

the FDA's data to help health plans understand the costs of drug side effects. (Bloomberg LP, the parent company of *Bloomberg Businessweek*, licenses data from AdverseEvents.)

The medical industry has been trying for years to sift through the Internet to dredge up meaningful signs of drug reactions. "If you have the right technology to connect the dots, then you can see problems very, very early on," says Ido Hadari, chief executive officer of **Treato**, which scans online patient forums and sells its reports to pharma companies. In an analysis of postings on the asthma drug Singulair, Treato found links to depression, anxiety, and hallucinations that predated warnings from manufacturer Merck and the FDA.

Microsoft researchers have worked on search mining for years and have co-authored a paper with FDA staff, says Eric Horvitz, a scientist and managing director at the company's research arm. In 2013 he co-wrote a paper with Microsoft colleagues and Stanford researchers concluding that search data could have more quickly revealed a link to high blood sugar in the combination of the antidepressant Paxil and the cholesterol-lowering drug Pravastatin. People who searched for both drugs on Google, Yahoo, and Bing over a 12-month period in 2010—a year before the link was publicly reported—were also more likely to search for terms related to high blood sugar, such as diabetes and dry mouth, according to the paper, published in the *Journal of the American Medical Informatics Association*.

Although the FDA wouldn't comment on the agency's talks with companies other than Google, there are signs that the agency is focusing on more troves of messages online. Last year an FDA researcher co-authored a paper about monitoring drug safety on **Twitter**. In June the FDA announced a collaboration with PatientsLikeMe, an online patient network, to monitor health forums for warnings of drug hazards. "The way we are taking care of patient safety once it's out there—once products are out there in the real world—belongs in the '70s," Hadari says. "We can do much better."
—John Tozzi and Dina Bass

The bottom line The FDA and Google are starting to talk about ways to spot drug side effects faster by analyzing search data.

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Innovation

Child Prostheses

Form and function

E-Nable designs 3D-printed prostheses for children older than 3 and shares their blueprints so they can be made for as little as \$30. This way, the prostheses can be easily replaced as the kids outgrow them.

Innovator Andreas Bastian

Age 25

Technical director of Los Gatos (Calif.) nonprofit E-Nable Community Foundation and 3D-printing researcher at Autodesk



Setup Made from \$8 to \$15 worth of nontoxic, waterproof 3D-printer plastic and five screws, the prosthetic hands connect to a child's active muscles via elastic straps.

Background Each year, 32,500 U.S. kids undergo amputations, and the Centers for Disease Control and Prevention estimates that about 1,500 are born with "upper limb reductions."

Origin Bastian, formerly head of R&D at MakerBot, began developing E-Nable's hands in 2013.



Funding In May, Google donated \$600,000 to support E-Nable's R&D and production.

Other options An Iron Man-branded prosthetic forearm and hand developed by Limbitless Solutions costs about \$300 to build.



Source E-Nable's open source 3D blueprints are available through Google Drive.

Next Steps

This year, E-Nable has made more than 270 hands and seen other companies use its specs to fill orders as large as 2,000, Bastian says. Next he's working on elbows and shoulders. "It has changed everything," says Robert Graboyes, senior research fellow in health-care economics at George Mason University. "Children were not a viable audience as recently as two or three years ago, because they would outgrow costlier prosthetics too quickly." —Richard Morgan