

# Improving the Safety of Heparin Protocol Infusions: The Journey Continues

Sue Whetstone, MS, RN, NE-BC, Lori Connors, MS, RN

*Lifespan, Providence, RI*

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## Introduction/Background

Intravenous heparin therapy has been identified by The Joint Commission as a high-risk medication that can potentially lead to adverse drug events. Heparin weight-based protocols have been shown to improve the ability to maintain patients within an appropriate therapeutic range, but can present patient safety challenges due to the complexity of prescribing, administration and monitoring processes.<sup>1</sup>

Despite longstanding efforts to reduce risk of errors through use of computerized nurse driven protocols, errors continued to occur, often due to ordering of initial weight based infusion rates and bolus doses over the protocol-defined maximum. In early 2015, Epic was implemented, including heparin protocol order sets with design features targeted to reduce these known sources of error. Monitoring of our internal electronic error reporting system (eERS) data indicated that despite these new ordering screens, errors were still occurring in unacceptably high numbers.

## Methods

A workgroup consisting of nurses, pharmacists, physicians and representatives from the Epic team was formed to evaluate the current process and identify additional safeguards to reduce the occurrence of errors. This aligns with Joint Commission recommended actions to improve safety of anticoagulant medications (NPSG.03.05.01), which requires organizations to evaluate anticoagulation safety practices, take action to improve practices, and measure the effectiveness of those actions in a time frame determined by the organization.

The major changes included:

- Application of dose limits within heparin protocol order panels that “cap” initial weight-based infusion rates that would result in exceeding protocol defined maximum infusion rates (12 units/kg/hr for low intensity and 18 units/kg/hr for high intensity protocol).
- Created a “Nursing Heparin Protocol Bolus/Anti Xa Panel” which provides dose limits/ “caps” for protocol-defined weight-based bolus doses.

## Results

The initial heparin protocol infusion rate was audited for 60 patients who had a documented weight which would have resulted in exceeding the protocol max initial infusion rate. We found that of the 30 pre-change orders reviewed, 40% (12/30) were ordered with the correct initial dosing rate to comply with the protocol-defined maximum initial rate. For the 30 patients reviewed after system changes implemented, 90% (27/30) were ordered for the correct initial dosing rate.

## Discussion/Conclusion

The multidisciplinary team approach produced important lessons for improving the quality of intravenous heparin use and resulted in increased reliability of ordering initial heparin infusion rates within protocol define limits.

Monitoring the performance of physician and nursing workflows related to heparin protocols will continue. Some recognized ongoing challenges include:

- Nursing staff not consistently using the order panel to place orders for heparin protocol bolus
- Physician staff who may be using a saved version of an older order set that does not have the updated safety features.

## References

1. Williams, T, Sullivan, K, Lacey, C, et al. Nurse-driven heparin protocol: quality improvement initiative. AACN Advanced Critical Care, 2010; 21:2; 152-161