March 2015 ■ Volume 13 Issue 3

ISMP

Nurse AdviseERR®

Educating the Healthcare Community About Safe Medication Practices

Follow-up survey results

Getting closer to the bull's eye: 2014-2015 Targeted Medication Safety Best Practices

Results of a recent ISMP survey show that many hospitals are reducing the risk of potentially catastrophic medication errors by implementing the six **ISMP 2014-2015 Targeted Medication Safety Best Practices for Hospitals** (www.ismp.org/sc?id=486). Close to 400 hospitals participated in the latest survey to measure progress with implementing the Targeted Best Practices. Overall, the survey showed modest but meaningful gains in protecting patients from errors with vin**CRIS**tine and methotrexate, eliminating glacial acetic acid from hospitals, dispensing oral liquids in oral syringes, and moving to a metric-based system for weights and liquid dose measurements.

In January 2014, ISMP introduced the **2014-2015 Targeted Medication Safety Best Practices for Hospitals**. The Targeted Best Practices are intended to inspire and mobilize national adoption of consensus-based best practices related to medication safety issues that continue to cause harmful and fatal medication errors, despite repeated warnings from ISMP and others. We initially conducted a baseline survey of the Targeted Best Practices early in 2014 to document implementation in hospitals. Late in 2014, we conducted a follow-up survey to measure progress. According to the survey results, there have been modest increases in full implementation of the best practices in hospitals and/or increases in activities directed toward achieving these goals. While there is room for continued growth, ISMP is encouraged by the forward progress 1 year into this national effort. A summary of the results can be found in **Table 1** (on page 2), with details below.

Respondent profile: The respondents from the early 2014 survey were similar to the group who participated in the latest survey. About half (47%) of all respondents worked in non-academic, non-governmental, non-profit hospitals. Twenty-seven percent worked in academic hospitals, 10% worked in for-profit hospitals, 10% worked in government-owned hospitals, and 6% worked in critical access hospitals. About 60% of the respondents were pharmacists, and 38% were nurses.

Dispense vinCRIStine (and other vinca alkaloids) in a minibag of compatible solution and not in a syringe.

An increase from 53% to 68% was found among respondents who reported full compliance with this practice (answer choice F in **Table 1**). Another 8% of respondents in the current survey reported partial compliance (answer choices D and E), and 6% reported making plans to implement the practice (answer choice C). Forty percent fewer respondents in the current survey reported taking NO ACTION to implement the practice (answer choices A and B), bringing the percent down from 30% in the earlier survey to 18% in the current survey.

Some respondents who have NOT implemented the practice told us they feel they have appropriate verification processes in place to prevent an error, such as manual

continued on page 2—**Practices** >

Take our pediatric survey

It's been 15 years since ISMP conducted a survey to learn about the processes in place when prescribing, dispensing, and administering medications to pediatric patients. So, we are inviting health professionals who provide care to pediatric patients to take a few minutes to complete our 2015 survey so we can assess progress made since 2000. You don't have to work in a pediatric hospital to participate in the survey. As long as you provide care to pediatric patients, regardless of volume, in an inpatient or outpatient setting, we would appreciate your participation. The survey must be taken with a specific patient care unit in mind, as practices may vary within an organization based on the type and level of care provided to pediatric patients. You can take the survey numerous times if you provide care or services to pediatric patients in more than one area of the organization. **The survey can be found on pages 6-7** and at: www.surveymonkey.com/r/ISMP-peds. We sincerely appreciate your participation!

40 years of learning and advocacy!

ISMP's current medication error-reporting programs originated with a monthly journal column called **Medication Error Reports** that began publication 40 years ago in March 1975 in *Hospital Pharmacy*. This advocacy effort, which focused on deidentified medication error stories and prevention strategies, prompted pharmacists from across the nation to report errors to share the lessons learned with other pharmacists. This monthly column expanded in 1977 to include the journal, *Nursing 1977*, which encouraged nurses to also report errors.

Both journal features soon caught the interest of the US Food and Drug Administration (FDA), and an agreement was established to automatically share error reports between FDA and

continued on page 2—**40 years!** >

Baxter

Supported by educational grants from Baxter and BD

BD

> **Practices**—continued from page 1

double checks, taking vin**CRIS**tine to the bedside by itself, dispensing vinca alkaloids in a large syringe or taking other steps to differentiate the syringe, and prohibiting vin**CRIS**tine administration in areas where intrathecal medications are administered. But these risk-reduction strategies do not take into account the risk associated with mistaking a syringe of vin**CRIS**tine as one containing a different medication. All of the risk-reduction strategies focused on vin**CRIS**tine will not be carried out if the syringe is mistaken as containing a different drug from the outset. Misadministration of IV vin**CRIS**tine by the intrathecal route has occurred despite all of the usual safeguards except administration in a minibag.

Other surmountable barriers to implementation of this practice included the absence of a central venous access line in all patients, the potential for extravasation, and resistance from pediatric providers who worry about the fluid volume to be infused using a small minibag. In some cases, respondents also reported that changes have not been made because an outside vendor prepares the drug in a syringe or because syringe pumps are typically used for pediatric IV drug administration—neither trumps the safety gained from dispensing and administering vin**CRIS**tine in minibags. Outsourcing sites can be asked to provide the drug in minibags, and infusion pumps are typically not used for vesicants such as vin**CRIS**tine. One respondent reported concern that the order entry system in his hospital still allows prescribing of vin**CRIS**tine via syringe even though minibags are usually dispensed. This can result in pharmacy preparing and dispensing vin**CRIS**tine in a syringe. If staff administering the drug are expecting vin**CRIS**tine in a minibag but receive it in a syringe, this is especially risky and can lead to a fatal error.

continued on page 3—**Practices** >

Table 1. Implementation of ISMP 2014-2015 Targeted Medication Safety Best Practices for Hospitals

Targeted Medication Safety Best Practice (see full description of each practice in article)	Date of Survey	Percent (%) Implementation*					
		A	B	C	D	E	F
1. Dispense vin**CRIS**tine (and other vinca alkaloids) in a minibag, not a syringe	Early 2014	22	8	7	5	5	53
	Late 2014	13	5	6	4	4	68
2a. Use a weekly dosage regimen default for oral methotrexate; if overridden to daily, require a hard stop verification of cancer indication	Early 2014	38	2	13	17	2	28
	Late 2014	19	3	12	19	4	43
2b. Pharmacists provide education to patients discharged on weekly oral methotrexate	Early 2014	62	3	13	8	3	11
	Late 2014	37	4	13	16	7	23
3. Measure and express patient weights in metric units only; scales set and measure only in metric units and lock out the ability to measure in pounds; only measured weights are used	Early 2014	18	7	6	25	11	33
	Late 2014	7	5	12	27	13	36
4. Dispense oral liquids not commercially available as unit dose products in oral syringes that do not connect to parenteral tubing; use auxiliary labels that state, "For Oral Use Only"	Early 2014	7	3	4	20	14	52
	Late 2014	3	2	4	16	8	67
5. Use oral liquid dosing devices that display only the metric scale; provide patients discharged on oral liquid medication with oral syringes	Early 2014	31	4	9	10	7	39
	Late 2014	16	4	17	10	4	49
6. Eliminate glacial acetic acid from the hospital and replace with vinegar (5%) or commercially available diluted products (0.25%, 2%)	Early 2014	13	< 1	5	2	6	74
	Late 2014	4	<1	1	1	3	90

*** Key**

A: No activity
B: Considered but decided not to implement
C: Planned but not implemented yet
D: Partial implementation in some or all areas
E: Full implementation in some areas
F: Full implementation

40 years! continued from page 1

ISMP. In 1991, the United States Pharmacopeial Convention (USP) began coordinating the medication errors reporting program, which became known as the USP-ISMP Medication Errors Reporting Program. ISMP was officially established as a tax-exempt, charitable organization in January 1994. In 2008, USP returned full operation of the reporting program to ISMP, and it was renamed the ISMP National Medication Errors Reporting Program (MERP). In 2008, the ISMP Consumer Medication Errors Reporting Program (C-MERP) was established, and in 2012, the ISMP Vaccine Errors Reporting Program (VERP) was established. FDA and ISMP continue to incorporate the knowledge learned from these error-reporting programs to benefit the entire healthcare community, including consumers. Forty years later, we continue to publish the columns in both the pharmacy and nursing journals, and we could not have done so without your willingness to report medication errors to ISMP. We sincerely appreciate your ongoing support and participation in this critically important patient safety advocacy effort.

SAFETY wires

Don't open Pradaxa capsules. Nurses and others may not be aware that the dabigatran, an oral anticoagulant, package insert states, "The oral bioavailability of dabigatran etexilate (**PRADAXA**) increases by 75% when the pellets are taken without the capsule shell compared to the intact capsule formulation. Dabigatran capsules should, therefore, not be broken, chewed, or opened before administration." Pharmacokinetic studies have shown that the absorption increases significantly if administered this way, increasing patients' risk for severe bleeding.

A hospital notified us recently that a patient brought to its emergency department (ED) from an outside care facility was admitted for hematemesis. It is believed that some nurses at the care facility may have been opening the dabigatran capsule and sprinkling the contents on the patient's food. The hospital wants to alert others to be aware of this situation so staff training and other measures can be provided to avoid adverse events with dabigatran. The medication administration record

continued on page 3—**SAFETY wires** >

> Practices—continued from page 2

Best Practice 2a **Use a weekly dosage regimen default for oral methotrexate. If overridden to daily, require a hard stop verification of an appropriate oncologic indication.**

An increase during the year from 28% to 43% was found among respondents who reported full compliance with this practice. Another 23% reported partial compliance in the recent survey. Twelve percent of respondents in the current survey reported making plans to implement the intervention. Forty-five percent fewer respondents in the current survey reported taking NO ACTION to implement the practice, bringing the percent down from 40% in the earlier survey to 22% in the current survey.

Respondents who have NOT implemented the practice reported barriers related to electronic health records (EHRs) or electronic order entry systems that could not support the change or would require significant customization. Some respondents who were planning implementation of the practice reported working on an electronic solution to the problem; others reported that the initiative is not considered high priority by IT staff with the skills to develop a solution. Numerous respondents reported changing the default to a weekly dosing regimen for methotrexate, but were unable to create a hard stop if the weekly default was then changed by a provider to a daily schedule.

Some respondents suggested that the practice was not practical or necessary if treating mostly patients with cancer. While the focus of this best practice is to reduce errors when methotrexate is prescribed for nononcologic indications, the same medication safety practices should apply to all patient care settings, including cancer centers.

Best Practice 2b **Provide patient education by a pharmacist for all weekly oral methotrexate discharge orders.**

An increase from 11% to 23% was noted during the year among respondents who reported full compliance, and another 23% reported partial compliance in the recent survey. Thirteen percent of respondents in the current survey reported making plans to implement the practice. Thirty-seven percent fewer respondents reported taking NO ACTION to implement the practice, bringing the percent down from 65% in the earlier survey to 41% in the current survey. However, this Targeted Best Practice has the largest percent of respondents who have made no plans to implement it.

Respondents who have NOT implemented this practice reported concern about disruptions in pharmacy workflow, lack of pharmacy coverage around the clock, and low availability of pharmacists to carry out the education. Others suggested that the frequency of patients discharged on weekly methotrexate was low and manageable. Some respondents felt the practice was not necessary given infrequent use of the drug in their practice settings. A few respondents who had partially implemented the practice suggested that knowing when patients are being discharged has been challenging.

Best Practice 3 **Measure and express patient weights in metric units only. Ensure that scales used for weighing patients are set and measure only in metric units (kg, g). If scales can measure in pounds and kilograms/grams (kg/g), modify the scale to lock out the ability to weigh in pounds. Document weights using metric designations only. Use measured weight, not stated, historical, or estimated weight.**

Full implementation increased from 33% in the earlier survey to 36% in the current survey. The increase in partial implementation during the year was also low, moving

continued on page 4—Practices >

> SAFETY wires

continued from page 2

(MAR) listing for dabigatran at this hospital states "Do NOT break, chew, or open capsules." Other hospitals and healthcare facilities should consider adding this statement to their MARs as well. Pradaxa is also included on the DO NOT CRUSH list on our website (www.ismp.org/Tools/DoNotCrush.pdf). If a patient cannot swallow pills or capsules, the physician should be notified so other formulations of anticoagulants can be considered.

Educational materials for measles outbreak. The Immunization Action Coalition (IAC) has put together a list of web resources (www.ismp.org/sc?id=488) to spotlight educational materials in the wake of the measles outbreak we are seeing around the US. The free IAC educational materials are for healthcare professionals and patients, with many available in different languages. Please refer to the information and resources as we work together to help stop the spread of measles during this multi-state outbreak.

Brilinta and Brintellix mix-ups. Please be aware of the potential for name mix-ups between **BRILINTA** (ticagrelor), an antiplatelet agent that's used in patients with acute coronary syndrome, and **BRINTELLIX** (vortioxetine), used for major depressive disorders. When selecting medications on the computer during prescribing or dispensing, typing the first few letters of the brand name into the computer may lead to either drug name or both appearing on the screen, which has led to the wrong item being selected. If a prescribing or dispensing error happens, nurses may detect this error before the wrong drug is administered to the patient if they have established the safe practice habit of always verifying that each medication is appropriate for the patient's condition. ISMP will be adding this name pair to our updated confused drug name list (www.ismp.org/sc?id=492).

Where did this come from? A hospital reported several occurrences in which medications not purchased or provided by the pharmacy made their way into the hospital supply, including on pharmacy shelves and in automated dispensing

continued on page 4—SAFETY wires >

> **Practices**—continued from page 3

from 36% to 40%. However, 52% fewer respondents reporting taking NO ACTION to implement the practice, bringing the percent down from 25% in the earlier survey to 12% in the current survey. An increase was also seen in the percent of respondents who are currently planning to implement this change (6% earlier vs. 12% currently).

Respondents who have NOT implemented the practice reported an inability to modify the EHR to allow kilogram (kg) entries only, which may require corporate changes, or the use of scales that do not lock out the ability to weigh in pounds. Some respondents were awaiting funding to replace existing scales and beds with units that weigh only in kg. A few respondents reported resistance to the practice by staff who felt it would require a huge practice and culture change to convert to the metric scale for weights.

Issues with private practice offices that communicate with hospitals regularly but still use pounds were also reported by a few respondents. This led some respondents to allow the use of both units of measure. However, numerous respondents also reported that nonstandard use of one or the other has led to errors. This risk was equally associated with paper chart forms that still prompt for weights in pounds despite changes made in electronic systems, and scales to weigh and document in kg. A few respondents suggested "fear of the metric system" as a barrier to this practice.

Best Practice 4 **Ensure that all oral liquids that are not commercially available as unit dose products are dispensed by the pharmacy in an oral syringe. Use of an auxiliary label, "For oral use only," is preferred if it does not obstruct critical information. Ensure that oral syringes do not connect to parenteral tubing in the hospital.**

An increase from 52% to 67% during the year was found among respondents who reported fully implementing this practice. Another 24% reported partial implementation in the current survey. All but 5% of respondents reported planning (4%) or implementing (91%, partial and full) this Targeted Best Practice.

A few respondents who have NOT fully implemented this practice reported they were awaiting a required and lengthy change in the billing process to accommodate a different dispensing procedure. Based on respondents' comments, some may have misunderstood the Targeted Best Practice, mistakenly believing that the medication available in manufacturer-provided unit dose cups that match the patient's ordered dose must be repackaged in an oral syringe. However, some respondents listed exceptions to the practice that are not compatible with its intent, including fast moving oral liquid antibiotics or any oral liquid medication if the entire volume will be needed during the course of treatment. Respondents commented that some exceptions made in their hospitals lacked a sound rationale. Several respondents were still evaluating the processes used to dispense oral medications that require reconstitution. Lack of pharmacy resources to implement standard doses for common oral liquid medications and to repackage oral liquid doses were cited as barriers to the practice, as were timing delays in pharmacy dispensing. Establishing a process that works with as-needed (PRN) doses was cited as a challenge by a few respondents.

Best Practice 5 **Purchase and use oral liquid dosing devices (oral syringes/cups/droppers) that only display the metric scale.**

An increase from 39% to 49% during the year was seen among respondents who reported full implementation of this practice. Another 14% of respondents in the current survey reported partial implementation, and 17% have made plans to purchase oral

continued on page 5—**Practices** >

> **SAFETY** wires continued from page 3

cabinets (ADCs). Recent examples include lidocaine ampuls that came from an IV line insertion kit and a heparin flush syringe brought in from home by a patient's family. Likewise, physicians sometimes bring unauthorized medications into the hospital to use for a patient. Safety is a concern when pharmacy has not assessed these medications for adequate labeling, expiration dating, barcode scanning capabilities, or other internal safeguards used to prevent errors with medications that have look- and sound-alike drug names. Nonformulary medications that haven't been reviewed by a Pharmacy & Therapeutics Committee also pose a risk. Incidentally, the heparin flush syringe mentioned above is labeled in a way that could have led to a medication error. It wasn't obvious that the syringe contained heparin flush solution since the word, "Monoject," a trademark used for a line of syringes from Covidien, was most prominently noted on the label, not its heparin contents (**Figure 1**).

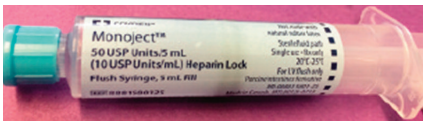

Figure 1. Heparin lock syringe label doesn't state that the syringe contains heparin.

Policies related to patients or physicians bringing medications into the facility should prevent patient use without first being identified by a pharmacist. These medications must be stored securely and never commingled with hospital floor stock medications. Pharmacists should work with the purchasing department to develop a list of manufacturer's kits that contain medications. Before these are purchased, pharmacists should analyze their safety and test the barcodes for proper scanning when possible. Also, saving unused vials from manufacturer's kits as floor stock should be prohibited, and nurses should be provided with clear directions regarding the disposition of leftover vials. Pharmacists and nurses should be alert to the risk of medications from external sources and look for these products during routine medication storage assessments and inspections.

> **Practices**—continued from page 4

liquid dosing devices that only display in the metric scale. Down from 35% in the earlier survey, 20% of respondents in the current survey still have no plans to implement this practice.

Many respondents wanted to use up their current supply of dosing devices before ordering new supplies with metric markings only. Several respondents were coordinating the implementation of this practice with the transition in enteral feeding devices to the new ENFit syringe for feeding tube use, which will be available this year.

Respondents who have NOT implemented this practice reported unavailability of dosing devices with metric-only markings or substandard products on the market. But now that the US Food and Drug Administration, the American Academy of Pediatrics, the Emergency Nurses Association, and other professional organizations have stepped up their support for use of the metric system for liquid medication doses, more commercial vendors are expected to make these devices available, including Baxter, MediDose, NeoMed, and BD.

Best Practice 6 **Eliminate glacial acetic acid from all areas of the hospital (laboratory excluded if the glacial acetic acid is purchased directly from an external source). Replace glacial acetic acid with vinegar (5% solution) or commercially available acetic acid 0.25% (for irrigation) or 2% (for otic use).**

Patient harm has occurred when undiluted glacial acetic acid has been dispensed and used in treating patients in procedural areas, the operating room, or for wound care. Accidental topical application has resulted in serious patient harm, including severe pain and serious tissue damage, such as third-degree burns.

This practice has the highest percent of respondents reporting full implementation, at 90%. This represents an increase from 74% in the earlier survey. In addition, 69% fewer respondents reported NO ACTION towards achieving this goal, down from 13% in the earlier survey to 4% in the current survey.

Few barriers to implementing this practice were reported, although several respondents mentioned that certain providers still want to use a specific percent of acetic acid solution for procedures. Even though we are happy to see a 90% full adoption rate, the challenge going forward will be the steps that organizations take to maintain a glacial acetic acid free-zone, such as eliminating the ability to order the product, or removing pharmacy recipes (paper or electronic) that use glacial acetic acid as a compounding solution.

Conclusion

Survey respondents who were very familiar with the **ISMP 2014-2015 Targeted Medication Safety Best Practices for Hospitals** prior to taking the current survey reported higher implementation rates for all targets than those who were unaware of the initiative. Thus, ISMP will be ramping up its promotion of the Targeted Best Practices to expand awareness. During 2015, we plan to feature one Targeted Best Practice at a time in the newsletter, addressing many of the barriers to implementation that were listed by respondents in the recent survey. We also plan to spotlight facilities that have achieved full compliance to help share any lessons learned from the field. Please let us know if you would like a particular barrier covered in an upcoming feature, or if you would like to share what your hospital has done to implement these best practices (ismpinfo@ismp.org). Meanwhile, if you are having problems with implementing any of these best practices, visit the *Frequently Asked Questions* section under the Targeted Best Practices for more information (www.ismp.org/tools/bestpractices/faq.aspx).

Special Announcements

ISMP webinar

March 19: **Evolution of Anticoagulants and the Effects on Patient Safety**
For details, visit: www.ismp.org/sc?id=476.

Unique 2-day program

Attend one of the **ISMP Medication Safety INTENSIVE** workshops being held in 2015: **Indianapolis** on April 16-17; Bellevue (near **Seattle**) on September 17-18; and **New Orleans** on December 4-5. This workshop provides hands-on experiences with risk assessment, event investigation, error analysis, error-reduction strategies, measuring effectiveness, and more! For details, visit: www.ismp.org/educational/MSI.

ISMP Fellowships

Apply for the **ISMP Safe Medication Management Fellowship Programs.** Applications are due **March 31, 2015.** For details, visit: www.ismp.org/sc?id=484.

To subscribe: www.ismp.org/sc?id=384

ISMP INSTITUTE FOR SAFE MEDICATION PRACTICES

ISMP Nurse AdviseERR (ISSN 1550-6304)

Report medication and vaccine errors to ISMP: Call 1-800-FAIL-SAF(E), or visit www.ismp.org/MERP or www.ismp.org/VERP. ISMP guarantees the confidentiality of information received and respects the reporters' wishes regarding the level of detail included in publications.

Editors: Ann Shastay, MSN, RN, AOCN; Judy Smetzer, BSN, RN, FISMP; Michael Cohen, RPh, MS, ScD (hon), DPS (hon); Russell Jenkins, MD. ISMP, 200 Lakeside Drive, Suite 200, Horsham, PA 19044. Email: ismpinfo@ismp.org; Tel: 215-947-7797; Fax: 215-914-1492.

ISMP Survey on Pediatric Medication Practices

It's been 15 years since ISMP conducted a survey to learn about the key processes in place when prescribing, dispensing, and administering medications to pediatric patients (newborn to less than 18 years old). If you provide care to pediatric patients (regardless of the volume), please take a few minutes to complete the following survey so we can assess the progress made since then and expose new vulnerabilities to errors. Please visit www.surveymonkey.com/r/ISMP-peds to submit your survey results to ISMP by **April 10, 2015. We sincerely appreciate your participation!**

1 Please select a specific type of patient care unit upon which to base your evaluation of the following error-prevention strategies. While the survey can be taken for each specific type of unit where care is provided to pediatric patients in your facility, please choose one unit at a time and answer questions related only to that unit.

☐ General inpatient pediatric unit ☐ General outpatient pediatric clinic ☐ Emergency department
☐ Pediatric ICU ☐ Inpatient pediatric oncology ☐ Outpatient pediatric oncology
☐ Level 1 nursery ☐ Level 2 nursery ☐ Level 3 NICU ☐ Level 4 NICU ☐ Other _____ (specify)

2 Please evaluate each error-prevention strategy and select the frequency with which you employ the strategy. If the strategy does not apply to you, choose Not Applicable (NA). If you do not know whether the strategy is implemented or to what extent, choose Don't Know (DK).

Error-Prevention Strategies	Always >99%	Almost Always 90-99%	Often 50-89%	Some-times 20-49%	Rarely 1-19%	Never <1%	NA	DK
General Recommendations								
a. All pediatric patients are weighed using metric units of measure (kilograms [kg] or grams [g]).								
b. Metric units of measure (kg or g) are the standard nomenclature for pediatric patient's weights on medical records.								
c. The volume of all pediatric medication doses are expressed in the metric system (e.g., 5 mL, not 1 teaspoon).								
d. The concentrations and dosage strengths of high-alert medications are standardized and limited.								
e. Adult, pediatric, and neonatal medications are not stored near each other or in the same automated dispensing cabinet drawer (unless in locked, lidded compartments).								
Prescribing Medications								
f. Prescribers include *both* the basis for the dose (e.g., mg/kg, mg/m^2) and the calculated dose for all pediatric drug orders. Exceptions: medications that do not lend themselves to weight-based dosing, such as topicals and ophthalmics.								
g. Prescribers order pediatric liquid medication doses in metric doses, not volume alone. Exception: multi-ingredient product available only in one strength.								
h. When ordering pediatric parenteral nutrition (PN) or other complex electrolyte solutions, prescribers order each ingredient as dose/kg/day (e.g., mg/kg/day, mcg/kg/day) for younger children.								
i. When ordering pediatric PN or other complex electrolyte solutions, prescribers order the total amount of each ingredient per day for older children.								
j. The patient's weight in kg or g is entered into the computerized prescriber order entry (CPOE) system *before* medication orders are entered.								
k. Dose range checking software is available in the CPOE system and enabled to provide alerts to prescribers for potentially incorrect pediatric medication doses.								
Dispensing Medications								
l. The pediatric patient's age is verified in the pharmacy system *before* medication orders are entered or verified.								
m. The pediatric patient's weight in kg or g is entered or verified in the pharmacy system *before* medication orders are entered or verified and drugs are dispensed.								
n. Pharmacists verify the mg/kg or mg/m^2 dose used to calculate the final dose of a drug (ideally listed in the prescriber's order) *before* preparing and dispensing pediatric medications. Exceptions: medications that do not lend themselves to weight-based dosing, such as topicals and ophthalmics.								
o. Pharmacists recalculate the pediatric patient's actual dose before preparing and dispensing medications.								

continued on page 7—Survey >

> Survey—continued from page 6

Error-Prevention Strategies	Always >99%	Almost Always 90-99%	Often 50-89%	Some-times 20-49%	Rarely 1-19%	Never <1%	NA	DK
p. Dose range checking software is available in the pharmacy system and enabled to provide alerts to pharmacists for potentially incorrect pediatric doses.								
q. PN or other complex electrolyte solutions are entered in the pharmacy system exactly as each ingredient is prescribed without requiring unit conversions.								
r. PN or other complex electrolyte solutions are entered into compounding software exactly as each ingredient is prescribed without requiring unit conversions.								
s. Automated compounding devices are used to compound PN and other complex electrolyte solutions (or these solutions are outsourced).								
t. Pharmacy preparation of pediatric IV and oral liquid doses include barcode verification of ingredients.								
u. The pharmacy dispenses patient-specific doses of liquid oral/enteral medications for pediatric patients in cups or specially designed oral syringes that will not connect to IV tubing.								
v. Components of pediatric and neonatal compounded sterile preparations are verified by a pharmacist *prior* to adding to an admixture (syringe pull-back method after preparation is not acceptable).								
w. Pharmacists/technicians who prepare or check pediatric parenteral solutions have undergone specialized training and demonstrated competency in pediatric drug therapy.								
x. Pharmacists who prepare or check pediatric parenteral solutions routinely spend dedicated time in the neonatal and pediatric patient care units to observe drug prescribing and administration procedures.								
y. A clinical pharmacist is physically present on the patient care unit to participate in daily pediatric patient rounds and provide input into the selection and administration of pediatric medications.								
Administering Medications								
z. A smart infusion pump is used to administer parenteral high-alert medication solutions, and the drug library is activated and functional during the entire infusion. Exception: vesicant chemotherapy via peripheral line.								
aa. Nurses who administer medications to pediatric patients have undergone specialized training and demonstrated competency.								
bb. Before parenteral high-alert medications are administered to pediatric patients, a second nurse independently double checks the solution against the medication administration record/order and verifies the patient, drug, dose, line attachment, and pump settings at the bedside.								
cc. For pediatric patients receiving multiple infusions (e.g., IV, arterial, enteral), nurses trace the line from the medication/solution source to the patient (or vice versa) to verify attachment before administration.								
dd. Specially designed oral syringes that do not connect to IV tubing are available in the patient care area to administer all oral/enteral liquid medications to pediatric patients.								
ee. The doses for emergency drugs and commonly used medications (e.g., acetaminophen) have been calculated for each pediatric patient based on weight and are available for reference during hospitalization.								
ff. Barcode scanning at the bedside is used for patient identification and to verify medications and solutions prior to administration.								
gg. Barcode scanning at the bedside is used for patient identification and to verify breast milk before each feeding.								

3 Please indicate the percent of all pediatric medication orders dispensed from the pharmacy in exact, premeasured patient-specific doses that are ready to use: _____%

4 Please indicate the percent of pediatric parenteral solutions that are further diluted by nurses on the unit prior to drug administration: _____%

5 Please indicate the percent of all parenteral solutions (e.g., IV, arterial) that are mixed/prepared on the nursing unit by nurses (exclude commercially available solutions): _____%

6 Please indicate the percent of all ordered medications for pediatric patients that are obtained from unit stock (vs. patient-specific doses dispensed by pharmacy): _____%