of the wrong drug.
d. The intent is to accept only clear and complete orders.

12. Which statement about bar-code technology in health care is correct?
a. Even the most basic systems improve documentation.
b. All medications have bar codes on their labels.
c. Standards for medication delivery are readily available.
d. Over 50% of hospitals use this technology.

13. What's a key feature of bar coding's ability to capture data?
a. assessing employee performance
b. monitoring trends such as late drug doses
c. triggering punitive action
d. disciplining staff members

14. What significant hospital bar-coding problem did the VA identify?
a. Medications were removed from patients' drug profiles 1 hour after scheduled administration.
b. Pressure to administer medications on time led to "work-arounds."
c. Deviations from the routine reduced paperwork.
d. Coordinating information between prescribers and nurses required a handwritten MAR.

15. Safe drug administration using bar coding requires
a. removing patients' wristbands to scan them.
b. scanning surrogate bar codes.
c. bypassing system checks.
d. double-checking administration of high-alert drugs.

16. Developing an effective, efficient bar-coding system requires nurses' involvement in
a. teaching "work-arounds" to staff.
b. establishing "overrides."
c. purchasing, training, implementing, and using the technology.
d. undermining the system's built-in safeguards.

17. Which statement is correct?
a. Most health care systems currently use bar-code technology for medication administration.
b. Multiple errors have been reported with the use of bar-code technology.
c. Errors can occur, especially in bar-code systems with only basic functions.
d. The VA system has banned bar-code technology.

18. Which bar-code system error is more likely when a medication doesn't have a bar code?
a. wrong drug
b. extra drug dose
c. wrong dosage form
d. documentation errors

19. Which of the following is a good practice for using ADCs?
a. maximizing the variety of drug concentrations
b. using bulk supplies
c. stocking drugs in multidose, childproof containers
d. periodically removing low-usage medications

20. What agency proposed a rule requiring standardized bar codes on prescription drug products packaged for hospital use?
a. USP-ISMP
b. JCAHO
c. FDA
d. ASHP

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2.	❍	❍	❍	❍	6.	❍	❍	❍	❍	10.	❍	❍	❍	❍	14.	❍	❍	❍	❍	18.	❍	❍	❍	❍
3.	❍	❍	❍	❍	7.	❍	❍	❍	❍	11.	❍	❍	❍	❍	15.	❍	❍	❍	❍	19.	❍	❍	❍	❍
4.	❍	❍	❍	❍	8.	❍	❍	❍	❍	12.	❍	❍	❍	❍	16.	❍	❍	❍	❍	20.	❍	❍	❍	❍

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