

Statement on Drug Concentration Standardization¹

Committee of Origin: Quality Management and Departmental Administration

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Physician anesthesiologists have a unique role to play in decreasing the risk of a patient experiencing medication errors associated with administration and in leading local coordination and implementation of common drug concentrations in perioperative settings. Reducing the number of drug concentrations for intravenous medication concentrations may benefit patients, anesthesiologists and other healthcare stakeholders by:

- Allowing physicians and other providers to better understand, during transitions of care, the drug(s) and drug concentration(s) administered to the patient
- Mitigating the safety risk to patients when physicians and providers must choose from multiple drug concentrations to administer
- Increasing patient safety, reducing burden and cost by prioritizing “high-alert” drugs for standardization based on medical literature and evidence
- Reducing the incidence of drug shortages by placing less burden on manufacturers to meet production for less frequently used concentrations
- Encouraging drug manufacturers to focus on producing common dosages or dosages that can be readily diluted by a physician, provider or pharmacist

Defining Drug Concentration Standardization

Local policy, including the establishment of goals of drug concentration standardization, should take into account the perspectives of anesthesiologists, surgeons, other physicians, nurses, and pharmacy staff.

- Standardization should include a limited set of concentrations for medications that have been labeled as high-alert or known to have produced a significant number of adverse events.
- Local facilities may seek to harmonize concentrations within their drug libraries and work toward common concentrations known to all stakeholders who encounter and administer these drugs.
- The goal of drug concentration standardization efforts should focus on developing the fewest number of drug concentrations to provide safe, timely and effective clinical care.

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Policy Should Consider Available Guidance and Best Practices

Local policy should balance the objective of reducing the risk of patient harm with pragmatic considerations, such as strength and quality of evidence, feasibility, drug availability and economic burden. Facilities and health systems may benefit from a thorough review and discussion of professional society statements, manufacturer evidence and recommended drug dosages to guide policy development. Local policy may take into account recommendations provided by the American Society of Anesthesiologists (ASA), the Agency for Healthcare Research and Quality (AHRQ), the American Society of Health-System Pharmacists (ASHP), Centers for Disease Control (CDC), Institute for Safe Medication Practices (ISMP), the Joint Commission (TJC), US Food & Drug Administration (FDA), the US Pharmacopeial Convention (USP) and other national organizations with expertise in drug safety.

To decrease the opportunity that an incorrect drug dose or concentration could be administered to a patient, anesthesiologists and other stakeholders should consider these actions, among others, for standardizing medications:

1. Identifying drug concentrations most appropriate for specific types of procedures
2. Identifying drug concentrations for patients receiving care in specific surgical, procedural and diagnostic settings
3. Limiting multiple drug concentrations to more concise but equally safe and effective ranges of drug concentrations
4. Coordinating with pharmacy services to prevent errors during sterile compounding of high-alert drugs and others known to cause medication adverse events
5. Administering identified high-alert intravenous medication using “smart technology” in programmable infusion pump using error-reduction software²
6. Developing contingency and advance planning for drug shortages of critical medications

When standardizing medications, stakeholders should consider medication management policies enacted by local facilities or required by accrediting organizations. Once medication standardization is established and agreed, all perioperative and procedure team members should comply with the policies in the facilities where they practice and routinely monitor for any necessary amendments to such policies. Auditing and compliance with medication policies should be handled in accordance with other locally developed and implemented policies.

Drug Concentration Standardization and Physician Anesthesiologists

ASA recognizes that new drugs routinely come to market and other drugs may be retired, experience shortages or discontinued. Local facilities and anesthesiologists should track and identify specific drugs that may cause the most adverse medication events or near misses in their facilities. At the time of this document’s publication and based upon available medical literature, registry data and the ASA Closed Claims Project, ASA recommends that national and local efforts

² Institute for Safe Medication Practices (ISMP). Survey Results: Smart Pump Data Analytics Pump Metrics that Should Be Monitored to Improve Safety. July 12, 2018. <https://www.ismp.org/resources/survey-results-smart-pump-data-analytics-pump-metrics-should-be-monitored-improve-safety>. Accessed July 27, 2018.

should consider standardizing the following ten medications commonly used in the perioperative environment and administered intravenously:

1. Dexmedetomidine
2. Epinephrine
3. Heparin
4. Hydromorphone
5. Insulin
6. Ketamine
7. Lidocaine
8. Norepinephrine
9. Phenylephrine
10. Remifentanyl

Drug Shortage Considerations

Efforts to standardize drug concentrations may be severely impacted by shortages or changes in the available formulation of pharmaceutical agents. ASA encourages federal agencies, manufacturers and other stakeholders to be vigilant and protect against drug shortages that may emerge from but not be limited to pharmaceutical company consolidation, vulnerable supply chains, key supplies of drugs being limited to a single manufacturer with a lack of back-up production, and reliance on a single production facility.

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