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ISMP
An ECRI Affiliate

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

Can we ensure medication safety with the use of speech recognition software?

Problem: Speech recognition, or speech-to-text, is the ability of a computer software system to identify spoken words and then convert them into readable text. It is something most people use daily through cell phone texting and dialing, commands given to smart home devices, virtual meeting transcripts, and closed captioning on television programs. In healthcare, it is used for scheduling, office visit summaries, and other electronic health record (EHR) documentation. A recent study, *Speech recognition for medical documentation: an analysis of time, cost efficiency and acceptance in a clinical setting* (www.ismp.org/ext/1353), found that medical documentation using speech recognition improved efficiency resulting in significant time savings with lower error rates compared to typing. Like other technologies, we expect the use of speech recognition to continue to expand in the healthcare setting. Be that as it may, medication errors and close calls have been reported by organizations that have been using speech recognition software.

Speech Recognition-Related Medication Errors

In 2022, The Joint Commission (TJC) updated the *Quick Safety* alert titled, *Speech recognition technology translates to patient risk* (www.ismp.org/ext/1085). The alert provides examples of speech recognition documentation errors (e.g., allergy to **XOPENEX** [levalbuterol] documented instead of allergy to sulfa when "sulfa [next]" was spoken). The alert discussed a case in which a patient died after they were discharged from a hospital to a rehabilitation facility. Unbeknownst to the prescriber, the note that was transcribed using speech recognition software included an incorrect insulin dosage of 80 units rather than 8 units (10 times the intended dose). The alert also noted that some EHR documents were found to contain disclaimers to point out the problems with speech recognition that can result in a patient safety event. For example, a disclaimer may state, "Portions of the record may have been created with voice recognition software. Occasional wrong-word or 'sound-alike' substitutions may have occurred due to the inherent limitations of voice recognition software. Read the chart carefully and recognize, using context, where substitutions have occurred."

Recently, an event reported to ISMP involved a pharmacist who received an order for chemotherapy, procarbazine 50 mg orally once daily for a patient. Since the patient did not have a history of cancer or an oncology consult documented, the pharmacist called the prescriber to clarify the indication. The prescriber stated that he intended to order prochlorperazine intravenously (IV) and that there must have been an error when placing the order in the EHR using speech recognition software. When the prescriber said the medication name using the computer dictation software, he was presented with a list of medication options and inadvertently selected the wrong medication and order sentence. After the error was identified, the prescriber discontinued the procarbazine order and entered an order for prochlorperazine 5 mg IV as needed. It is unknown which medication the prescriber had actually dictated.

The pharmacist was unaware that the hospital had recently implemented speech recognition software for prescribers to enter medication orders. The pharmacist who discovered the error notified the medication safety pharmacist who was also not aware of this software capability. In this organization, prescribers were expected to review dictated orders for accuracy before signing, but it seemed, in this case, a gap existed in the process.

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New medical device for hypertension calls for risk-prone 1 liter sterile water for injection bags. A pharmacist reported a concern with a newly approved device used in her hospital's radiology department to treat patients with resistant hypertension. The Paradise Ultrasound Renal Denervation (RDN) System by Recor Medical was approved in November 2023. The device involves a generator that uses ultrasound energy to disrupt nervous system signals to the kidneys, resulting in decreased blood pressure.

The device requires the use of sterile water for injection as a coolant in the device to protect the renal arteries during the procedure. According to the Operator's Manual (www.ismp.org/ext/1412, see page 14), acceptable coolants to be used with the Paradise System are 250 mL, 500 mL, and 1 liter sterile water for injection bags. However, the use of 1 liter bags outside of the pharmacy conflicts with the ISMP ***Targeted Medication Safety Best Practices for Hospitals***, *Best Practice #10* (www.ismp.org/node/160). The goal of this *Best Practice* is to prevent accidental intravenous (IV) administration of sterile water to a patient. Administering large quantities of hypotonic sterile water IV has resulted in patient harm, including death, from hemolysis.

ISMP has received reports of mix-ups between 1 liter bags of sterile water for injection, irrigation, and inhalation with 1 liter bags of dextrose 5% (D5W) and 0.9% sodium chloride (normal saline [NS]). These products look very similar in size, shape, and type of flexible plastic bag used for distribution. The *Best Practice* recommends using an alternative to avoid the storage and use of 1 liter bags of sterile water for injection, irrigation, or inhalation in patient care areas. For example, replacing 1 liter bags of sterile water with 2 liter bags of

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Safe Practice Recommendations: The decision for an organization to implement software with speech recognition should be made with input and agreement of senior leadership, department heads, and safety/quality representation (e.g., pharmacy director, medication safety officer, risk management). If your organization is considering its use, follow these safeguards to mitigate the risk of error.

Designate a team. A designated team (e.g., prescribers, pharmacists, nurses, informatics, safety/quality) should invest time in evaluating and planning the use of speech recognition software for medication order entry. The team should proactively test the accuracy of the software for transcribing medication names. Include sound-alike medication name pairs (e.g., clonaze**PAM** and clo**BAZ**am) in testing scenarios and share these examples with staff to demonstrate the type of errors that could happen. Consider completing a failure mode and effects analysis (FMEA) to determine potential failure points and mitigation strategies.

Use simulation. Before implementing speech recognition software for medication orders, use simulation to evaluate the system in a test environment. Work directly with software vendors to understand potential problems that have been reported and recommendations to prevent them. Simulate the workflow to test what does and does not work, gain crucial feedback from frontline staff, and identify any potential safety gaps. Consider holding "a day in the life" to run real-life simulations to see how speech recognition software works in your clinical settings with a diverse group of end users, incorporating various background noises (e.g., emergency department, intensive care unit, cafeteria), and compare to vendors' testing environments. Evaluate all devices practitioners may use (e.g., laptop, computer on wheels, smartphone) and ask end users to identify vulnerabilities and discuss concerns with the team so they can correct any issues before implementation.

Define the process. Evaluate if there should be any restrictions on using speech recognition software for medication orders (e.g., consider prohibiting use for chemotherapy/other high-alert medications, nonformulary medications). Ensure prescribers understand the risk of transcription errors and the requirements for clear communication of orders considering the impact of background noises.

Use clinical decision support. After they say the medication name, ensure prescribers are prompted to select from a list of medications and corresponding order sentences that go through the same clinical decision support (CDS) as typed orders. Make enhancements to CDS (e.g., indication selection, dose range checking, drug-disease interactions) if needed.

Review the order. As with any medication order, ensure there is a process that requires prescribers to review the medication order prior to submitting it.

Verify the indication. When verifying medication orders, pharmacists should also review the order, evaluate the indication, and ensure the prescribed medication and dose make sense in the context of the patient's condition. This helps to identify errors with sound-alike drug names. If a pharmacist or nurse has any uncertainty with the medication order, they should contact the prescriber for clarification prior to dispensing or administering the medication.

Educate practitioners. Educate practitioners (e.g., prescribers, pharmacists, nurses) who may use speech recognition software for ordering, or who may receive an order using this technology, about the appropriate steps to ensure safety. Ensure prescribers understand the risk of patient harm if they do not review the order for accuracy prior to signing it.

Seek feedback and report errors. Establish a feedback mechanism for practitioners to report concerns, close calls, and errors with using speech recognition software and share these issues with the medication safety committee. Also report errors to the US Food and Drug Administration (FDA), software vendors, and ISMP. Share internal and external events and lessons learned with end users along with the best workflow to reduce the risk of these errors.

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sterile water, or using bottles of sterile water for irrigation or inhalation, or vials.

We reached out to the US Food and Drug Administration (FDA) and Recor Medical to notify them of this concern. Recor Medical has escalated this issue, and their engineering team is investigating the use of 2 liter bags and sterile water bottles as an alternative to 1 liter sterile water for injection bags. Organizations must take precautions to avoid mix-ups between sterile water and IV fluids. Establish a policy that pharmacy alone can order sterile water bags. If your organization uses the Paradise System, establish an effective process for ensuring the chain of custody for sterile water for injection bags. Inform staff of the risks of infusing sterile water for injection bags and the importance of verification during medication preparation and administration. Consider the use of auxiliary labels on sterile water for injection bags (e.g., only for use with Paradise System). Ensure barcode scanning verification is completed for all infusion bags before administration.

MethylPREDNISolone was almost administered instead of triamcinolone. A prescriber ordered an intra-articular dose of triamcinolone 40 mg/mL injectable suspension for a patient who was being treated for joint inflammation in the radiology department. A nurse inadvertently removed a nearly identical-looking carton of methyl**PREDNIS**olone 40 mg/mL injectable suspension from a shelf where triamcinolone was stored nearby. The radiology department did not have an automated dispensing cabinet (ADC) and had not implemented barcode medication administration (BCMA) scanning. Fortunately, when preparing the dose, the nurse identified that it was the incorrect medication. Both products, made by Amneal, are the same concentration and come in the same size cartons with similar colors, fonts, and designs (**Figure 1**, page 3).

We contacted the US Food and Drug Administration (FDA) and the manufacturer to recommend differentiating these products. When the pharmacy receives a new product (e.g., new product added

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Implement quality checks. Establish and implement policies and procedures for regularly monitoring the quality of medication orders produced using speech recognition software. Identify issues and develop quality action plans to improve processes. Continually assess speech recognition software available on the market to determine if other software solutions offer a superior product.

Provide feedback to vendors. Organizations should collaborate with software vendors and provide feedback, as needed, to improve this technology. We expect this technology will become more advanced and encourage practitioners to become involved in this undertaking.

Message in our Mailbox

Pharmacists responding to codes. In our October 6, 2022 newsletter article, *Survey results from pharmacists provide support to enhance the organizational response to codes* (www.ismp.org/node/41926), we reviewed survey results, which showed that a surprising number of pharmacists felt they were ill-prepared to respond to codes. In response to that article, two pharmacists from LifeBridge Health recently sent the following to ISMP:

To address the gaps identified in the ISMP newsletter, LifeBridge Health's critical care pharmacy workgroup developed a three-part lecture and workshop for pharmacists, which was provided twice at three acute care hospitals. Lectures included expectations when responding to an emergency, a review of Advanced Cardiac Life Support (ACLS) medications, and information regarding medication preparation and compounding during a code. Surveys were conducted pre- and post-lecture series to assess pharmacist confidence and concerns with responding to emergencies.

Of those who completed the pre-lecture survey (N = 40), pharmacists were often concerned about their ability to anticipate what would be asked of them and to provide a quick answer (n = 11), their drug dosing knowledge (n = 7), or their ability to quickly prepare or compound a medication at the bedside (n = 5). The majority had not attended any emergencies in the past year (n = 24) or had only attended between one and five (n = 9). When asked on a scale of 1 to 5 (with 5 being high) how confident they felt attending emergencies, the average score was 2.68 (median 3).

The pharmacists (N = 11) who completed the post-lecture survey rated their confidence in emergency response as an average of 4 (median 4). When asked about future topics not covered in the lecture series, the most common requests were for simulations, including pediatric emergencies and drug dosing, as well as the development of a badge card (for easy access to common code medication doses and preparation instructions).

While the LifeBridge Health survey response was small, the results support the findings in the ISMP survey that continued growth in this area is critical to improving patient outcomes and supporting pharmacists in high-stress situations. LifeBridge Health plans to provide pharmacists with simulation experience and promote pharmacist completion of ACLS certification.

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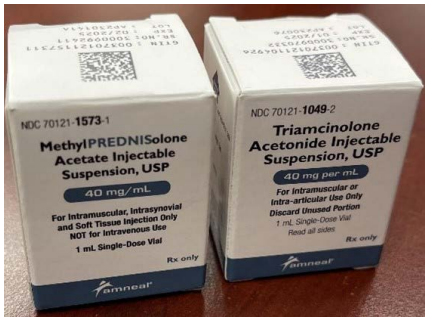

Figure 1. Methyl**PREDNIS**olone 40 mg/mL suspension (left) and triamcinolone 40 mg/mL suspension (right) by Amneal, come in nearly identical cartons.

to formulary, drug shortage), conduct a review to identify potential risks with the product's design including look-alike labeling and packaging concerns with other products that are in use within the organization (www.ismp.org/node/71460). When problems are recognized, notify staff and consider purchasing the product (or one product of a problematic pair) from a different manufacturer. Store look-alike products separately and consider the use of signage or auxiliary labels on the cartons and in storage locations.

When possible, hospitals should have ADCs in clinical areas such as the radiology department to support safe and secure medication distribution and require pharmacist review and approval prior to allowing access to medications. In addition, the ISMP ***Targeted Medication Safety Best Practices for Hospitals***, *Best Practice #18* (www.ismp.org/node/160) calls for maximizing the use of barcode verification prior to medication and vaccine administration by expanding use beyond inpatient care areas. Organizations should specifically target clinical areas with an increased likelihood of short or limited patient stays, including radiology. Use barcode scanning when receiving, dispensing, filling the ADC, and prior to administration of any medication.

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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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