Health & Medicine

Data Mining Reveals Risky Drug Combos

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Nicholas Tatonetti, center, and members of his research team. Photo: E. Jason Wambsgans / Chicago Tribune

They are two of the most commonly prescribed drugs in the United States: the heartburn medication Prevacid and the antibiotic Rocephin. Taken separately, neither is known to cause heart problems. If taken together, however, they may short-circuit an electrical pathway in the heart, causing it to beat irregularly and putting a patient at risk of cardiac arrest.

A team of Columbia data scientists recently discovered this potentially dangerous drug combination, along with three others, after analyzing an online archive of medical records maintained by the US Food and Drug Administration. The scientists, whose findings appeared in the *Journal of the American College of Cardiology*, are among the first ever to identify risky drug combinations by spotting patterns in large data sets, rather than by investigating drugs that had already been flagged by physicians as potentially dangerous.

Led by Nicholas Tatonetti, an assistant professor of biomedical informatics at Columbia, the scientists searched the FDA database for drugs that had never been known to cause heart problems but that share side effects with those that had — a deductive technique that Tatonetti had developed and proved effective. After identifying hundreds of such medications, they consulted Columbia University Medical Center's records to see if patients who had taken these medications in various combinations later experienced heart problems. The combination of Prevacid and Rocephin was among the apparently risky pairs that stood out; people who had taken these drugs together were 40 percent more likely to develop a heart condition that can cause dangerous arrhythmias.

Tatonetti says that additional research will be necessary to prove that the discoveries warrant changes to prescription guidelines. But even more important than his team's specific findings, he says, is that they modeled a new way of conducting medical research.

"There is currently a lot of skepticism about whether big data is worth the hype," he says. "I hope that our study ameliorates some of this doubt."

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