

Acute Care

ISMP Medication Safety Alert!®

Educating the Healthcare Community About Safe Medication Practices

ISMP updates its list of drug names with tall man (mixed case) letters based on survey results



Several design techniques have been explored for the purpose of differentiating look-alike drug names to prevent medication selection errors. Tall man (mixed case) lettering describes a method for differentiating the unique letter characters of similar drug names known to have been confused with one another. Starting with a generic drug name expressed in lowercase letters, tall man lettering highlights the differences between similar drug names by CAPITALIZING dissimilar letters. Occasionally, brand names, which always start with an UPPERCASE letter, may require the use of tall man letters to differentiate them from other brand or generic names. The use of tall man lettering to accentuate a unique portion of a drug name with UPPERCASE letters, along with other means such as color, **bolding**, or a contrasting background, can draw attention to the dissimilarities between look-alike drug names as well as alert healthcare providers that the drug name can be confused with another drug name.

Since 2008, ISMP has maintained a list of drug names with recommended UPPERCASE and **bolded** tall man letters. The list includes mostly generic-generic drug name pairs or larger groupings, although a few brand-brand or brand-generic name pairs are also included. Periodically, ISMP updates this list; it was last revised in 2016. Each time the list is updated, we analyze reported events from our error databases, survey practitioners on the topic, and conduct an internal review of drug names that would benefit from the application of UPPERCASE and **bolded** tall man lettering. The internal assessment includes an exploration of orthographic similarity; patterns of similarities in dosage, formulation, and use; and the potential for patient harm if the drugs are confused.

Standardization of Tall Man Letters

To promote standardization regarding which letters to present in **bold**/UPPERCASE, ISMP follows a tested methodology whenever possible, called the CD3 rule.¹ The rule suggests working from the left of the drug name first by CAPITALIZING all the characters to the right once two or more dissimilar letters are encountered. Then, working from the right of the word back, returning two or more letters common to both words to lowercase letters. When the rule cannot be applied because there are no common letters on the right side of the word, the methodology suggests CAPITALIZING the central part of the word only. When this rule fails to lead to the best tall man lettering option (e.g., makes names appear too similar or hard to read based on pronunciation), an alternative option is considered. ISMP suggests that the tall man lettering provided by the US Food and Drug Administration (FDA) and ISMP be followed to promote consistency.

ISMP Survey

ISMP conducted a survey between October and December 2022 to help update ISMP's current list of look-alike drug names with tall man (mixed case) letters. We believe healthcare practitioners should be involved in the process of identifying confusing drug names relevant to their respective practice settings, along with reviewing proposed tall man lettering for possible implementation. The CAPITALIZED and **bolded** letters should make the drug names distinguishable from the user's perspective.²

Respondent profile. ISMP extends our sincere appreciation to the 298 respondents who completed

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SAFETY briefs

Inappropriate use of ADC overrides.

One of the biggest challenges to the safe use of automated dispensing cabinets (ADCs) is the ease with which medications can be removed upon override, many times unnecessarily and with a lack of perceived risk. ISMP's affiliate, ECRI, recently released **Top 10 Health Technology Hazards for 2023** (www.ismp.org/ext/1079). Coming in at number three is the inappropriate use of ADC overrides and how they can result in medication errors. We encourage organizations to review the **ISMP Targeted Medication Safety Best Practices for Hospitals**, Best Practice #16: www.ismp.org/ext/986, and implement the following recommendations:

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IMPORTANT! Read and utilize the Acute Care Action Agenda

One of the most important ways to prevent medication errors is to learn about problems that have occurred in other organizations and to use that information to prevent similar problems at your practice site. To promote such a process, selected items from the **October – December 2022** issues of the **ISMP Medication Safety Alert! Acute Care** newsletters have been prepared for leadership to use with an interdisciplinary committee or with frontline staff to stimulate discussion and action to reduce the risk of medication errors. Each item includes a brief description of the medication safety problem, a few recommendations to reduce the risk of errors, and the issue number to locate additional information.

The **Action Agenda** is available for download as an Excel file (www.ismp.org/node/59272). **Continuing education** credit is available for nurses at: www.ismp.org/nursing-ce.

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our survey on drug names with tall man letters. The respondents were mostly pharmacists (57%), nurses (24%), and pharmacy technicians (12%); however, we also received responses from physicians and other prescribers (2%), and others (e.g., consultant, project manager, respiratory therapist) (5%). The findings from the survey and a discussion of how we updated the FDA and ISMP lists follow.

Scope of using tall man letters. A majority (94%) of respondents reported that their facility uses tall man letters. Almost three-quarters (74%) consistently use tall man letters for organization-defined drug names in all required contexts (e.g., computer screens for pharmacy and prescribers, smart infusion pump drug libraries, labels). Four out of five (80%) respondents use tall man letters in all settings (e.g., pharmacy, surgical suites) and across multihospital and/or multi-clinic settings.

Internal selection of drug names for tall man letters. Fewer than one out of five (18%) respondents use tall man letters for one or more drug names that do NOT comply with the configurations on the **FDA and ISMP Lists of Look-Alike Drug Names with Recommended Tall Man (Mixed Case) Letters**. However, most of the examples provided by respondents were drug names that were NOT on the FDA or ISMP lists. Examples include doxEPin (confused with doxycycline), nitroGLYcerin and nitroPRUSSide, and ALTEplase and TENECTEplase. One respondent notified us that internally selected tall man letters for drug name pairs created confusion because of differences in the tall man letters used in drug information references (which comply with the FDA and ISMP lists). Thus, the organization opted to use the configurations on the FDA and ISMP lists, and to eliminate the use of tall man letters for drug names not included on either list.

Reduction of errors. The vast majority of respondents felt that the use of tall man lettering helped reduce the risk of errors among medications with look-alike names. Specifically, 95% of respondents felt that the use of tall man letters by the pharmaceutical industry on product and carton labels helps to reduce drug selection errors. More compelling is the fact that 87% of survey respondents were able to recall one or more instances when tall man lettering had actually prevented them from prescribing, transcribing, dispensing, or administering the wrong medication. Respondents provided examples of look-alike name pairs involved in these potential events, including hydrALAZINE and hydrOXYzine, levETIRAcetam and levoFLOXacin, and SOLU-Medrol and DEPO-Medrol. Many others reported a personal experience where tall man lettering has helped them avoid errors when selecting drugs during order entry, removing medications from an automated dispensing cabinet (ADC) via override, programming the smart pump using the drug library, and prior to administration when referencing the medication administration record (MAR). Others reported that the use of tall man lettering on preprinted paper order sets helps prevent errors during electronic health record (EHR) downtime when technological safeguards are unavailable.

Several respondents also told us that tall man lettering alerts them to the possibility of a drug mix-up, reminding them to be cautious. They said that tall man letters are an effective alert system that quickly captures their attention and causes them to pause, read the drug name more carefully a second or third time, and make sure the drug is appropriate for the patient. Respondents referred to the tall man letters as a “tool to highlight errors” that helps to “catch your eyes” and “slow down or stop the process” to ensure they have the correct drug and “to prevent confirmation bias” when handling drugs with similar names.

Updated Lists

FDA list. In 2001, FDA initiated the name differentiation project to continually evaluate postmarketing reports of name pair confusion and to determine if tall man lettering should be used to help differentiate similar generic names (www.ismp.org/ext/1072). Since our last update to the lists in 2016, FDA has added three drug name pairs to its list:

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- Limit the variety of medications that can be removed from an ADC using the override function.
- Require a medication order (e.g., electronic, written, telephone, verbal) prior to removing any medication from an ADC, including those removed using the override function.
- Monitor ADC overrides to verify appropriateness, transcription of orders, and documentation of administration.
- Periodically review for appropriateness the list of medications available using the override function.

⚡ Pediatric strength Biktarvy was accidentally prescribed and dispensed to adults.

ISMP has received multiple reports in which an adult patient was ordered and dispensed the pediatric strength of **BIKTARVY** (bictegravir/emtricitabine/tenofovir alafenamide) in error. In one case, an adult recently diagnosed with a human immunodeficiency virus (HIV) infection was discharged from a hospital with a new prescription for Biktarvy 30 mg/120 mg/15 mg tablet once daily. This dose is appropriate for pediatric patients weighing between 14 and 25 kg, but not for adults. For pediatric and adult patients who weigh 25 kg or more, the recommended Biktarvy dose is 50 mg/200 mg/25 mg once daily.

In the error described above, the community pharmacist did not recognize that this was an underdose and dispensed the medication to the patient. The patient's partner, who was prescribed Biktarvy from an HIV clinic, told the patient that the label on the bottle looked different, so they contacted the HIV clinic. It was then discovered that the prescriber ordered the pediatric formulation in error. The label does not indicate the intended weight range or specify that it is a pediatric formulation (**Figure 1**, page 3). It is unclear if the hospital or retail pharmacy had a dose range checking alert set up in the electronic health record (EHR) to confirm the prescribed dose.

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- **CIS**platin and **CARBO**platin
- mig**ALA**stat and mig**LU**stat
- tra**ZOD**one and tra**MAD**ol

Two of these name pairs were already on the ISMP list: **CIS**platin and **CARBO**platin, and tra**ZOD**one and tra**MAD**ol. Also, aceto**HEXAMIDE**, sulfi**SOXAZOLE**, and **TOLBUT**amide have been discontinued and are not marketed in the United States. However, FDA does not want to remove these names from its list because the names might still be listed in electronic drug information sources. Also, unless a drug is removed from the market for reasons of safety or efficacy, the drug could still be marketed at a later date.

Table 1. Drug names tested for possible addition to the *ISMP List of Look-Alike Drug Names with Recommended Tall Man Letters*

Drug Names	Aware of Confusion? (%)	Add to List? (%)
py RI Dostigmine and PHYS ostigmine	49	91
cyclo PHOS phamide (confused with cyclo SPORINE and cyclo SERINE , already on FDA list)	50	83
dro PER idol and dro NAB inol	37	82
lina GLIP tin and lina CLO tide	27	79
le NALID omide and le FLUN omide	21	79
hydroxy UREA (confused with hydr OXY zine, already on FDA list)	43	77
dex AMETH asone and dexmede TOMID ine	44	75
DESMO pressin and VASO pressin	44	71
NIZ atidine and nita ZOX anide	21	68
metho TREX ate (confused with met OL azone, meth IMA zole, and methazol AMIDE , already on ISMP list)	31	63

ISMP list. In the 2022 survey, we asked for feedback on 10 potential new drug name pairs or single drug names that may be confused with another drug name pair already on the list. Of these, 75% or more of the respondents felt that seven of these should be added to the ISMP list of drug names with tall man letters (**Table 1**). For these seven drug names or pairs, we evaluated the potential for overlap among indications, frequency of administration, storage, drug formulation, and available strengths, along with the potential for harm if a mix-up occurred. We also searched our error-reporting databases to see how often we received reports of mix-ups with a similar-looking drug name. Based on this assessment, the following drug names were added to the ISMP list:

- cyclo**PHOS**phamide (confused with cyclo**SPORINE** and cyclo**SERINE**, already on FDA list)
- dro**PER**idol and dro**NAB**inol
- dex**AMETH**asone and dexmede**TOMID**ine
- py**RI**Dostigmine and **PHYS**ostigmine

Many respondents shared their thoughts regarding other drug names that were not tested in the survey. We reviewed each suggestion while considering all risk factors and the need to keep the list short enough to avoid diluting the effectiveness of tall man letters. Overuse of tall man letters may reduce effectiveness, as names would no longer appear novel.² More than 30 name pairs with tall man letters were suggested (many brand names, which we hesitate to include without FDA approval). There were drug name pairs or single drug names that may be confused with other drug

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Figure 1. The Biktarvy 30 mg/120 mg/15 mg label (left) does not indicate that this is intended for pediatric patients weighing 14 to less than 25 kg. The Biktarvy 50 mg/200 mg/25 mg label (right) does not indicate that this is intended for adult and pediatric patients that weigh 25 kg or more.

The practitioners involved in prescribing and dispensing this medication were not familiar with HIV medications and their various formulations, which could have contributed to the error.

In a second report, a prescriber ordered the pediatric dose of Biktarvy for an adult patient, and a retail pharmacist dispensed it to the patient for 8 months before discovering the underdose. The health system completed an audit and identified another adult patient who was also prescribed the pediatric dose in error upon discharge.

Another pharmacy reported that they accidentally purchased the pediatric formulation because they were not aware there were two strengths available. The bottle was dispensed to an adult patient prior to the pharmacy recognizing the error.

We reached out to the manufacturer, Gilead, and recommended they include a prominent pediatric or weight-based specification on the Biktarvy 30 mg/120 mg/15 mg label; they will escalate this concern. For now, educate any healthcare provider involved with prescribing and/or dispensing this medication about the two formulations along with the corresponding weight ranges. Create weight-based order sentences with dose range checking in the EHR to guide prescribers to select the correct dose and automatically link the corresponding formulation in the pharmacy system.

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names already on the list that were closely associated with a high risk of harm if a mix-up were to occur, therefore, the following were added to the ISMP list:

- **AL**fentanil (confused with **SUF**entanil and fenta**NYL**, already on the ISMP list)
- **BU**Pivacaine and **RO**Pivacaine
- oxy**BUTY**nin (confused with oxy**CODONE**, Oxy**CONTIN**, and oxy**MOR**phone, already on the ISMP list)

ISMP has previously recommended NOT using brand names of drugs that have been discontinued (e.g., Versed); thus, three name pairs were removed from the ISMP list:

- **AVIN**za (discontinued) and **INV**anz
- **SINE**quan (discontinued) and **SERO**quel
- **TREN**tal (discontinued) and **TEG**retol

In addition, the list was updated to include a notation for a medication that is not currently available in the United States:

- ra**NITI**dine (not available) confused with ri**MANTA**dine

The **FDA and ISMP Lists of Look-Alike Drug Names with Recommended Tall Man (Mixed Case) Letters** has been updated on our website (www.ismp.org/node/136).

Ongoing Research

In 2016, ISMP published an up-to-date review of the research, **Tall man letters: A review of the evidence; in Special Edition: Tall Man Lettering; ISMP Updates Its List of Drug Names with Tall Man Letters** (www.ismp.org/node/250). Using tall man letters, alone or with other text enhancements, has been shown to reduce errors due to drug name similarity. However, the evidence is mixed, with some studies showing the method may not be effective. Interestingly, a 2021 meta-analysis (www.ismp.org/ext/1077) that looked at 11 articles representing 20 individual trials, showed a significant reduction in wrong medication selection errors caused by look-alike drug names when using tall man lettering or other forms of text enhancement.

ISMP is currently serving as a co-investigator in a 4-year Northwestern University (Chicago) research project, led by Bruce L. Lambert, PhD, to assess the comparative effectiveness of various methods of tall man lettering, text enhancements, and their ability to reduce errors during drug selection. This research project is being funded through a grant from FDA. We look forward to participating in the research project and learning more about the effectiveness of tall man lettering.

Although there are still questions to be answered, tall man lettering is done at little or no cost, has little or no downside, and is not known to be associated with any potential risk for patient harm. Considering past research showing it may be an effective way to prevent mix-ups, and the overwhelming support for tall man lettering shown by survey respondents, ISMP strongly encourages continued use by FDA, pharmaceutical manufacturers, outsourcers and compounders, hospitals, and other practice locations, while we conduct further research to answer questions about the most effective way to differentiate look-alike drug name pairs.

References

- 1) Gerrett D, Gale AG, Darker IT, Filik R, Purdy KJ. Tall man lettering. Final report of the use of tall man lettering to minimize selection errors of medicine names in computer prescribing and dispensing systems. Loughborough University Enterprises Ltd; 2009.
- 2) ISMP Canada. Principles for the application of tallman lettering in Canada. October 2015. www.ismp.org/ext/1083

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▶ ISMP will soon be accepting applications for our unique Fellowship program that will begin in the summer of 2023. The **ISMP Safe Medication Management Fellowship** and **FDA/ISMP Safe Medication Management Fellowship** will help you grow in your career and enable you to make major contributions to medication safety worldwide. For a brief description of our Fellowship program, candidate qualifications, program brochure and outline, please visit: www.ismp.org/node/871. More information, including application deadline, will be coming soon!

Special Announcement

Virtual MSI workshops

Don't miss the opportunity to register for one of our unique 2-day, virtual **ISMP Medication Safety Intensive (MSI)** workshops. Learn how to identify risks before they cause harm and how to use data for continuous improvement. These programs fill up quickly, so register early. Our first session is scheduled for **April 13-14, 2023**. For more details about the program and more dates in 2023, visit: www.ismp.org/node/127.

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



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