

Mandatory Computer-Based Decision Support System

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The Johns Hopkins Hospital (JHH) has shown remarkable commitment to preventing DVT over the past five years. These efforts have been spearheaded by the multi-disciplinary Johns Hopkins VTE Collaborative led by Michael B. Streiff, MD (Medicine), Elliott R. Haut, MD (Surgery and Anesthesiology / Critical Care Medicine), Deborah B. Hobson, BSN (Nursing and Center for Innovation in Quality Patient Care) and Peggy S. Kraus, PharmD (Pharmacy). Their main goals have been to develop a strategy to risk stratify all hospitalized patients, educate medical providers to give appropriate prophylaxis, and increase VTE awareness and prevention methods amongst healthcare workers and the community at large. The VTE Collaborative's most notable achievement is the development of a mandatory computer based decision support system (CDSS) which has been incorporated into the workflow of all patient admissions and transfers of care via the computerized provider order entry (CPOE) system. The VTE prophylaxis CDSS enables providers to easily comply with American College of Chest Physicians (ACCP) guidelines on VTE prevention by using specialty-specific risk factor assessment and the application of risk-appropriate VTE prophylaxis.

To facilitate accurate VTE prophylaxis decision making, the CDSS module prompts the provider to answer two or three simple questions (depending upon the patient population) about specific risk factors for VTE and contraindications to pharmacologic prophylaxis. To help ensure compliance, this step is mandatory; any attempt to skip it will force cancellation of the entire patient order set. The CDSS then incorporates current patient data directly from the CPOE database (ie. age, weight, etc.) and automatically determines the patient's VTE risk status and provides an evidence-based recommendation for risk-appropriate VTE prophylaxis. An order box with the available methods of pharmacologic and mechanical prophylaxis is provided below the recommendation to facilitate prophylaxis prescribing. The CDSS has over 15 different specialty-specific VTE risk stratification and prophylaxis schemes. These order sets are customized to individual departments and patient populations to ensure accurate VTE risk assessment and prophylaxis. The following list represents a sample of the schemes that have been developed: medicine, general surgery, trauma, orthopedic surgery (four schemes), neurosurgery, neurology, cardiac surgery, obstetrics/gynecology (four schemes), medical oncology, and head/neck surgery.

During the design stage, the VTE Collaborative and the information technology team decided it was imperative to incorporate a reporting function to track protocol adherence and give feedback about compliance. The CPOE now automatically creates an analytical database to store patient and provider-specific data generated by the VTE order sets. This database allows the creation of VTE prophylaxis performance reports for the VTE Collaborative team and

institutional leadership concerning VTE risk assessment and prophylaxis compliance for continuous quality improvement. We also supply service- and department- specific performance reports, allowing key stakeholders to pinpoint specific reasons for non-compliance and target improvement efforts and educational programs to overcome the unique challenges faced by each service.

The VTE collaborative clearly has made easily measurable significant strides in both the process and structure of VTE prevention. Currently, over 96% of adult patients admitted to The Johns Hopkins Hospital are risk-stratified within 24 hours of admission. However, as with many other performance improvement initiatives, scientifically valid hard data are often not easy to supply on the true outcome of care. Using administrative data, the group has demonstrated large reductions in VTE rates for hospitalized patients at JHH. The overall VTE rate has dropped from 24.0 per thousand admissions in 2004 to 13.1 per thousand admissions in 2008, a nearly 50% relative reduction in VTE. With over 33,000 annual admissions, this reduction corresponds to approximately 350 fewer patients developing VTE per year.