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## Quantifying additional COVID-19 symptoms will save lives

Public health authorities across the world have been trying to contain the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) via public awareness and contact tracing—ie, by identifying and isolating individuals at high risk of being positive.<sup>1</sup> In many countries, regular mass swab testing is still inadequate. To reduce the number of infectious people in the community, it is therefore crucial to use the symptom combinations that can identify them.

Using self-reported symptoms data from 18 401 users of the COVID Symptom Study app, who underwent an official SARS-CoV-2 test (7104 testing positive, 11 297 testing negative), we previously reported that loss of smell and taste is a potential predictor of COVID-19 in addition to the most established symptoms of a high temperature and a new continuous cough.<sup>2</sup> The prevalence of loss of smell and taste was three-fold higher in individuals testing positive (65.03%) than in those testing negative (21.71%),<sup>2</sup> suggesting that people with loss of smell and taste should self-isolate. In April, 2020, WHO, along with many EU countries, the USA, and Australia added loss of smell and taste as one of the key COVID-19 symptoms, whereas the UK Government added it to its symptom list on May 18, 2020. The reason quoted for the reticence was reportedly that anosmia by itself (without cough or fever) is responsible for less than 2% extra cases.<sup>3</sup> Our data suggest this not to be the case.

As of May 19, 2020, of the more than 3.2 million UK users of the COVID Symptom Study app,<sup>4</sup> 76 260 people have now been tested for SARS-CoV-2 and reported symptoms. 71.5% of the 13 863 individuals testing positive indicated fever or cough, suggesting

that only isolating and screening those reporting fever or cough could have missed almost 30% of positive cases. Consistent with our previous results,<sup>2</sup> loss of smell and taste was reported overall by 64.5% of those testing positive; and by 15.9% of those not suffering from either fever or cough. These findings are depicted in a Venn diagram in the appendix. New onset loss of smell and taste is a symptom, which is particularly relevant for the young and working population who are likely to be ambulant and able to spread the disease. This 15.9% without classic symptoms could be very relevant to reducing spread.

We also quantified the sensitivity, specificity, positive predicted value, and negative predicted value of fever, cough, fever or cough, and loss of smell in 76 260 users of the COVID Symptom Study app who underwent the SARS-CoV-2 test (13 863 testing positive; 62 397 testing negative; appendix). We found the predictive ability of loss of smell and taste to be higher than fever or persistent cough, which is in line with our previous finding that loss of smell and taste was the strongest predictor of having the virus.<sup>2</sup> Moreover, we found that the median duration of anosmia symptoms was 5 days, whereas the median duration of fever was only 2 days.

As countries slowly emerge from lockdown measures, it is imperative to correctly contact-trace infected individuals. We believe that having added loss of smell and taste to the list of COVID-19 symptoms is of great value as it will help trace almost 16% of cases that otherwise would have been missed. Loss of smell and taste, together with fever or cough, should now enable us to identify 87.5% of symptomatic COVID-19 cases, although this is likely to be less in the early phases of the infection.

Our results also provide theoretical support for adding more symptoms to Public Health England's list of symptoms, as WHO and other countries

have done. The danger is that, unlike loss of smell and taste, many symptoms might be non-specific and might need algorithms, as the ones used in the COVID-19 Symptom Study app, to increase predictive power.

Like all observational studies, our findings have limitations and rely on self-report of symptoms, as do most strategies outside of mass population testing. Direct self-testing for new onset loss of smell and taste could improve symptoms capture and should open doors to confirmatory testing. However, loss of smell and taste could be a less discriminating symptom in older people and by those who are less able to report symptoms, such as people in care homes.

We believe that loss of smell and taste is a common COVID-19 symptom and that infections could be reduced and lives saved now that this non-flu-like symptom is recognised. Our data suggest that low-cost so-called smell the difference screening tests, instituted in workplaces and entrances in some settings worldwide, might capture a larger number of positive cases than temperature sensors do.

Ultimately, all individuals have an interest in isolating if they have any symptoms of the disease, and less overtly symptomatic people might have unwittingly been silent spreaders.

CM declares funding through a National Institute for Health Research Clinical Doctoral Research Fellowship. CHS declares a grant from the Alzheimer's Society. SO declares grants from Wellcome and from UK Research and Innovation. TDS is a consultant to Zoe Global. CJS declares no competing interests.

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- 2 Menni C, Valdes AM, Freidin MB, et al. Real-time tracking of self-reported symptoms to predict potential COVID-19. *Nat Med* 2020; published online May 11. DOI:10.1038/s41591-020-0916-2.



Published Online  
June 4, 2020  
[https://doi.org/10.1016/S0140-6736\(20\)31281-2](https://doi.org/10.1016/S0140-6736(20)31281-2)

See Online for appendix

For the COVID Symptom Study app see [covid.joinzoe.com](http://covid.joinzoe.com)

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- 3 Smyth C. 'Smell loss has little effect on coronavirus case tallies'. May 19, 2020. <https://www.thetimes.co.uk/article/smell-loss-has-little-effect-on-coronavirus-case-tallies-230nm82vl> (accessed June 1, 2020).
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