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ISMP An ECRI Affiliate

Nurse AdviseERR®

Educating the Healthcare Community About Safe Medication Practices

Challenges with requiring five characters during ADC drug searches via override

PROBLEM: Since 2019, ISMP has recommended the entry of a minimum of the first five characters of a drug name (unless the name has fewer than five letters) during searches in automated dispensing cabinets (ADCs) (Statement 4.4 in the ***ISMP Guidelines for the Safe Use of Automated Dispensing Cabinets***, www.ismp.org/node/1372) and other electronic forms of communication (Statement 19 in the ***ISMP Guidelines for Safe Electronic Communication of Medication Information***, www.ismp.org/node/1322). The use of only the first two to four characters of the drug name, mnemonics or short names (e.g., "met"), skipped character abbreviations (e.g., "mtx" instead of methotrexate), or a combination of the first few characters and dose (e.g., "meth10") has led to the presentation of similar looking drug names on the screen, which has resulted in drug search selection errors. For example, entering "met" has led to mix-ups between methylphenidate, methadone, met**OL**azone, methotrexate, met**FORMIN**, and metro**NIDAZOLE**; and entering "ve" has led to mix-ups between vecuronium and **VERSED** (discontinued brand of midazolam).

We received two error reports involving confusion between rocuronium and **ROMAZICON** (discontinued brand of flumazenil). One event occurred during cardio-pulmonary resuscitation in a critical care unit. When a physician gave a verbal order for rocuronium for intubation, a nurse logged into an ADC, selected the override function, entered "ro," and accidentally selected and administered "Romazicon" to the arresting patient. Fortunately, the intubation and resuscitation were successful. As it turns out, rocuronium, the neuromuscular blocking agent, was not available via override as an individual drug; it was only available via override in a rapid sequence intubation (RSI) kit. In the other event, a head trauma patient in the emergency department, who needed urgent intubation, required an additional vial of rocuronium. Again, only "ro" was entered into the ADC to access the medication via override, and "Romazicon" was selected in error and administered to the patient. The nurse did not know a second vial of rocuronium was available in the RSI kit the team was currently using. The patient was still

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Just Culture scholarships

In December 2021, The Just Culture Company announced that three scholarships will be awarded each year to honor Judy Smetzer, BSN, RN, FISMP, former vice president at the Institute for Safe Medication Practices (ISMP). For years, Judy has been an unfaltering advocate of a more fair and just response to medication errors. The three recipients of the ***Judy Smetzer Just Culture Champion Scholarship***, selected by ISMP each year, will be able to enroll in a live-hosted or online Just Culture Certification Course, after which they will be eligible to sit for the Just Culture Certification Exam. Award recipients will also receive membership in the Just Culture Community of Learners (with live-hosted webinars) and a 2-year software license for the Just Culture Algorithm and supplemental learning materials. Applications must be submitted by **July 31, 2022**. Details can be found on **page 6**, and are also available on the ISMP (www.ismp.org/node/30840) and The Just Culture Company (www.justculture.com) websites.

SAFETY wires

ISMP relieved by Vaught sentence. ISMP is relieved that RaDonda Vaught did not receive a prison sentence after her conviction for impaired adult abuse and criminally negligent homicide stemming from a fatal medication error. The judge sentenced her to 3 years of supervised probation on a diverted sentence, after which her record could be wiped clean. While RaDonda will likely never work as

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New ECRI and ISMP Headquarters

On April 19, 2022, ECRI and ISMP celebrated the opening of a new state-of-the-art global headquarters and medical device evaluation laboratory on a 24-acre campus near Philadelphia, PA. In 2020, ISMP became an affiliate of ECRI and together created the largest healthcare quality and safety entity in the world, driving greater value to healthcare across all care settings. The opening of the new building marks a historic opportunity for the nation's largest patient safety organization (PSO) to fulfill its mission and to usher in a new era of patient safety innovation.

With the opening of the new headquarters, ISMP's old office is closed. Our new address is 5200 Butler Pike, Plymouth Meeting, PA 19462. However, our telephone number remains the same: 215-947-7797. You can also reach us by email (ismpinfo@ismp.org) or via the Contact Us page (www.ismp.org/contact) on our website.

Supported by an educational grant from Fresenius Kabi

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intubated successfully and experienced no permanent harm despite receiving the wrong drug.

Some ADC vendors have modified the functionality to allow organizations to require five characters when searching for drug names via the override feature. Based on practitioner comments on listservs and error reports, some organizations have implemented this functionality when using the override feature. However, we are also aware of several challenges, some of which have been present when entering two to four characters during drug name searches, but have been intensified with the five-character requirement:

- Misspelling the first five letters of a drug name
- Entering spaces or symbols (e.g., "/" or "-" or ":") to meet the five-character requirement (e.g., entering "kit <space> <space>" to allow a list of virtual or actual kits in the ADC to display; entering "fat <space> 1" to get Fat 10% to display)
- Difficulties in locating combination drugs or parenteral fluids
- Difficulties in locating drugs known by several different names (e.g., searching under "lipids" but the drug name is set up as "fat 10% emulsion")
- Failing to locate an emergency drug because the user forgets to enter the full five characters; for example, we received one report in which several practitioners were unable to access emergency doses of **EPINEPH**rine because they forgot about the five-character functionality and only entered "epi"

Also, scrolling through an entire list of drugs using the inventory function rather than searching for a specific drug is one of the unsafe, time-consuming workarounds practitioners may take when searching for drugs via override if they are unable to find the intended product.

Safe Practice Recommendations: Despite these limitations and challenges, ISMP still recommends using at least five characters when conducting drug name searches. For drug names with the same beginning characters beyond five letters, you might want to consider adding the therapeutic class to the drug name listing to help avoid drug selection errors (e.g., methyl**PREDNIS**olone [corticosteroid], methylphenidate [stimulant], methylnaltrexone [gastrointestinal agent], methylergonovine [ergot derivative]). Some have suggested that vendor functionality should be more tailored and specific to individual, problematic drugs that require the five-character search via override, rather than requiring an all-inclusive change for all drug name searches via override. Alternatively, functionality could exist to allow users to "opt out" certain drugs from the five-character search rule. However, it may be confusing to require two different levels of drug name searches, especially when staff are unable to remember whether they must search for a particular product using two or three characters or the full five characters. ISMP has previously talked to ADC vendors about developing more sophisticated functionality, such as an algorithm that allows users to enter the exact number of characters to get only one unique drug name to appear on the screen. Also, it might be safest to allow simultaneous drug name searches by the current brand and generic name.

It is also reasonable to consider creating an alias/synonym for certain drugs on the override list that are commonly known by an alias/synonym. For example, NSS <space> <space> may be created as an alias for 0.9% sodium chloride solution. But each synonym created should be reviewed against other aliases/synonyms to ensure they are not too similar. If there was enough room on the screen, it might also be helpful to allow users to "pin" emergency kits and emergency drugs (e.g., **EPINEPH**rine) to the top of the screen, similar to how certain posts can be pinned to the top of someone's Facebook page. This would make emergency kits and key emergency drugs always

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a registered nurse again since her license in Tennessee was permanently revoked, we commend the judge for using the power of the law with integrity and humanity during the sentencing. As we continue to grieve the loss of Charlene Murphey, we call on all healthcare providers to consider if similar risks exist where you work, and to meet internally to plan proactive interventions.

Companies begin move toward full implementation of ENFit. As organizations move toward full implementation of ENFit, manufacturers will begin to phase out legacy feeding tubes, syringes, and bags with attached administration sets for enteral feedings. Currently, enteral administration sets have an ENFit connector, but they also have a transition adaptor to connect with legacy feeding tubes. However, Cardinal Health (in July 2022) and Moog Medical (later this quarter) will begin removing the transition connectors from their administration set assemblies. Transition connectors will still be available, but only as stand-alone items. Furthermore, Cardinal has announced that, in July 2022, adult and pediatric nasogastric feeding tubes, pediatric extension sets, and gastrostomy feeding tubes will **only** be manufactured with the ENFit design. The Global Enteral Device Supplier Association (GEDSA) posts manufacturer updates on its website (https://stayconnected.org) and has compiled the most recent information in a document found at: www.ismp.org/ext/911.

Infant deaths associated with medical tubing entanglement. The US Food and Drug Administration (FDA) recently issued a warning about a strangulation risk when pediatric patients receiving enteral feedings get tangled in their enteral feeding delivery sets (www.ismp.org/ext/849). The feeding set tubing can become wrapped around a child's neck and cause strangulation and death. FDA received reports of two toddlers who died after being strangled by the enteral tubing. ***ECRI and the Institute for Safe Medication Practices (ISMP) Patient Safety Organization (PSO)*** has also received reports of children getting tangled in enteral feeding delivery sets.

Although not mentioned in the FDA warning, similar events have occurred with intravenous (IV) tubing. In our September 2006

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accessible, although a separate code cart should always be maintained for emergency equipment and drugs to use during a cardiac and/or respiratory arrest.

As we recommended previously, before implementing the five-character search requirement for medications obtained from an ADC via override, hospitals should analyze the workflow, especially the searchability of emergency medications, and conduct a failure mode and effects analysis (FMEA) to identify and manage potential challenges. See **Table 1** for examples of risk points to consider during the FMEA. Prior to implementation, organizations must develop a robust and effective communication plan, and obtain feedback from frontline staff. After any changes, collect data to assess whether unintended consequences are occurring and make appropriate adjustments if needed. Of course, to limit override challenges, whenever possible, orders should be entered and verified by a pharmacist to allow medication or product removal within the patient's profile, bypassing the requirement to enter five characters.

Table 1. Examples of potential risk points that may intensify when requiring a five-character drug name search in ADCs

Potential Risk Point	Possible Consequence									
	Unable to find the desired drug	Select the wrong look-alike drug	Delay in care	Look up the drug in a reference	Try another ADC	Call the pharmacy	Ask for help finding the drug	Not secure/ unsafe drug storage	Erroneous/ absent drug charges	Drug unavailable for another purpose
Enter the wrong five characters due to a spelling error or wrong key stroke	X	X	X	X	X	X	X		X	X
Search by a drug's brand name when only generic names are in the library or when searching in "generic name" mode only	X		X	X	X	X	X			
Don't know the generic name of a brand product, and system is set up to search only by the generic name	X		X	X		X	X			
Don't realize you need to enter a space or two for drugs with less than five letters	X		X		X	X	X			
Don't realize you need to enter a special character (e.g., %, /) to reach the five-character limit	X		X		X	X	X			
Can't find the drug so you scroll down an alphabetical list of available products to find it	X	X	X						X	X
Can't find the drug so you look for it in another location (e.g., code cart, treatment cart)	X	X	X						X	X
Stash common and emergency medications outside the ADC for easy access		X						X	X	X
Borrow the medication from another patient's storage location/profile		X			X				X	X

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newsletter, we wrote about a case report published in *Lancet* (www.ismp.org/ext/850) that described a tragic event in which a 10-month-old child, hospitalized with leukemia, was found by nursing staff, pulseless, cyanotic, and apneic, with clavicular IV tubing tightly wrapped twice around his neck. Sadly, all resuscitation attempts failed. Similar cases in the US (www.ismp.org/ext/851) and Canada (www.ismp.org/ext/852) have been reported. Strangulation risks can also be associated with oxygen tubing, electrical cords, and monitor leads. The risk might increase when a child connected to medical tubing is moving around, such as rolling over or crawling, and not being closely watched.

Direct supervision, use of accessories to stabilize flexible lines (www.ismp.org/ext/854), video surveillance systems, and assessment of the need for continuous, rather than intermittent IV infusions (e.g., saline or heparin locked IV sites), have also been recommended. A tool is available to help assess the risk of iatrogenic strangulation in children (www.ismp.org/ext/855).

Atropine prefilled syringes with sealed syringe tips. We received a report about atropine prefilled glass syringes (1 mg/10 mL) with sealed syringe tips that will not allow injection. The syringes are manufactured by Intas Pharmaceuticals for Accord Healthcare (NDC 16729-484-03). A hospital reported nine such syringes across multiple lot numbers (not all recorded but including lots M2107942 and M2107940). The reporting

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Figure 1. Rather than having an opening at the tip, the syringe is completely sealed with what appears to be a "bubble" of glass (arrow), and the user is unable to expel atropine (Intas Pharmaceuticals) from the syringe.

what's in a Name?

The "vin-" drug stem name

Medications with the prefix "vin-" belong to a class of chemotherapy agents referred to as vinca alkaloids. Vinca alkaloids disrupt cell division which prevents cancer from growing and spreading. Vinca alkaloids are used to treat various cancers either alone or in regimens that include other chemotherapy agents that may be given via other routes. There are three conventional formulations of vinca alkaloids approved for use in the US: vin**BLAS**tine, vin**CRIS**tine, and vinorelbine. In addition, a liposomal formulation of vin**CRIS**tine was available, but as of May 2, 2022 (www.ismp.org/ext/932), it was approved to be taken off the market (**Table 1**).

Vinca alkaloids are intended for intravenous (IV) administration only. For years, the common (less safe) practice has been to prepare and administer vinca alkaloids using a syringe. There were two main reasons for this: 1) vinca alkaloid dose volumes are small and need to be administered quickly over a short period of time (such as an IV push) through a running IV; and 2) they are considered vesicants, which means if the drug extravasates (leaks outside the vein into the surrounding tissue), tissue necrosis can occur. However, if a vinca alkaloid is inadvertently administered via the intrathecal route, the result can cause an irreversible, neurological injury or most likely death. The standard of practice has changed as a result of multiple wrong route errors (www.ismp.org/node/1514) and data that show incidents of extravasation have not increased when vinca alkaloids are diluted and administered via a minibag (www.ismp.org/node/368).

In 2020, the US Food and Drug Administration (FDA) approved labeling changes for vin**CRIS**tine. The label for vin**CRIS**tine now includes the statement: **To reduce the potential for fatal medication errors due to incorrect route of administration, vinCRIStine sulfate injection should be diluted in a flexible plastic container and prominently labeled as indicated "FOR INTRAVENOUS USE ONLY – FATAL IF GIVEN BY OTHER ROUTES."** The other vinca alkaloids continue to include the warning statement "FOR INTRAVENOUS USE ONLY – FATAL IF GIVEN BY OTHER ROUTES."

Table 1. Vinca alkaloids available in the US.

Generic Name	Brand Name
vin**BLAS**tine	Generic only (formerly **VELBAN**)
vin**CRIS**tine	**VINCASAR PFS**
vin**CRIS**tine liposomal	**MARQIBO** (May 2022 discontinued)
vinorelbine	Generic only (formerly **NAVELBINE**)

Drug interactions between vinca alkaloids and phenytoin can reduce anticonvulsant blood levels and may result in increased seizure activity. In addition, since vinca alkaloids are primarily metabolized in the liver, dose adjustments should be considered for patients with hepatic insufficiency or elevated bilirubin levels. Common side effects include leukopenia, peripheral neuropathy, and constipation. Blood counts should be closely monitored as chemotherapy doses may need to be reduced, or even held until blood counts recover. Since white blood cells help protect against infection, it is important to monitor for symptoms of infection prior to and during treatment. Encourage patients to report other signs of infection such as fever, sore throat/mouth, or chills.

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facility noticed that the affected syringes usually had a small but visible "bubble" of glass (**Figure 1**, page 3) at the syringe tip. This was discovered by nurses attempting to administer atropine but were unable to expel the medication, causing delays in administration during medical emergencies.

We have reported this issue to the US Food and Drug Administration (FDA) and the manufacturer. We encourage you to inspect your inventory for this defective product. If you discover defective atropine syringes, remove them from inventory and report the lot number to us (www.ismp.org/MERP) and the company. Purchase prefilled syringes of atropine from another manufacturer.

Special Announcements

FREE webinar recording

On May 6, 2022, leaders from ISMP and The Just Culture Company presented a **FREE** webinar, ***Lessons Learned about Human Fallibility, System Design, and Justice in the Aftermath of a Fatal Medication Error***. An overview of a fatal medication error was presented. The panel then discussed common system vulnerabilities and key strategies to help prevent a similar tragedy, as well as providing a risk model of the error and how it might be viewed within a Just Culture. To listen to (and view) the webinar, visit: www.ismp.org/node/31106.

FREE webinar from ASPEN

On **June 22, 2022**, the American Society for Parenteral and Enteral Nutrition (ASPEN) will be hosting a **FREE** webinar, ***Incorporating Multi-Chamber Bag (MCB) Parenteral Nutrition Formulations into Practice***, in light of the automated compounding device valve shortage. For details and to register, visit: www.ismp.org/ext/925.

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Judy Smetzer Just Culture Champion Scholarships

Become a Just Culture Certified Champion

In cooperation with The Just Culture Company, the Institute for Safe Medication Practices (ISMP) will award three scholarships for the next calendar year to individuals or teams from an organization to participate in a 15-hour Just Culture certification course. For more details about course options and additional benefits, visit: **ismp.org/node/30857**.

Candidate Qualifications

For an individual or team to be considered for a scholarship, they must:

- Be currently working in the healthcare field in any setting
- Have at least 3 years of fulltime experience working in healthcare
- Possess knowledge of the basic tenets of a Just Culture
- Exhibit a strong commitment to design/redesign systems to prevent patient harm
- Obtain a commitment to a Just Culture from at least one executive leader within their primary organization

For more information and to apply, visit:
ismp.org/node/30840

Application Deadline: July 31, 2022

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These scholarships will be awarded in honor of **Judy Smetzer, BSN, RN, FISMP**, former vice president at ISMP who retired in 2022.