

'Swine flu' breath test could reduce future vaccination shortages, research suggests

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A novel breath test, measuring the immune response to the H1N1 flu virus, could help to ease future vaccine shortages by identifying the people who have already been infected with the flu virus.

In a study published 15 July 2011, in IOP Publishing's *Journal of Breath Research*, researchers have investigated an easy, non-invasive [breath test](#) to measure [biomolecules](#) that accumulate in response to the H1N1 strain.

Research published last month claimed that over half of the people in Glasgow vaccinated during the 2009 swine [flu](#) pandemic were already infected with the [flu virus](#), meaning they were vaccinated unnecessarily. It is thought that similar patterns would have been found throughout the UK.

These vaccinations would not have harmed the people concerned, however local [health authorities](#) would have been affected as they attempted to administer the vaccine quickly and effectively on limited supplies.

A fast-acting, non-invasive test for the virus could therefore help to avoid unnecessary vaccinations and help prioritise the people who most need the vaccines.

The researchers, from [Cleveland Clinic](#) and Syft Technologies, enrolled 11 individuals on their study of which nine were given the live attenuated H1N1 vaccine and administered the breath test on each of the

following seven days.

The breath test examined exhaled nitric oxide (NO) – a biomolecule whose production has previously been linked to influenza and viral infection and has been speculated to play a beneficial role in viral clearance.

The results showed a peak in NO levels in all subjects on the third day after vaccination. There were no significant differences in NO levels on any other day.

Of the 11 other compounds examined in the study, only one compound – isoprene - showed an elevated level, again on day three. Increased levels of isoprene, a compound produced within the body and a major constituent of exhaled breath, have been reported to reflect oxidative stress in the airways.

Previous findings show that the highest number, and severity, of symptoms related to a H1N1 infection occur on day three, suggesting, along with this research, that this is when an [immune response](#) is triggered in the body.

The H1N1 [swine flu pandemic](#) of 2009 affected over 214 countries and resulted in approximately 43,000 million illnesses and 8,870,449 deaths.

This study presents the first direct evidence of a potential test to diagnose H1N1 influenza using your breath, a concept which has already been used to diagnose and monitor asthma, check for transplant organ rejection, and to detect lung cancer and alcohol intoxication.

If a fast, easy, non-invasive breath test is to be mass-produced, the researchers state that further work will need to identify other compounds associated with an immune response that were only touched upon in this

study, as well as identifying the exact mechanism underlying the increase in exhaled NO as a result of the live vaccine.

One of the study's authors Professor Raed Dweik said, "This study adds to the growing evidence for the utility of breath analysis in medical diagnostics. More work still needs to be done, however, to identify the specific compounds that change in response to vaccination and to find the biologic link between those compounds and the host response to the [vaccine](#) or the actual disease."

More information: "Effect of the influenza A (H1N1) live attenuated intranasal vaccine on nitric oxide (FENO) and other volatiles in exhaled breath" 2011 *J. Breath Res.* 5 037107 iopscience.org/jbr/5/3/037107

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