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

New error-prone situations after vaccines approved with prefilled diluent syringes

Problem: Immunizations are one of the greatest success stories in public health, helping to eradicate or reduce many infectious diseases to an all-time low. However, if errors happen when prescribing, dispensing, or administering vaccines, the adverse impact on disease prevention could be significant. The success of any individual vaccine relies on its correct preparation and administration.

We have previously written about preparation and administration errors with vaccines that require reconstitution (e.g., **M-M-R II** [measles, mumps, and rubella vaccine]) and two component vaccines (e.g., **SHINGRIX** [zoster vaccine], **PENTACEL** [diphtheria and tetanus toxoids, acellular pertussis, poliovirus, and *Haemophilus* b conjugate vaccine]). In these cases, the wrong diluent was used to reconstitute the lyophilized powder component or the liquid component alone was administered to the patient. The potential for similar errors exists with recent product approvals that include syringes prefilled with diluent.

Merck's New Prefilled Diluent Syringes

Merck recently received US Food and Drug Administration (FDA) approval for and has begun distributing new prefilled sterile diluent syringes (packaged separately) (**Figure 1**) for reconstituting a lyophilized powder vial of M-M-R II, **VARIVAX** (varicella), and **PROQUAD** (measles, mumps, rubella, and varicella) live virus vaccines. The diluent was formerly available only in vials.

In general, prefilled syringes are great, but in this case, they are causing medication errors and creating increased risk. The syringes are labeled "**STERILE DILUENT FOR RECONSTITUTION OF MSD LIVE VIRUS VACCINES**." The company's instructions and promotional materials say the syringes should be used to reconstitute the associated vaccine, withdraw the liquid back into the syringe, and then administer (www.ismp.org/ext/1269). However, the instructions do not mention the need to relabel the diluent syringe with the vaccine name after reconstitution. So, if there are other prefilled syringes nearby (e.g., on a table or countertop), all will be labeled only as sterile diluent in the same way, and will all look alike. That could lead to someone inadvertently picking up and injecting an unmixed diluent syringe, or not knowing a syringe is already reconstituted, resulting in someone getting a double dose or two different vaccine products. Also, this removes the option of having parents read the syringe label as part of a process to confirm the right vaccine is about to be given.

We have already received an error report as well as a complaint about the situation. Also, there are other vaccines such as GSK's **PRIORIX** (measles, mumps, and rubella vaccine, live) (www.ismp.org/ext/1270), and Pfizer's **ABRYSVO** (respiratory syncytial virus vaccine) that use prefilled sterile diluent syringes, and share the same problem.

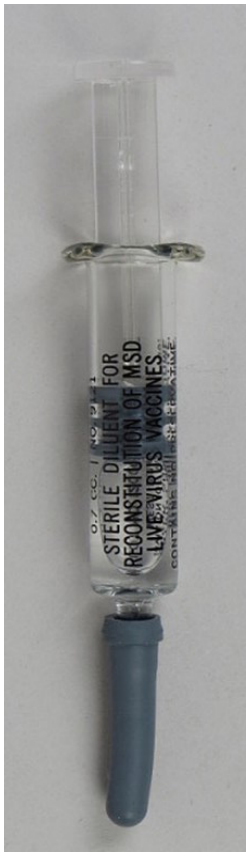

Figure 1. Prefilled diluent syringe for use with Merck vaccines must be relabeled with the vaccine name after reconstitution.

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SAFETY briefs

Changes in Zejula formulations contribute to errors. A specialty pharmacy recently reported patient confusion with the dosing changes that occur when switching from **ZEJULA** (niraparib) capsules to tablets. Zejula is used to treat advanced epithelial, ovarian, fallopian tube, or primary peritoneal cancer in patients who have had complete or partial response to first-line platinum-based chemotherapy. The drug was originally available as 100 mg capsules. However, the manufacturer is now producing 100 mg, 200 mg, and 300 mg tablets, and as of August 2023, has discontinued the 100 mg capsules.

Typical dosing for Zejula, depending on the indication and the patient's weight and/or platelet count, is either 200 mg or 300 mg once daily. When patients originally received the 100 mg capsule formulation, they needed to take multiple capsules for a single dose. A specialty pharmacy recently reported that when patients have been switched to the tablet formulation, they have inadvertently taken multiple 200 mg or 300 mg tablets, instead of just one tablet, thinking that they still needed to take multiple tablets for a single dose.

Ensure the patient instructions included on pharmacy-generated labels clearly indicate the number of tablets to take for each dose. During patient educations sessions, ensure patients, especially those previously on the capsule formulation, understand the correct dosing by using the teach-back method. Build this counseling point into pharmacy protocols and treatment guidelines for Zejula. If the patient will pick the prescription up in the pharmacy, mark the prescription for mandatory counseling to reinforce the correct dosing.

HIGH-ALERT

Potential for mix-ups between Talvey and Tecvayli. We wanted to warn practitioners about the potential for mix-

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Influenza Vaccine Mistaken as Diluent Meant for RSV Vaccine

Pharmacies reported two recent close calls involving patients who were supposed to concurrently receive **FLUZONE** (influenza high-dose vaccine) and Abrysvo. Abrysvo is available in a vial containing lyophilized powder antigen. A practitioner must first dilute it using an accompanying prefilled syringe of sterile water for injection and a vial adapter. However, instead of connecting the Abrysvo diluent syringe to the vial, those preparing the vaccines have mistakenly used Fluzone high-dose syringes (**Figure 2**). Fortunately, in both cases, the error was recognized prior to administration.

Figure 2. Rather than using an Abrysvo diluent syringe (right), a practitioner connected the Fluzone high-dose syringe (left) to the Abrysvo vial via an adapter for reconstitution.

The diluent syringe for Abrysvo looks similar to the Fluzone high-dose syringe, and the dark plunger stoppers make it difficult to read the labels. In addition, both the diluent syringe and the Fluzone syringe have Luer connectors, making them compatible with the vial adapter. A similar error could occur with other powdered vaccines when diluents and other vaccines are kept nearby and are in prefilled Luer-lock syringes.

SAFE PRACTICE RECOMMENDATIONS: Consider the following recommendations to prevent preparation and administration errors with vaccines that come with prefilled diluent syringes:

- Establish a process to keep vaccines and their corresponding diluents together if storage requirements do not differ.
- Prepare only one vaccine at a time. If patients require multiple vaccines in which one requires reconstitution while others do not, start with the vaccine that needs reconstitution, and after preparing and labeling the syringe, retrieve and ready the other vaccine.
- Implement barcode scanning prior to preparing and administering a vaccine. Configure the system to require scanning of both the vaccine and corresponding diluent barcodes.
- We reached out to FDA and the manufacturers to notify them of these issues and recommended that manufacturers provide self-adhering labels, packaged with the specific vaccine, for use on the diluent syringe after the vaccine is reconstituted and withdrawn from the vial. For now, to reduce risk with these syringes, create vaccine-specific auxiliary labels to facilitate relabeling. Store the labels with the specific vaccine products.

Unintentional ingestion of boric acid vaginal suppositories

A doctor told a woman with a vaginal infection to use boric acid suppositories to help relieve symptoms that often accompany vaginitis, such as a bad odor. Boric acid (a pesticide that is harmful when taken orally) suppositories are sold over-the-counter (OTC) and do not require a prescription. What is confusing is that boric acid suppositories come as a powder inside a gelatin capsule that looks similar to oral capsules. In fact, people who have had an infection in the past, may have been prescribed medication in a capsule, such as an oral antibiotic, to treat the infection. Patients may not be familiar with capsules used as suppositories.

In the report we received, the patient swallowed one of the suppositories. Later, when she read the container label more carefully, she realized the capsules were suppositories meant for vaginal insertion. There was also a warning on the container that said, "For vaginal use only, not for oral

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ups between **TALVEY** (talquetamab-tgvs) and **TECVAYLI** (teclistamab-cqyv). Both products, made by Janssen, are indicated for the treatment of adult patients with relapsed or refractory multiple myeloma after previously receiving at least four prior lines of therapy. While Tecvayli has been approved for nearly a year, Talvey was approved this past August. At issue are the multiple overlapping characteristics, including similar brand and generic names; similar-looking carton principal display panels (**Figures 1** and **2**); and the fact that each is packaged as a single-dose vial, administered subcutaneously, and requires refrigeration for storage.

Talvey and Tecvayli also share several clinical similarities. Both medications require weight-based dosing, including step-up dose escalation (see package insert for details). Talvey is administered on a weekly or biweekly (every 2 weeks) dosing

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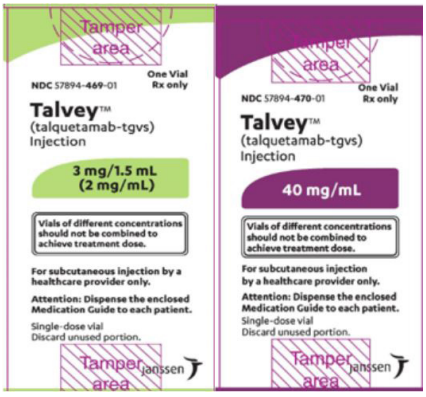

Figure 1. Principal display panels on cartons of Talvey 3 mg/1.5 mL (left) and 40 mg/mL (right).

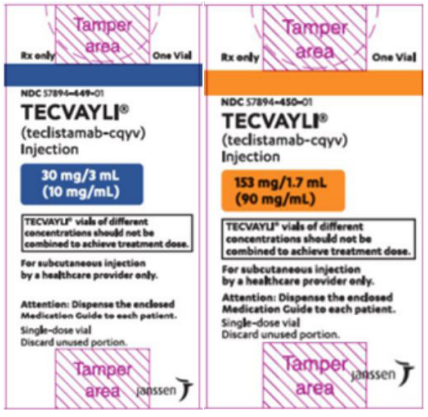

Figure 2. Principal display panels on cartons of Tecvayli 30 mg/3 mL (left) and 153 mg/1.7 mL (right).

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consumption. If swallowed, get medical help and call poison control right away." The woman decided to go to an emergency room. According to Poison Control (www.ismp.org/ext/1253), the small amount of boric acid in a single capsule would not be expected to cause harm. However, ingesting large amounts of boric acid may result in gastrointestinal distress, kidney problems, or death. Fortunately, the patient did not suffer any serious problems. A search of the internet revealed numerous other cases of women swallowing boric acid suppositories unintentionally.

Boric acid suppositories are available from multiple companies and labeling is inconsistent. Although these products are labeled as vaginal suppositories, they are often packaged in plastic bottles as loose capsules that resemble oral medications or dietary supplement products. Some boric acid suppository container labels are visually attractive and may distract the patient from reading important information (**Figure 1**).

Figure 1. Consumers may overlook the description of the contents (vaginal suppositories) that appear at the bottom of the label on this OTC product.

Given that the basic problem is confusing boric acid suppositories as oral capsules, we are asking the US Food and Drug Administration (FDA) and product manufacturers to investigate ways this common error can be prevented. For example, consider reformulating products so they are shaped as suppositories: most suppositories are waxy and small, with a round or cone shape. Vaginal suppositories are usually oval and are not gelatin capsules filled with powder. These products should also be sold in unit-of-use blister packs, with the carton holding enough for use over a typical course of treatment, which is 7 to 14 days. Vaginal products should also include an applicator with instructions and a link to a professional video that explains what a vaginal suppository is and how to properly use them. Additionally, the cartons and individual blisters need to call out the name of the product, "boric acid," and warning, "For vaginal insertion only" more conspicuously.

Moderna COVID-19 vaccine overfill leads to a double dose

Under an emergency use authorization (EUA), the recommended dose of the 2023-2024 Moderna coronavirus disease 2019 (COVID-19) vaccine for patients 6 months to 11 years (**Figure 1**) is 25 mcg/0.25 mL. To ensure practitioners can withdraw the proper dose, the manufacturer provides overfill in the vial. However, healthcare practitioners have reported up to 0.5 mL of solution in the vial. In several cases, staff have drawn up the entire contents of the vial and administered 0.5 mL, or double the intended dose. At one pediatric clinic, more than 200 children were administered the full vial of the COVID vaccine. To complicate matters, the dose of Moderna's **SPIKEVAX** (COVID-19 vaccine) for patients 12 years and older is 50 mcg/0.5 mL (www.ismp.org/ext/1272), a dose volume similar to other childhood vaccines.

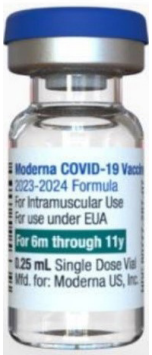

Figure 1. Vial label of Moderna COVID-19 vaccine (2023-2024) for patients 6 months through 11 years states, "0.25 mL Single-Dose Vial," but practitioners have administered the entire contents (up to 0.5 mL).

We have notified the US Food and Drug Administration (FDA) and the manufacturer of this concern. If your organization purchases this vaccine, affix preprinted labels to the prepared syringes specifying the vaccine name, indicated age range, and dose of 0.25 mL. Develop protocols and/or order sets to guide practitioners to select the correct dose for the patient population. Educate staff that the dose for patients 6 months through 11 years is 0.25 mL, not the entire vial. Practitioners should dispose of the single-use vial after the 0.25 mL dose has been removed.

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schedule, and Tecvayli is administered on a weekly dosing schedule. Both medications have *Boxed Warnings* due to risks of life-threatening or fatal reactions, such as cytokine release syndrome (CRS) and neurologic toxicity, including immune effector cell-associated neurotoxicity syndrome (ICANS). Both medications are only available through a restricted program called the TECVAYLI and TALVEY Risk Evaluation and Mitigation Strategy (REMS) and need to be administered by a healthcare professional. Due to the risk of CRS and neurologic toxicity, including ICANS, patients should be hospitalized with appropriate medical support for 48 hours after administration of all doses within the step-up dosing schedules.

Educate staff about the potential for mix-ups and stress the importance of barcode scanning during product selection, preparation, and prior to administration. Store the products in separate areas of the refrigerator and consider using auxiliary warning labels on medication containers and storage bins to help differentiate them. Check how the medication names appear in the electronic health record (EHR) and pharmacy dispensing system. If possible, display both the brand and generic names. Work with providers to create order sets, including step-up dose frequencies, and ensure the correct formulation is automatically linked for ordering and dispensing.

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Report medication and vaccine errors to ISMP: Please call 1-800-FAIL-SAF(E), or visit 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.

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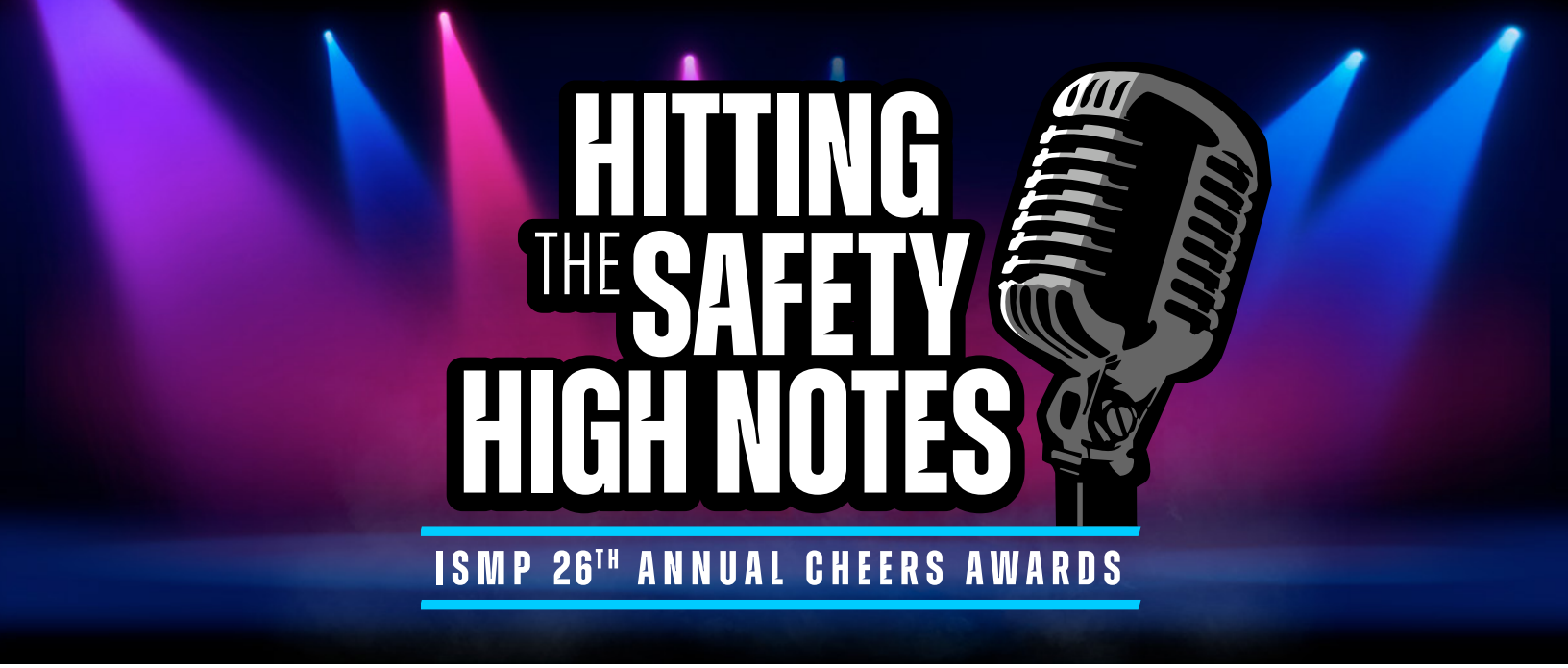

Tuesday, December 5, 2023

House of Blues – Anaheim

ISMP is showcasing medication safety stars at the 2023 Cheers Awards dinner, and we would love to see you there.

You can help honor this year's Cheers Award winners by attending the awards dinner and/or supporting the event. Your participation helps bring attention to safety advances and enables ISMP to continue the core of its lifesaving work – preventing medication errors.

Guest Speaker:

RaDonda Vaught

RaDonda Vaught is a former nurse criminally prosecuted for a fatal medication error who has a compelling story to tell. RaDonda self-reported her error and provided detailed information to help prevent similar mistakes in the future but was convicted of two felony charges and lost her nursing license. ISMP and many other healthcare organizations have spoken out in support of RaDonda and against the criminalization of medication errors. Today she is a passionate advocate for system-based medication safety and second victims of errors.

To show your support, visit:
www.ismp.org/node/83407

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