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Corresponding author(s): Cristina Menni

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Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see Authors & Referees and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

n/a	Confirmed
☐	☒ The exact sample size (*n*) for each experimental group/condition, given as a discrete number and unit of measurement
☐	☒ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐	☒ The statistical test(s) used AND whether they are one- or two-sided *Only common tests should be described solely by name; describe more complex techniques in the Methods section.*
☐	☒ A description of all covariates tested
☐	☒ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐	☒ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐	☒ For null hypothesis testing, the test statistic (e.g. *F*, *t*, *r*) with confidence intervals, effect sizes, degrees of freedom and *P* value noted *Give P values as exact values whenever suitable.*
☒	☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☐	☒ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☐	☒ Estimates of effect sizes (e.g. Cohen's *d*, Pearson's *r*), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection	The COVID Symptom Tracker smartphone based app (version 0.13) was developed by Zoe Global Limited, King's College London, and Massachusetts General Hospital, and was launched in the UK on Tuesday the 24th March 2020, and in the US on 29th March 2020. On first use, the app records self-reported location, age, and core health risk factors. With continued use and notifications, participants provide daily updates on symptoms, health care visits, COVID-19 testing results, and if they are self-quarantining or seeking health care, including the level of intervention and related outcomes. Individuals without apparent symptoms are also encouraged to use the app. Data from the app is automatically downloaded into a protected server.
Data analysis	Analyses were carried out using version 3.6.0. The prediction model was fitted using standard R functions. The R package epiR 1.0-14, was used to calculate its performance statistics (SE, SP, PPV, NPV), while the receiver operating characteristic (ROC) curves were compared with the R package pROC 1.16.2 .

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors/reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

Data collected in the app is being shared with other health researchers through the NHS funded Health Data Research UK (HDRUK)/SAIL consortium, housed in the UK Secure Research Platform (UKSeRP) in Swansea. Anonymised data is available to be shared with bonafide researchers HDRUK according to their protocols in the public interest. See https://healthdatagateway.org/detail/9b604483-9cdc-41b2-b82c-14ee3dd705f6.
US investigators are encouraged to coordinate data requests through the COPE Consortium (www.monganinstitute.org/cope-consortium). Data updates can be

found on https://covid.joinzoe.com

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences ☐ Behavioural & social sciences ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size	Given the observation nature of our study, we did not perform statistical analyses to predetermine sample size. Between March 24, 2020 and April 21, 2020, 2,450,569 UK and 168,293 US individuals reported symptoms through the smartphone app. 15,638 UK and 2,763 US app users reported having had an RT-PCR SARS-CoV-2 test, and having received the outcome of the test (6,452 UK individual tested positive and 9,186 tested negative; 726 US individual tested positive and 2,037 US individual tested negative). All the 18,401 who had undergone a SARS-CoV-2 test, were included to test the association between loss of smell and taste and been tested positive and also were included to develop and test the prediction model. The prediction model was then applied to all app users.
Data exclusions	The individuals whose data was included to develop and test the prediction model were those who completed the report for symptoms in the app, who declared to have had a SARS-CoV-2 RT-PCR test and to have received the result for the test. Only individuals who answered at least 9 of the 10 symptoms and answered about loss of smell and taste were included. The data exclusion criteria for the prediction phase were pre-established. The prediction model was then applied to all app users.
Replication	The association between loss of smell and taste and testing positive for COVID-19 was successfully replicated in the US cohort as well as the prediction model.
Randomization	Our study is an observational study so no randomization is needed here.
Blinding	This is not relevant given the observational nature of our study

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology
☒	☐ Animals and other organisms
☐	☒ Human research participants
☒	☐ Clinical data

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Human research participants

Policy information about studies involving human research participants

Population characteristics	Study participants are 2,450,569 UK and 168,293 US adult users of the COVID Symptom Tracker, a smartphone app. Of the 2,450,569 participants in the UK, 789,083 (32.2%) indicated having one or more potential symptoms of COVID-19. 15,638 UK and 2,763 US app users reported having had an RT-PCR SARS-CoV-2 test, and having received the outcome of the test. Users are 65% females, are slightly overweight and have a mean age of 44 yrs with a range from 18 to 90 years. All users are able to provide written informed consent.
Recruitment	The COVID Symptom Tracker smartphone based app was developed by Zoe Global Limited (a digital healthcare company), King's College London, and Massachusetts General Hospital. By leveraging the established digital backbone of an application used for personal nutrition studies, the COVID Symptom Tracker was launched in the UK on Tuesday the 24th March 2020, and in the US on 29th March 2020 and after three weeks has reached 2,618,862 users. Volunteers using the app are a self-selected group who might not be fully representative of the general population.

Ethics oversight	The Ethics for the app has been approved by KCL ethics Committee and all users provided consent for non-commercial use. An informal consultation with TwinsUK members over email and social media prior to the app having been launched found that they were overwhelmingly supportive of the project. The US protocol was approved by the Partners Human Research Committee.

Note that full information on the approval of the study protocol must also be provided in the manuscript.