

Surgeon-in-Training Report Cards Can Help Reduce Blood Clots in Hospitalized Patients

Individualized feedback more effective than group instructions, study suggests

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A study of general surgery residents at The Johns Hopkins Hospital suggests that in the efforts to prevent dangerous blood clots among hospitalized patients, regular, one-on-one feedback and written report cards work a lot better than the usual group lectures that newly minted surgeons receive as part of their training.

The strategy, described Dec. 9 in *Annals of Surgery*, was designed to boost the use of correct therapy in surgery patients and ward off the often fatal consequences of blood clots in the deep veins of the legs and lungs, collectively known as venous thromboembolism, or VTE.

A well-known complication of surgery and hospitalization, clots that form deep inside the veins of the legs can often break off, sending splinters to the lungs, heart or brain — a complication that claims some 100,000 lives each year in the United States, according to the Centers for Disease Control and Prevention.

Because of this well-established risk, hospitals take standard precautions to put nearly all surgical patients on anticoagulation therapy, but choosing the optimal treatment — blood thinning drugs for high-risk patients versus compression stockings and boots for lower-risk ones — and doing so 100 percent of the time remains challenging.

Now the Johns Hopkins study suggests that providing novice surgeons with regular feedback about their individual performance could seriously sharpen young doctors' decision-making skills on that front and boost hospitals' overall VTE prevention efforts.

The study, conducted between July 2013 and March 2014, involved 49 general surgery residents in their first through fifth year of training. For the first three months, residents received no personalized feedback. For the following three months, they received an electronic score card via email detailing their individual performance, including how many times they prescribed the appropriate treatment, how many times they failed to do so and how they fared compared with others. For the next three months, all residents continued to receive monthly scores but subpar performers — those who failed to prescribe appropriate treatment to every single patient they cared for — also received one-on-one coaching from a senior resident.

In the span of six months, the Johns Hopkins approach brought down from three to zero the number of preventable complications among surgery patients — those occurring in patients who didn't get the right anticoagulation treatment. In the three-month period prior to deploying the direct feedback strategy, seven out of 865 surgical patients developed complications. Three of the seven cases were subsequently identified as preventable. In comparison, there were *no* such preventable complications after residents received individualized feedback.

As a result of the feedback, the number of patients getting appropriate treatment jumped from 89 percent to 96 percent. The number of residents who performed at 100 percent — prescribing the right treatment to every patient all the time — went up from 22 (45 percent) to 38 (78 percent),

with most of the prescription failures — 19 out of 28 such cases — clustered in a small group of four residents.

“Our results show that personalized, concrete feedback can be a form of forced introspection that improves self-awareness and decision-making on clotting prophylaxis,” says [Elliott Haut, M.D., Ph.D.](#), associate professor of surgery and of anesthesiology and critical care medicine at the Johns Hopkins University School of Medicine and senior author on the study.

But beyond that, researchers say, the results illustrate the notion that simple interventions can be harnessed to foster learning and improve performance among *any* frontline clinician. “Speaking more broadly, why stop with residents? Why stop with anticoagulation prophylaxis?” Haut says. “If our findings are borne out by larger studies, this approach could be harnessed to improve training and outcomes for anyone who touches a patient, from nurses to physicians to physical therapists.”

Researchers say their idea is rooted in the premise that group feedback is often too vague and lacking in detail to be meaningful. More importantly, the researchers say, people tend to perceive a generalized critique as applying to someone else. And since treatment decisions on clotting prophylaxis in hospitals are often made primarily by residents rather than the senior attending physicians who supervise them, researchers say, targeting trainees made all the more sense.

“Without doubt, medicine is teamwork, but to improve team performance we first need to improve individual responsibility and accountability,” says lead author [Brandyn Lau, M.P.H., C.P.H.](#), instructor in surgery and health sciences informatics at the Johns Hopkins University School of Medicine. “It’s critical to give the right information to the right person at the right time.” The approach, the investigators found, also boosted trainee morale, a finding captured in the more than two-fold spike in resident satisfaction scores on the annual survey given by the Accreditation Council for Graduate Medical Education, the accreditation body for all residency programs in the United States.

Asked whether they receive feedback about their clinical performance, surgical residents at The Johns Hopkins Hospital responded with an average score of 4.5 out of 5 in 2014, an increase from 2.5 out of 5 in 2013, leapfrogging the national average of 3.3.

“Residents are hungry to learn and eager to improve,” Haut says. “The survey results reflect that. We owe it to our trainees to provide meaningful, constructive insight that helps them grow.”

The individualized feedback approach is an extension of another safety effort at Johns Hopkins launched several years ago — a computer-based algorithm built into the electronic medical record that calculates each patient’s risk for developing a clot by factoring in medical history, age and overall health, among other variables. Based on this automated risk score, physicians are given a menu of treatments to choose from, but even so, prescribing the right treatment occurred 86 percent of the time at Johns Hopkins — well above the national average of 50 percent but decidedly below the goal of 96 percent the institution had set for itself.

“Complex problems rarely have silver-bullet solutions,” Lau says. “The individualized feedback approach was the next logical step to turbocharge our risk reduction efforts and get us over that 96 percent mark.”

More than 600,000 Americans develop deep vein clots every year, and more than one-sixth of them die as a result of complications. The Agency for Healthcare Research and Quality has declared clot prevention a major safety target for averting in-hospital death.

Other investigators on the study included Michael Streiff, Isaac W. Howley, Katherine Poruk, Robert Beaulieu, Trevor Ellison, Kyle Van Arendonk, Peggy Kraus, Deborah Hobson, Christine Holzmueller, James Black and Peter Pronovost of Johns Hopkins.

George Arnaoutakis, a former chief surgery resident at The Johns Hopkins Hospital and now at the University of Pennsylvania, was co-author on the paper.