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ISMP Institute for Safe Medication Practices
An ECRI Company

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

Lost in transition: Evaluate and mitigate risks during interfacility transfers

Problem: Oftentimes, organizations lack policies and procedures that address interfacility medication and equipment transfers in the transitions of care continuum. During transfers from one organization to another, certain patients require intravenous (IV) medications and the use of infusion pumps. This usually happens when patients need to be transferred by ground or air to a facility that provides the required level of care, and a practitioner decides that an infusion is necessary to manage the patient's condition until they reach their destination.

Children's hospitals often have an organizational transport team responsible for handling medications and equipment when transferring patients. In adult facilities, this may be done by an external transport team or emergency medical services (EMS).[1,2]

The potential for errors exists when handling medications from different institutions, especially when organizations provide infusions in different concentrations and/or dosing units (e.g., mcg/hour versus mcg/kg/min). This can later result in programming an infusion pump incorrectly or outside of the dose error-reduction system (DERS) due to the medication entry not being available in the receiving institution's drug library. It can also lead to confusion for practitioners if the patient arrives with an infusion pump that is different than what they use at their facility. Other risks include inconsistent handoff communication between organizations and a lack of reconciliation procedures when transferring medications, including controlled substances. This can contribute to incomplete medication histories, medication errors, and the risk of drug diversion.

Errors

A pharmacist reported errors involving high-alert medications that had occurred during the transition of care from outside organizations. Differences in heparin infusion concentrations (100 units/mL versus 50 units/mL) have led to misprogramming errors when a nurse at the receiving facility attempted to program an infusion using the drug library that did not have the concentration provided. In another case, a patient was transferred with a norepinephrine infusion programmed in mcg/kg/min using the outside hospital's pump. When switching out the infusion, the receiving nurse did not identify that their hospital's drug library was programmed to infuse in mcg/min, resulting in the patient being underdosed.

*In another hospital, a 3 kg neonate received four times the intended dose of milrinone due to a concentration discrepancy. EMS transported the neonate with a 50 mcg/mL concentration of milrinone infusing. At the receiving hospital, the standard concentration of a milrinone infusion for a 3 kg baby was 200 mcg/mL (the 50 mcg/mL was reserved for neonates less than 1 kg). Upon arrival, the prescriber ordered the 200 mcg/mL concentration of milrinone in the electronic health record (EHR), and the pharmacy prepared and dispensed the infusion for the patient. However, when the nurse switched out the syringes and initiated the 200 mcg/mL infusion, she did not reprogram the infusion pump to reflect the change from the 50 mcg/mL to the 200 mcg/mL concentration, resulting in a four-fold overdose. Another nurse identified the error 24 hours later. The neonate required a higher dose of an **EPINEPH**rine infusion. Although the neonate had other significant health issues (cardiogenic shock), it cannot be ruled out that the milrinone overdose contributed to the neonate's hemodynamic instability.*

continued on page 2 — Lost in transition >

SAFETY briefs

Is it ceFAZolin or penicillin G potassium?

A nurse removed a vial of what they thought was 1 g of ce**FAZ**olin from an automated dispensing cabinet (ADC) in an operating room (OR). The nurse reconstituted the vial, prepared the dose, and administered it to the patient. The organization had not yet implemented barcode scanning in the OR. After administration, the nurse read the vial label and identified that it was labeled, *Buffered* Penicillin G Potassium for Injection, 20,000,000 units which looked similar to vials of ce**FAZ**olin (both by Sandoz) (**Figure 1**). They notified the prescriber, and the patient was monitored with no reported harm.

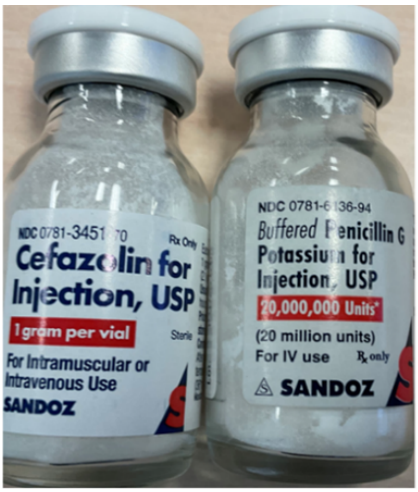

Figure 1. Similar-looking vials labeled as 1 g ce**FAZ**olin injection (left) and 20,000,000 units of *buffered* penicillin G potassium injection (right) by Sandoz.

The nurse reported the event to the pharmacy. Another pharmacist noted that about one month prior, they also had found a vial of penicillin G potassium, a drug that the organization had not purchased since 2017, mixed in with ce**FAZ**olin vials and they sequestered it. The pharmacist had notified their wholesaler, thinking that perhaps the wholesaler had shipped the penicillin G potassium vial to them in error. Upon review of the vial labels, the pharmacist discovered that the lot number (PG4360) and expiration date (11/2027) on the vial labeled as penicillin

continued on page 2 — SAFETY briefs >

> Lost in transition — continued from page 1

Safe Practice Recommendations: Consider the following recommendations to mitigate the risk of medication errors during interfacility transfers.

Evaluate current process. Gather an interdisciplinary team to review the workflow associated with medication infusions required during transport to or from another facility. Have the team conduct a failure mode and effects analysis (FMEA) to determine potential risks, then develop policies and procedures with mitigation strategies for safe medication handling. Consider how prescribers should order medications (e.g., using a standard medication order form) and how to store medications safely and securely during transport. Develop a procedure for pharmacy to prepare infusions for the organizational transport team to administer to the patient that also addresses how the transport team will document medication administration during transport (e.g., medication administration form, monitoring documentation). Consider preparing a step-by-step checklist for use when switching patients to the receiving organization's infusion pump and medication. The process should also specify the disposition of the sending organization's infusion equipment. Consider also including guidance on when the sending organization's medication should be continued (e.g., parenteral nutrition) or specify when it should be replaced (e.g., immediately or when a new infusion is due).

Develop guidelines. Based on your patient population, establish guidelines for commonly seen high-risk conditions. For example, the Emergency Medical Services for Children (EMSC) has a pediatric interfacility transfer guide, and the Southwest Texas Regional Advisory Council has created guidelines for transfer of acute stroke patients.

Collaborate. Partner with local hospitals, transport teams, and EMS companies that transfer patients to and/or from the organization. Define the workflow and ensure that involved organizations understand expectations. Discuss experiences or challenging situations along with recommendations to mitigate these issues.

Standardize drug concentrations and dosing units. Develop a consensus between local hospitals and transport teams to provide standard drug concentrations and dosing units in all applicable systems and processes (e.g., medication ordering and administration forms, EHR, infusion pump drug libraries). Refer to the American Society of Health-System Pharmacists (ASHP) Standardize 4 Safety initiative for recommended standard medication concentrations.

Develop a transport medication kit with labels. Create a standard list of emergent medications that the organizational transport team can use intermittently to stabilize a patient's condition during transport. When possible, provide commercially available, ready-to-use prefilled syringes and premixed medication infusions in standard concentration(s). Include prepopulated label templates that specify the medication name, concentration, expiration date, and volume to assist in labeling practitioner-prepared medications and infusions. Store medications in each transport kit in a standard configuration, with labels facing up and separating look-alike products. Routinely review medications ordered during transport to ensure the drugs and doses are evidence-based and readily accessible.

Enhance communication. Develop a process for practitioners to proactively communicate with transport teams and/or external facilities prior to and during patient handoff. This can help ensure that the transport team has the appropriate information (e.g., patient condition, weight, allergies, isolation status) and supplies and equipment (e.g., medications, infusion pump) to provide the required level of care. It is just as important for the practitioners responsible for handing off care to communicate pertinent patient (e.g., identification) and medication information (e.g., drug name, concentration, dose, dosing units, time last dose was administered) to the receiving organization so they can take appropriate measures to pre-register the patient, prepare medications, and ensure that they are delivered to the proper area for a safer transition.

continued on page 3 — Lost in transition >

>SAFETY briefs

cont'd from page 1

G potassium were the same as the ce**FAZ**olin 1 g vial (**Figure 2**). The pharmacist became concerned about product authenticity and the potential that this was a mislabeled product, with uncertainty about what substance was in the vial. The pharmacy conducted a review of all storage locations and found two additional vials labeled as penicillin G potassium, making it a total of four vials sequestered.

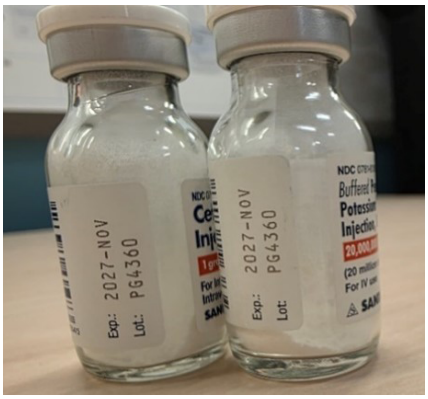

Figure 2. Sandoz vials labeled as 1 g ce**FAZ**olin injection (left) and 20,000,000 units of *buffered* penicillin G potassium injection (right) have the same lot number (PG4360) and expiration date (11/2027).

We reached out to the US Food and Drug Administration (FDA) and the manufacturer to notify them of this concern, and Sandoz is investigating this issue. For now, if your organization purchases 1 g ce**FAZ**olin for injection from Sandoz, review all product inventory (e.g., ADCs, pharmacy storage locations, ambulatory clinics, surgical centers) and verify that none of the vials are labeled *buffered* penicillin G potassium for injection, 20,000,000 units. If potentially impacted product is found, sequester the vials and report this to the manufacturer, FDA, and ISMP.

Abrysvo diluent syringe design hinders vaccine reconstitution. A pharmacist reported concerns with not being able to reconstitute **ABRYSVO** (respiratory syncytial virus [RSV] vaccine) due to the diluent syringe design (NDC: 00069-0344-05, Lot #/Exp: LG9829 Exp 10/25, LH4511 Exp 10/25). The Abrysvo (Pfizer) vial and prefilled syringe (BD Hypak syringe) presentation is supplied in a carton containing kits. Each kit includes a vial of lyophilized antigen component (a sterile white powder), a prefilled syringe containing the sterile water diluent component, and a

continued on page 3 — SAFETY briefs >

> **Lost in transition** — continued from page 2

Safeguard controlled substances. If controlled substances can be transferred with the patient between facilities, create a policy and procedure that complies with state and federal laws. Ensure chain of custody of the controlled substance, including a documentation process to reconcile waste with the original dispensing pharmacy. Consider involving the organizational controlled substance diversion prevention program team to proactively implement drug diversion prevention strategies; help resolve any discrepancies; and identify, report, and respond to any potential diversion. For additional information, refer to our March 9, 2023 article, *Controlled substance drug diversion by healthcare workers as a threat to patient safety – Part II*.

Facilitate pump recognition. Include the organization's name as part of the drug library name, so users can quickly identify whether an infusion pump is from an outside organization, with a different drug library.

Implement interoperability. If your organization has not done so already, plan for implementing interoperability between smart infusion pumps and the EHR, including in the emergency department where patients may arrive after interfacility transfer. With this level of bidirectional (e.g., auto-programming and auto-documentation) interoperability, infusion parameters can be transmitted wirelessly from the EHR to prepopulate settings on the smart infusion pump, and infusion data are wirelessly sent back to the EHR, where it is documented, eliminating manual programming steps. For additional information, refer to our September 5, 2024 article, *Implementation of smart infusion pump interoperability in the emergency department*.

Educate practitioners. Provide initial and annual competency assessments and educate practitioners (including members of the transport team) about the proper procedures when a patient is transferred in or out of the organization and requires a medication infusion. Consider providing simulations where staff can practice the entire handoff process.

Learn from errors. Review transport-related medication errors reported internally or in the ***ISMP Medication Safety Alert!*** with local hospitals and transport teams. Encourage staff to report close calls and errors that have reached the patient. Share impactful stories and recognize staff for good catches. Inform staff of any changes made that were the result of reporting to foster ongoing reporting.

References

1) Heaton J, Kohn MD. EMS inter-facility transport. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; September 26, 2022.
2) National Highway Traffic Safety Administration. Guide for interfacility patient transfer. Published April 2006. Accessed January 25, 2025.

Reminder...CHEERS AWARDS nominations open

Nominations for this year's **CHEERS AWARDS** are now open and will be accepted through **August 1, 2025**. For more details and to submit a nomination, click here.

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>SAFETY briefs

cont'd from page 2

vial adapter. The organization reported that when nurses tried to remove the gray syringe cap (**Figure 1**) to attach the luer lock adapter on the diluent syringe to the vial adapter, the luer lock adapter disconnected, revealing a slip-tip syringe (**Figure 2**), and they were unable to reconstitute the vaccine.

Figure 1. The BD Hypak diluent syringe that is provided to reconstitute the Abrysvo vaccine, has a gray cap attached to a clear luer lock adapter that covers a slip-tip syringe.

Figure 2. The luer lock adapter separated from the BD Hypak diluent syringe, revealing a slip-tip, and the vaccine could not be reconstituted.

We discussed a similar issue with this device in our March 27, 2025 article, *Syringe design hinders emergency medication delivery*. Used by other companies for various drug products, BD's Hypak design requires a twist-off motion to remove the cap, unlike other syringes. According to the Abrysvo prescribing information, to connect the diluent syringe to the vial adapter, practitioners should hold the syringe by the luer lock adapter and then twist to remove the syringe cap.

We reached out to Pfizer to notify them of this concern. Pfizer offers an alternative Abrysvo Act-O-Vial presentation with a simpler reconstitution process involving a dual-component vial system activated by pressing on the plastic cap. Based on practitioner feedback, Pfizer will transition Abrysvo fully to the Act-O-Vial for the 2025-26 RSV season in the United States. For now, if your organization purchases Abrysvo vial adapter kits, ensure staff are aware to properly hold the diluent syringe by the luer lock adapter, and to twist to remove the cap. Consider applying auxiliary labels with a warning or purchasing an alternative product. Continue to report any issues to the manufacturer, the US Food and Drug Administration (FDA), and ISMP.