January 14, 2021 ■ Volume 26 Issue 1

ISMP An ECRI Affiliate

Acute Care ISMP Medication Safety Alert!®

Educating the Healthcare Community About Safe Medication Practices

Learning from errors with the new COVID-19 vaccines

Problem: In mid-December, the US Food and Drug Administration (FDA) granted emergency use authorization (EUA) to both the Pfizer-BioNTech and Moderna coronavirus disease 2019 (COVID-19) vaccines. Since then, ISMP has received numerous voluntary reports of COVID-19 vaccine errors or hazards through the ISMP National Vaccine Errors Reporting Program (VERP), the ISMP National Consumer Medication Errors Reporting Program (C-MERP), and via email correspondence from professional colleagues. (See the last recommendation on **page 5** regarding a mandatory requirement to report all COVID-19 vaccine errors and adverse reactions to the Vaccine Adverse Event Reporting System (https://vaers.hhs.gov). The following highlights a few of the missteps happening across the nation and internationally, from vaccine dilution errors to look-alike product mix-ups. There is much to be gleaned from these reports, as the same types of errors are likely happening globally, and similar risks exist in most settings. We conclude with safe practice recommendations to help prevent these types of errors in your practice setting.

Dilution Errors

Four dilution errors were reported with the Pfizer-BioNTech COVID-19 vaccine, which was granted EUA for immunization to prevent COVID-19 in individuals 16 years and older. After thawing, each Pfizer-BioNTech multiple-dose vaccine vial contains 0.45 mL, which must be diluted using 1.8 mL of preservative-free (not bacteriostatic) 0.9% sodium chloride injection. Once properly diluted, each vial contains 6, perhaps even 7, doses when using low dead-volume syringes/needles to extract each 0.3 mL (30 mcg) dose. The vaccine is administered intramuscularly (IM) as a series of 2 doses 3 weeks apart.

Dilution errors result in administering too much or too little vaccine. If you add too much diluent, doses may be ineffective; if you add too little diluent, doses may invoke stronger adverse effects (if one happens). In one reported case, mixing the vaccine with too little diluent was suspected when only 0.25 mL remained in the multiple-dose vial when attempting to access the fifth dose. As instructed in the *Fact Sheet*, the 0.25 mL of remaining vaccine was discarded (rather than pooled with excess vaccine from other vials). The previous four doses may represent overdoses.

According to a second report, an inadequate volume of diluent (approximately 1 mL) was added to the vaccine vial. Before the error was discovered, a 60-year-old patient received a nearly 2-fold overdose during his first vaccine dose. The patient had no initial reaction to the overdose and was discharged after an hour, with follow-up calls planned for the next 48 hours. Clinic staff called a Pfizer representative to determine if the patient's second vaccine dose should be altered, but no immediate guidance was offered.

The third dilution error was similar to the previous error in that only 1 mL instead of 1.8 mL of 0.9% sodium chloride injection was used to dilute the vaccine. Again, only one clinic patient received the nearly 2-fold overdose before the error was caught. No details were provided regarding the patient's response to the overdose.

In the last case, which happened internationally, eight healthcare workers in a long-term care (LTC) facility received the entire vial contents (0.45 mL), without dilution, for their first dose of the Pfizer-BioNTech vaccine. Four of the eight workers were hospitalized as a

continued on page 2 — Vaccine errors >

SAFETY briefs

Bamlanivimab confused with belimumab. Four residents at a long-term care (LTC) facility received 700 mg of belimumab (**BENLYSTA**) instead of the intended bamlanivimab intravenously (IV). Belimumab is indicated for patients with active systemic lupus erythematosus or active lupus nephritis who are also taking other lupus medications. Bamlanivimab was granted emergency use authorization (EUA) for the treatment of mild to moderate coronavirus disease 2019 (COVID-19) in adults and children 12 years and older (weighing at least 40 kg) who are at high risk for progressing to severe COVID-19 and/or hospitalization. This event began when a nurse at the LTC facility called the offsite pharmacy with orders but either mispronounced or misread bamlanivimab. The pharmacist heard belimumab, which he prepared and dispensed. The preparations were infused over 60 minutes, but no adverse reactions were reported for any of the residents.

There are several elements in common with belimumab and bamlanivimab. Each drug is added to a 250 mL intravenous (IV) bag of 0.9% sodium chloride injection. Other diluents may also be used with belimumab, but 0.9% sodium chloride injection is one of the recommended base solutions. Also, the dosages can overlap. The pharmacist did not question the dose of 700 mg for belimumab because it aligned with the patients' weights and it fell within a safe dosing range. Both are infused IV over 60 minutes. Bamlanivimab is available in 700 mg vials, while belimumab comes in 120 mg and 400 mg vials for IV use, and in a prefilled syringe or autoinjector for subcutaneous injection. In this case, the pharmacist processing the order was not familiar with either drug. Apparently, the preparations, labeled as belimumab, did not raise a red flag at the LTC facility, either. The incident occurred just as bamlanivimab use was increasing for patients with early

continued on page 3 — SAFETY briefs >

> Vaccine errors — continued from page 1

precaution after experiencing flu-like symptoms from the overdose. According to BioNTech, doses up to 100 mcg (30 mcg is the recommended dose) were administered during a clinical trial of the vaccine, with only mild to moderate, transient local injection site reactions and flu-like symptoms being reported. No serious adverse effects were reported with administration of the higher doses. A similar error happened in Israel because a vaccinator did not know the Pfizer-BioNTech vaccine contained multiple doses (www.ismp.org/ext/625).

The Moderna COVID-19 vaccine does NOT require dilution. After thawing, each Moderna multiple-dose vaccine vial contains 10 (perhaps 11) doses of 0.5 mL each. To date, we have not received any reports of unnecessary dilution of the Moderna vaccine.

Vaccine and Monoclonal Antibody Mix-Up

Instead of receiving the first dose of the Moderna COVID-19 vaccine, 44 adults (77 years and older) at a West Virginia (WV) clinic received IM injections of casirivimab, one of two new Regeneron monoclonal antibodies recently granted EUA in the US to treat adults and children (12 years or older weighing at least 40 kg) with mild to moderate COVID-19 who are at risk for progressing to severe COVID-19 and/or hospitalization. The two monoclonal antibodies, casirivimab and imdevimab, are intended to be administered together as an intravenous (IV) infusion. They are supplied in individual, 2.5 mL or 11.1 mL single-dose vials. To prepare the infusion, 10 mL of casirivimab and 10 mL of imdevimab must be withdrawn into separate syringes and then diluted in the same 250 mL bag of 0.9% sodium chloride injection. Any product remaining in the vials must be discarded.

The mix-up between the Moderna vaccine and casirivimab started during the distribution process. The county health department dispatched two individuals from the National Guard to retrieve COVID-19 vaccine supplies from an area medical center for the WV clinic. When the individuals arrived at the medical center, they signed a chain-of-custody form stating that the product they were picking up was the "Moderna COVID-19 vaccine." The small white case they were given mentioned REGN10933 (**Figure 1**, above right), which the individuals did not recognize as a monoclonal antibody. According to media reports (www.ismp.org/ext/626), nothing on the white case led the individuals to believe it was not the vaccine listed on the chain-of-custody form. Instead, they thought it must be special labeling for the new vaccine. The case was then transported to the clinic. Inside the case, the vial cartons and vials were, again, only labeled with REGN10933, not the product name (**Figure 2**, middle right). Unfortunately, the error was not recognized, and casirivimab was administered IM to the patients instead of the vaccine. No serious adverse reactions were reported, and patients were offered the vaccine as soon as possible.

Although we do not have a detailed description of why the error happened, product packaging and labeling issues were likely involved. Both the Moderna vaccine and the Regeneron monoclonal antibody are available in 5 mL glass vials. The vaccine vial contains 5 mL (10 doses of 0.5 mL each) while the vials of the monoclonal antibodies are partially full and contain 2.5 mL. It should be noted that both of the Regeneron antibodies (casirivimab and imdevimab) are available in larger vials containing 11.1 mL, which may have been used at the time of the error. Vials of both the Regeneron antibodies and the Moderna vaccine have identical red caps (**Figure 3**, bottom right). If the clinic staff had previously administered the Moderna vaccine, they may have been expecting a vial with a red cap, similar to the monoclonal antibody, casirivimab, packaged in a vial with a red cap.

Also, our December 3, 2020, newsletter called attention to the labeling problems with Regeneron's casirivimab and imdevimab, which clearly played a role in the mix-up. Two versions of vial and carton labels for each monoclonal antibody exist, which were used during investigational trials. Neither version includes the name of the specific antibody contained within and instead lists a product code number for casirivimab (REGN10933) and imdevimab (REGN10987). Although a barcode is on the vial label, it is not functional or tied to a National Drug Code (NDC) number. Initially, supplies of these monoclonal an-

continued on page 3 — Vaccine errors >

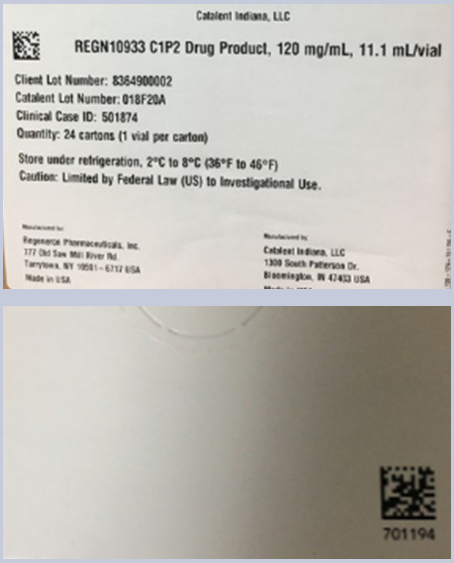

Figure 1. Front (top) and back (bottom) of a case of a Regeneron monoclonal antibody, which is labeled with a product code name (REGN10933), not the established name, casirivimab.

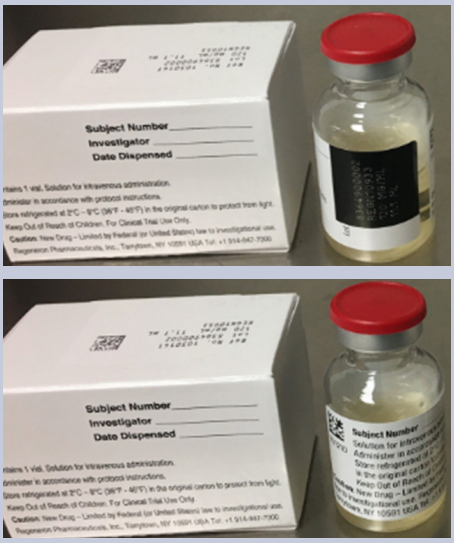

Figure 2. Vial carton and front (top photo)/back (bottom photo) of a vial of Regeneron's casirivimab is labeled with a product code name, not the established name.

Figure 3. The Moderna COVID-19 vaccine vial has a red cap, similar to the red cap on vials of Regeneron's monoclonal antibodies (see **Figure 2**).

> Vaccine errors — continued from page 2

tibodies affixed with investigational new drug (IND) labels were used to meet the immediate demands for this COVID-19 treatment option. Regeneron confirms that a third version of the carton and vial label (www.ismp.org/ext/601) meant for EUA use is now being applied to the product and hopefully will be in the field in a few weeks. These EUA-specific labels are color differentiated and include a functioning barcode. While the cap color will remain red for now given current stock, we hope the cap colors will eventually match the new label color schemes. ISMP also believes Regeneron should consider packaging a vial of casirivimab with a vial of imdevimab in a single carton, or mixing the two monoclonal antibodies in a single vial if possible, since they must be administered together.

Waste of Vaccine Doses

ISMP received one report of vaccine contamination and several emails about concerns associated with unnecessary waste of the COVID-19 vaccines. In the reported event, a vaccinator found that one of the pharmacy-prepared syringes of the Pfizer-BioNTech COVID-19 vaccine dispensed that morning did not have a cap over the needle, and that the safety shield was locked over the needle. The vaccine dose was appropriately discarded.

We also learned that Operation Warp Speed, the federal COVID-19 vaccine response, has been shipping out a variety of syringe types since vaccinations began, some of which are not low dead-volume syringes and, thus, not efficient enough to extract more than 5 doses from the Pfizer-BioNTech vaccine or more than 10 doses from the Moderna vaccine vials (www.ismp.org/ext/627). While the number of doses withdrawn from a vial is influenced by the healthcare worker's technique, using a syringe designed to limit the dead space between the syringe hub and needle reduces the amount of wasted vaccine and increases the ability to extract an extra dose(s) from COVID-19 vaccine vials.

Finally, we learned about concerns regarding the waste of leftover vaccine doses. Some of the wasted vaccines were due to cancellations of scheduled vaccine appointments or "no-shows" exacerbated by leadership miscommunications regarding vaccine scheduling. The rest of the wasted vaccines were due to leftovers at the end of the day. Since both the Pfizer-BioNTech and Moderna vaccines must be used within 6 hours after dilution (Pfizer-BioNTech vaccine) or vial puncture (Moderna) and cannot be refrozen or refrigerated again, facilities with leftover doses in vials or prefilled syringes at the end of the day are sometimes scrambling to find unvaccinated people or are wasting the unused doses. One vaccinator thought that leadership might be less concerned about the waste because the government is paying for every vaccine dose, even wasted doses. But high vaccine waste could lead to extending the pandemic unnecessarily.

Administration to the Wrong Age Group

A 17-year-old at one clinic received the Moderna vaccine instead of the Pfizer-BioNTech vaccine, and a 15-year-old at another clinic inappropriately received the Moderna vaccine. According to the EUAs, the Pfizer-BioNTech vaccine is intended for individuals 16 years and older, and the Moderna vaccine is intended for individuals 18 years and older.

Error with Scheduling the Second Dose

An elderly patient who had received his initial Moderna COVID-19 vaccination reported that he had misspelled his email address on a registration form, which was needed for registration and confirmation of his appointment for his second dose 1 month later. The patient had been told he would receive an email providing instructions to register for his second vaccination and then to confirm his next appointment. Because of the misspelled email address, the patient never received directions for registering for his second vaccination. Although he contacted the facility where he received his first dose, as well as the state health department, he was unable to register for his second vaccination.

Allergic Reactions

ISMP received two reports of serious but not life-threatening allergic responses to the Pfizer-BioNTech vaccine that required immediate treatment and overnight hospitalization.

continued on page 4 — Vaccine errors >

> SAFETY briefs

cont'd from page 1

COVID-19 symptoms and a positive COVID-19 test, so personnel were not as familiar with the product.

With ever-increasing numbers of monoclonal antibodies reaching clinical practice, confusion between these products is growing given generic name similarities. For this reason, it is critically important to adhere to the basics. Limit verbal orders to true emergencies or circumstances in which the prescriber is physically unable to electronically transmit, write, or fax orders. When verbal orders cannot be avoided, enunciate orders clearly. The receiver should then read back the order, including spelling out drug names, as transcribed in the patient's medical record or onto a prescription pad. Prescribers should also communicate the purpose of the medication during the ordering process. Finally, it is important for organizations to ensure staff become familiar with new medications, especially COVID-19-related products.

Piqray labeling confusion. PIQRAY (alpelisib) is prescribed along with fulvestrant to treat specific forms of advanced or metastatic breast cancer. The standard dose is two 150 mg tablets (300 mg) daily. The product is packaged in a carton with a principal display panel that notes, "Two 14-day blister packs each containing 28 tablets." While the label also states that this is a "28-Day Supply," it fails to note the total number of tablets (56) inside the carton (**Figure 1**). This led to dispensing an extra carton during monthly refills for 2 patients.

In these cases, the reporter explained that pharmacy staff saw "28-Day Supply" on the carton and assumed they would need two boxes to reach the intended quantity of 56 tablets. The staff member did not understand that "Two 14-day blister packs each containing 28 tablets" meant there

continued on page 4 — SAFETY briefs >

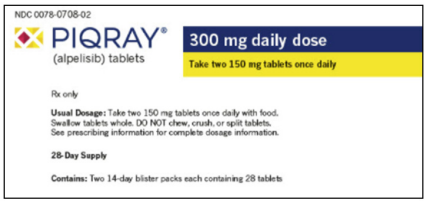

Figure 1. Piqray label prominently displays daily dose (300 mg) but does not prominently display the strength of each tablet (150 mg). The label also fails to specify the number of tablets per package (56).

> Vaccine errors — continued from page 3

Recently, the Centers for Disease Control and Prevention (CDC) (www.ismp.org/ext/628) confirmed that, so far, 29 individuals have experienced a serious allergic response, mostly within minutes of receiving the vaccine. According to the CDC (www.ismp.org/ext/631), this equates to a rate of 11.1 per million doses, making it a rare outcome. Most individuals who had a severe allergic reaction had a documented history of allergies.

Safe Practice Recommendations: While the voluntary reports and emails submitted to ISMP likely represent just the tip of the iceberg given the massive scope of the global COVID-19 vaccination campaign, please expect that mistakes will be made and, importantly, that lessons can be learned from them so steps can be taken to prevent their recurrence. While this is not a comprehensive list of all that can be done to prevent COVID-19 vaccination errors, consider the following targeted recommendations:

Safely select vaccination sites. Be sure vaccination sites have enough space to assess patients before vaccination, observe them after vaccination, and treat patients who experience a reaction, while maintaining social distancing and other pandemic precautions.

Verify the competency of vaccinators. Educate vaccination staff regarding the storage, preparation, and administration of the COVID-19 vaccines, as well as the common types of errors that may occur, including those described above. Provide vaccinators with an up-to-date *Fact Sheet for Healthcare Providers* for the vaccine(s) being used, and verify their competency regarding:

- Proper vaccine storage and temperature monitoring
- Patient assessment prior to vaccination
- Age indications for each vaccine (16 years and older for Pfizer-BioNTech, 18 years and older for Moderna)
- Providing patients with a *Fact Sheet for Recipients and Caregivers* before vaccination
- Proper dilution of only the Pfizer-BioNTech vaccine
- Withdrawal of the correct dose for each vaccine from multiple-dose vials using strict aseptic technique and low dead-volume syringes/needles
- Identification of the appropriate IM injection site (www.ismp.org/node/21714)
- Administration of the IM vaccine(s)
- Recognition of the signs and symptoms of an allergic reaction
- Emergency treatment of anaphylaxis (e.g., immediate IM injection of **EPINEPH**rine, transport for further medical care)
- Timing and scheduling of a second vaccine dose

Dispense pharmacy-prepared syringes. If feasible within the timeframe for vaccine stability at room temperature (6 hours) and patient scheduling, have the pharmacy verify the number of vaccines needed each day (to prevent waste) and dispense prefilled, labeled syringes of the vaccine for daily vaccination clinics. Check that the needle cap is secure on all vaccine syringes before dispensing.

Implement an independent double check. When preparing the Pfizer-BioNTech vaccine, require an independent double check of the dilution process (if staffing permits).

Maximize doses withdrawn from vials. Whenever possible, use low dead-volume syringes/needles to withdraw as many doses as possible of the COVID-19 vaccine from each vial (6 or 7 from the Pfizer-BioNTech vaccine vial and 10 or 11 from the Moderna vaccine vial) to reduce the amount of wasted vaccine.

Identify/differentiate monoclonal antibodies. If Regeneron monoclonal antibodies are received in investigational drug packaging without the product name on the case, vial carton, or vial (**Figures 1** and **2**, page 2), establish a process immediately upon receipt to identify and differentiate each antibody from other medications, including the Moderna COVID-19 vaccine. For example, the pharmacy at Beaumont Hospital in Royal

continued on page 5 — Vaccine errors >

> SAFETY briefs cont'd from page 3

were 56 tablets within the carton. In fact, some computer listings indicate "28" as the quantity. Piqray is available in other tablet strengths, and this type of confusion extends to the 250 mg daily dose but does not extend to the 200 mg daily dose because a 200 mg strength tablet is available. If a patient only needs one 200 mg tablet daily, and the carton contains 28 tablets, there is no risk of confusion.

ISMP also received a report from an inpatient pharmacist who indicated that Piqray displays in their electronic health record (EHR) as "Unit strength: 300 mg, quantity: 56 tablets, days supply: 28," which led staff to believe the tablet strength was 300 mg, 2 tablets daily, or 600 mg per day. This resulted in an inpatient order for an incorrect dose of 600 mg per day.

If your organization supplies Piqray, ensure that the EHR and pharmacy software correctly indicate the tablet strength, daily dose, and the correct quantity per box. Educate staff about potential confusion around the correct quantity and dose. For the 300 mg and 250 mg daily dose cartons, affix flags or reminders to indicate that one box contains 56 tablets and that only one box is needed for a 28-day supply. ISMP has contacted Novartis, the manufacturer of Piqray, to recommend updating the label to include the total number of tablets of each strength per package, as well as displaying the tablet strength (e.g., 150 mg) more prominently than the daily dose (e.g., 300 mg). Novartis agreed to follow up on these issues.

Discard rufinamide oral suspension within 90 days of opening. Rufinamide (40 mg/mL) oral suspension, a generic anticonvulsant from Hikma, should be discarded within 90 days after opening the bottle. This is noted in the product's package insert but not on the bottle or outer carton. The carton and bottle label for the reference rufinamide product, **BANZEL** (40 mg/mL) oral suspension from Eisai, mentions this important warning. The problem has been reported to Hikma. The company told us it has initiated a revision of the carton and bottle labeling to include this statement, which will be implemented in the next production cycle. For now, the facility that reported the problem is attaching auxiliary labels to the bottle to draw the patient's attention to the 90-day limit.

> **Vaccine errors** — continued from page 4

Oak, Michigan, affixes brightly colored labels (pink for casirivimab, green for imdevimab) that include the product name, strength, and a scannable barcode (**Figure 4**) to provide visual distinction and verify product selection prior to preparation. NDCs are available in the *Fact Sheets* and can be used to prepare the barcodes.

Separate vaccine storage. To avoid mix-ups, do not store the Pfizer-BioNTech and Moderna vaccines together in the refrigerator while or after thawing (e.g., use separate shelves). Do not place the vaccines close to the Regeneron monoclonal antibodies.

Plan for leftover vaccine. Ensure the vaccine scheduling process is efficient, accurate, and includes a reliable communication system to remind patients and confirm their appointments. Also establish a standard process (e.g., daily list of readily available alternative recipients) for dealing with any leftover doses at the end of a vaccination clinic (but within 6 hours of storage at room temperature). Consider preparing vaccines in small batches for confirmed appointments only to minimize leftover doses at the end of the day.

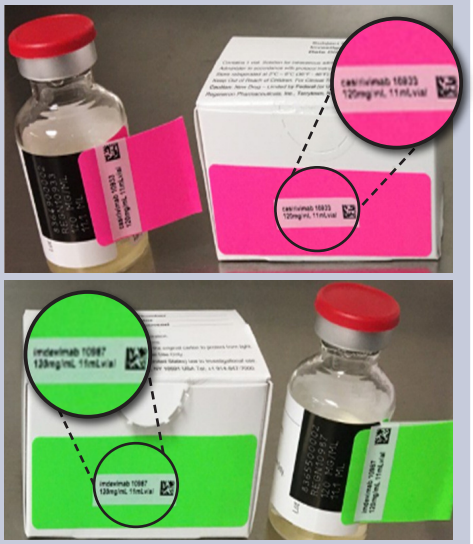

Figure 4. Hospital affixes barcoded, brightly colored labels to help differentiate investigational labels on casirivimab (top, pink) from imdevimab (bottom, green).

Be prepared for allergic reactions. At all vaccination sites, be prepared to immediately treat an allergic reaction. Make sure emergency equipment and medications (e.g., **EPINEPH**rine prefilled syringe or autoinjector, H_1 antihistamine such as diphenhydr**AMINE**) are readily available to staff. Monitor patients for at least 15 minutes after vaccination for signs of an adverse reaction, or at least 30 minutes if patients have a history of an immediate allergic reaction of any severity to a vaccine or injectable therapy, or a history of anaphylaxis due to any cause. Avoid administration of the vaccine to patients with a known severe allergic reaction to ingredients in the Pfizer-BioNTech and Moderna vaccines, including polyethylene glycol, or a reaction of any severity to polysorbate (due to potential cross-reactive hypersensitivity to polyethylene glycol). Patients with general allergies should consult a healthcare provider prior to administration. Patients with anaphylaxis after the first vaccine dose should not receive the second vaccine dose.

Establish scheduling workflow. Establish a vaccination scheduling system that does not allow patients younger than 16 years to obtain an appointment, and schedules appointments for patients who are 16 and 17 years old only for receipt of the Pfizer-BioNTech vaccine. Establish a communication system for confirming all vaccine appointments, including for patients scheduled to receive their second vaccine dose. If relying on email, respond to all unconfirmed deliveries with phone calls or other means of rapid communication. Consider establishing a "hotline" for vaccine scheduling questions.

Report vaccine errors and adverse reactions. Report all COVID-19 vaccine errors and adverse reactions to the Vaccine Adverse Event Reporting System (VAERS [https://vaers.hhs.gov]), which is mandatory for healthcare providers. ISMP also asks providers to report vaccine errors to the ISMP VERP (www.ismp.org/VERP). Vaccinated patients should receive a "v-safe" information sheet and be encouraged to enroll in the program (www.cdc.gov/vsafe). V-safe is a smartphone-based monitoring tool from CDC that provides a personalized "check in" after vaccination so patients can easily report any adverse vaccine reactions.

Special Announcements

Real-world solutions to problems

ECRI Institute for Safe Medication Practices PSO

Report and learn from hazards and adverse events in a legally protected environment with **ECRI and the ISMP Patient Safety Organization** (PSO), one of the largest federally designated PSOs in the US. Learn how we can assist with your patient safety efforts by visiting: www.ecri.org/pso.

FREE international ISMP webinar

Join us on **January 21, 2021**, for a **FREE** webinar on the ***Top Medication Errors Reported to ISMP in 2020***. During the presentation, the speakers will describe frequently reported medication safety events and suggest global prevention and mitigation strategies. We encourage our international colleagues to attend! To register, visit: www.ismp.org/node/21308.

Virtual MSI workshops – dates for 2021

Do not miss a unique opportunity to maximize your error prevention efforts and look at your organization through the eyes of leading safety experts! Register for one of the virtual ***ISMP Medication Safety Intensive (MSI)*** workshops in 2021. The 2-day workshops will be offered on: **February 25 & 26**, **April 22 & 23**, **June 24 & 25**, and **August 5 & 6**. Join us to learn how to establish a comprehensive medication safety program. For details, visit: www.ismp.org/node/127.

To subscribe: www.ismp.org/node/10

ISMP An ECRI Affiliate

ISMP Medication *Safety Alert!* Acute Care (ISSN 1550-6312)

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

Special thanks to our 2020 MSOS Briefings presenters

The Medication Safety Officers Society (MSOS) holds member Briefings every other month on various medication safety topics. The MSOS Briefings are webinars that feature three 10-minute presentations from volunteer MSOS members who highlight a project, initiative, or relevant medication safety topic. The goal is for participants to take the information presented and use it to implement similar medication safety initiatives within their own organization. At each Briefing, ISMP President Michael Cohen also provides an update on ISMP activities. Please let us know (ismpinfo@ismp.org) if there is a medication safety topic you would like to present (or see presented) during a 2021 MSOS Briefing. We hope others can join us as presenters in 2021! To join the MSOS and attend the Briefings, visit: www.medsafetyofficer.org/user/register. MSOS membership and the 2021 member Briefings are **FREE**.

Production of the MSOS Briefings would not be possible without the assistance of voluntary MSOS member presenters. ISMP sincerely thanks all of the 2020 presenters who helped make the Briefings a valuable medication safety resource for MSOS members.

Thank You!

- **Ghadeer Banaseer**, PharmD, CPHQ, FISMP, Medication Safety Specialist, Saudi Medication Safety Center, MNG-HA, Saudi Arabia
- **Dave T. Caron Jr**, PharmD, Pharmacy Director, Martha's Vineyard Hospital, Oak Bluffs, MA
- **Joanie Cook**, PharmD, BCPS, CPPS, Pharmacy Clinical Coordinator, St. Francis Medical Center, Colorado Springs, CO
- **Rabih Dabliz**, PharmD, FISMP, Senior Manager, Quality & Medication Safety Practices, Cleveland Clinic Abu Dabi, United Arab Emirates
- **Megan Fletcher**, PharmD, Director of Pharmacy, Spectrum Health, Grand Rapids, MI
- **Allison Hanson**, PharmD, BCPS, FISMP, Medical Science Liaison, Baxter International, Philadelphia, PA
- **Liz Hess**, PharmD, MS, FISMP, CPPS, Pharmacy Program Coordinator, Medication-Use Safety & Quality, University of Kentucky Healthcare, Lexington, KY
- **Eileen Kasda**, DrPH, MHS, Assistant Director Patient Safety Analytics, Johns Hopkins Medicine, Baltimore, MD
- **Steve Mogridge**, PA-C, Medication Safety Manager, Spectrum Health, Grand Rapids, MI
- **Casey Moore**, PharmD, Medication Safety Pharmacist–Pediatrics, Cleveland Clinic Foundation, Cleveland Clinic Children's, Cleveland, OH
- **Jenny Panic**, PharmD, PGY2 Pharmacy Resident, Medication Use Safety and Policy, Marshfield Clinic Health System, Marshfield, WI
- **Eileen Relihan**, PhD (Pharm), MSc (Hosp Pharm), BSc (Pharm), Dip LQH MPSI, Medication Safety Facilitator, St James's Hospital, Dublin, Ireland
- **Meghan Rowcliffe**, PharmD, BCPS, BCPPS, Pediatric Medication Safety Officer, Johns Hopkins Hospital, Baltimore, MD
- **Farzana Samad**, PharmD, FISMP, Medication Safety and Quality Coordinator, Baptist Hospital of Miami, Miami, FL
- **Dan Sheridan**, MS, RPh, CPPS, Medication Safety Pharmacist, OhioHealth Marion General Hospital & Hardin Memorial Hospital, Marion, OH
- **Luanne Sojka**, PharmD, BCPS, Medication Safety Officer, Pharmacy Administration, Marshfield Clinic Health System, Marshfield, WI
- **Jameika Stuckey**, PharmD, BCACP, Medication Safety Manager, The University of Mississippi Medical Center, Jackson, MS
- **Chris Walsh**, PharmD, FISMP, Medication Safety Pharmacist, Penn State Health St. Joseph Medical Center, Reading, PA

MSOS
MEDICATION SAFETY OFFICERS SOCIETY

ISMP Safe Medication Management Fellowships

ISMP is now accepting applications for three unique **Fellowship** programs commencing in **2021**

ISMP Safe Medication Management Fellowship

Location and Term: This Fellowship commences July 2021. The Fellow will spend 12 months with ISMP, which is located in the suburbs of Philadelphia (Montgomery County), Pennsylvania. Relocation to the Philadelphia area will depend on the state of the COVID-19 pandemic.

Description: Now in its 29th year, this Fellowship offers a **healthcare professional with at least 1 year of postgraduate experience in a healthcare setting** an unparalleled opportunity to work collaboratively with the nation's experts in medication safety to assess and develop interdisciplinary medication error-prevention strategies.

FDA/ISMP Safe Medication Management Fellowship

Location and Term: This Fellowship commences late summer/fall 2021. The Fellow will spend 6 months with ISMP, which is located in the suburbs of Philadelphia (Montgomery County), Pennsylvania, and 6 months with the US Food and Drug Administration (FDA), which is located in Silver Spring (near Washington, DC), Maryland. Relocation to these areas will depend on the state of the COVID-19 pandemic.

Description: This Fellowship, open to a **healthcare professional with at least 1 year of postgraduate experience in a healthcare setting**, is a joint effort between ISMP and FDA's Center for Drug Evaluation and Research, Office of Surveillance and Epidemiology, Division of Medication Error Prevention and Analysis. The Fellowship allows the candidate to benefit from ISMP's years of medication safety experience along with FDA's valuable regulatory experience focused on medication error prevention.

ISMP International Medication Safety Management Fellowship

Location and Term: This Fellowship commences July 2021. The Fellow will spend 12 months with ISMP, which is located in the suburbs of Philadelphia (Montgomery County), Pennsylvania. Relocation to the Philadelphia area will depend on the state of the COVID-19 pandemic.

Description: This Fellowship, open to a **healthcare professional with at least 1 year of postgraduate experience in a healthcare setting**, will help train a medication safety leader interested in seeking a long-term career at an international level. The Fellow will be involved in both US and international medication safety initiatives, helping to address medication safety issues on a national and global level.

Applicants for all three Fellowship programs must be legally eligible to work in the US and have excellent written and verbal communication skills. A competitive stipend is provided with all Fellowship programs.

How to Apply

For a complete description of candidate qualifications and the online application, visit: www.ismp.org/profdevelopment/.
For questions regarding the Fellowships or the application process, please contact ISMP at: fellowship@ismp.org or 215-947-7797.

The application deadline for all three Fellowship programs is March 31, 2021.