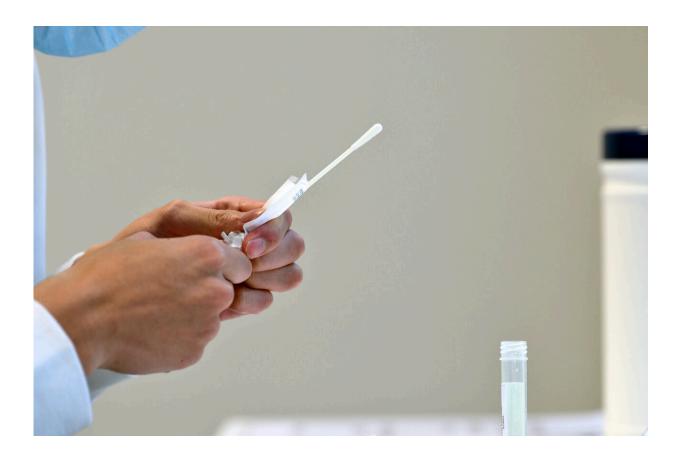# Seven symptoms jointly predict COVID-19 diagnosis

September 28 2021

RT-PCR testing for SARS-CoV-2 infection. Credit: Imperial College London, CC BY 4.0 (creativecommons.org/licenses/by/4.0/)

A set of 7 symptoms, considered together, can be used to maximize detection of COVID-19 in the community, according to a new paper

published this week in *PLOS Medicine* by Marc Chadeau-Hyam and Paul Elliott of Imperial College London, UK, and colleagues.

The rapid detection of SARS-CoV-2 infection in the community is key to ensuring efficient control of transmission. When testing capacity is limited, it is important to use tests in the most efficient way possible, including using the most informative symptoms for test allocation. In the new study, researchers obtained throat and nose swabs with valid SARS-CoV-2 PCR test results from 1,147,345 volunteers in England aged 5 years and above. The data were collected over 8 testing rounds conducted between June 2020 and January 2021 as part of the REal-time Assessment of Community Transmission-1 (REACT-1) study. Participants were asked about symptoms they experienced in the week prior to testing.

A model was developed based on the data obtained during rounds 2 to 7, with 7 symptoms selected as jointly positively predictive of PCR positivity: loss or change of smell, loss or change of taste, fever, new persistent cough, chills, appetite loss, and muscle aches. The first 4 of those symptoms are currently used in the UK to determine eligibility for community PCR testing. In round 8 of testing, the resulting model predicted PCR positivity with an area under the curve of 0.77, and testing people in the community with at least 1 of the 7 selected positively predictive symptoms gave sensitivity, specificity, and positive predictive values of 74%, 64%, and 9.7%, respectively. Modeling suggested that the use of the 7 symptoms identified for PCR test allocation would result in 30% to 40% of symptomatic individuals in England being eligible for a test (versus 10% currently) and, if all those eligible were tested, would result in the detection of 70% to 75% of positive cases.

"In order to improve PCR positivity detection rates and consequently improve control of viral transmission via isolation measures, we would

propose to extend the list of symptoms used for triage to all 7 symptoms we identified," the authors say.

"These findings suggest many people with COVID-19 won't be getting tested—and therefore won't be self-isolating—because their symptoms don't match those used in current public health guidance to help identify infected people," Elliott adds. "We understand that there is a need for clear testing criteria, and that including lots of symptoms which are commonly found in other illnesses like seasonal flu could risk people self-isolating unnecessarily. I hope that our findings on the most informative symptoms mean that the testing program can take advantage of the available evidence, helping to optimize the detection of infected people."

More information: Elliott J, Whitaker M, Bodinier B, Eales O, Riley S, Ward H, et al. (2021) Predictive symptoms for COVID-19 in the community: REACT-1 study of over 1 million people. PLoS Med 18(9): e1003777. doi.org/10.1371/journal.pmed.1003777

Provided by Public Library of Science