June 13, 2024 | Volume 29 ■ Issue 12

ISMP
An ECRI Affiliate

Acute Care
ISMP Medication Safety Alert!®
Educating the Healthcare Community About Safe Medication Practices

Survey shows room for improvement with three new Best Practices for hospitals

In our February 22, 2024 newsletter (www.ismp.org/node/123806), we invited hospitals to participate in a short survey to establish a baseline of implementation for the three new *Best Practices* released in the ***2024-2025 ISMP Targeted Medication Safety Best Practices for Hospitals*** (www.ismp.org/node/160). The three new *Best Practices* are associated with safeguarding against wrong-route errors with tranexamic acid (#20), implementing strategies to prevent medication errors at transitions in the continuum of care (#21), and safeguarding against errors with vaccines administered in the inpatient and associated outpatient settings (#22). We sincerely thank the hospitals that participated in our survey and shared their valuable lessons learned regarding the barriers and enablers for the new *Best Practices*. An overview of the survey findings is presented in **Table 1** (pages 5 and 6) and detailed below.

Respondent Profile

More than four hundred (N = 427) respondents participated in our *Best Practices* survey. More than a quarter (26%) of them worked at hospitals with 500 beds or more; 18% with 300-499 beds; 28% with 100-299 beds; 13% with 26-99 beds; and 15% with 25 beds or less. Overall, nearly two-thirds (58%) reported employing one or more part- or full-time medication safety officer(s) (MSO). Most (85%) respondents were located in the United States/US territory, but we also heard from practitioners located in a US military foreign country/territory (1%) and other foreign countries/territories (14%).

New *Best Practice* 20: Safeguard against wrong-route errors with tranexamic acid

New *Best Practice* #20 consists of seven interventions designed to safeguard against wrong-route errors with tranexamic acid. Mix-ups with local anesthetics such as **BUP**ivacaine and **ROP**ivacaine have been reported due to similar cap color especially when the vials are stored upright near each other. When accidentally administered intrathecally, tranexamic acid injection is a potent neurotoxin with a mortality rate of about 50% and is almost always harmful to the patient. Survivors of intraspinal tranexamic acid often experience seizures, permanent neurological injury, and paraplegia. The **first intervention** recommends the use of point-of-care barcode-assisted medication safety checks prior to administering medications in surgical and obstetrical areas. More than a third (35%) reported full implementation, while another 47% reported partial implementation. Electronic health record (EHR) limitations and anesthesia staff resistance were the most frequently cited barriers to implementation. No enablers were reported.

The **second intervention** recommends, when appropriate, to use premixed intravenous (IV) bags of tranexamic acid, which are less likely to be confused with local anesthetic vials. Overall, 40% reported full implementation. Respondents reported shortages of premixed bags as a barrier. An enabler was having the pharmacy prepare and dispense premixed bags.

The **third intervention** recommends, if possible, not to store tranexamic acid in an anesthesia tray. For *Best Practice* #20, this intervention had the greatest number reporting full compliance (62%). The primary barrier to implementation was anesthesia providers' resistance to removing tranexamic acid vials from their trays. Some providers insisted the vials be readily available, or thought that mix-ups with other available vials were unlikely. No enablers were reported.

continued on page 2 — Best Practices >

SAFETY briefs

HIGH-ALERT

Vials of 23.4% sodium chloride and calcium gluconate switched on automated compounder device. A hospital reported several parenteral nutrition (PN) infusions were compounded with inaccurate ingredient amounts after concentrated 23.4% sodium chloride injection (400 mEq/100 mL) and calcium gluconate (10,000 mg/100 mL) vials were switched on the automated compounder device. Both products are made by Fresenius Kabi and come in 100 mL vials (**Figure 1**). A pharmacy technician identified the error upon visual assessment of the device. A total of 17 infusions for three patients were impacted. Two patient's infusion bags were still in the pharmacy, and one that was en route to the patient was returned to the pharmacy prior to reaching the patient. Details regarding each of the patient's PN infusions follow.

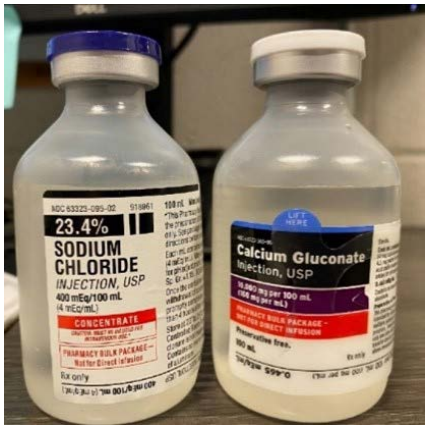

Figure 1. Vials of 23.4% sodium chloride injection (400 mEq/100 mL) (left) and calcium gluconate (10,000 mg/100 mL) (right) were switched on an automated compounding device.

Patient A was prescribed 3.6 g of calcium gluconate and 96 mEq of sodium (zero mEq from sodium chloride). The product compounded included no calcium gluconate and 242 mEq of sodium (146 mEq from sodium chloride).

Patient B was prescribed 2.2 g of calcium gluconate and 184 mEq of sodium (123 mEq from sodium chloride). The product compounded

continued on page 2 — SAFETY briefs >

> Best Practices — continued from page 1

The **fourth intervention** recommends separating or sequestering tranexamic acid in storage locations (e.g., pharmacy, clinical areas) to avoid storing local anesthetics and tranexamic acid near one another. Sixty-one percent reported full implementation. Limited storage space was a barrier to implementation. An enabler was not storing tranexamic acid outside of the pharmacy.

The **fifth intervention** recommends avoiding storage of injectable medication vials in an upright position, especially when stored in a bin or drawer below eye level, to prevent misidentifying medications by viewing only the vial caps. Store medication vials in a way that always keeps their labels visible. Thirty-eight percent reported full implementation. Frequently cited barriers were that this process was reliant on humans to remember, users can still change the vial orientation, and space constraints do not always allow for this to occur. Enablers were continuous education to staff before and after implementation.

The **sixth intervention** recommends conducting a review to identify any look-alike ampules or vials (including caps) and determine if the risk of a mix-up will be reduced by purchasing them from different manufacturers. If so, purchase them from different manufacturers. One-third (33%) reported full implementation, while another 43% reported partial implementation. Frequently cited barriers to implementation included drug shortages, purchasing based on cost, and not having enough time or resources to complete a product review. An enabler was implementing a yearly review by the MSO.

The **seventh intervention** is to consider labeling vial caps with a label that states, "Contains Tranexamic Acid." Of the seven interventions for *Best Practice* #20, this had the lowest reported full implementation (17%), with almost three-quarters (74%) reporting no implementation. Several respondents reported that they did evaluate this, but opted not to add auxiliary labels due to the concern about label fatigue resulting in staff not reading the labels, or because this was too labor-intensive and not feasible with the pharmacy workload. Others told us they did not know this was a recommendation and planned to review this with their team.

New *Best Practice* 21: Prevent medication errors at transitions in the continuum of care

New *Best Practice* #21 consists of six interventions to prevent medication errors at transitions in the continuum of care. The **first intervention** is to obtain the most accurate medication list feasible upon admission to the organization before the first dose of medication is administered (except in emergency or urgent situations). Nearly half (46%) reported full implementation, while another 52% reported partial implementation. Barriers were a lack of staff to obtain this information, not having a consistent policy or process, and lack of communication (e.g., staff, patients, pharmacies). Enablers included having a designated medication reconciliation technician team, and implementing widespread education for staff involved in medication reconciliation. One respondent said they turned to a remote medication reconciliation service to help ensure this was completed.

The **second intervention** recommends asking about allergies and associated reactions, prescription and over-the-counter medications (including herbals and dietary supplements), and non-enteral medications. Nearly two-thirds (63%) reported full implementation, and only 1% reported no implementation. Barriers included labor, budget, and time constraints. Enablers were implementing a standard checklist or scripting for staff to use as a tool.

The **third intervention** recommends listing the drug name, dose, route, frequency, indication, and time of the last dose. More than half (53%) reported full implementation, while another 45% reported partial implementation. The primary barriers to implementation were that this information was not readily available, and that the indication and last dose were not required fields in the EHR. However, those who were able to implement this reported an enabler was building these fields into the EHR to facilitate documentation.

continued on page 3 — Best Practices >

>SAFETY briefs

cont'd from page 1

included 3 g of calcium gluconate and 150 mEq of sodium (88 mEq from sodium chloride).

Patient C was prescribed 1.1 g of calcium gluconate and 79 mEq of sodium (26 mEq from sodium chloride). The compounded product included 0.651 g of calcium gluconate and 98 mEq of sodium (45 mEq from sodium chloride).

When the pharmacy technician set up the automated compounder device, they scanned the vial's barcode, traced the tubing to the port, and scanned the barcode tag for the corresponding port. This was repeated for each medication. However, the standard procedure for the location where the vials were latched within the device was not followed; the ports for 23.4% sodium chloride and calcium gluconate were to be separated by 5 port sites, but for an unknown reason, the vials were placed next to each other. The pharmacist checked the device setup but did not question why the placement of the vials was changed from the standard port locations. When vials needed to be replaced, the tubing that was attached to the 23.4% sodium chloride was spiked into a calcium gluconate vial, and vice versa. The new vials were scanned but the tubing was not traced from the source containers to the ports. The hospital did not require pharmacists to check the replacement products.

Review the ISMP ***Guidelines for Sterile Compounding and the Safe Use of Sterile Compounding Technology*** (www.ismp.org/node/31362) and develop a standard operating procedure for automated compounding devices. Include a standard setup (e.g., arrangement of products within the device) considering product characteristics (e.g., similar-looking vials, product size) and ensure the standard setup is easily accessible for staff. Policies and procedures should define the steps required to set up the automated compounding device before use and when products need to be changed. Scan the product barcode before connecting it to the tubing, trace the tubing to the port, and scan the barcode tag for the port. This should be done for each product, one at a time. A second individual should verify device setup steps, including barcode verification

continued on page 3 — SAFETY briefs >

> Best Practices — continued from page 2

The **fourth intervention** recommends considering assigning dedicated practitioners to obtain the medication histories. More than a third (36%) reported full implementation, while another 42% reported partial implementation. Respondents indicated that not having enough staff to complete this 24 hours a day was a barrier to implementation. Sometimes this was due to cost; with one respondent referring to this as an "unreimbursed expense." Enablers included a robust 24/7 medication reconciliation technician program, or using a remote medication reconciliation service.

The **fifth intervention** recommends ensuring the medication and doses collected and subsequently ordered are the correct therapy for that patient, given their current state of health. More than half (57%) reported full implementation. Respondents acknowledged that pharmacy technicians and nurses obtaining the medication list were not able to determine the appropriateness of the medication for the patient's condition as this is outside their scope of practice. Enablers were having prescribers or pharmacists evaluate appropriateness after the medication history was completed.

The **sixth intervention** recommends designating a provider to compare the prescribed medications to those on the medication history list and resolve any discrepancies. In addition, have providers document reconciliation and modifications made to the current therapy upon admission, with each change in level of care, and at discharge. Forty percent reported full implementation, while another 47% reported partial implementation. Reported barriers included the cost to monitor compliance, resources, and time to complete this in a quality manner. Some said physicians are not required to do this. Enablers were building this into the EHR at the required transitions of care, and establishing and maintaining collaborative relationships between providers and pharmacy.

New *Best Practice* 22: Vaccine safety

New *Best Practice #22* consists of 10 interventions to safeguard against errors with vaccines administered in the inpatient and associated outpatient settings. The **first intervention** recommends using standard order sets to prescribe vaccines; requiring an order prior to administration of any vaccine; utilizing the full generic name and brand name (if applicable); and avoiding vaccine abbreviations, which some staff may confuse or not even be familiar with. Full implementation was reported by more than half (52%) of the respondents. Barriers were that order sets were not available for all vaccine orders, and that abbreviations were used in the EHR. Some respondents told us they were compliant for inpatient vaccine orders, but not outpatient vaccine orders. Enablers were building order sets, and using generic/brand names without abbreviations in the EHR.

The **second intervention** recommends verifying a patient's immunization status (in the EHR as well as vaccine registries) prior to providing vaccines. These systems track the vaccines that patients have received and can prevent duplication or omission errors. Forty-eight percent reported full implementation, and another 41% reported partial implementation. Some respondents reported that in its current state, their EHR system did not have the capability to pull in the vaccine registry for automatic screening upon order entry, while others said this is being addressed by an upcoming EHR upgrade.

The **third intervention** recommends providing patients and/or caregivers with vaccine information (e.g., Vaccine Information Statement [VIS]) in their primary language prior to vaccination. Sixty-five percent reported full compliance. Respondents reported budget, workforce, and availability of interpretation services as barriers. Similar to other interventions, enablers included having this prebuilt in the EHR.

The **fourth intervention** recommends storing vaccines in separate bins or containers based on type and formulation, and storing two-component vaccines together to assist with proper mixing. Nearly three-fourths (72%) reported full implementation. The most frequently reported barrier was not having enough space, along with inconsistencies in storage among locations.

continued on page 4 — Best Practices >

>SAFETY briefs

cont'd from page 2

and line tracing. This process should be followed when replacement vials are used. Organizations should define how overrides of system warnings or alerts are to be managed, building in a second verification before a warning is overridden. Provide initial and ongoing competency assessments, including a broad spectrum of scenarios that staff might encounter. Encourage staff to report errors and close-call compounding events including those involving line tracing. Ensure wrong drug scans that were intercepted by the technology are captured in a report to facilitate compounding error analysis and process improvement. Regularly review alert overrides to determine appropriateness and to improve the safety of compounding practices.

Clotrimazole topical solution bottle resembles eye drops. A pharmacist was checking a patient's prescriptions for two eye drops and came across what he thought was a third eye drop. The medication was clotrimazole 1% topical solution (NDC 10135-067-01) 10 mL bottle made by Marlex (**Figure 1**). Upon further inspection, the pharmacist noted that despite being packaged in what looks like a dropper bottle that may contain eye medication, it was actually a topical product not for use in the eye. Towards the bottom of the label, it states "Not for Ophthalmic use" in a tiny font size, making it difficult to see and read.

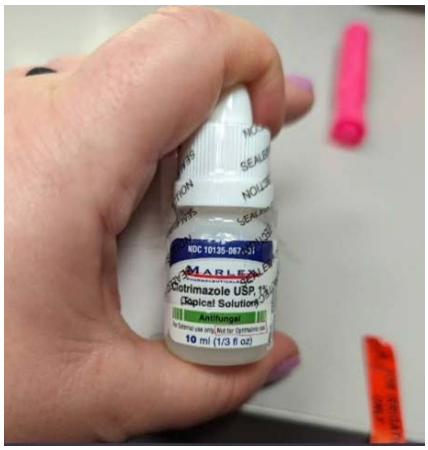

Figure 1. Clotrimazole 1% topical solution by Marlex comes in an eye dropper bottle, even though it should not be administered in the eye.

The pharmacy plans to add an auxiliary label warning patients that this is for topical use and not for use in the eye. They are also ensuring that prescription labels

continued on page 4 — >SAFETY briefs >

> Best Practices — continued from page 3

The **fifth intervention** recommends using prefilled syringes when available; and if not available, preparing each vaccine dose immediately prior to administration and labeling with the vaccine name, dose, and, if appropriate, the indicated age range. Sixty-nine percent reported full implementation. Barriers included time constraints, lack of staff education about how to label syringes, and space limitations that prevent the ability to store prefilled syringes. An enabler was the organization evaluating which vaccines are available in prefilled syringes and purchasing them, when possible.

The **sixth intervention** recommends that when multiple adults and children are being vaccinated at the same time, patients should be separated into distinct treatment areas; bringing only one patient's vaccines into the area at a time. Just over one-half (51%) reported full implementation. The most frequent barrier was not having enough space or patient rooms to allow for this. One respondent told us this is feasible in the inpatient setting, but presented safety challenges in the outpatient setting. As an example, they stated a child cannot be left alone during the clinic visit if a parent brings multiple young children to be vaccinated. An enabler was including this in the organization's policy and procedure.

The **seventh intervention** recommends verifying the patient's identity using two unique identifiers. This intervention had the greatest number reporting full compliance (89%). A barrier was that although some outpatient pharmacies have built this into their systems and processes prior to dispensing medication prescriptions, this was not built into the process prior to vaccine administration. Other respondents said that room numbers were still used rather than unique patient identifiers. An enabler was analyzing and learning from barcode medication administration (BCMA) data.

The **eighth intervention** recommends using barcode scanning technology to verify the correct vaccine and dose are administered to the correct patient. Sixty percent reported full implementation, with over a quarter (27%) reporting partial implementation. The most frequent barrier to implementation was that outpatient areas did not have the technology to do this (e.g., barcode scanners). Others shared that frontline staff did not understand the benefits of using BCMA. Although enablers were not reported, organizations should consider sharing and learning from internal and external errors that could have been avoided had BCMA been used, as well as close calls (i.e., good catches) that demonstrate how the use of BCMA prevented patient harm.

The **ninth intervention** is to document the vaccine's national drug code (NDC) number, lot number, and expiration date prior to administration; document administration in the EHR; and ensure information is sent to the local or state vaccine registry. More than three-quarters (76%) reported full implementation. Barriers and enablers were opposed, meaning those who did not implement this told us this was not a required field in the EHR, versus those who were doing this consistently, had this built as a required field in the EHR.

The **tenth intervention** is to provide vaccinators with ongoing education and competency assessment about vaccines and their appropriate storage, selection, administration, and monitoring. Fewer than half (49%) reported full implementation. Barriers included not having resources to educate staff or to create and complete competency assessments. An enabler was having a dedicated clinical educator to oversee this process.

Conclusion

These survey results suggest there is room for improvement with the three new *Best Practices*. We hope that hospitals will use these survey results to prompt interdisciplinary discussions that take note of the barriers and enablers while implementing these *Best Practices*. Notably, the most frequently reported enabler among all interventions was building the particular requirement into the EHR. An *Implementation Worksheet* (www.ismp.org/node/1506) for all of the *Best Practices* is available and might be helpful to document your assessment of implementation status, actions required, and assignments.

Table 1 starts on page 5 — **Best Practices** >

>SAFETY briefs

cont'd from page 3

include, "for topical use only" and apply to a specified location.

We have notified the US Food and Drug Administration (FDA) and Marlex of this concern and recommended modifying the package so that this topical medication comes in a container that facilitates topical application (e.g., with a built-in applicator), which would make it difficult to apply to the eye or ear, and does not look like an eye or ear drop bottle. If your pharmacy purchases this product, store it separately from eye drops and consider the use of signage, shelf talkers, or other warnings such as auxiliary labels to place on the bottle and in storage locations. Include the prescribed site of topical administration in the order, on the medication label, and on the medication administration record (MAR). Review where medications should be applied topically when educating patients.

Special Announcements

Nominations open for CHEERS AWARDS

Each year, ISMP honors various healthcare disciplines that have demonstrated an exemplary commitment to medication safety through innovative projects with an ISMP **CHEERS AWARD**. Nominations for this year's **CHEERS AWARDS** are now open and will be accepted through **August 2, 2024**. Please refer to the information provided on our website when submitting a nomination. For details, visit: www.ismp.org/node/123.

Virtual MSI workshop

Join us for one of our ***ISMP Medication Safety Intensive (MSI)*** workshops in **2024**. The unique 2-day virtual program will be held:

- **August 8 and 9**
- **September 20 and 27** (community/specialty pharmacy)
- **October 3 and 4**
- **December 5 and 6**

For more information and to register, please visit: www.ismp.org/node/127.

> Best Practices — continued from page 4

Table 1. Compliance with the three new ***2024-2025 ISMP Targeted Medication Safety Best Practices for Hospitals***

	Best Practice Statement	Percent Compliance			Common Barriers (B) or Enablers (E)
		None	Partial	Full	
20	**Safeguard against wrong-route errors with tranexamic acid**				
	Utilize point-of-care barcode-assisted medication safety checks prior to administering medications in surgical and obstetrical areas.	18	47	35	B: Limited by electronic health record (EHR) options, anesthesia staff reluctance
	When appropriate, use premixed intravenous (IV) bags of tranexamic acid, which are less likely to result in mix-ups than the vials of tranexamic acid.	42	18	40	B: Shortages impact the ability to supply premixed bags E: Pharmacy prepares and dispenses premixed bags
	If possible, do not store tranexamic acid in an anesthesia tray.	18	20	62	B: Anesthesia provider resistance
	Separate or sequester tranexamic acid in storage locations (e.g., pharmacy, clinical areas) and avoid storing local anesthetics and tranexamic acid near one another.	12	27	61	B: Limited space E: Tranexamic acid is not stored outside pharmacy
	To prevent misidentifying medications by viewing only the vial caps, avoid storing injectable medication vials in an upright position, especially when stored in a bin or drawer below eye level. Store them in a way that always keeps their labels visible.	18	44	38	B: Human-dependent, users can change vial orientation, space constraints E: Education before and after implementation
	Conduct a review to identify any look-alike ampules or vials (including caps) and determine if the risk of a mix-up will be reduced by purchasing them from different manufacturers. If so, purchase them from different manufacturers.	24	43	33	B: Drug shortages, purchasing based on cost, limited time and resources to conduct a review E: Annual product review by the Medication Safety Officer (MSO)
	Consider labeling vial caps with a label that states, "Contains Tranexamic Acid."	74	9	17	B: Label fatigue, labor-intensive
21	**Implement strategies to prevent medication errors at transitions in the continuum of care**				
	Obtain the most accurate medication list possible upon admission to the organization before the first dose of medication is administered (except in emergency or urgent situations).	2	52	46	B: Not enough staff, inconsistent process, lack of communication E: Designated technicians, widespread education and training, using a remote medication reconciliation service
	Include asking about allergies and associated reactions, prescription, and over-the-counter medications (including herbals and dietary supplements), and non-enteral medications.	1	36	63	B: Labor, budget, and time constraints E: Implementing a standard checklist and scripting
	List drug name, dose, route, frequency, indication, and time of last dose.	2	45	53	B: Information is not readily available, indication and last dose are not required fields in the EHR E: Built in the EHR
	Consider assigning dedicated practitioners to obtain medication histories.	22	42	36	B: Cost, limited staff E: Robust 24/7 medication reconciliation technician program, using a remote medication reconciliation service
	Ensure the medication and doses collected and subsequently ordered are correct therapy for that patient, given their current state of health.	4	39	57	B: Technicians or nurses not allowed by law to determine appropriateness E: Prescribers or pharmacists evaluate this after the medication history is completed
	Designate a provider to compare the prescribed medications to those on the medication history list and resolve any discrepancies. Have providers document reconciliation and modifications made to the current therapy upon admission, with each change in level of care, and at discharge.	13	47	40	B: Cost, resources, and time; physician resistance; compliance is not monitored E: Built in the EHR, collaborative relationships between providers and pharmacy

Table 1 continued on page 6 — Best Practices >

> **Best Practices** — continued from page 5

	Best Practice Statement	Percent Compliance			Common Barriers (B) or Enablers (E)
		None	Partial	Full	
	Safeguard against errors with vaccines administered in the inpatient and associated outpatient settings				
22	Utilize standard order sets to prescribe vaccines. Require an order prior to administration of any vaccine. Utilize the full generic name and brand name (if applicable) and avoid vaccine abbreviations.	13	35	52	B: Order sets not available for all vaccine orders, abbreviations used in the EHR may be confusing E: Built in the EHR
	Verify a patient's immunization status (in the EHR as well as vaccine registries) prior to providing vaccines.	11	41	48	B: No capability of pulling vaccine registry data into the EHR E: Pulling vaccine data from registries is being addressed by some via an EHR upgrade
	Provide patients and/or caregivers with vaccine information (e.g., Vaccine Information Statement [VIS]) in their primary language prior to vaccination.	6	29	65	B: Budget, workforce, availability of interpretation services E: Built in the EHR
	Store vaccines in separate bins or containers based on type and formulation. Store two-component vaccines together.	6	22	72	B: Space limitations, inconsistent practices
	Use prefilled syringes when available. If not available, prepare each vaccine dose immediately prior to administration and label with the vaccine name, dose, and if appropriate, the indicated age range.	4	27	69	B: Time constraints, lack of staff education, limited space prevents the storage of prefilled syringes E: Evaluate prefilled syringe availability prior to purchasing vaccines
	If multiple adults and children are being vaccinated at the same time, separate them into distinct treatment areas; bring only one patient's vaccines into the treatment area at a time.	10	39	51	B: Human-dependent process, susceptible to high patient volumes and room turnover, one parent may bring two or more children E: Policy and procedure requirement
	Verify the patient's identity using two unique identifiers.	1	10	89	B: Outpatient pharmacies have systems and processes to do this prior to dispensing medication but not vaccine administration, room numbers used rather than unique identifiers E: Analyze and learn from barcode medication administration (BCMA) data
	Use barcode scanning technology to verify the correct vaccine and dose are being administered to the correct patient.	13	27	60	B: Clinics do not have this technology, frontline staff do not understand the benefit of BCMA
	Document the vaccine's national drug code (NDC) number, lot number, and expiration date prior to administration; document administration in the EHR; and ensure information is sent to the local or state vaccine registry.	5	19	76	B: EHR does not have this built as a required field E: EHR prompts the clinician to document this as a required field
	Provide vaccinators with ongoing education and competency assessment about vaccines and their appropriate storage, selection, administration, and monitoring.	13	38	49	B: Lack of resources to create competency assessments or to educate staff E: Dedicated clinical educator

Editors: Shannon Bertagnoli, PharmD; Ann Shastay, MSN, RN, AOCN; Rita K. Jew, PharmD, MBA, BCPPS, FASHP; Editor Emeritus, Michael R. Cohen, RPh, MS, ScD (hon), DPS (hon), FASHP. ISMP, 5200 Butler Pike, Plymouth Meeting, PA 19462. Email: ismpinfo@ismp.org; Tel: 215-947-7797.