

## INFORMATICS

# Anticoagulation Made Easier Via Tracking Software

Anticoagulation therapy is risky business. Just *how* risky became common knowledge in November 2007, amidst widespread media reports that the newborn twins of actor Dennis Quaid had accidentally been given 1,000-fold overdoses of heparin at a Los Angeles hospital. (They survived.) But blood clots, uncontrolled bleeding and other potentially lethal problems associated with blood thinners may become largely things of the past if computerized patient-safety surveillance tools live up to their early promise.

“Anticoagulation therapy has a narrow therapeutic window,” said John Poikonen, PharmD, clinical informatics director at UMass Memorial Medical Center in Worcester. “Getting it right requires initial and ongoing expertise and close monitoring, and information tools to alert and guide the dosing and monitoring of anticoagulants can be extremely valuable.”

Numerous studies have demonstrated the benefits of such tools, which automate the tracking of patients on blood thinners and warn hospital workers of impending hazards while there is still time to prevent them. (See “Electronic Alerts to Prevent Venous Thromboembolism among Hospitalized Patients,” *N Engl J Med* 2005;352:969-977.) In light of this research—and in an effort to meet stringent anticoagulation safety guidelines put into effect last Jan. 1 by the Joint Commission—a growing number of hospitals have begun implementing these tools.

Among the first to do so is the University of Pittsburgh Medical Center (UPMC), which started using TheraDoc Anticoagulation Alerts last May. This software

package compares patient laboratory values and pharmacy records to data streams from radiology, microbiology and other hospital departments and then sends anticoagulation-related updates and alerts to hospital staff. It was developed by the Salt Lake City–based medical informatics company TheraDoc ([www.theradoc.com](http://www.theradoc.com)) and piggybacks on the firm’s existing expert system platform. (UPMC is an investor in the company as well as an early adopter of its products.)

## Hundreds of Alerts Generated

UPMC pharmacists say the TheraDoc software has generated hundreds of alerts about potential bleeding events and other problems that required patient interventions. “TheraDoc has become the backbone of our anticoagulation program to help us quickly catch and document potential adverse events, tests that need to be ordered, or lab values that are too high or too low,” said Susan Skledar, RPh, MPH, director of UPMC’s Drug Use and Disease State Management Program. “It’s quick and efficient, and it lets you know in real time when something needs to be looked at. Rather than looking through five or six paper reports, it provides a single integrated system for alerting us when a patient’s medication may need to be adjusted.”

The software comes preprogrammed with 34 different anticoagulation alerts, including ones that point out out-of-range international normalized ratio values, potential drug interactions and patients who are new to anticoagulant therapy (and who are thus candidates

**FRANDSEN, LAUREN HELENE** MRN: 4-757003 Location: 30th-94 - SMC 526H 02 Attending: WANNER, NATHAN A Account #: 557802190

**Alert Time:** 05/04/2009 18:48  
**Alert:** Warfarin, no daily INR  
 Admit Diagnosis: CVT/ CELLULITIS  
 Demographics & renal function

This patient has at least one active or one time order for WARFARIN 2.5MG TAB and no INR result within the last 30 hours.

**Most Recent Active / Hold Warfarin Orders:**

Drug	Dose	Start	End	Status	Pat Class
WARFARIN 2.5MG TAB	2.5 mg PO HS	05/04/2009 21:00:00		ACTIVE	I

Lab Review Medications Microbiology Review

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**THOMAS, DARWIN CRISTINA** MRN: 3-31757900 Location: 30th-93 - 4CCU 4CCU 09 Attending: STEHLIK, JOSEF Account #: 225881224

**Alert Time:** 05/03/2009 21:41  
**Alert:** Heparin, new aPTT  
 Admit Diagnosis: CAD RECENT HF  
 Demographics & renal function

This patient has one or more active orders for heparin and has a new Partial Thromboplastin Time result available for review.

Order/Culture	Result	Source	Collected	Result Status (Date/Time)	Specimen #
Partial Thromboplastin Time	Partial Thromboplastin Time = 100 sec HH (24-35)	See RSP	05/03/2009 20:29	F (05/03/2009 21:33)	5449376

**Active or Held Heparin Orders:**

Drug	Dose	Start	End	Status	Pat Class
HEPARIN	25000 unit Iv	05/02/2009 02:31:00		ACTIVE	I

Top Most Recent Coagulation Modifiers Orders:

TheraDoc software analyzes patient laboratory values and pharmacy records to send anticoagulation-related alerts to hospital staff.

*“Getting [anticoagulation] right requires initial and ongoing expertise and close monitoring, and information tools to [guide practitioners] can be extremely invaluable.”*

—John Poikonen, PharmD

for the patient education mandated by the Joint Commission goals). Hospitals can customize the system to meet their needs, activating some alerts and turning off others. Additionally, the system can be configured to work smoothly with a variety of workflow patterns—for example, firing off real-time pager or e-mail alerts in hospitals with rounding pharmacists or sending out once-daily reports in hospitals where pharmacists play a more centralized clinical role.

According to Ms. Skledar, the system’s key benefit is its adaptability. “You can

match it to whatever pharmacy practice model you have,” she said.

By the end of the year, TheraDoc will begin selling a more robust anticoagulation alert product, Anticoagulation Assistant Module. The company said it will incorporate an expanded set of alerts, clinical care dashboards and intervention documentation and compliance reporting tools designed to streamline communication among caregivers, improve clinical workflow and enhance clinical decision making and patient safety.

—David W. Freeman