



Emergency Department & ICU/CCU Physicians & Nurses administer many of the IV push injections of critical care drugs that will use SafePush.

Articles and Research

- Institute for Safe Medication Practices (ISMP) – IV Push Study and Guidelines with Joint Commission
- https://www.nursingcenter.com/ce_articleprint?an=00152193-201610000-00012
 - *** Administer I.V. push medications and any subsequent I.V. flush at the rate recommended by the manufacturer, supported by evidence in peer-reviewed biomedical literature, or in accordance with approved institutional guidelines. Use an appropriate volume of the subsequent I.V. flush to ensure that the entire drug dose has been administered.** Rates for I.V. push medication administration listed as "slow" or "fast" are considered ambiguous and should be clarified. In some cases, the speed at which a practitioner administers a medication makes a therapeutic difference or may contribute to an adverse reaction. An example would be the inappropriately slow administration of I.V. push adenosine to treat stable, regular, narrow-complex tachycardia with a pulse refractory to vagal maneuvers. Practitioners who administer I.V. push medications without a watch or second hand tend to underestimate the time that has passed, often administering medications at a rate faster than recommended.¹⁴ Therefore, practitioners who administer I.V. push medications over a period of seconds to minutes must have immediate access to a watch or clock *with a second hand or with a digital display of minutes and seconds*. Because not all locations where I.V. medications are administered have a viewable wall clock, it's suggested that the practitioner wear a watch.
- <https://www.myamericannurse.com/i-v-push-medication-administration-bridging-education-and-practice-through-standardization/>
 - Best practice guidelines for I.V. push administration are easier to access than ever before, but many nurses still use outdated and unsafe I.V. push administration practices, according to the Institute for Safe Medication Practices (ISMP) and other experts. The most common dilution error reported in the 2019 Arizona survey was the dilution of I.V. push opioids (70% of respondents). In addition, 65.6% of respondents dilute I.V. push medications by withdrawing them from a prefilled syringe/container into a prefilled flush syringe of 0.9% sodium chloride.
 - Another risky practice is the improper flushing of I.V. push medications, especially after injecting a medication into a distal port in the tubing. "ISMP received reports in which a neuromuscular blocking medication was administered without proper flushing, such that the entire dose did not immediately reach the patient," Mandrack says. "Then in the [postanesthesia care unit], when the nurse flushed the I.V. line to give pain medication, a bolus of the remaining neuromuscular blocking agent was infused, resulting in respiratory complications."
 - In another case reported to ISMP, a patient in hypertensive crisis died after receiving I.V. push medications too rapidly. "The terminology we use is ambiguous," Mandrack says. "What does 'slow I.V. push' really mean? Timing needs to be clarified and efforts made to standardize I.V. push rates for each drug."
- **National Burden of Preventable Adverse Drug Events Associated with InPatient Injectable Medications: Healthcare and Medical Professional Liability Costs**
 - "The incremental healthcare and malpractice liability costs of preventable adverse drug events resulting from inpatient injectable medications are substantial."
 - "The data in this study strongly supports the clinical and business case of investing in efforts to prevent errors related to injectable medications."

- “Reducing injectable medication errors and the associated preventable adverse drug events can improve quality of care for patients and reduce unnecessary costs for payers, hospitals, and physicians.”
- “When a patient experiences a preventable adverse drug event, there may be direct costs to payers, such as extended inpatient stays, use of additional medications, and physician’s visits in an outpatient setting to restore the patient’s health.
- “There are also ... indirect costs, which may include missed work, reduced quality of life, and disability for the patients as well as uncompensated expenses for the healthcare provider.”
- “Lawsuits and administrative actions related to preventable adverse drug events also increase costs for healthcare stakeholders.”
- “A hospital with 10,000 injectable doses daily could expect 25 daily preventable adverse drug events, or more than 9,000 preventable adverse drug events annually from injectable medications.”(2012)
- “Errors in administration are the most difficult to detect because they occur in the last step of the medication process, usually by the bedside nurse, and often without additional oversight.”
- **How Fast Is Too Fast For IV Push Medications?**
 - “An ED physician prescribed Labetalol 20 mg IV push for a patient experiencing a hypertensive crisis. A nurse retrieved the drug quickly, but the patient was in the process of being transported to radiology. On the way, the nurse administered the medication in a matter of seconds. The patient arrested and was unable to be resuscitated. Staff discovered several other cases where rapid IV pushes of Labetalol may have contributed to patient harm.”
 - “According to a study done in the United Kingdom, (Taxis K, Barber N, Ethnographic study of incidence and severity of intravenous drug errors. BMJ 2003.326:684), too rapid administration of IV medications occurs frequently. The authors uncovered errors in 49% of all IV medications administered. 73% occurred when giving IV push doses, and in 95% of those cases, the dose was given faster than recommended.”
 - **”Perhaps manufacturers should design a syringe that would allow only the slow IV administration of drugs.”**
- **Lippincott Nursing Center: Dangerous IV Push Medication Practices**
 - “Dangerous IV push medication administration practices have existed for decades and continue to persist today. Rate of Administration: Some stated that they give all IV push medications over 2-5 minutes, and therefore don’t need to look up or know the specific rate for each drug. Others reported that they administer ALL IV push medications in LESS THAN 2 minutes. The majority of respondents use a clock, watch, phone or some other timing device to help control the speed of IV push drug administration.”
- **Medication Errors - StatPearls - NCBI Bookshelf**
 - “Untoward medical errors and under reported medication errors result in significant morbidity and mortality. One of the major causes of medication errors is distraction. Nearly 75% of medication errors have been attributed to this cause.”
- **Preventing Serious Tissue Injury with Intravenous Promethazine (Phenergan)**
 - “... the product’s labeling states the drug may be given by slow IV push, the method typically used in most hospitals. Severe tissue damage can occur ... paralysis, tissue necrosis, nerve damage, venous thrombosis, phlebitis, abscess, and gangrene.”
- **Medication Errors Involving the Intravenous Administration R... : Journal of Infusion Nursing**
 - “Case Study was done (N+975) on IV associated medication errors affecting patients. Results pointed to healthcare and consumer knowledge, the need for ongoing education of nursing staff, and interdisciplinary strategies for preventing IV- associated medication errors.”
- **A Review of Best Practices for Intravenous Push Medication A... : Journal of Infusion Nursing**
 - “In 2015, the Institute for Safe Medication Practices (ISMP) released safe practice guidelines for adult intravenous (IV) push medications.”
- **Errors in high-risk intravenous injections administered by nurses: the causes according to healthcare professionals | Insight Medical Publishing**
 - “Errors that occur when injecting high-risk medications can critically harm patients, and the resulting malpractice liability falls on hospitals as well as the nurses who administer the drugs.”
 - “Causes of errors in the high-risk intravenous administration in nurses according to healthcare professionals: Inaccurate speed control of aqueous solutions...When the speed is controlled by eye measurement.”

- **The Third-Leading Cause of Death in US Most Doctors Don't Want You to Know About**
 - “Any new tools will be a game changer. Medical errors are the 3rd leading cause of death after heart disease and cancer.”
- **Evaluation of Intravenous Medication Errors with Smart Infusion Pumps in an Academic Medical Center**
 - Finding Solutions to Prevent IV Medication Errors Represents a Pressing Problem
- **A Comparison of Error Rates Between Intravenous Push Methods: A Prospective, Multisite, Observational Study**
 - “An estimated 44% of nurses administer injectable medications more than 5 times per shift. 99% of nurses agree that errors related to IV medication use pose a serious risk to patients. IV push administrations demonstrate higher error rates than IV infusions.”
- **Errors In the Administration of Intravenous Medications in Hospital and The Role of Correct Procedures and Nurse Experience**
 - “Wrong rate was the most frequent and accounted for 95 of 100 serious errors. Error rates and severity decreased with clinical experience. Administration by bolus was associated with a 312% increased risk of error.”
- **9 Nursing Medication Errors that KILL**
 - “7. IV Push not IV Slam”
- **Increased burnout at 76% surveyed cost over +\$5 Billion in turnover, errors, increased unbilled length of stays, liability costs and patient deaths.**
 - <https://www.symplr.com/blog/the-cost-of-burnout-in-healthcare>