

**Safe
Medication
Use in the ICU**

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Guideline Summary

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About the Guideline

- **The goal of the guideline is to provide evidence based recommendations to reduce medication errors (ME) and adverse drug events (ADE) in the ICU setting.**
- **Created by an interdisciplinary task force with expertise in medication safety appointed by the American College of Critical Care Medicine.**
- **Safe medication practice recommendations which are structured on three key components:**
 - 1) environment and patients**
 - 2) the medication use process**
 - 3) the patient surveillance system**

Background

Medication errors are estimated to occur in 19% of hospitalized patients (Leape et al., 2001). MEs and ADEs are associated with increased morbidity and mortality, increase hospital length of stay (LOS), and increased cost to the healthcare system. Key government agencies, regulatory bodies and non-profit organizations have identified medication safety as a priority for healthcare in the United States. Given that MEs occur more frequently in ICUs with a greater likelihood for causing harm, and with the probability of death being 2.5 times higher than the non-ICU patient (Latif et al. 2013), it is pragmatic to develop recommendations specific the ICU environment for the prevention of MEs and ADEs.

Key Clinical Considerations

In each category, the committee developed quality of evidence statements, relevant questions with answers and rationale and/or commentary pertaining to MEs, ADEs and preventable ADEs in the ICU environment.

Environment
and Patient

The
Medication
Use Process

The Patient Safety
Surveillance
System



Environment and Patient

Environment

**ICU
Patients**

Environment

- ICU vs. Non-ICU

Statement: In adult ICU and PICU patients, the severity or harm associated with MEs/ADEs is greater compared to non-ICU patients.

Environment

- Safety Culture

Question: In adult ICU and pediatric ICU (PICU) patients, do changes in the climate or culture of safety in the environment of the medication use process **increase the frequency of reporting** (Part 1) MEs or ADEs and **reduce the frequency** of MEs or ADEs (Part 2)?

Answer: The task force suggests implementing changes in the culture of safety to increase the frequency of ME reporting and reduce the frequency of MEs or ADEs.

Note: low quality of evidence given lack of consistency in the definitions of “safety climate” and reported outcomes of these changes. Despite limitations and need for further research, data does suggest a punitive culture has shown to be a barrier to reporting and systematic changes in safety climate coupled with system wide institutional support leads to reduction in MEs and ADEs.

Environment

- Education Efforts

Question: In the adult ICU and PICU patients, do educational efforts reduce the frequency of MEs or ADEs?

Answer: The task force suggests including education as part of any comprehensive program to reduce MEs in the ICU. (There were no trials evaluating educational efforts on ADEs.)

Environment

- Disclosure of MEs and ADEs to Patients and/or Family Members

Commentary: Although there is no evidence regarding this topic, ethical and professional guidelines support a responsibility for healthcare professionals to report MEs to patients and/or families as well as the importance of communication between healthcare providers and patients when MEs occur. The task force comments that an ultimate goal should be full disclosure of medical errors to patients and/or family with policy to support this as a standard of practice. More research is needed to evaluate the impact of disclosure on patients and healthcare providers.

ICU Patients

- Risk Factors for ADEs

Statement: Adult ICU and PICU patients have different risk factors for ADEs compared to general care patients.

Note: Contributing factors include intensity of work environment, greater exposure to medications including high-alert, cardiovascular and IV medications, and physiologic factors and organ dysfunction related to critical illness (Cullen et al. 1997). Furthermore, ICU patients are prescribed twice the number of medications as non-ICU patients (Cullen et al., 1997).

ICU Patients

- Risk Factors for MEs

Statement: Adult ICU and PICU patients have different risk factors for MEs compared to general (non-ICU) patients.

Note: There was a lack of adequate data specific to direct comparison of risk factors for MEs in ICU versus non-ICU patients, limiting the inclusion in quality of evidence statements. As in the “Risk factors for ADEs statement” (Cullen et al., 1997) did not specifically address MEs, only ADEs, but find that more MEs occur in the ICU in medication administration followed by medication ordering, whereas in non-ICU settings, more errors occurred in medication ordering followed by medication administration.

The Medication Use Process

**Prescription
/Prescribing**

Dispensing

Administration

Monitoring

Prescription/Prescribing

Recommendations:

The task force suggests implementing the following processes to decrease MEs/ADEs or potential ADEs in the ICU:

- Computer Provider Order Entry (CPOE)
- CDSS (Clinical Decision Support System)
- Drug Dosing Software for insulin prescribing
- The use of protocol/bundles in the ICU

The Broselow tape:

Statement: The Broselow tape is reliable in predicting patient weight for United States, European, Indian, New Zealand, Filipino, and Korean pediatric population especially in younger (< 3yr) and lower weight (< 26kg) children.

Recommendation: The task force suggests using the Broselow tape in pediatric emergency situations when patient weight is not readily available to determine patient's length and then the associated color-coded, weight-based dosing for emergency drug doses to reduce MEs and ADEs.

Dispensing

Recommendations:

The task force suggests implementing the following dispensing technologies to decrease MEs/ADEs or potential ADEs in the ICU:

- Installation of robotic dispensing systems as a component of the medication dispensing process of solid dosage forms
- Implementation of automation strategies in the medication dispensing process (as opposed to human personnel methods for dispensing)
- The use of medication labeling practices including “tall man lettering” (uppercase lettering) for Sound-Alike Look-Alike Drugs. (example: DOBUTamine and DOPamine, rather than dobutamine and dopamine)
- Compliance with safe medication concentration practices (premade IV preparations or pharmacist prepared preparations)
- The use of independent double checks during the dispensing phase for high risk medications in the ICU

Administration

Recommendations:

The task force suggests implementing the following dispensing technologies/ processes to decrease MEs/ADEs or potential ADEs in the ICU:

- The use of Bar Code Medication Administration (BCMA)
- The use of Smart Infusion Pumps (with dose error reduction software)
- The use of validated subjective assessment tools to achieve therapeutic goals during administration/titration of medications in the ICU (examples: Richmond Agitation Sedation Scale (RASS) and Ramsay Sedation Assessment Scale)

Monitoring

Recommendations:

The task force suggests implementing the following monitoring processes to decrease MEs/ADEs or potential ADEs in the ICU:

- The use of reflex (automatic) ordering of lab values with the addition of dosing suggestions for heparin
- The use of alerts prompting laboratory ordering during the drug prescribing process to reduce rate of drug-related hazardous conditions (DRHCs)

Note: Due to lack of supporting evidence, the task force makes no recommendations on the use of handoff communication, POC Testing, patient and family member knowledge of patient's medication regimen.

The Patient Safety Surveillance System

Reporting

**Methods of
ME and ADE
Detection**

**Evaluation Of A
Possible Event
After Suspicion**

**Methods of
Evaluating
Data**

Reporting

- There are no specific recommendations regarding electronic versus analog reporting systems on the quality or quantity of ADE reporting due to lack of supporting evidence.

Methods of ME and ADE Detection

The task force makes the following recommendations on the methods of ME and ADE detection:

- Implement family/patient reported outcome interview at or after ICU discharge to improve ME/ADE reporting.
- Perform non-targeted chart reviews for detecting ADEs as part of a surveillance system
- Use trigger-initiated chart review in addition to voluntary reports to improve the rate of ADE identification
- Use direct observation as a component of an active medication surveillance system due to benefit of detecting more events and administration errors than other surveillance methods (voluntary reporting, chart review)

Note: There are no specific recommendations regarding the use of trigger alert systems to identify severe ADEs compared to alternate detection methods due to lack of supporting evidence.

Evaluation Of A Possible Event After Suspicion

Statement: In the adult ICU and PICU, a reliable and valid ADE causality assessment can aid in the evaluation of suspected drug-induced events.

Methods of Evaluating Data

The task force makes the following recommendations regarding methods of evaluating data:

- Perform ICU-specific ADE surveillance and evaluation; evaluation between types of ICU units is unnecessary to improve the quantity and quality of ADE reporting.

Note: Due to lack of supporting evidence, the task force makes no recommendations in respect to 1) the effectiveness of prospective versus retrospective strategies for detecting MEs/ADEs in medication safety surveillance, 2) the effectiveness of benchmarking for patient safety surveillance strategies on improving outcomes such as ME/ADE rate or 3) on the effectiveness of strict compliance with patient safety standards set forth by regulatory bodies on impacting outcomes such as ME/ADE rates.

References

Cullen, D.J., Sweitzer, B.J., Bates, D.W., Burdick, E., Edmondson, A., & Leape, L.L. (1997). Preventable adverse drug events in hospitalized patients: A comparative study of intensive care and general care units. *Critical Care Medicine*, 25(8), 1289–1297.

Kane-Gill, S.L., Dasta, J.F., ...et al 2017. Clinical Practice Guidelines: Safe Medication Use in the ICU. *Critical Care Medicine*; 45(9), e877- e915. doi: 10.1097/CCM.0000000000002533


Latif A., Rawat N., Pustavoitau A., Pronovost, P.J., Pham, J.C. (2013). National study on the distribution, causes, and consequences of voluntarily reported medication errors between the ICU and non-ICU settings. *Critical Care Medicine*, 41(2), 389–398. doi: 10.1097/CCM.0b013e318274156a.

Leape, L.L., Brennan, T.A., Laird, N., Lawthers, A.G. (1991). The nature of adverse events in hospitalized patients. Results of the Harvard Medical Practice Study II. *The New England Journal of Medicine*, 324, 377–384. doi: 10.1056/NEJM199102073240605

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