

Internet searches can identify drug safety issues well ahead of public alerts

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Internet searches on health symptoms can be used to identify drug side effects and could be used to develop a new kind of early warning system to boost drug safety, indicates a study published online in the *Journal of the American Medical Informatics Association*.

The authors base their findings on an analysis of the anonymised search logs of millions of US web users, who agreed to install a browser add-on and share their online searches with Microsoft throughout 2010.

The researchers developed automated tools to analyse the queries of people who searched for information on the antidepressant ([paroxetine](#)) and a [cholesterol lowering drug \(pravastatin\)](#), using the search engines [Google](#), Bing and Yahoo.

In 2010, it was not yet public knowledge that taking both these two drugs caused high blood sugar (hyperglycaemia), but the authors later extracted this information by mining the US drugs regulator's medicines side effect reporting system (AERS) and confirming the finding in a separate [laboratory study](#).

In the web log study, the authors looked at whether people who had searched online for either one of the drugs separately, or for both of them, would also search with queries containing terms associated with the symptoms of high blood sugar.

In all, they analysed 82 million drug, symptom, and condition queries

from among 6 million web users.

They found that online searches for information on [prescription drugs](#) was common, with more than one in 250 people looking up at least one of the 100 top selling drugs in the US, including paroxetine and pravastatin.

For people who searched online for both drugs during the 12 month period, queries were made on the same day in almost a third (29.61%) of searches, while four out of 10 were in the same week. Six out of 10 were made within the same month.

During the study period, those people who looked up both drugs online were almost twice as likely to search for terms associated with high blood sugar as were those who looked up the drugs separately.

One in 10 of those looking up both drugs did this, compared with around one in 20 of those looking up each drug separately. Just 0.3% of all users searched for one or more terms associated with high blood sugar over the 12 months.

These differences in search patterns were evident across the whole period of the study, and were not influenced by public information as the discovery of the interaction between this particular pair of drugs was only made in 2011.

Analysis of other 31 drug pair interactions associated with [high blood sugar](#) also indicated similar patterns, suggesting that the value of log analysis is not just confined to paroxetine and pravastatin.

"There is a potential public health benefit in listening to such signals, and integrating them with other sources of information," write the authors.

"We see a potentially valuable signal, even though search logs are

unstructured, not necessarily related to health, and can include any words entered by users," they add.

And they conclude: "We believe that patient search behaviour directly captures aspects of patients' concerns about sensed [symptoms] and can complement more traditional sources of data for pharmacovigilance [drug safety monitoring]."

More information: www.jamia.bmj.com/lookup/doi/10.1136/amiajnl-2012-001482

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