

Commentary

Utility of alert-based CDSS in CPOE to improve compliance with plasma transfusion guidelines

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Given our present healthcare environment with an increasing focus on effectiveness, efficiency, cost, and quality improvement, no one should be surprised to see significant attention targeted at employing Clinical Decision Support Systems (CDSS) in electronic health records increasingly dependent upon the computerized physician order entry (CPOE). Blood products and their utilization constitute an excellent example where all of these trends intersect.

Blood is a fundamental, supply-limited, perishable prescription product that is simultaneously expensive, labor-intensive, dangerous, and life-saving. Not surprisingly, the entire process from altruistic donation through prescribed transfusion is heavily regulated. Blood is also a complex product. Whereas most people think of blood as the “whole blood” form initially collected, blood is primarily transfused as one of the fractionated components – RBCs (red blood cells), platelets, or plasma. Each component is used to address specific deficiencies, sometimes prophylactically. RBCs are used to increase oxygen carrying capacity; platelets to improve platelet-deficient bleeding; and plasma to address factor-deficient coagulopathies. All of these products inherently carry a real risk of incompatibility, transfusion-transmitted disease, immunologic reaction, and hemodynamic instability. Moreover, blood products comprise one of the largest single expense items in a typical hospital budget, often as much as 1% or more of the operating budget. Ascertaining its appropriate use is an ideal opportunity for an intelligent CDSS to guide the usage of this valuable and dangerous product. Consequently, blood utilization and management are of increasingly high profile for all health systems.

In their article, Yazer *et al.*, describe their efforts to improve plasma-ordering practices at a highly integrated multi-hospital health system with a common CPOE platform.^[1] Initially, the CPOE system issued “alerts” based on policy-driven logic whenever an order for plasma fell outside the proscribed guidelines. After four months, an improved version of alerts (“adaptive alerts”) was implemented that circumvented usage impediments and allowed for more varied indications for appropriate plasma transfusion. These adaptive alerts also included a free-text field for the prescriber to add comments or instructions. Hence, the purpose of the study was to assess both the efficacy of the adaptive alerts compared to the initial alerts, and to identify why prescribers were ordering plasma contrary to the established policy guidelines.

Data were collected over a 5-month period to compare with the 4-month baseline. In the initial (“baseline”) phase, approximately 43% of the plasma orders generated an alert, indicating that the order fell outside guidelines predicated upon pre-existing coagulation (INR) test results. The improved version of alerts included options to indicate more on clinical information to support the transfusion namely bleeding, massive transfusions,

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invasive procedure, therapeutic plasma exchange, or “other”. In this phase, alerts were only triggered 24% of the time; a significant improvement over the baseline but certainly not ideal. Interestingly, 22% of plasma orders had the indication selected as “other”. Evaluation of the free-text field information identified a few common reasons for the transfusion, including criteria that is specifically contrary to the established guidelines as well as a significant portion that were actually criteria specified among the prepopulated options. Why some practitioners chose to ignore the guidelines and others simply selected “other” and then manually entered an option that was already offered, may serve to indicate that many simply “plowed through” the alerts. Some of this behavior could be improved with education or counseling, however, many of the plasma transfusions were ordered contrary to the established guidelines.

The alerts in this study were designed for guidance and were neither proscriptive nor prohibitive. Nevertheless, many providers did not comply with the approved guidelines and simply did not heed the alerts. As a result, a significant number of plasma products were transfused, contrary to the anticipated promise of CDSS in CPOE. In a more positive note, there was a real net improvement in plasma transfusion practices, but there is room for more improvement. The authors conclude that electronic interaction via alerts can improve transfusion practice, but are not likely to eliminate nonevidence-based plasma transfusions.

REFERENCE

1. Yazer MH, Triulzi DJ, Reddy V, Waters JH. Effectiveness of a real-time clinical decision support system for computerized physician order entry of plasma orders. *Transfusion* 2013;53:3120-7.