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ISMP

Nurse AdviseERR®

Educating the Healthcare Community About Safe Medication Practices

Confusion abounds! 2-year summary of the ISMP National Vaccine Errors Reporting Program (Part I)

According to the World Health Organization (WHO), immunizations prevent between 2 and 3 million deaths per year. Despite this success, many children and adults in the US remain vulnerable to the 17 vaccine-preventable diseases. Some people are vulnerable because they have not been offered vaccinations; others opt-out of recommended immunizations based in large part on misinformation. However, errors with vaccines can also result in unintended and unrecognized vulnerability, leaving patients unprotected against serious diseases such as hepatitis A, hepatitis B, diphtheria, tetanus, measles, cervical cancer, and many others.

In September 2012, ISMP (in cooperation with the California Department of Public Health) established the ISMP National Vaccine Errors Reporting Program (ISMP VERP) to collect data about the types of errors occurring and their underlying causes. In our June 2014 newsletter, we provided a summary analysis of error reports submitted during its inaugural year. In this issue, we provide a 2-year summary of error reports submitted through October 2014.

Volume, types, and sources of reports

Between September 2012 and October 2014, a total of 884 reports were submitted to the ISMP VERP. The error reports provided a steady stream of information to ISMP for analysis so that prevention strategies could be identified and shared. In the past 2 years, reports have increased from 373 in 2013 to 425 so far in 2014 (January-October).

Most reports (89%) involved vaccine errors that reached patients. Those involving close calls (8%) or hazardous conditions (3%) were often

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Table 1. Vaccines frequently cited in error reports based on setting*

Setting (% of All Reports)	Vaccines*	% Within Setting
Physician Office Practice (26%)	Tdap*	16
	DTaP-IPV*	15
	Influenza	15
	Hepatitis A	9
	DTaP-IPV/Hib*	8
Public Health Immunization Clinic (23%)	Hepatitis A	19
	DTaP-IPV*	15
	Influenza	11
	MMRV*	10
	HPV4*	7
Outpatient Medical Clinic (23%)	DTaP-IPV*	19
	Tdap*	15
	Influenza	14
	DTaP*	13
	Hepatitis A	12
Pediatric Outpatient (10%)	Haemophilus b	13
	DTaP-IPV*	12
	Influenza	10
	Hepatitis A	10
	MMRV*	10
Hospital Ambulatory Care (2%)	Influenza	38
	DTaP-HepB-IPV*	10
Hospital Inpatient Care (1%)	Hepatitis B	46
	Tdap*	36
Military Locations (3%)	Anthrax	21
	Influenza	21
	Hepatitis A	17
	RV5 (rotavirus)	13
	Yellow Fever	8
Community Pharmacies (2%)	Influenza	75
	Zoster	20

Full generic names can be found in Table 2.

SAFETY wires

Transdermal patches and heat sources. While hospitalized, a woman with multiple myeloma was placed on transdermal fentaNYL (DURAGESIC) 25 mcg per hour for back pain management. The patient had previously suffered two vertebral compression fractures. When discharged, the woman continued using the patches. During the first 2 weeks, she was doing well. But soon thereafter, a family member noticed that the patient seemed disoriented, was losing her balance, and had nausea and vomiting.

The family discovered that the fentaNYL patch was being applied to the patient's back. At the same time, the patient routinely sat in her favorite recliner which vibrates and has a heating component that was activated. The heat from this chair over the area that the patch was applied likely led to the patient's symptoms of fentaNYL toxicity.

As mentioned in the product labeling, it's important to remind patients and caregivers to avoid exposing transdermal fentaNYL and other transdermal medication patches to heat from heating pads, electric blankets, heat or tanning lamps, sunbathing (even if the patch is under clothing or a bathing suit), hot baths, saunas, hot tubs, heat wraps, and heated water beds, as this could increase the rate of drug delivery from the patch into the body. Also, avoid tight coverings over the patch and strenuous exercise, which can heat the body.

The person who reported this event wanted us to remind patients that heated loungers and even vehicles with heated seats can affect absorption when the patch is exposed to these heat sources for more than a short time. Patients should be instructed to apply patches to skin that is not irritated

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Baxter

Supported by educational grants from Baxter and BD

BD

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associated with labeling and packaging concerns. An example of a reported hazard is the labeling of **RABAVERT** (rabies vaccine), which fails to draw attention to the required diluent and vaccine vials. The hazard may lead to administration of RabAvert diluent alone without the vaccine component.

The vast majority of vaccine error reports were submitted by practitioners who work in outpatient settings (**Table 1** on page 1) where most children and adults receive vaccines. Given its voluminous use, influenza virus vaccine errors were among the most frequently reported, accounting for 16% of all reports. However, errors related to other vaccines

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Table 2. Top contributing factors associated with vaccines most frequently cited in reports

Vaccine	% of All Reports	Top Contributing Factors	
			%
Influenza Virus *Trivalent, Types A and B*	16	Age-dependent formulation of same vaccine	19
		Not familiar with dosing of the product	7
		Patient age not verified before administration	6
DTaP-IPV *Diphtheria and Tetanus Toxoids, Acellular Pertussis Adsorbed, and Inactivated Poliovirus*	13	Not familiar with indicated ages for product	32
		Age-dependent formulation of same vaccine	17
		Patient age not verified before administration	4
HepA *Hepatitis A, Inactivated*	12	Age-dependent formulation of same vaccine	40
		Not familiar with dosing of the product	31
		Patient chart not checked prior to administration	6
Tdap *Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Adsorbed*	10	Similar vaccine abbreviations	18
		Not familiar with product(s)	8
		Similar generic names	8
HPV4 *Human Papillomavirus (Types 6, 11, 16, 18), Recombinant*	8	Stored at temperature greater than recommended	17
		Stored at temperature lower than recommended	13
		Not familiar with product(s)	11
DTaP *Diphtheria and Tetanus Toxoids and Acellular Pertussis Adsorbed*	7	Patient age not verified before administration	14
		Routine check for expired products not conducted	9
		Similar generic names	8
MMRV *Measles, Mumps, Rubella, and Varicella Virus Live*	6	Not familiar with indicated ages for product	10
		Similar vaccine container labels/packaging	6
		Products stored near one another	6
HepB *Hepatitis B (Recombinant)*	6	Age-dependent formulation of same vaccine	14
		Not familiar with dosing of product	8
		Similar vaccine container labels/packaging	6
DTaP-IPV/Hib *Diphtheria and Tetanus Toxoids, Acellular Pertussis Adsorbed, Inactivated Poliovirus, and Haemophilus b Conjugate*	4	Not familiar with how to mix or prepare the product	19
		Miscommunication of vaccine order	3
		Not familiar with indicated ages for product	3
Hib *Haemophilus b Conjugate (Tetanus Toxoid Conjugate)*	4	Patient age not verified before administration	8
		Confusion regarding components of vaccine	6
		Not familiar with indicated ages for product	6
DTaP-HepB-IPV *Diphtheria and Tetanus Toxoids, Acellular Pertussis Adsorbed, Hepatitis B (Recombinant), and Inactivated Poliovirus*	4	Patient chart not checked before administration	8
		Patient age not verified prior to administration	5
		Similar vaccine container labels/packaging	5

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or exposed to radiation treatments. They should also understand that the patch can be placed on the chest, back, flank, or upper arm. It does not need to be placed directly on or near the area of pain because the drug works systemically regardless of where the patch is placed on the body.

PCA pump security issue. Did you know it's possible to purchase keys on eBay or Amazon to unlock patient-controlled analgesia (PCA) pumps? They may be available on other websites, too. When we searched, we found keys for CADD-Solis pumps, Hospira LifeCare PCA 3, Baxter PCA II syringe pump, and several other current and older model infusion pumps. Some pumps may not just rely on a key but may have other security features such as software codes to activate locking mechanisms. Be sure to engage or activate these other security features whenever possible. If the volume in an opioid infusion bag on a PCA pump begins to dwindle unexpectedly, without any other explanation after a thorough investigation, your PCA pump locking mechanism may have been compromised.

Farxiga and Fetzima mix-ups. The US Food and Drug Administration (FDA) is aware of several reported mix-ups due to name confusion between two medications—**FARXIGA** (dapagliflozin) and **FETZIMA** (levomilnacipran). Farxiga was approved in January 2014 to lower blood glucose levels in adults with type 2 diabetes when used along with diet and exercise. It is available in 5 and 10 mg tablets. Fetzima was approved in July 2013. It is a selective norepinephrine and serotonin reuptake in-

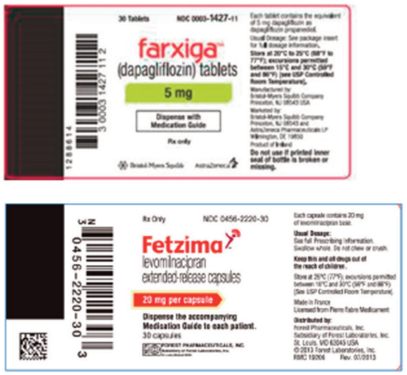

Figure 1. Drugs have been confused due to name similarity.

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were more common in specific settings based on the typical populations served. For example, errors with the hepatitis A (HepA) and human papillomavirus (types 6, 11, 16, 18) (HPV4) vaccines were most commonly reported by staff in public health immunization clinics, and errors with the anthrax vaccine were most commonly reported by staff at military locations.

Medical assistants (27%), registered nurses (23%), and licensed practical nurses (11%) were most frequently involved in the reported errors. Physicians (8%), nurse practitioners (5%), and pharmacists (2%) were involved less frequently in the reported errors, suggesting that most of the reports we received were related to vaccine administration and not prescribing or dispensing. Medical assistants were most often involved in events that occurred in medical clinics, physician offices, or hospital ambulatory care facilities. Registered nurses were most often involved in events that occurred in public health clinics and pediatric facilities. These statistics may reflect the groups most likely to administer vaccines in these locations and report errors to the ISMP VERP.

The most frequently reported vaccine errors can be found in **Table 2** (page 2), along with the most prevalent contributing factors for each vaccine. The Table also lists the full generic names of vaccines abbreviated in this report as established by the Advisory Committee on Immunization Practices (ACIP) (www.ismp.org/sc?id=278). Among all vaccine errors, age-related contributing factors were reported most often.

Influenza Virus Vaccine

The influenza vaccine is available in various formulations that differ based on patient age:

- ≥ 6 months **FLUZONE, FLUZONE QUADRIVALENT**
- ≥ 3 years **FLUARIX, FLUARIX QUADRIVALENT, FLULAVAL, FLULAVAL QUADRIVALENT**
- ≥ 4 years **FLUVIRIN**
- ≥ 9 years **AFLURIA***
- ≥ 18 years **FLUCELVAX, FLUBLOK**
- 2 - 49 years **FLUMIST QUADRIVALENT**
- 18 - 64 years **FLUZONE INTRADERMAL**
- ≥ 65 years **FLUZONE HIGH-DOSE**

**Package insert says ≥ 5 years, but ACIP discourages use in children less than 9 years due to risk of febrile reactions.*

Thus, it is not surprising that the most common type of influenza vaccine error reported to the ISMP VERP was related to administration of a vaccine to a patient who was not within the indicated age range for that vaccine. Most often, these errors were caused by a lack of knowledge regarding the age-dependent formulations or a failure to verify the patient's age before administration to ensure the correct formulation was being administered. Also, the dosing (and volume) of various influenza vaccines differs in adults and children, which has led to dosing errors.

Some influenza vaccine errors were associated with mix-ups between vaccines with similar brand names or look-alike vaccine container labels or packaging, particularly when products accidentally found their way into the wrong bin or storage area or were kept in crowded storage areas. The vaccine has also been confused with other drugs. For example, in multiple cases, school nurses administering influenza vaccines to teachers accidentally prepared and administered insulin (www.ismp.org/sc?id=455). A few errors were also associated with the administration of expired vaccines, and confusion regarding the correct route of administration or the correct administration technique. For example, two reported events during this influenza season dealt with administration of influenza vaccines to body sites that did not contain enough muscle—too high on the shoulder in one case, and too far back in the fatty tissue of the arm near the armpit in the other case. Both injections led to prolonged pain and significant adverse local reactions. We have also received numerous reports of administration of the intramuscular vaccine via the intranasal route.

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hibitor for major depressive disorder. The drug is available in 20, 40, 80, and 120 mg extended-release capsules.

Upon review of 5 medication error reports received by FDA, it is believed that the errors can largely be attributed to both drug names beginning with the letter F and ending with the letter A, and are of the same length and number of syllables. Also, the drugs were approved and marketed within 6 months of one another. Prescribers and pharmacists may choose the wrong item from computer screens if they use the brand name instead of the generic name to search, and if they are not familiar with the correct spelling of the brand names. Furthermore, the container labels might appear similar since both display the proprietary name of the product in red font (**Figure 1**, page 2), and the strength display may not be prominent enough to differentiate.

If these drugs are used in your hospital, consider adding computer alerts to verify the indication for these medications. Prescribers should include the indication with orders or prescriptions. Hopefully, as practitioners become more familiar with the two products, name confusion errors will diminish. This drug name pair has been added to the *ISMP List of Confused Drug Names* (www.ismp.org/sc?id=492).

Law firm advertisements. Readers have notified us about advertisements being run by at least two national law firms that mention findings from ISMP's *QuarterWatch*™ reports about the newer oral anticoagulants and bleeding risk. ISMP remains a nonprofit, unbiased organization and does **NOT** get involved with law firms working on malpractice suits. These firms quote material that was published as part of our advocacy efforts and is in the public domain, so its use cannot be restricted.

What else is stored in a refrigerator with influenza vaccine? During the flu season, some hospitals provide boxes of influenza vaccine to the emergency department (ED) and nursing units to store in their unit-based medication refrigerator to facilitate vaccine administration. Although we would much rather see patient-specific doses dispensed

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DTaP (DAPTACEL, INFANRIX), Tdap (ADACEL, BOOSTRIX), DTaP-IPV (KINRIX), DTaP-HepB-IPV (PEDIARIX), or DTaP-IPV/Hib (PENTACEL) vaccines

The dominant issues reported with these vaccines are the same issues that have long been reported to ISMP and the US Food and Drug Administration (FDA)—confusion between the different age-dependent formulations and combination products that have led to administration of the wrong vaccine. For example, more than 50 errors have been reported in which DTaP (diphtheria and tetanus toxoids, acellular pertussis) was administered instead of Tdap (tetanus toxoid, reduced diphtheria toxoid, acellular pertussis), or vice versa. Tdap is for older children and adults as a booster dose, and DTaP is intended for children between 6 weeks and 6 years of age for initial immunization. Reports also suggest that Tdap has been mistakenly administered instead of Td (tetanus, diphtheria). In some cases reported to ISMP before establishing the VERP, hundreds of patients were involved in a single mix-up.

Several reports suggest that packaging similarities have also led to mix-ups between Kinrix and Pediarix, and Tdap and Pediarix. Similar or identical cap colors on vials have led to Kinrix administration instead of HPV (human papillomavirus vaccine). Hepatitis B (recombinant) (HepB) vaccine has been mistaken as Adacel given similar orange coloring on the vials. Vaccine vials placed in the wrong bin in automated dispensing cabinets have also led to unintended vaccinations.

We have received dozens of reports of patients given a combination vaccine when only one component was needed or when components in the administered vaccine differed from those that were intended. For example, numerous reports involved administration of Kinrix by staff who mistakenly thought it contained HepB, and misadministration of Pediarix, believing it contained Hib (*Haemophilus influenzae* type b conjugate), not IPV (inactivated poliovirus). Complex vaccination schedules have contributed to mistakes with the timing of these vaccines, particularly when children are following an alternate or delayed schedule of immunizations. We have also received numerous reports of children 7 years and older receiving Pediarix (DTaP-HepB-IPV), which is intended for younger children (i.e., at 2, 4, and 6 months of age).

Another problem detailed in numerous reports involved administration of a single vaccine already contained in a combination vaccine given at the same time. For example, one patient received Pentacel along with separate DTaP and IPV vaccinations, thus receiving duplicate DTaP and IPV along with the Hib component in Pentacel. Giving just one component instead of the intended combination vaccine has also been reported. Confusion has led to administration of both Pediarix and HepB instead of the intended Hib, which can sound or look like "HepB." Thus, extra doses have been an ongoing problem with the combination vaccines.

Errors reported with Pentacel continue to include administration of just one of the two required vials of product. One vial contains DTaP-IPV liquid and the other contains Hib powder. An event reported recently involved a nurse who reconstituted Hib powder using sterile water instead of using the DTaP-IPV liquid included in the Pentacel carton. One thing is clear—2 years of data in the ISMP VERP confirms that confusion abounds given the plethora of incorrect abbreviations used for this group of vaccines and erroneous statements in the narrative reports regarding the actual components of combination vaccines, dosing schedules, and intended ages.

Hepatitis A (HAVRIX, VAQTA) or hepatitis B (ENGERIX-B, RECOMBIVAX HB) vaccines

The most frequent errors reported with HepA and HepB vaccines involved dosing errors in which a child received an adult's dose or an adult received a child's dose, mix-ups between the two vaccines, and timing errors in which the vaccines were given at the wrong age or interval—usually too soon after the first dose. In 2014, there were also nu-

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from the pharmacy, if your facility provides stock vials of influenza vaccine, make sure there are no other refrigerated look-alike vials (vial volume, shape, color, labeling) with which the vaccine might be confused.

In November 2014, we published an article about a measles vaccine diluent that was confused with atracurium, which resulted in the deaths of 15 children in Syria. But we also listed similar mix-ups between neuromuscular blockers and influenza vaccines in the US, at least one of which was a fatal event. All of these products were stored near one another in hospital refrigerators. In addition, we've received multiple reports of influenza vaccine being mixed up with insulin, and, also in November 2014, a mix-up was reported with tuberculin purified protein derivative (PPD), which led to 41 correctional officers receiving intradermal injections of influenza vaccine (www.ismp.org/sc?id=454).

While look-alike packaging can contribute to errors, nomenclature issues can also arise. We just learned about a close call in which boxes of **DEFINITY** (perflutren lipid microspheres), used for cardiac imaging, were stored in an intensive care unit (ICU) refrigerator where influenza vaccine was normally kept during the flu season. The "perflutren" nomenclature, which contains the syllable "flu," confused some staff, who initially thought it might be a new brand of influenza vaccine. It's unclear why Definity would need to be stored in a nursing unit refrigerator, but it was. We've also seen this when visiting hospitals as safety consultants.

Instead of storing Definity on nursing units, cardiac staff should bring it with them for bedside echocardiograms. The bottom line is to routinely check on how medications and vaccines are stored in refrigerators and segregate as necessary to prevent mix-ups form occurring. Also, the importance of barcode scanning prior to administration can't be overemphasized as a way to identify and reduce these types of errors.

Yet another expiration date issue. Add yet another problem with the way expiration dates appear on drug products. The **NITRO-DUR** (nitroglycerin) patch from Key

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merous reports of patients receiving an extra dose of the vaccine due to inaccuracies in state immunization registries or duplicate orders entered into an electronic record. Even when immunization records were accurate, doses given at too-short intervals were reported without a clear explanation regarding why it happened.

Specific to HepB, several reports indicated that an infant had received the first vaccine dose at birth while in the hospital, but the physician's office staff was unaware of this information and administered an extra dose in the series to a child during the first year. The reports imply that the parents were responsible for reporting the birth dose to the physician's office and had failed to do so. A worse problem is when the vaccine is not given at birth (within the first 12 hours of life) prior to hospital discharge, and may be missed entirely.

Repeated mix-ups have been reported between the two vaccines and others, specifically Hib, the influenza vaccine, and HPV4. Close proximity of vaccines in refrigerators was often cited as a factor. In one report, a nurse reached into the refrigerator to obtain a HepB vaccine, but she accidentally pulled out a vial of HepA vaccine, which was sitting right beside it. The nurse read the label but only verified "hepatitis" and subsequently gave the dose to the child. Numerous reports have also been received regarding the administration of both Engerix-B and Pediarix, which both include a hepatitis B component.

Human papillomavirus vaccine (HPV4) (GARDASIL)

Most of the errors reported with HPV4 were due to temperature extremes in which the vaccine was exposed to temperatures greater than or less than recommended. In one case, three vials that had been exposed to excessive temperatures for an extended period of time were gathered to be returned to the pharmacy provider. However, these three vials were inadvertently used to immunize patients at a pediatric health facility, as they were not labeled as unusable or sequestered away from other medication supplies. A few errors occurred when the vaccine was administered to children younger than 9 years of age or when the vaccine was given unnecessarily beyond the recommended series. Mix-ups have also been reported between HPV4 and other vaccines, including human papillomavirus (types 16, 18) (HPV2), which was administered to male patients by staff who believed it was HPV4. Mix-ups with HepB, IPV, and **PNEUMOVAX 23** (pneumococcal polysaccharide) (PPSV23) vaccines have also been reported.

Measles, mumps, rubella, and varicella vaccine (MMRV) (PROQUAD)

The MMRV vaccine has been erroneously administered via the intramuscular route rather than the subcutaneous route. A few errors involved vaccine administration to an infant less than 12 months or children older than 12 years. Mix-ups in the schedule of doses have also been reported, particularly when international travel was anticipated. Recently, numerous reports note that patients received ProQuad and a varicella vaccine at the same time. Several of these reports reveal that staff members administering the vaccines did not know that varicella was a component of ProQuad. Other reports indicated that only "MMR" was seen when quickly viewed on the ProQuad box label, so the product was thought to contain only measles, mumps, and rubella vaccine. ProQuad has also been given in error when only MMR has been prescribed. In September 2014, 15 children died in Syria after the diluent used to reconstitute a measles vaccine turned out to be atracurium, a neuromuscular-blocking agent. Given that ProQuad is supplied in single-dose vials of lyophilized vaccine along with vials of sterile water diluent, reconstitution with the wrong diluent is likewise possible with the MMRV vaccine.

Wrong patient errors

Unrelated to a specific type of vaccine, we continue to receive multiple reports of vaccines administered to the wrong child when more than one child was present in the exam room or medication administration area. Several of the reports describe the confusion that ensues when several children are crying and a parent is trying to calm them down. Parents often bring siblings into the office for immunizations together, raising the risk of

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Pharmaceuticals (**Figure 1**) embosses the lot number and expiration date over a corrugated area that seals the protective paper outerwrap. Unfortunately, this makes the date nearly impossible to read and the numbers 3 and 5 difficult to distinguish. An illegible expiration date on a nitroglycerin patch can result in negative outcomes for cardiac patients.

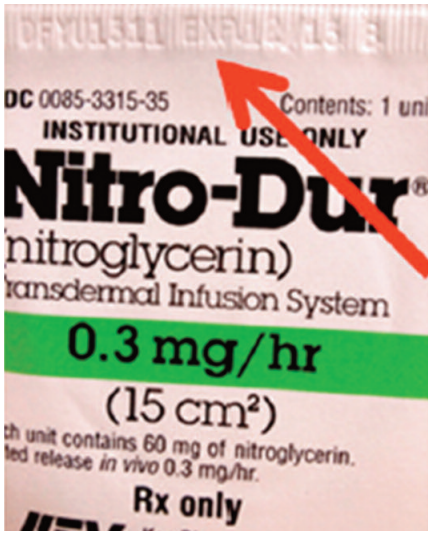

Figure 1. Embossed print is nearly impossible to decipher.

In our November 20, 2014 acute care newsletter, we mentioned a situation in which a nurse used a lactulose product, by Pharmaceutical Associates, that was past its expiration date because the lot number "2D15" looked more like 2015 next to the actual expiration date of "04/14" (04/14 2D15). Manufacturers have also used dates such as 15MAR14, which could be understood as March 14, 2015, or March 15, 2014, or the companies have abbreviated a month such as JN or MA 2014, which could be January or June, or May or March, respectively.

ISMP has asked the US Food and Drug Administration (FDA) and the US Pharmacopeial Convention (USP) to ensure that manufacturers use specific expiration date formats that express dates in a uniform sequence to clearly communicate the date in a consistent and unambiguous manner. Manufacturers should also avoid packaging features that might interfere with the legibility (e.g., printing on shiny foil, corrugated areas, end seals on shrink-wrap).

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giving one child a vaccine intended for another child. To cite an example, an infant was supposed to receive DTaP and his toddler sister was to receive a HepA vaccine. But the infant received the HepA vaccine before the mix-up was discovered. In this case, the mother of the children reported the error to ISMP, thus additional information was not provided. In another case, ProQuad intended for a young boy was given to his 13-year-old sibling.

Wrong diluent errors

While several examples of using the wrong diluent to prepare vaccines were reviewed above, errors of this type were reported frequently for several other vaccines. There are currently 12 vaccines that have specific diluents, and 2 vaccines that have two-component containers that must be mixed prior to administering the dose (www.ismp.org/sc?id=364). Typically, the practitioner dispensed or administered just the manufacturer-supplied diluent, or the practitioner reconstituted a lyophilized vaccine using an unintended diluent instead of the specific diluent provided. These errors were reported most frequently with the Hib vaccine, which comes with a vial of 0.4% sodium chloride, provided by the manufacturer, to be used as a diluent. Reported errors with these vaccines frequently involve multiple patients. In other cases, a practitioner dispensing or administering the vaccine failed to notice that a single dose requires combining the contents of two vials. Many times, these vials look very similar and both may emphasize the name of the active drug. Several errors also suggest that practitioners may mistakenly believe the "liquid" component of the vaccine is just a standard diluent. These errors were reported most frequently with **MENVEO** (meningococcal [groups A, C, Y, and W-135] diphtheria conjugate) and Pentacel.

Conclusion

The ISMP VERP 2-year summary provides new details regarding how vaccine errors happen, which we will continue to use as we hone in on vaccine safety. In the next few months, we plan to publish a follow-up article (Part II) recapping the main risks and offering recommendations to reduce the risk of vaccine errors. We extend our sincere thanks to those who have submitted reports to the ISMP VERP (http://verp.ismp.org/), and we encourage all of our readers to join in these efforts.

New ISMP CE on Perioperative Medication Safety

The perioperative (operating room) environment is a high-risk, complex area where medication errors lead to disproportionately more harm than errors elsewhere in the hospital. ISMP is now offering nurses the opportunity to earn **FREE** CE credit on perioperative medication safety through a convenient on-demand webinar. The webinar features leading national experts discussing often-unrecognized problems, actual cases where errors have occurred, relevant regulatory and/or accreditation requirements, and how one organization successfully implemented risk reduction strategies in the surgical setting. To access the webinar and earn 1.5 hours of nursing CE credit, go to: www.proce.com/activities/activity_detail?id=299.

Special Announcements

ISMP webinars

Join us on **April 30** for ***The Human Dimension: When Being Human Gets in the Way of Medication Safety***. While the importance of designing reliable systems in healthcare should not be understated, viewing a mishap from the sharp end, at the human contribution to error, is critical—and interesting! During the webinar, a model of the brain's information processing system will be presented. The focus of the program will include both human and system conditions that degrade human performance, and present strategies to reduce their impact on medication safety.

Join us on **May 27** for ***Expanding Barcode Medication Administration: Making a Difference in the Emergency Department (ED) and Other Outpatient Settings***. The safety benefits of barcode technology have not been as quickly adopted in many outpatient clinical locations, such as the ED, oncology clinics, and dialysis locations, where a large number of high-alert medications are administered. Get an inside look at the implementation of bedside barcode scanning in clinical areas once thought to be "off limits" for this type of technology.

Join us on **June 24** for our ***2015 Update on The Joint Commission Medication-Related Standards***. Learn the most troublesome Medication Management Standards and National Patient Safety Goals along with successful approaches taken by healthcare organizations to accomplish the intent of these Standards. A second presenter will provide personal insight into the Standards, based on a recent Joint Commission survey at a large, nonprofit, teaching hospital.

For details, visit: www.ismp.org/sc?id=349.

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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.