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

Warning! Smart Pump Anesthesia Mode Removes Hard Limits Aimed at Preventing Catastrophic Overdoses

Problem: In many organizations, anesthesia providers use smart infusion pumps in the operating room (OR) using an "anesthesia mode" setting. However, the organization may fail to understand that, in some pumps, "anesthesia mode" settings reduce all hard stops to soft stops—allowing easy overrides of dosing/concentration limits that should never be bypassed.

In a recent case reported to ISMP, a 75-year-old patient was transferred from the preoperative unit to the OR with insulin infusing at 1.3 units/hour on a smart infusion pump. A student registered nurse anesthetist (SRNA) obtained a second pump, which they switched the patient's insulin infusion to and used to administer other medication infusions to the patient while in the OR. When programming the insulin infusion using the new pump, the SRNA selected anesthesia mode on the pump per the organizational procedure. The SRNA selected insulin from the drug library and programmed "1.3" into the pump using the dose error-reduction system (DERS). However, the pump was inadvertently logged into the pediatric drug library, which defaulted the insulin dosing units to units/kg/hour, rather than units/hour, as in the adult library. This resulted in the infusion running at 110 units/hour rather than the intended 1.3 units/hour. After 1 hour, the patient's blood glucose dropped to 98 mg/dL, at which point the SRNA decreased the infusion from 1.3 units/kg/hour to 0.3 units/kg/hour. The patient arrived in the postanesthesia care unit (PACU) an hour later, lethargic and diaphoretic, with a blood glucose of 35 mg/dL. The PACU nurse identified the pump programming error. The nurse notified the prescriber and administered three bolus doses and a continuous infusion of dextrose to the patient, who, fortunately, recovered.

During the event investigation, the organization identified that the certified registered nurse anesthetist (CRNA) overseeing the case did not check the SRNA's pump programming, although that was the typical process. At the previous institution where the SRNA practiced, insulin infusions were dosed in units/kg/hour for all patients (including adults). The drug library had alerted the SRNA that the dose had exceeded the soft guardrail limit of 0.1 units/kg/hour, which the SRNA bypassed. Although there was a hard maximum limit (1 unit/kg/hour) with this selected infusion option, since the pump was running in anesthesia mode, the hard stop feature was not available to protect end users from a potentially catastrophic programming error. The organization had implemented interoperability between the electronic health record (EHR) and the smart pump, which would have prepopulated the appropriate dose and dosing units. However, interoperability was not yet used in the OR, and there was a lack of buy-in from anesthesia leadership to move forward with implementation.

Anesthesia providers in the reporting organization have updated their practice to maintain the use of the infusion pump already administering medications to the patient upon arrival to the OR, rather than switching to a second pump that requires reprogramming. In addition, the anesthesia providers are considering implementing interoperability in the OR and have expressed this to senior leadership.

This is not the first time we have warned about the risk of anesthesia mode disabling hard limits. In our April 20, 2023 article, "Incorrect Lidocaine Infusion Option Selected in Smart Pump Drug Library," we discussed how an anesthesiologist inadvertently administered lidocaine at a rate of 30 mg/minute instead of 30 mcg/kg/minute. The anesthesiologist had selected a

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Be Prepared! New Once-Weekly 700 units/mL Awiqli Insulin Pen. In March 2026, the US Food and Drug Administration (FDA) announced approval of **AWIQLI** (insulin icodec-abae), a long-acting human insulin analog indicated as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus. According to the prescribing information, each carton of Awiqli (Novo Nordisk) will contain one 1.5 mL (1,050 units) or 3 mL (2,100 units) FlexTouch prefilled pen and 13 NovoFine needles. There will also be a 1 mL (700 unit) sample pen available.

Not only is the highly concentrated 700 units/mL formulation unique, but the once-weekly dosage and corresponding dose adjustments will be new for practitioners and patients. The recommended weekly starting dose of Awiqli in insulin-naïve patients is 70 units (0.1 mL) administered subcutaneously once weekly on the same day each week. The pen delivers doses in 10-unit increments and can deliver up to **700 units in a single injection**. Practitioners may need to titrate the dose of Awiqli based on the patient's metabolic needs, blood glucose monitoring results, and glycemic control goals, with dose adjustments for renal or hepatic function and during illness. If patients need to change the day of the week to administer Awiqli, they may do so if their last dose has been at least 4 days prior. If they missed a dose, they should administer the missed dose as soon as possible if it has been 4 days or less, and then continue the once-weekly schedule 1 week from the day the missed dose was administered. If more than 4 days have passed, patients should skip the missed dose and take their next Awiqli dose on their regularly scheduled day.

A pharmacist reported concerns that the 700 units/mL concentration on the pen device is in small font, which could be overlooked by a practitioner or patient. It is also difficult to know how easy it will be for patients to differentiate between doses

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lidocaine option in the smart pump drug library that was intended for ventricular tachycardia with a dose rate of mg/minute, instead of the option in mcg/kg/minute that was intended for perioperative infusions in this organization. Although the DERS was set with a hard maximum limit (5.5 mg/minute) for the selected lidocaine option, because the pump was running in anesthesia mode, the hard stop feature was not available. When the anesthesiologist programmed a dose of "30," the soft maximum alert (greater than 5 mg/minute) fired but was overridden. The patient subsequently received 1,544 mg over 50 minutes rather than the intended dose of 85 mg. When the programming error was discovered, the patient was immediately treated with a lipid rescue infusion and recovered.

We have heard from organizations who were considering disabling anesthesia mode, that doing so with certain pumps removes the ability to pause infusions indefinitely without the pump alarming/beeping. One organization told us that distractions from frequent pump alarms during surgery posed a greater risk of error than leaving anesthesia mode enabled, so they have opted to continue using anesthesia mode.

Safe Practice Recommendations: We recommend that smart infusion pump vendors make anesthesia mode aspects configurable by the organization (e.g., allow for pausing infusions without alarming and still maintain hard dosing limits). Organizations should refer to the ISMP Guidelines for Optimizing Safe Implementation and Use of Smart Infusion Pumps and consider the following recommendations to prevent smart pump programming errors in the perioperative setting.

Establish expectations. Leadership must clearly establish that the use of smart pumps with engaged DERS is expected in perioperative settings for all infusions and loading/bolus doses (except when the rate of infusion exceeds the pump's capabilities/capacity). Leadership should confirm if "anesthesia mode" is enabled on the organization's smart pumps and consider limiting use of this feature, which may reduce all hard stops to soft stops.

Collaborate. Involve anesthesia practitioners when building and enhancing the drug library. Organizations are encouraged to understand any barriers to the effective use of DERS in the OR. Routinely meet with anesthesia team members to foster increased communication and feedback.

Optimize drug library options. Review how drug library options are displayed on the pump screen (e.g., pediatric versus adult drug libraries) and ensure that selecting the appropriate drug library is intuitive to end users. Provide standard drug concentrations and dosing units in drug libraries. Refer to the American Society of Health-System Pharmacists (ASHP) Standardize 4 Safety initiative for recommended standard medication concentrations.

Build maximum dose limits in the drug library. Establish and/or evaluate maximum dose limits for each medication infusion and loading/bolus dose and ensure the smart pump limits match the EHR limits. Create drug libraries with soft dosing limits that reflect the maximum expected dose and rate prescribed, as well as a buffer for patients who may require more or less than the typical default doses and rates. Set hard dosing limits as a forcing function to prevent catastrophic errors, while considering patients who may clinically require atypical doses, to prevent end users from creating workarounds to program infusions without engaging the DERS.

Use hard stops judiciously. Hard stops should not prevent practitioners from administering a clinically appropriate, but perhaps an unusual dose. Rather, hard stops should be in place to protect against massive overdoses. Gather feedback from anesthesia providers and modify hard limits if needed.

Educate practitioners. Standardize the orientation process and provide medication safety-specific education to students, residents, and new practitioners for tasks that are deemed critical to their role. Determine a designated number of times a practitioner should be observed completing a task to validate competency (e.g., pump programming). Educate them on medication

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on the dose selector, especially since there is such a wide range of doses that can be selected from the starting dose of 70 units all the way up to 700 units! Another concern is that when switching to Awiqli from daily basal insulin therapy, there are different instructions based on the week (e.g., week 1 and week 2 have different dosing recommendations), which may also lead to prescribing or administration errors.

The prescribing information warns that serious hypoglycemia requiring hospitalization has occurred due to accidental mix-ups between Awiqli and other insulin products or once-weekly injectable antidiabetic medicines, incorrect dose selection, and dosing frequency errors. While this long-acting insulin is not available yet in the United States, it is available in other countries. A recently published case report described a patient who unintentionally administered a 10-fold higher dose of insulin icodec as his first dose.[1] He was prescribed 70 units of insulin icodec subcutaneously once weekly and was provided with a 1 mL sample pen containing 700 units. The patient misread the concentration on the packaging and administered 700 units of icodec. Fortunately, he identified the error immediately, went to the ED, and suffered no adverse effects or hypoglycemic events, as demonstrated by continuous glucose monitoring.

According to Novo Nordisk, Awiqli is expected to be available this summer (2026). Hospitals need to educate practitioners about this new insulin product and have a plan for when patients using Awiqli are hospitalized, whether or not Awiqli is on formulary. During medication reconciliation, specifically ask the patient which day of the week they take this medication (e.g., every Monday). Evaluate your electronic health record (EHR) and pharmacy dispensing software to require a weekly dosage regimen default for Awiqli and lock this field down so that practitioners cannot change it to another frequency (e.g., daily). If patients are admitted and need to discontinue Awiqli (for whatever reason), practitioners need to account for the residual effect of Awiqli and have a plan to initiate a daily basal insulin after the 7-day duration.

Evaluate acute care workflows and consider if it is possible to add a patient-specific

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safety-related policies and organizational expectations as a learner. Provide practitioners with information about medication errors that have occurred regarding smart infusion pumps and strategies that have been implemented to prevent them.

Monitor alerts. Smart pump dosing limits should not cause nuisance alerts. The smart infusion pump team should regularly monitor drug library usage and alerts and adjust the dose limits as needed based on current practice and literature.

Implement interoperability. Plan for bi-directional (i.e., auto-programming and auto-documentation) smart infusion pump interoperability with the EHR, including in the OR.

Learn from errors. Review internally reported pump programming-related errors as well as external events published by ISMP and others. Encourage staff to report both close calls and errors that have reached the patient. Share impactful stories and recognize anesthesia providers for good catches.

Special Announcements

MSB Clinician Database

Med Safety Board (MSB), an ISMP company powered by ECRI, is recruiting clinicians to join its growing MSB Clinician Database, a network of healthcare professionals who contribute to medication and medical device safety initiatives. Clinicians in the database may be invited to participate in paid surveys, trademark name evaluations for look-alike or sound-alike issues, onetime consultations, or advisory boards focused on real world safety challenges. Participation is optional, project specific, and designed to respect clinicians' time and professional expertise. We are actively enrolling US-based clinicians at this time, including pharmacists, nurses, physicians, medication safety practitioners, and other healthcare professionals across practice settings. International clinician recruitment will begin soon. Joining the database does not guarantee selection for a project but ensures consideration for future MSB engagements aligned with your background and interests.

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- **ISMP Safe Medication Management Fellowship**: This opportunity is for a healthcare practitioner (e.g., pharmacist, nurse, or physician) to work remotely with ISMP.

For more information, click here.

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label to the insulin pen device itself (not on the removable cap), so that, before administration, the nurse can scan the patient's wristband, patient-specific barcode on the pen, and the manufacturer's barcode to ensure it is the correct product for the patient. Practitioners and patients must be educated not to use an insulin syringe to withdraw Awiqli from the pen cartridge, and to only use the NovoFine needles that come with the pen. Determine if additional strategies (e.g., store separately from other insulin products such as in the controlled substance safe, conduct an independent double check prior to dispensing and administration) are needed to safeguard the 700 units/mL pens. If it is a nonformulary product for your organization, consider whether the drug is appropriate for formulary addition, so that system safeguards can be optimized.

Organizations (e.g., hospitals, clinics, pharmacies) should provide patients with education for all Awiqli prescriptions and ensure that they understand the correct weekly frequency. When dispensing from the outpatient or community pharmacy, staff should apply a label on the pen devices, not the removable caps. When Awiqli is picked up at the pharmacy, provide mandatory counseling and require the patient to repeat back the instructions, at every encounter, to validate that the patient understands the once-weekly dosing schedule and hypoglycemic effect of the medication if taken more frequently than prescribed. Tell patients to always check the product label before each injection to confirm they are using Awiqli and not another insulin product. Instruct patients to visually verify the dialed units on the dose selector of the Awiqli pen before each injection and to **not** dial the maximum single dose (700 units) of Awiqli unless this is the prescribed dose. Ensure patients understand how to recognize and manage hypoglycemia. We encourage practitioners to maintain a heightened awareness when prescribing, dispensing, and administering this product. Report errors to ISMP, FDA, and the manufacturer.

Reference

1) Hawker K, Morein J, Gill G, Druce I. Tenfold insulin icodec overdose. *Can J Diabetes*. 2025;49(8):470-472.