Mining Electronic Medical Records Could Help Depression Patients Find the Right Treatment

Personalized medicine has been one of the most promising medical developments in recent years. To personalize treatment for patients, some doctors have turned to predictive models to help determine which patients will benefit from different treatments.

A new study from Massachusetts General Hospital and Harvard University finds that using data from electronic medical records in those models could hold a lot of promise.

Researchers MGH's Roy Perlis and Harvard's Finale Doshi-Velez, joined by postdoctoral researcher Michael Hughes, looked over large amounts of electronic medical record data from more than 50,000 people with depression, a condition that is notoriously difficult to treat. Patients often try several different treatments before arriving at an effective one.

The researchers applied machine learning to sort the data into depression subtypes, some of which weren't necessarily standardized. The subtypes represented clusters of symptoms and features spotlighted by the data—such as age, sexual dysfunction, weight gain, or obesity.

Doshi-Velez's team also looked at 16 types of antidepressants that were ultimately successful in treating the patients' depression. From these data, they were able to develop an algorithm to predict an antidepressant's effectiveness based on depression subtypes.

When implemented in clinical settings, the new tool was more accurate than existing methods, the researchers found. And clinicians polled by the researchers said they found the tool more user-friendly than existing predictive models.

As there is a 50 percent failure rate among patients trying a first treatment for depression, and a 50 percent failure rate among those who try a second type of treatment, cutting down on the guesswork involved could be life-changing. "Each try can take multiple weeks to assess, while you're playing around with dosages. And these are already people for whom morale is sapped," says Doshi-Velez. "Even if we could make a modest improvement—for instance, one less try—this could be a very significant result."

While the researchers studied the impact of mining records on depression, their method could apply more broadly and help patients with various health problems, mental and physical.

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