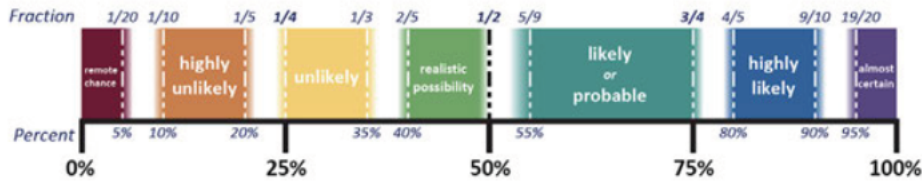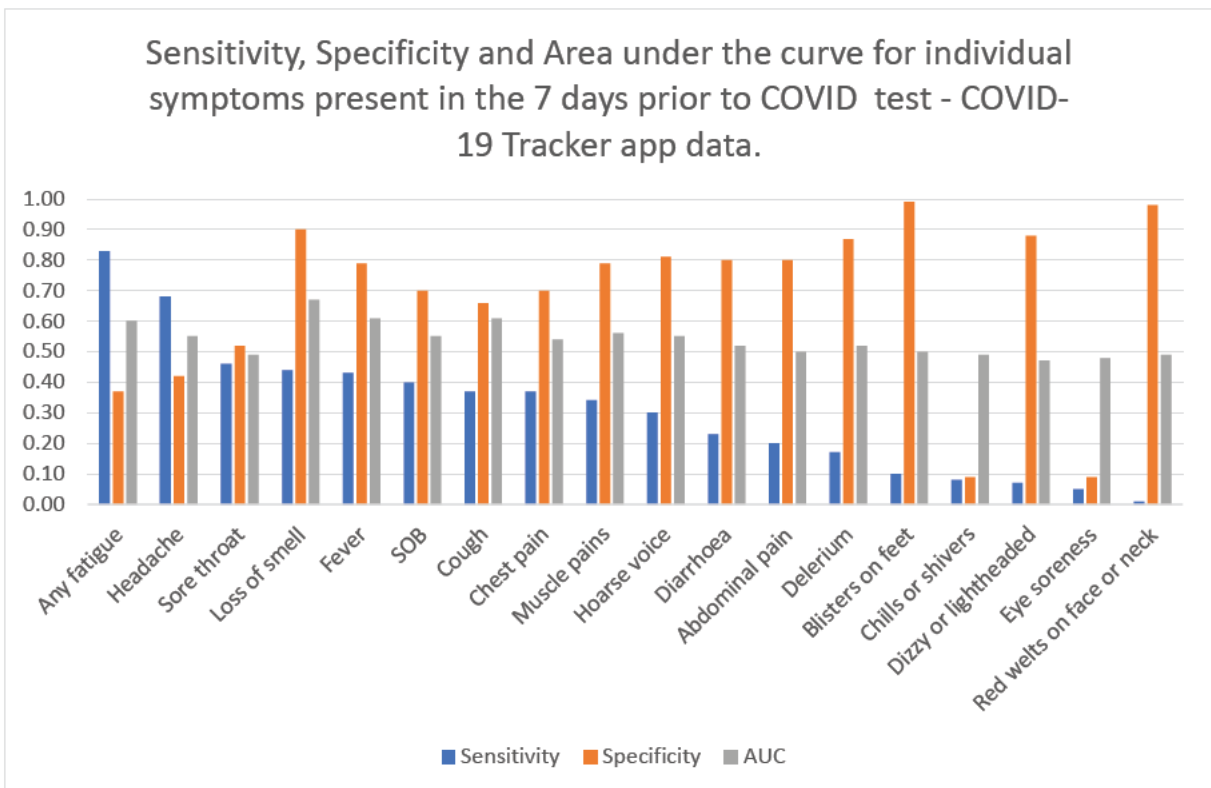**PHIA probability yardstick – to be used when expressing likelihood or confidence**
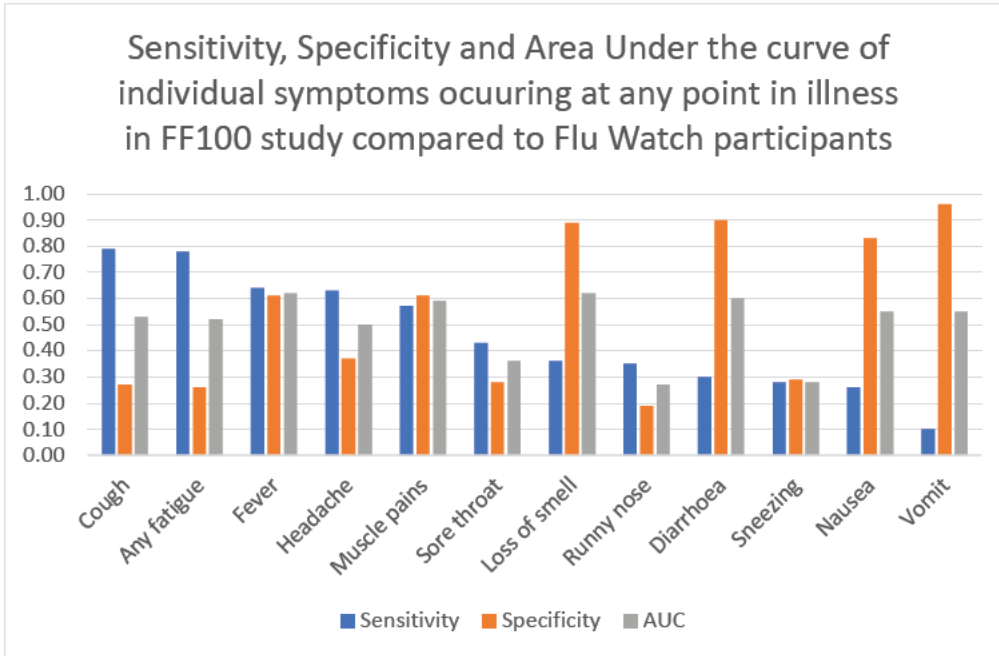

Detailed findings

Analyses of FF100 and COVID-19 Tracker app data
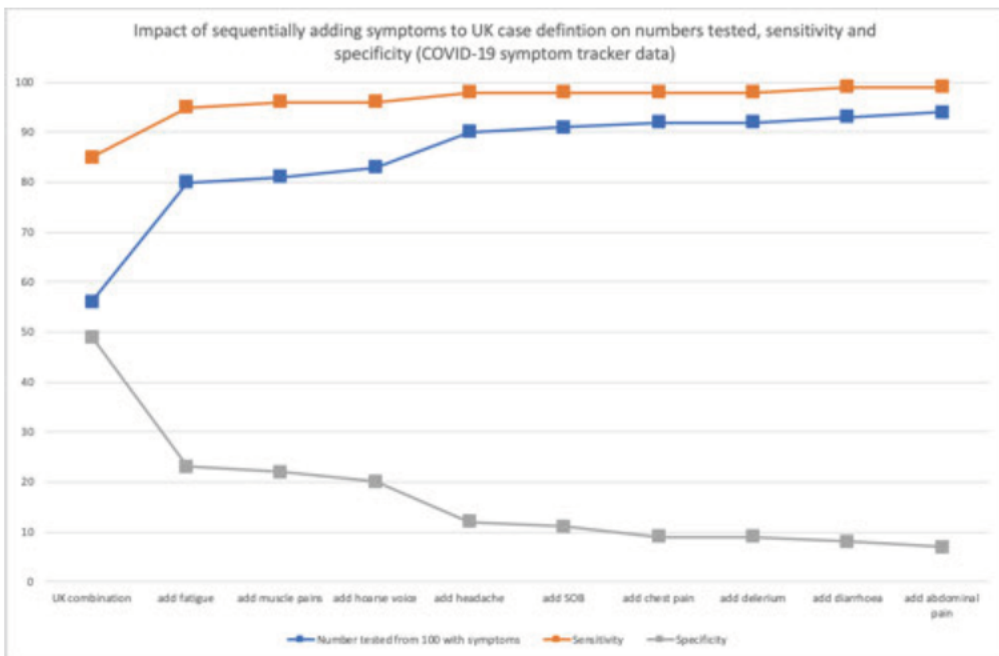
COVID presents with a wide range of constitutional, respiratory, gastrointestinal or other symptoms. With the exception of symptoms that are common in the population, regardless of respiratory infection (headache and fatigue) none of the symptoms are consistently present in most cases and most of the symptoms are also common in other respiratory infections. (High certainty)

Sensitivity, Specificity and Area Under the curve of individual symptoms ocuuring at any point in illness in FF100 study compared to Flu Watch participants

Achieving acceptable accuracy requires multiple symptoms to be included in case definitions. Increasing the number of symptoms included will increase sensitivity (the ability of a test to correctly identify those with the disease) but this will be at the cost of reducing specificity (the ability of the test to correctly identify those without the disease and increasing the number of tests needed. (High certainty)

Impact of sequentially adding symptoms to UK case defintion on numbers tested, sensitivity and specificity (COVID-19 symptom tracker data)
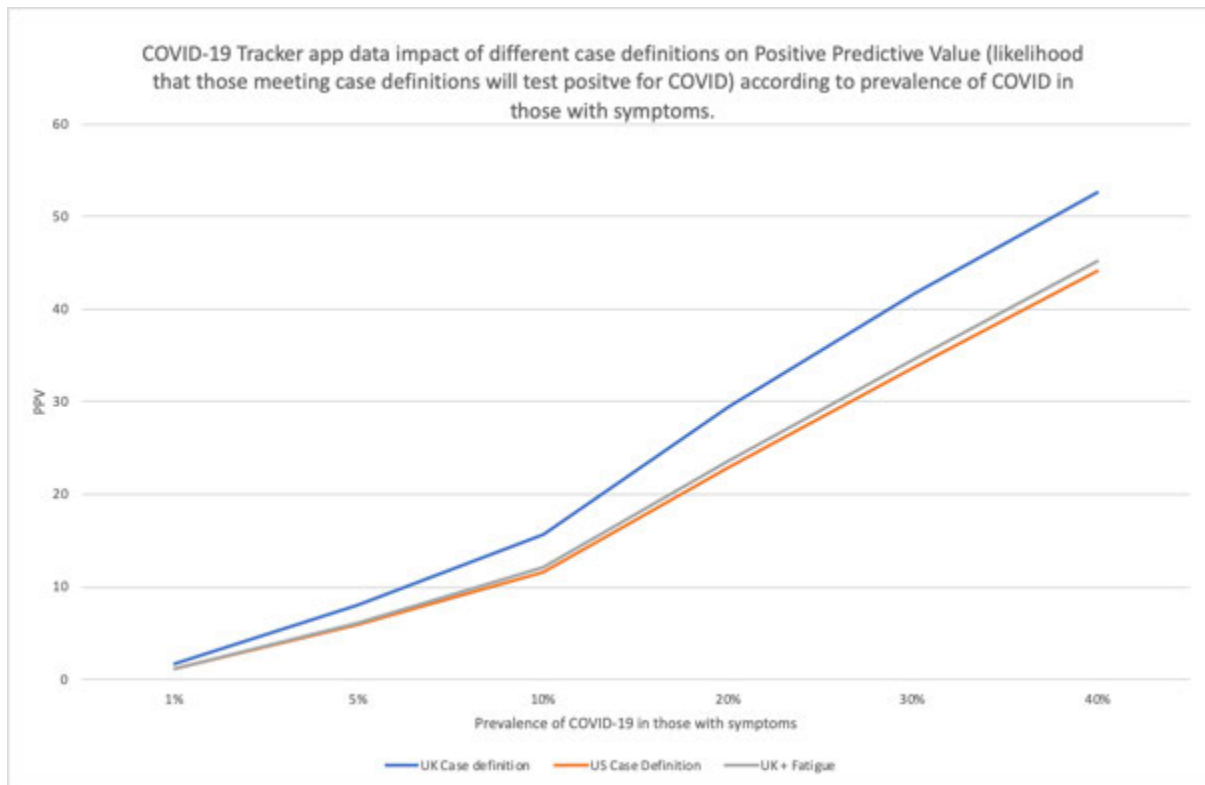
UK combination = Fever OR Loss of Sense of Smell OR Cough – other symptoms added sequentially according to highest area under the curve
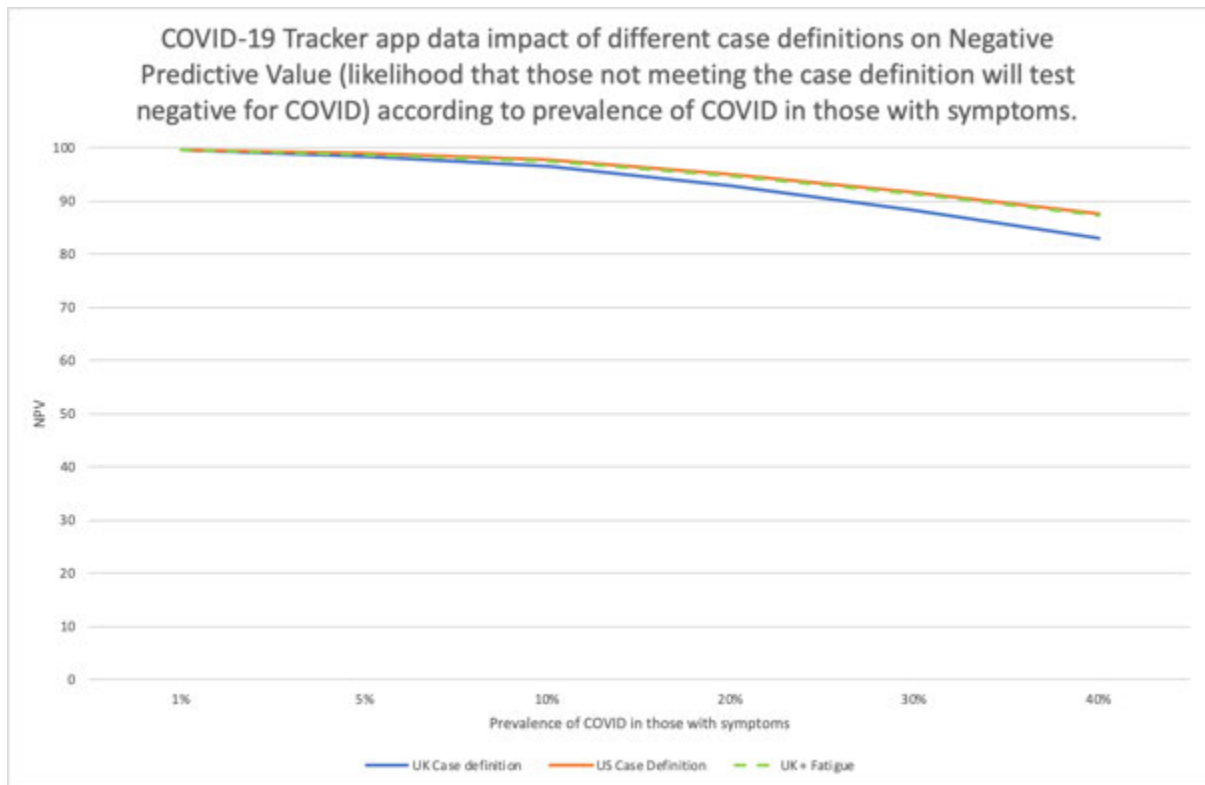
Only two studies (conducted for this review) measure the sensitivity and specificity of the current UK definition (Persistent Cough, OR Fever (measured or subjective) OR Loss of sense of smell or taste. The First Few Hundred study (FF100) compares patients with confirmed COVID-19 from the FF100 Covid Study (n=301) with participants in the pre-COVID FluWatch study (which recorded symptoms of people who suspected they had a respiratory infection- n= 1637). This showed a sensitivity of 94% (95% CI 91%-97%) and a specificity of 17% (15%-19%). Analysis of the COVID-19 tracker app data for tested participants with a known test date (2700 positive, 14309 negative) showed a lower sensitivity of 85% (83%-86%) and a higher specifity of 49% (49%-50%).

In the US a wider range of symptoms are promoted as being COVID symptoms (cough OR fever OR loss of sense of smell or taste OR sore throat OR Shortness of breath OR unusual muscle pain). In the FF100 analysis including this wider range of symptoms had minimal effect on sensitivity – (96% - 93-98%) but lowered specificity (12% - 11-14%). In the COVID-19 tracker app study including these additional symptoms moderately increased the sensitivity to 94% (93-95%) and markedly decreased the specificity to 19% (18-20%). Including the extra symptoms also increased the number of people needing testing by 48% compared to the current UK definition. Adding fever to the current UK definition had a similar impact on sensitivity and specificity and number of tests as adopting the US definition. The reasons for these difference between the studies is unclear but may relate to the completeness of symptom reporting in the different studies, or the fact that the analysis of the COVID-19 tracker app analysis excluded symptoms that only started after the COVID-19 test was taken. The increase in the test numbers needs to be regarded as a minimum as many patients with fatigue but without symptoms will not have been tested and the results are based on tested participants.

FF100 study	Sensitivity	Specificity	
UK definition	94% (91-97%)	17% (15-19%)	
UK definition + Fatigue	97% (94-98%)	7% (23-24%)	
US definition	96% (93-98%)	12% (11-14%)	
COVID Tracker app	Sensitivity	Specificity	Percentage of all those tested
UK definition	85% (83-86%)	49 (49-50%)	56%
UK definition + Fatigue	95% (94-96%)	23% (23-24%)	80%
US definition	96% (93-98%)	19% (18-20%)	83%

The performance of any case definition will also depend on the prevalence of COVID-19 in those with symptoms that could be due to COVID-19, which in turn will vary according to both the prevalence of COVID in the population and the prevalence of other co-circulating respiratory infections. (High certainty) At the time of writing approximately 1% of those tested by Track and Trace test positive for COVID in most parts of the country rising to around 5% in outbreak areas. The percentage positive amongst those tested is not expected to exceed 40% even at the height of a peak of infection. The figures below show the impact of varying disease prevalence amongst those tested on Positive and Negative predictive values.

COVID-19 Tracker app data impact of different case definitions on Positive Predictive Value (likelihood that those meeting case definitions will test positve for COVID) according to prevalence of COVID in those with symptoms.

COVID-19 Tracker app data impact of different case definitions on Negative Predictive Value (likelihood that those not meeting the case definition will test negative for COVID) according to prevalence of COVID in those with symptoms.

Unfortunately, there were insufficient children in either data set to draw conclusions on symptom profiles in children (only 15 test positive children with known test date in the COVID-19 Tracker app study). Recent media reports on the COVID-19 Tracker app suggest that skipping meals, fatigue, headaches and skin rashes are common predictors of COVID-19 in children. (1) A systematic review (not confined to community cases of COVID-19 (2) found the most common symptoms in children were fever, reported in 47.5% of the cases, followed by cough (41.5%), nasal symptoms (11.2%), diarrhoea (8.1%), nausea/vomiting (7.1%), fatigue (5.0%) and respiratory distress (3.5%).

Analyses of the COVID-19 tracker app data showed that in adult age groups under 85 years of age, fever, cough and loss of sense of smell were consistently the best COVID-19 predictors. In adults ages 85 years or over Delerium, Fatigue and Loss of sense of smell were the best predictors with the most common five symptoms being Fatigue (sensitivity 88%), delirium (sensitivity 68%) shortness of breath (sensitivity 41%), Fever (sensitivity 35%), Headache (sensitivity 32%) and cough (sensitivity 29%).

Additional relevant literature

Few other studies report sensitivity of symptom combinations but a large cohort study of symptoms in community cases in Iceland (45,105 tested 1797 positive) showed that at disease onset 82% had one or more constitutional symptom (fever or chills or rigor or headache or myalgia or lethargy or loss of appetite), 63% had an upper respiratory symptom (runny nose, sore throat, loss of sense of smell or taste), 62% had a lower respiratory symptom (cough or shortness of breath) and 30% has a gastrointestinal symptom (diarrhoea, abdominal pain, nausea or vomiting).(3) Further details are shown below.

Symptom Category		Day 1	Day 3	Day 7	Day 14	Cumulative
General		82	78	65	41	93
	Fever	42	33	18	6.6	47
	Rigor, chills	32	24	13	4.9	43
	Headache	51	46	35	21	73
	Myalgia	55	45	27	10	62
	Lethargy	38	38	36	27	74
	Loss of appetite	24	23	20	11	46
Upper respiratory		63	60	54	37	87
	Rhinorrhoea	33	28	21	12	55
	Sore throat	33	27	18	10	45
	Dysosmia	21	24	28	24	56
	Dysgeusia	24	26	30	24	58
Lower respiratory		62	60	56	43	80
	Dry cough	49	45	37	24	66
	Wet cough	13	14	16	15	39
	Any sob	25	26	28	22	52
	SOB at rest	5	5	4.8	3.7	16
Gastrointestinal		30	27	22	11	50
	Nausea	13	12	10	4.9	26
	Vomiting	3.3	2.6	1.6	0.7	4.9
	Abdominal pain	11	9.3	6.4	3.7	24
	Diarrhoea	14	13	10	6	29

Analyses from the Zoe symptom tracker app in the UK and US and other data sources have developed algorithms for identification of COVID-19 based on reported symptoms. (4,5,6) Such algorithm-based approaches are likely to be challenging to communicate and operationalise within the context of encouraging people to be tested and do not improve on sensitivity compared to the approaches described above. Cluster analyses of Zoe symptom tracker data have been used to divide PCR confirmed cases into different clusters according to symptom trajectories. (7) The clusters were predictive of the need for respiratory support.

Recently data has been published from the "How we feel" app used in the USA. (8) The study examined who was most likely to be tested – see figure below – this demonstrates that those with classical symptoms are more likely to be tested than those with other symptoms, probably leading to under-ascertainment of those with other symptoms.

Associations of professions and symptoms with receiving a SARS-CoV-2 PCR test, adjusted for demographics and other covariates (Methods). Common symptoms listed by the CDC are starred

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Factors associated with getting tested

Predictor	Log Odds Ratio	Odds Ratio	95% CI (Lower, Upper)
Demographics			
Healthcare worker		2.94	2.75 3.15
Other essential worker		1.39	1.28 1.52
Hispanic/latinx		1.39	1.25 1.55
African american		1.47	1.29 1.68
Asian		0.88	0.71 1.08
Multi-racial		1.00	0.72 1.40
Other race		0.81	0.62 1.06
Unknown race		0.93	0.69 1.27
Symptoms			
*Fever		4.34	3.56 5.30
*Cough		3.05	2.72 3.42
*Sore throat		2.37	1.98 2.84
Tight feeling in chest		2.27	1.93 2.66
*Shortness of breath		1.97	1.60 2.42
Fatigue		1.69	1.50 1.91
*Loss of taste and or smell		1.52	1.22 1.89
Diarrhea		1.44	1.13 1.84
Loss of appetite		1.40	1.11 1.76
*Muscle and joint pain		1.32	1.17 1.49
Nasal congestion		1.25	1.12 1.39
*Chills shaking		1.16	0.92 1.46
Nausea and vomiting		1.12	0.87 1.44
Runny nose		0.91	0.80 1.05
Tingling sensation		0.61	0.44 0.85

(Log Odds Ratio axis: −1, 0, 1, 2, 3)

An analysis of the data accounting for probability of testing showed loss of taste and/or smell was most strongly associated with a positive test result (OR: 33.17, 95% CI:[17.3, 67.94]). Other symptoms associated with testing positive included fever (OR: 6.27, 95% CI:[2.82, 13.70]) and cough (OR: 4.45, 95% CI: [2.83, 6.99]).

Analysis of twitter data confirms the wide range of symptoms reported by people who test positive for COVID-19 (9-10).

CART analyses have been used to produce decision trees for testing for COVID-19 but are based on small numbers of positive cases. (11)

An analysis of patients presenting in primary care in Germany compared symptoms in test positive and test negative patients. Anosmia and chills were the only symptoms that were significantly more common in COVID-19 than in other respiratory infections. Sore throat was less common in COVID-19 than other respiratory infections. (12)

An analysis of patients with respiratory infection presenting to emergency departments found that fever (82% vs 44%), Fatigue (85% 50%) were the only symptoms that were significantly more common in COVID-19 than other respiratory infections. (Loss of sense of smell or taste was not measured). (13)

A range of reviews of symptom profiles have been conducted but primarily focus on hospitalised patients. (14-18) A review of systematic reviews (19) reported on frequency of symptoms in those diagnosed with COVID-19. Overall, symptoms in patients with COVID-19 were (range values of the point estimates): fever (82–95%), cough with or without sputum (58– 72%), dyspnea (26– 59%), myalgia or muscle fatigue (29–51%), sore throat (10–13%), headache (8–12%), gastrointestinal

disorders, such as diarrhea, nausea or vomiting (5.0–9.0%), and others (including, in one study only: dizziness 12.1%)

A wide range of studies have shown loss or altered sense of smell of taste to be discriminatory but often not present. (20-28) Gastrointestinal symptoms are also commonly present but at a lower frequency than respiratory symptoms. (29,30)

An analysis of patients admitted from nursing homes compared to those living in the community showed care home residents were less likely to experience cough (46.9% vs 72.9%, p=0.002) but more likely to present with delirium (51.6% vs 31.4%, p=0.018), particularly hypoactive delirium (40.6% vs 24.3%, p=0.043). (31)

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4) Real-time tracking of self-reported symptoms to predict potential COVID-19

https://www.nature.com/articles/s41591-020-0916-2

5) https://www.medrxiv.org/content/10.1101/2020.05.14.20101931v1

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6) https://www.medrxiv.org/content/10.1101/2020.05.18.20105569v2.full.pdf+html

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https://www.medrxiv.org/content/10.1101/2020.06.12.20129056v1.full.pdf

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"Population-scale Longitudinal Mapping of COVID-19 Symptoms, Behavior, and Testing Identifies Contributors to Continued Disease Spread in the United States"

9) Self-reported COVID-19 symptoms on Twitter: An analysis and a research resource

https://www.medrxiv.org/content/10.1101/2020.04.16.20067421v3

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11) https://www.medrxiv.org/content/10.1101/2020.05.11.20097980v1

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12) https://www.medrxiv.org/content/10.1101/2020.04.27.20081877v2

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18) https://www.medrxiv.org/content/10.1101/2020.04.18.20070565v1.full.pdf

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26) https://www.medrxiv.org/content/10.1101/2020.05.04.20090902v3

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Clinical and Epidemiological Characteristics of 1,420 European Patients with mild-to-moderate Coronavirus Disease 2019

29) https://www.medrxiv.org/content/10.1101/2020.04.20.20064873v1

Gastrointestinal symptoms as Covid-19 onset in hospitalized Italian patients

30) https://www.medrxiv.org/content/10.1101/2020.07.07.20143024v2

Digestive Manifestations in Patients Hospitalized with COVID-19

31) https://www.medrxiv.org/content/10.1101/2020.07.07.20148148v1

Atypical Presentations of COVID-19 in Care Home Residents presenting to Secondary Care: A UK Single Centre Study

Annex 1

Full analysis of COVID-19 Tracker App data
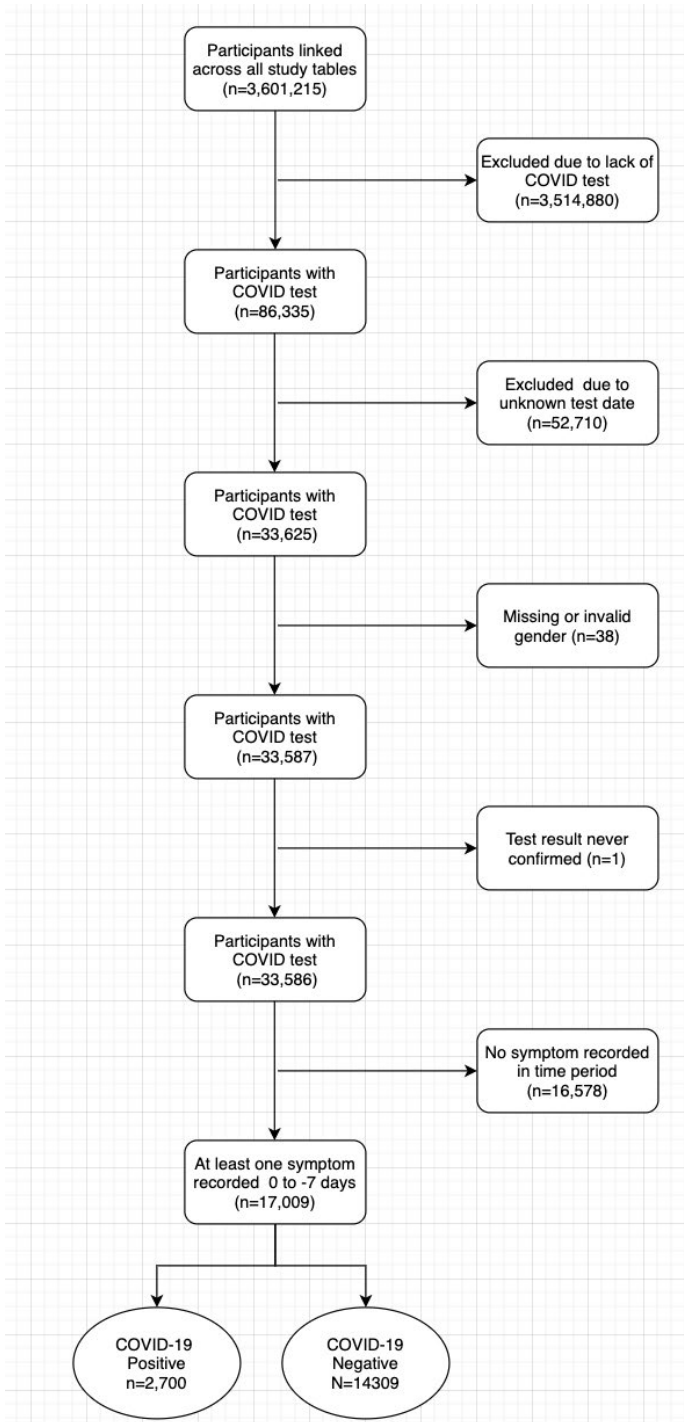
CMO-ZOE tables and figures

Table 1: Baseline characteristics

	Negative (n=14309)	Positive (n=2700)	Overall (n=17009)
Age (years)			
Mean (SD)	45.0 (14.0)	42.1 (13.1)	44.5 (13.9)
Median [Min, Max]	45.0 [0.00, 120]	40.0 [0.00, 95.0]	45.0 [0.00, 120]
Age group			
[0,16)	279 (1.9%)	15 (0.6%)	294 (1.7%)
[16,45)	5781 (40.4%)	1348 (49.9%)	7129 (41.9%)
[45,65)	6775 (47.3%)	1210 (44.8%)	7985 (46.9%)
[65,120]	1474 (10.3%)	127 (4.7%)	1601 (9.4%)
Sex			
Women	10227 (71.5%)	1940 (71.9%)	12167 (71.5%)
Men	4082 (28.5%)	760 (28.1%)	4842 (28.5%)
BMI			
Mean (SD)	26.3 (6.40)	26.5 (6.38)	26.3 (6.40)
Median [Min, Max]	25.0 [10.0, 77.5]	25.0 [10.0, 72.5]	25.0 [10.0, 77.5]
Missing	116 (0.8%)	24 (0.9%)	140 (0.8%)
Current smoker			
No	7983 (55.8%)	1454 (53.9%)	9437 (55.5%)
Yes	515 (3.6%)	71 (2.6%)	586 (3.4%)
Missing	5811 (40.6%)	1175 (43.5%)	6986 (41.1%)
Number of distinct days of symptom reporting prior to test			
Mean (SD)	2.70 (1.73)	2.94 (1.87)	2.74 (1.75)
Median [Min, Max]	2.00 [1.00, 8.00]	2.00 [1.00, 8.00]	2.00 [1.00, 8.00]
Timing of earliest symptom record relative to test date (within 7 days of test)			
Mean (SD)	-3.34 (2.21)	-3.38 (2.48)	-3.35 (2.26)
Median [Min, Max]	-3.00 [-7.00, 0.00]	-3.00 [-7.00, 0.00]	-3.00 [-7.00, 0.00]

Table 2: Sensitivity and specificity of individual symptoms recorded in the 7 days prior to a COVID test (n= 17,009), sorted by AUC

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
Loss of smell	0.16	0.44 (0.42, 0.46)	0.9 (0.89, 0.9)	0.45 (0.43, 0.47)	0.89 (0.89, 0.9)	0.67 (0.66, 0.68)
Persistent cough	0.37	0.56 (0.54, 0.58)	0.66 (0.66, 0.67)	0.24 (0.23, 0.25)	0.89 (0.88, 0.89)	0.61 (0.6, 0.62)
Fever	0.25	0.43 (0.41, 0.45)	0.79 (0.78, 0.79)	0.28 (0.26, 0.29)	0.88 (0.87, 0.89)	0.61 (0.6, 0.62)
Any fatigue	0.66	0.83 (0.82, 0.85)	0.37 (0.36, 0.38)	0.2 (0.19, 0.21)	0.92 (0.91, 0.93)	0.6 (0.59, 0.61)
Mild fatigue	0.62	0.75 (0.73, 0.76)	0.4 (0.39, 0.41)	0.19 (0.18, 0.2)	0.89 (0.89, 0.9)	0.57 (0.56, 0.58)
Unusual muscle pains	0.23	0.34 (0.32, 0.35)	0.79 (0.78, 0.79)	0.23 (0.22, 0.24)	0.86 (0.86, 0.87)	0.56 (0.55, 0.57)
Headache	0.59	0.68 (0.66, 0.7)	0.42 (0.41, 0.43)	0.18 (0.17, 0.19)	0.87 (0.87, 0.88)	0.55 (0.54, 0.56)
Any shortness of breath	0.31	0.4 (0.38, 0.42)	0.7 (0.7, 0.71)	0.2 (0.19, 0.21)	0.86 (0.85, 0.87)	0.55 (0.54, 0.56)
Hoarse voice	0.21	0.3 (0.29, 0.32)	0.81 (0.8, 0.81)	0.23 (0.21, 0.24)	0.86 (0.85, 0.87)	0.55 (0.55, 0.56)
Severe fatigue	0.13	0.22 (0.2, 0.23)	0.89 (0.89, 0.9)	0.27 (0.25, 0.29)	0.86 (0.85, 0.86)	0.55 (0.55, 0.56)
Chest pain	0.31	0.37 (0.35, 0.39)	0.7 (0.7, 0.71)	0.19 (0.18, 0.2)	0.86 (0.85, 0.86)	0.54 (0.53, 0.55)
Mild shortness of breath	0.29	0.36 (0.34, 0.38)	0.73 (0.72, 0.73)	0.2 (0.19, 0.21)	0.86 (0.85, 0.86)	0.54 (0.53, 0.55)
Diarrhoea	0.2	0.23 (0.22, 0.25)	0.8 (0.8, 0.81)	0.18 (0.17, 0.19)	0.85 (0.84, 0.85)	0.52 (0.51, 0.52)
Delirium	0.13	0.17 (0.15, 0.18)	0.87 (0.87, 0.88)	0.2 (0.18, 0.21)	0.85 (0.84, 0.85)	0.52 (0.51, 0.53)
Significant shortness of breath	0.06	0.09 (0.08, 0.1)	0.95 (0.94, 0.95)	0.24 (0.22, 0.27)	0.85 (0.84, 0.85)	0.52 (0.51, 0.52)
Severe shortness of breath	0.01	0.02 (0.02, 0.03)	0.99 (0.99, 0.99)	0.27 (0.21, 0.33)	0.84 (0.84, 0.85)	0.51 (0.5, 0.51)
Abdominal pain	0.2	0.2 (0.18, 0.21)	0.8 (0.8, 0.81)	0.16 (0.15, 0.17)	0.84 (0.84, 0.85)	0.5 (0.49, 0.51)
Blisters on feet	0.01	0.01 (0, 0.01)	0.99 (0.99, 0.99)	0.1 (0.06, 0.15)	0.84 (0.84, 0.85)	0.5 (0.5, 0.5)
Sore throat	0.48	0.46 (0.44, 0.48)	0.52 (0.51, 0.52)	0.15 (0.15, 0.16)	0.84 (0.83, 0.84)	0.49 (0.48, 0.5)
Chills or shivers	0.1	0.08 (0.07, 0.09)	0.9 (0.89, 0.9)	0.12 (0.11, 0.14)	0.84 (0.83, 0.84)	0.49 (0.48, 0.49)
Red welts on face or lips	0.02	0.01 (0.01, 0.02)	0.98 (0.97, 0.98)	0.1 (0.07, 0.13)	0.84 (0.83, 0.85)	0.49 (0.49, 0.5)
Eye soreness	0.09	0.05 (0.04, 0.06)	0.9 (0.9, 0.91)	0.09 (0.08, 0.11)	0.83 (0.83, 0.84)	0.48 (0.47, 0.48)
Dizzy or light headed	0.12	0.07 (0.06, 0.08)	0.88 (0.87, 0.88)	0.1 (0.09, 0.11)	0.83 (0.83, 0.84)	0.47 (0.47, 0.48)

Table 3 - combinations of symptoms

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
UK (cough, fever, or loss of smell)	0.56	0.85 (0.83, 0.86)	0.49 (0.49, 0.5)	0.24 (0.23, 0.25)	0.94 (0.94, 0.95)	0.67 (0.66, 0.68)
US (cough, fever, loss of smell, shortness of breath, unusual muscle pain or sore throat)	0.83	0.94 (0.93, 0.95)	0.19 (0.18, 0.2)	0.18 (0.17, 0.19)	0.95 (0.94, 0.95)	0.57 (0.56, 0.57)
Any upper respiratory	0.81	0.94 (0.93, 0.95)	0.21 (0.21, 0.22)	0.18 (0.18, 0.19)	0.95 (0.94, 0.96)	0.58 (0.57, 0.58)
Any gastrointestinal	0.2	0.23 (0.22, 0.25)	0.8 (0.8, 0.81)	0.18 (0.17, 0.19)	0.85 (0.84, 0.85)	0.52 (0.51, 0.52)
Any constitutional	0.88	0.93 (0.92, 0.94)	0.14 (0.13, 0.14)	0.17 (0.16, 0.18)	0.92 (0.9, 0.93)	0.53 (0.53, 0.54)
Any respiratory AND at least one other	0.72	0.89 (0.88, 0.9)	0.31 (0.3, 0.32)	0.2 (0.19, 0.2)	0.94 (0.93, 0.94)	0.6 (0.59, 0.61)
Any gastrointestinal AND at least one other	0.2	0.23 (0.21, 0.25)	0.81 (0.8, 0.82)	0.18 (0.17, 0.2)	0.85 (0.84, 0.85)	0.52 (0.51, 0.53)
Any constitutional AND at least one other	0.77	0.9 (0.89, 0.91)	0.26 (0.25, 0.27)	0.19 (0.18, 0.19)	0.93 (0.92, 0.94)	0.58 (0.57, 0.59)
Any symptom	0.98	0.99 (0.99, 0.99)	0.02 (0.02, 0.02)	0.16 (0.15, 0.17)	0.93 (0.89, 0.95)	0.51 (0.5, 0.51)

Table 4 - UK symptom combination + sequentially adding top 10 other symptoms (by AUC)

Table 4: Sensitivity and specificity of sequential symptom combinations recorded in the 7 days prior to a COVID test (n= 17,009)

Symptom combination	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
UK combination	0.56	0.85 (0.83, 0.86)	0.49 (0.49, 0.5)	0.24 (0.23, 0.25)	0.94 (0.94, 0.95)	0.67 (0.66, 0.68)
+ any fatigue	0.8	0.95 (0.94, 0.96)	0.23 (0.23, 0.24)	0.19 (0.18, 0.2)	0.96 (0.96, 0.97)	0.59 (0.59, 0.6)
+ unusual muscle pains	0.81	0.96 (0.95, 0.97)	0.22 (0.21, 0.23)	0.19 (0.18, 0.19)	0.97 (0.96, 0.97)	0.59 (0.58, 0.59)
+ hoarse voice	0.83	0.96 (0.96, 0.97)	0.2 (0.19, 0.21)	0.19 (0.18, 0.19)	0.97 (0.96, 0.97)	0.58 (0.58, 0.59)
+ headache	0.9	0.98 (0.97, 0.98)	0.12 (0.11, 0.12)	0.17 (0.17, 0.18)	0.96 (0.95, 0.97)	0.55 (0.54, 0.55)
+ any shortness of breath	0.91	0.98 (0.97, 0.99)	0.11 (0.1, 0.11)	0.17 (0.17, 0.18)	0.97 (0.96, 0.97)	0.54 (0.54, 0.55)
+ chest pain	0.92	0.98 (0.98, 0.99)	0.09 (0.09, 0.1)	0.17 (0.16, 0.18)	0.97 (0.96, 0.98)	0.54 (0.54, 0.54)
+ delirium	0.92	0.98 (0.98, 0.99)	0.09 (0.09, 0.1)	0.17 (0.16, 0.18)	0.97 (0.96, 0.98)	0.54 (0.53, 0.54)
+ diarrhoea	0.93	0.99 (0.98, 0.99)	0.08 (0.07, 0.08)	0.17 (0.16, 0.17)	0.97 (0.96, 0.98)	0.53 (0.53, 0.53)
+ abdominal pain	0.94	0.99 (0.98, 0.99)	0.07 (0.06, 0.07)	0.17 (0.16, 0.17)	0.97 (0.95, 0.98)	0.53 (0.52, 0.53)
+ blisters on feet	0.94	0.99 (0.98, 0.99)	0.07 (0.06, 0.07)	0.17 (0.16, 0.17)	0.97 (0.95, 0.98)	0.53 (0.52, 0.53)

Table 4 - but using 'severe fatigue' instead of 'any fatigue' as the first added symptom

Table 4: Sensitivity and specificity of sequential symptom combinations recorded in the 7 days prior to a COVID test (n= 17,009)

[Severe fatigue instead of any fatigue]

Symptom combination	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
UK combination	0.56	0.85 (0.83, 0.86)	0.49 (0.49, 0.5)	0.24 (0.23, 0.25)	0.94 (0.94, 0.95)	0.67 (0.66, 0.68)
+ severe fatigue	0.59	0.86 (0.85, 0.88)	0.47 (0.46, 0.47)	0.23 (0.23, 0.24)	0.95 (0.94, 0.95)	0.66 (0.66, 0.67)
+ unusual muscle pains	0.64	0.89 (0.88, 0.9)	0.4 (0.39, 0.41)	0.22 (0.21, 0.23)	0.95 (0.94, 0.96)	0.64 (0.64, 0.65)
+ hoarse voice	0.68	0.91 (0.89, 0.92)	0.36 (0.35, 0.37)	0.21 (0.2, 0.22)	0.95 (0.95, 0.96)	0.63 (0.63, 0.64)
+ headache	0.84	0.95 (0.94, 0.96)	0.18 (0.17, 0.19)	0.18 (0.17, 0.19)	0.95 (0.94, 0.96)	0.56 (0.56, 0.57)
+ any shortness of breath	0.87	0.96 (0.95, 0.96)	0.15 (0.15, 0.16)	0.18 (0.17, 0.18)	0.95 (0.94, 0.96)	0.55 (0.55, 0.56)
+ chest pain	0.88	0.96 (0.96, 0.97)	0.13 (0.13, 0.14)	0.17 (0.17, 0.18)	0.95 (0.94, 0.96)	0.55 (0.54, 0.55)
+ delirium	0.89	0.96 (0.96, 0.97)	0.13 (0.12, 0.13)	0.17 (0.17, 0.18)	0.95 (0.94, 0.96)	0.55 (0.54, 0.55)
+ diarrhoea	0.91	0.97 (0.96, 0.98)	0.11 (0.1, 0.11)	0.17 (0.16, 0.18)	0.95 (0.94, 0.96)	0.54 (0.53, 0.54)
+ abdominal pain	0.92	0.97 (0.96, 0.98)	0.09 (0.09, 0.1)	0.17 (0.16, 0.17)	0.94 (0.93, 0.96)	0.53 (0.53, 0.54)
+ blisters on feet	0.92	0.97 (0.96, 0.98)	0.09 (0.09, 0.1)	0.17 (0.16, 0.17)	0.94 (0.93, 0.96)	0.53 (0.53, 0.54)

Table 5: Sensitivity and specificity of symptoms recorded in the 7 days prior to a COVID test sorted by AUC – **participants aged<45 years (n=7423)**

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
Loss of smell	0.16	0.45 (0.42, 0.47)	0.9 (0.89, 0.91)	0.51 (0.48, 0.54)	0.88 (0.87, 0.89)	0.67 (0.66, 0.69)
Persistent cough	0.4	0.56 (0.53, 0.59)	0.63 (0.62, 0.64)	0.25 (0.24, 0.27)	0.86 (0.85, 0.87)	0.6 (0.58, 0.61)
Fever	0.29	0.44 (0.41, 0.47)	0.74 (0.73, 0.75)	0.28 (0.26, 0.3)	0.85 (0.84, 0.86)	0.59 (0.58, 0.6)
Any fatigue	0.68	0.82 (0.8, 0.84)	0.36 (0.34, 0.37)	0.22 (0.21, 0.23)	0.9 (0.89, 0.91)	0.59 (0.58, 0.6)
Mild fatigue	0.64	0.75 (0.73, 0.77)	0.39 (0.38, 0.4)	0.22 (0.21, 0.23)	0.87 (0.86, 0.89)	0.57 (0.56, 0.58)
Unusual muscle pains	0.25	0.34 (0.32, 0.37)	0.78 (0.77, 0.79)	0.26 (0.24, 0.28)	0.84 (0.83, 0.85)	0.56 (0.55, 0.57)
Headache	0.62	0.71 (0.68, 0.73)	0.4 (0.39, 0.42)	0.21 (0.2, 0.22)	0.86 (0.85, 0.87)	0.56 (0.54, 0.57)
Any shortness of breath	0.31	0.4 (0.37, 0.42)	0.71 (0.69, 0.72)	0.23 (0.21, 0.25)	0.84 (0.83, 0.85)	0.55 (0.54, 0.56)
Hoarse voice	0.21	0.29 (0.26, 0.31)	0.81 (0.8, 0.82)	0.25 (0.23, 0.28)	0.83 (0.82, 0.84)	0.55 (0.54, 0.56)
Mild shortness of breath	0.29	0.36 (0.34, 0.39)	0.73 (0.72, 0.74)	0.23 (0.21, 0.25)	0.84 (0.83, 0.85)	0.55 (0.53, 0.56)
Severe fatigue	0.13	0.19 (0.17, 0.22)	0.88 (0.87, 0.89)	0.27 (0.24, 0.29)	0.83 (0.82, 0.84)	0.54 (0.53, 0.55)
Chest pain	0.33	0.39 (0.36, 0.41)	0.68 (0.67, 0.7)	0.22 (0.2, 0.23)	0.83 (0.82, 0.84)	0.54 (0.52, 0.55)
Delirium	0.13	0.15 (0.13, 0.17)	0.88 (0.87, 0.89)	0.22 (0.19, 0.24)	0.82 (0.81, 0.83)	0.51 (0.5, 0.52)
Significant shortness of breath	0.06	0.08 (0.06, 0.09)	0.95 (0.94, 0.95)	0.25 (0.21, 0.3)	0.82 (0.81, 0.83)	0.51 (0.51, 0.52)
Diarrhoea	0.21	0.22 (0.2, 0.24)	0.8 (0.79, 0.81)	0.19 (0.17, 0.21)	0.82 (0.81, 0.83)	0.51 (0.49, 0.52)
Severe shortness of breath	0.01	0.02 (0.01, 0.03)	0.99 (0.98, 0.99)	0.26 (0.18, 0.35)	0.82 (0.81, 0.83)	0.5 (0.5, 0.51)
Sore throat	0.51	0.51 (0.49, 0.54)	0.49 (0.48, 0.5)	0.18 (0.17, 0.2)	0.82 (0.8, 0.83)	0.5 (0.49, 0.52)
Blisters on feet	0.01	0.01 (0, 0.02)	0.99 (0.98, 0.99)	0.13 (0.07, 0.21)	0.82 (0.81, 0.82)	0.5 (0.49, 0.5)
Abdominal pain	0.2	0.2 (0.18, 0.22)	0.79 (0.78, 0.8)	0.18 (0.16, 0.2)	0.81 (0.8, 0.82)	0.5 (0.48, 0.51)
Red welts on face or lips	0.02	0.01 (0.01, 0.02)	0.98 (0.97, 0.98)	0.11 (0.06, 0.17)	0.81 (0.81, 0.82)	0.49 (0.49, 0.5)
Chills or shivers	0.1	0.08 (0.07, 0.1)	0.89 (0.89, 0.9)	0.15 (0.12, 0.18)	0.81 (0.8, 0.82)	0.49 (0.48, 0.5)
Eye soreness	0.08	0.06 (0.04, 0.07)	0.92 (0.91, 0.92)	0.13 (0.11, 0.16)	0.81 (0.8, 0.82)	0.49 (0.48, 0.49)
Dizzy or light headed	0.12	0.08 (0.07, 0.1)	0.87 (0.86, 0.88)	0.13 (0.1, 0.15)	0.81 (0.8, 0.82)	0.48 (0.47, 0.49)

Table 6: Sensitivity and specificity of symptoms recorded in the 7 days prior to a COVID test sorted by AUC - **participants aged 45-60 years (n=6646)**

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
Loss of smell	0.16	0.44 (0.41, 0.47)	0.89 (0.88, 0.9)	0.42 (0.39, 0.45)	0.9 (0.89, 0.9)	0.66 (0.65, 0.68)
Persistent cough	0.37	0.58 (0.55, 0.61)	0.67 (0.65, 0.68)	0.24 (0.23, 0.26)	0.9 (0.89, 0.91)	0.62 (0.61, 0.64)
Fever	0.23	0.44 (0.41, 0.47)	0.8 (0.79, 0.81)	0.29 (0.27, 0.32)	0.89 (0.88, 0.9)	0.62 (0.61, 0.64)
Any fatigue	0.67	0.84 (0.82, 0.86)	0.36 (0.35, 0.37)	0.2 (0.18, 0.21)	0.93 (0.91, 0.94)	0.6 (0.59, 0.61)
Mild fatigue	0.63	0.75 (0.72, 0.77)	0.39 (0.38, 0.4)	0.18 (0.17, 0.2)	0.89 (0.88, 0.91)	0.57 (0.55, 0.58)
Hoarse voice	0.22	0.33 (0.3, 0.36)	0.8 (0.79, 0.81)	0.23 (0.21, 0.26)	0.87 (0.86, 0.88)	0.57 (0.55, 0.58)
Severe fatigue	0.13	0.23 (0.2, 0.26)	0.89 (0.89, 0.9)	0.28 (0.25, 0.32)	0.86 (0.85, 0.87)	0.56 (0.55, 0.58)
Unusual muscle pains	0.23	0.34 (0.31, 0.37)	0.78 (0.77, 0.79)	0.22 (0.2, 0.24)	0.87 (0.86, 0.87)	0.56 (0.55, 0.58)
Any shortness of breath	0.32	0.41 (0.38, 0.44)	0.69 (0.68, 0.7)	0.2 (0.18, 0.21)	0.86 (0.85, 0.87)	0.55 (0.53, 0.57)
Headache	0.61	0.69 (0.66, 0.72)	0.4 (0.39, 0.42)	0.17 (0.16, 0.19)	0.88 (0.86, 0.89)	0.55 (0.53, 0.56)
Chest pain	0.31	0.38 (0.35, 0.41)	0.7 (0.69, 0.71)	0.19 (0.17, 0.2)	0.86 (0.85, 0.87)	0.54 (0.52, 0.55)
Mild shortness of breath	0.3	0.36 (0.33, 0.39)	0.71 (0.7, 0.72)	0.19 (0.17, 0.21)	0.86 (0.85, 0.87)	0.54 (0.52, 0.55)
Significant shortness of breath	0.06	0.1 (0.08, 0.12)	0.95 (0.94, 0.95)	0.26 (0.22, 0.31)	0.85 (0.84, 0.86)	0.52 (0.51, 0.53)
Diarrhoea	0.21	0.24 (0.21, 0.27)	0.8 (0.79, 0.81)	0.18 (0.16, 0.2)	0.85 (0.84, 0.86)	0.52 (0.5, 0.53)
Delirium	0.13	0.16 (0.13, 0.18)	0.88 (0.87, 0.88)	0.19 (0.16, 0.21)	0.85 (0.84, 0.86)	0.52 (0.5, 0.53)
Severe shortness of breath	0.01	0.02 (0.01, 0.03)	0.99 (0.99, 0.99)	0.26 (0.17, 0.37)	0.85 (0.84, 0.85)	0.5 (0.5, 0.51)
Abdominal pain	0.2	0.2 (0.18, 0.23)	0.8 (0.79, 0.81)	0.16 (0.14, 0.18)	0.85 (0.84, 0.86)	0.5 (0.49, 0.52)
Blisters on feet	0.01	0 (0, 0.01)	0.99 (0.99, 0.99)	0.08 (0.03, 0.17)	0.84 (0.83, 0.85)	0.5 (0.49, 0.5)
Red welts on face or lips	0.02	0.01 (0.01, 0.02)	0.98 (0.97, 0.98)	0.1 (0.06, 0.16)	0.84 (0.83, 0.85)	0.5 (0.49, 0.5)
Chills or shivers	0.09	0.06 (0.05, 0.08)	0.9 (0.89, 0.91)	0.11 (0.08, 0.13)	0.84 (0.83, 0.85)	0.48 (0.47, 0.49)
Sore throat	0.49	0.44 (0.41, 0.47)	0.51 (0.49, 0.52)	0.14 (0.13, 0.15)	0.83 (0.82, 0.84)	0.47 (0.46, 0.49)
Eye soreness	0.09	0.05 (0.03, 0.06)	0.9 (0.89, 0.91)	0.08 (0.06, 0.1)	0.84 (0.83, 0.85)	0.47 (0.47, 0.48)
Dizzy or light headed	0.11	0.05 (0.04, 0.07)	0.88 (0.87, 0.89)	0.08 (0.06, 0.1)	0.84 (0.83, 0.84)	0.47 (0.46, 0.48)

Table 7: Sensitivity and specificity of symptoms recorded in the 7 days prior to a COVID test sorted by AUC - **participants aged 60-75 years (n= 2681)**

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
Loss of smell	0.13	0.42 (0.36, 0.48)	0.91 (0.89, 0.92)	0.34 (0.29, 0.39)	0.93 (0.92, 0.94)	0.66 (0.63, 0.69)
Any fatigue	0.61	0.84 (0.79, 0.88)	0.41 (0.39, 0.43)	0.14 (0.12, 0.16)	0.96 (0.94, 0.97)	0.62 (0.6, 0.65)
Fever	0.17	0.37 (0.31, 0.43)	0.86 (0.84, 0.87)	0.23 (0.19, 0.27)	0.92 (0.91, 0.93)	0.62 (0.59, 0.65)
Persistent cough	0.29	0.49 (0.43, 0.55)	0.73 (0.71, 0.75)	0.17 (0.14, 0.2)	0.93 (0.91, 0.94)	0.61 (0.58, 0.64)
Severe fatigue	0.1	0.27 (0.21, 0.32)	0.92 (0.91, 0.93)	0.28 (0.22, 0.34)	0.92 (0.91, 0.93)	0.59 (0.57, 0.62)
Mild fatigue	0.58	0.72 (0.67, 0.78)	0.44 (0.42, 0.46)	0.13 (0.11, 0.14)	0.93 (0.92, 0.95)	0.58 (0.55, 0.61)
Unusual muscle pains	0.21	0.31 (0.26, 0.37)	0.81 (0.79, 0.82)	0.15 (0.13, 0.19)	0.91 (0.9, 0.92)	0.56 (0.53, 0.59)
Hoarse voice	0.2	0.29 (0.24, 0.35)	0.81 (0.79, 0.82)	0.14 (0.12, 0.18)	0.91 (0.9, 0.92)	0.55 (0.52, 0.58)
Any shortness of breath	0.28	0.37 (0.31, 0.43)	0.72 (0.71, 0.74)	0.13 (0.11, 0.16)	0.91 (0.9, 0.92)	0.54 (0.51, 0.57)
Diarrhoea	0.19	0.26 (0.21, 0.32)	0.82 (0.81, 0.84)	0.14 (0.11, 0.18)	0.91 (0.9, 0.92)	0.54 (0.52, 0.57)
Delirium	0.14	0.2 (0.16, 0.26)	0.87 (0.85, 0.88)	0.15 (0.11, 0.19)	0.91 (0.89, 0.92)	0.54 (0.51, 0.56)
Chest pain	0.25	0.3 (0.25, 0.36)	0.76 (0.74, 0.77)	0.12 (0.1, 0.15)	0.91 (0.89, 0.92)	0.53 (0.5, 0.56)
Mild shortness of breath	0.26	0.31 (0.25, 0.36)	0.74 (0.73, 0.76)	0.12 (0.1, 0.14)	0.91 (0.89, 0.92)	0.52 (0.5, 0.55)
Significant shortness of breath	0.05	0.08 (0.05, 0.12)	0.96 (0.95, 0.97)	0.19 (0.12, 0.27)	0.9 (0.89, 0.91)	0.52 (0.5, 0.54)
Abdominal pain	0.17	0.2 (0.15, 0.25)	0.83 (0.81, 0.84)	0.11 (0.09, 0.15)	0.9 (0.89, 0.91)	0.51 (0.49, 0.54)
Severe shortness of breath	0.01	0.03 (0.02, 0.06)	0.99 (0.98, 0.99)	0.26 (0.12, 0.43)	0.9 (0.89, 0.91)	0.51 (0.5, 0.52)
Headache	0.52	0.53 (0.47, 0.59)	0.48 (0.46, 0.5)	0.1 (0.09, 0.12)	0.9 (0.88, 0.92)	0.51 (0.47, 0.54)
Blisters on feet	0.01	0 (0, 0.02)	0.99 (0.99, 0.99)	0.04 (0, 0.21)	0.9 (0.89, 0.91)	0.5 (0.49, 0.5)
Red welts on face or lips	0.02	0.01 (0, 0.03)	0.98 (0.97, 0.98)	0.05 (0.01, 0.13)	0.9 (0.89, 0.91)	0.49 (0.49, 0.5)
Chills or shivers	0.09	0.07 (0.04, 0.1)	0.91 (0.89, 0.92)	0.07 (0.04, 0.12)	0.9 (0.88, 0.91)	0.49 (0.47, 0.5)
Dizzy or light headed	0.12	0.08 (0.05, 0.12)	0.88 (0.87, 0.89)	0.07 (0.04, 0.1)	0.89 (0.88, 0.91)	0.48 (0.46, 0.5)
Eye soreness	0.11	0.04 (0.02, 0.07)	0.88 (0.87, 0.9)	0.04 (0.02, 0.07)	0.89 (0.88, 0.9)	0.46 (0.45, 0.48)
Sore throat	0.42	0.32 (0.27, 0.38)	0.57 (0.55, 0.59)	0.08 (0.06, 0.1)	0.88 (0.87, 0.9)	0.45 (0.42, 0.48)

Table 8: Sensitivity and specificity of symptoms recorded in the 7 days prior to a COVID test sorted by AUC - **participants aged 75+ years (n= 259)**

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
Delirium	0.37	0.68 (0.49, 0.83)	0.68 (0.61, 0.74)	0.24 (0.16, 0.34)	0.93 (0.88, 0.97)	0.68 (0.59, 0.76)
Any fatigue	0.64	0.88 (0.73, 0.97)	0.39 (0.33, 0.46)	0.18 (0.12, 0.25)	0.96 (0.89, 0.99)	0.64 (0.57, 0.7)
Severe fatigue	0.24	0.44 (0.27, 0.62)	0.79 (0.73, 0.84)	0.24 (0.14, 0.37)	0.9 (0.85, 0.94)	0.62 (0.53, 0.7)
Mild fatigue	0.48	0.65 (0.46, 0.8)	0.54 (0.47, 0.61)	0.18 (0.11, 0.25)	0.91 (0.85, 0.95)	0.59 (0.51, 0.68)
Loss of smell	0.11	0.26 (0.13, 0.44)	0.92 (0.87, 0.95)	0.32 (0.16, 0.52)	0.89 (0.84, 0.93)	0.59 (0.51, 0.67)
Fever	0.21	0.35 (0.2, 0.54)	0.81 (0.76, 0.86)	0.22 (0.12, 0.36)	0.89 (0.84, 0.93)	0.58 (0.5, 0.67)
Severe shortness of breath	0.05	0.15 (0.05, 0.31)	0.97 (0.94, 0.99)	0.42 (0.15, 0.72)	0.88 (0.84, 0.92)	0.56 (0.5, 0.62)
Chills or shivers	0.11	0.21 (0.09, 0.38)	0.91 (0.86, 0.94)	0.25 (0.11, 0.45)	0.88 (0.83, 0.92)	0.56 (0.48, 0.63)
Any shortness of breath	0.32	0.41 (0.25, 0.59)	0.7 (0.63, 0.76)	0.17 (0.1, 0.27)	0.89 (0.83, 0.93)	0.55 (0.47, 0.64)
Diarrhoea	0.2	0.29 (0.15, 0.47)	0.81 (0.76, 0.86)	0.19 (0.1, 0.33)	0.88 (0.83, 0.92)	0.55 (0.47, 0.64)
Persistent cough	0.23	0.29 (0.15, 0.47)	0.78 (0.72, 0.83)	0.17 (0.08, 0.29)	0.88 (0.83, 0.92)	0.54 (0.45, 0.62)
Dizzy or light headed	0.15	0.21 (0.09, 0.38)	0.85 (0.8, 0.9)	0.18 (0.07, 0.33)	0.88 (0.83, 0.92)	0.53 (0.46, 0.6)
Headache	0.29	0.32 (0.17, 0.51)	0.72 (0.66, 0.78)	0.15 (0.08, 0.25)	0.88 (0.82, 0.92)	0.52 (0.44, 0.61)
Mild shortness of breath	0.2	0.24 (0.11, 0.41)	0.8 (0.75, 0.85)	0.15 (0.07, 0.28)	0.87 (0.82, 0.92)	0.52 (0.44, 0.6)
Unusual muscle pains	0.18	0.21 (0.09, 0.38)	0.82 (0.77, 0.87)	0.15 (0.06, 0.28)	0.87 (0.82, 0.91)	0.51 (0.44, 0.59)
Blisters on feet	0.01	0.03 (0, 0.15)	0.99 (0.97, 1)	0.33 (0.01, 0.91)	0.87 (0.82, 0.91)	0.51 (0.48, 0.54)
Eye soreness	0.1	0.12 (0.03, 0.27)	0.9 (0.85, 0.93)	0.15 (0.04, 0.34)	0.87 (0.82, 0.91)	0.51 (0.45, 0.57)
Significant shortness of breath	0.11	0.12 (0.03, 0.27)	0.89 (0.85, 0.93)	0.14 (0.04, 0.33)	0.87 (0.82, 0.91)	0.51 (0.45, 0.56)
Red welts on face or lips	0.02	0.03 (0, 0.15)	0.98 (0.95, 0.99)	0.17 (0, 0.64)	0.87 (0.82, 0.91)	0.5 (0.47, 0.53)
Abdominal pain	0.17	0.15 (0.05, 0.31)	0.83 (0.78, 0.88)	0.12 (0.04, 0.25)	0.87 (0.81, 0.91)	0.49 (0.42, 0.55)
Hoarse voice	0.2	0.18 (0.07, 0.35)	0.8 (0.74, 0.85)	0.12 (0.04, 0.24)	0.87 (0.81, 0.91)	0.49 (0.42, 0.56)
Chest pain	0.19	0.15 (0.05, 0.31)	0.8 (0.75, 0.85)	0.1 (0.03, 0.22)	0.86 (0.81, 0.91)	0.48 (0.41, 0.54)
Sore throat	0.22	0.18 (0.07, 0.35)	0.77 (0.71, 0.83)	0.11 (0.04, 0.22)	0.86 (0.81, 0.91)	0.47 (0.4, 0.55)

Table 9: Sensitivity and specificity of symptoms recorded within the first 3 days of the first symptom sorted by AUC (n=17009)

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
Loss of smell	0.14	0.38 (0.36, 0.4)	0.91 (0.9, 0.91)	0.44 (0.42, 0.46)	0.89 (0.88, 0.89)	0.64 (0.64, 0.65)
Persistent cough	0.34	0.51 (0.49, 0.53)	0.7 (0.69, 0.7)	0.24 (0.23, 0.25)	0.88 (0.88, 0.89)	0.6 (0.59, 0.61)
Fever	0.22	0.39 (0.37, 0.4)	0.81 (0.81, 0.82)	0.28 (0.27, 0.29)	0.88 (0.87, 0.88)	0.6 (0.59, 0.61)
Any fatigue	0.63	0.79 (0.78, 0.81)	0.39 (0.39, 0.4)	0.2 (0.19, 0.21)	0.91 (0.9, 0.92)	0.59 (0.59, 0.6)
Mild fatigue	0.59	0.7 (0.68, 0.72)	0.43 (0.42, 0.44)	0.19 (0.18, 0.2)	0.88 (0.88, 0.89)	0.57 (0.56, 0.58)
Unusual muscle pains	0.21	0.31 (0.29, 0.33)	0.81 (0.8, 0.81)	0.23 (0.22, 0.25)	0.86 (0.85, 0.87)	0.56 (0.55, 0.57)
Severe fatigue	0.11	0.19 (0.17, 0.2)	0.91 (0.9, 0.91)	0.27 (0.25, 0.3)	0.86 (0.85, 0.86)	0.55 (0.54, 0.56)
Hoarse voice	0.19	0.27 (0.25, 0.29)	0.83 (0.82, 0.83)	0.22 (0.21, 0.24)	0.86 (0.85, 0.86)	0.55 (0.54, 0.56)
Headache	0.56	0.63 (0.61, 0.65)	0.45 (0.44, 0.46)	0.18 (0.17, 0.19)	0.87 (0.86, 0.87)	0.54 (0.53, 0.55)
Any shortness of breath	0.28	0.35 (0.33, 0.37)	0.73 (0.72, 0.74)	0.2 (0.18, 0.21)	0.86 (0.85, 0.86)	0.54 (0.53, 0.55)
Mild shortness of breath	0.26	0.31 (0.29, 0.32)	0.75 (0.75, 0.76)	0.19 (0.18, 0.2)	0.85 (0.85, 0.86)	0.53 (0.52, 0.54)
Chest pain	0.28	0.33 (0.31, 0.35)	0.73 (0.72, 0.74)	0.19 (0.18, 0.2)	0.85 (0.85, 0.86)	0.53 (0.52, 0.54)
Delirium	0.12	0.15 (0.14, 0.17)	0.88 (0.88, 0.89)	0.2 (0.18, 0.21)	0.85 (0.84, 0.85)	0.52 (0.51, 0.52)
Significant shortness of breath	0.05	0.06 (0.06, 0.07)	0.96 (0.95, 0.96)	0.22 (0.19, 0.25)	0.84 (0.84, 0.85)	0.51 (0.51, 0.52)
Diarrhoea	0.18	0.2 (0.19, 0.22)	0.82 (0.81, 0.83)	0.17 (0.16, 0.19)	0.84 (0.84, 0.85)	0.51 (0.5, 0.52)
Severe shortness of breath	0.01	0.02 (0.01, 0.02)	0.99 (0.99, 0.99)	0.25 (0.18, 0.32)	0.84 (0.84, 0.85)	0.5 (0.5, 0.51)
Abdominal pain	0.18	0.18 (0.16, 0.19)	0.82 (0.82, 0.83)	0.16 (0.15, 0.17)	0.84 (0.84, 0.85)	0.5 (0.49, 0.51)
Blisters on feet	0.01	0.01 (0, 0.01)	0.99 (0.99, 0.99)	0.11 (0.06, 0.17)	0.84 (0.84, 0.85)	0.5 (0.5, 0.5)
Red welts on face or lips	0.02	0.01 (0.01, 0.02)	0.98 (0.98, 0.98)	0.1 (0.07, 0.14)	0.84 (0.83, 0.85)	0.5 (0.49, 0.5)
Chills or shivers	0.08	0.06 (0.05, 0.07)	0.91 (0.91, 0.92)	0.12 (0.1, 0.14)	0.84 (0.83, 0.84)	0.49 (0.48, 0.49)
Sore throat	0.45	0.43 (0.41, 0.45)	0.54 (0.54, 0.55)	0.15 (0.14, 0.16)	0.83 (0.83, 0.84)	0.49 (0.48, 0.5)
Eye soreness	0.07	0.04 (0.03, 0.05)	0.92 (0.92, 0.93)	0.09 (0.08, 0.11)	0.84 (0.83, 0.84)	0.48 (0.48, 0.49)
Dizzy or light headed	0.1	0.06 (0.05, 0.07)	0.9 (0.89, 0.9)	0.09 (0.08, 0.11)	0.83 (0.83, 0.84)	0.48 (0.47, 0.48)

Table 10: Sensitivity and specificity of symptoms recorded within the first 5 days of the first symptom, sorted by AUC (n=17009)

Symptom	Prevalence	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Area under the curve
Loss of smell	0.15	0.42 (0.4, 0.44)	0.9 (0.9, 0.91)	0.45 (0.43, 0.46)	0.89 (0.89, 0.9)	0.64 (0.64, 0.65)
Persistent cough	0.36	0.54 (0.52, 0.56)	0.68 (0.67, 0.68)	0.24 (0.23, 0.25)	0.89 (0.88, 0.89)	0.6 (0.59, 0.61)
Fever	0.24	0.42 (0.4, 0.43)	0.8 (0.79, 0.8)	0.28 (0.26, 0.29)	0.88 (0.87, 0.88)	0.6 (0.59, 0.61)
Any fatigue	0.66	0.82 (0.8, 0.83)	0.38 (0.37, 0.38)	0.2 (0.19, 0.21)	0.92 (0.91, 0.92)	0.59 (0.59, 0.6)
Mild fatigue	0.61	0.73 (0.71, 0.75)	0.41 (0.4, 0.42)	0.19 (0.18, 0.2)	0.89 (0.88, 0.9)	0.57 (0.56, 0.58)
Unusual muscle pains	0.23	0.32 (0.31, 0.34)	0.79 (0.79, 0.8)	0.23 (0.22, 0.24)	0.86 (0.86, 0.87)	0.56 (0.55, 0.57)
Severe fatigue	0.12	0.21 (0.19, 0.23)	0.9 (0.89, 0.9)	0.28 (0.26, 0.3)	0.86 (0.85, 0.86)	0.55 (0.54, 0.56)
Hoarse voice	0.2	0.29 (0.28, 0.31)	0.81 (0.81, 0.82)	0.23 (0.21, 0.24)	0.86 (0.85, 0.86)	0.55 (0.54, 0.56)
Headache	0.58	0.66 (0.65, 0.68)	0.43 (0.42, 0.44)	0.18 (0.17, 0.19)	0.87 (0.86, 0.88)	0.54 (0.53, 0.55)
Any shortness of breath	0.3	0.38 (0.36, 0.4)	0.71 (0.71, 0.72)	0.2 (0.19, 0.21)	0.86 (0.85, 0.87)	0.54 (0.53, 0.55)
Mild shortness of breath	0.28	0.34 (0.32, 0.36)	0.74 (0.73, 0.74)	0.19 (0.18, 0.21)	0.86 (0.85, 0.86)	0.53 (0.52, 0.54)
Chest pain	0.3	0.36 (0.34, 0.38)	0.71 (0.71, 0.72)	0.19 (0.18, 0.2)	0.86 (0.85, 0.86)	0.53 (0.52, 0.54)
Delirium	0.13	0.16 (0.15, 0.17)	0.88 (0.87, 0.88)	0.2 (0.18, 0.21)	0.85 (0.84, 0.85)	0.52 (0.51, 0.52)
Significant shortness of breath	0.05	0.08 (0.07, 0.09)	0.95 (0.95, 0.96)	0.24 (0.21, 0.27)	0.85 (0.84, 0.85)	0.51 (0.51, 0.52)
Diarrhoea	0.2	0.22 (0.2, 0.23)	0.81 (0.8, 0.81)	0.18 (0.16, 0.19)	0.85 (0.84, 0.85)	0.51 (0.5, 0.52)
Severe shortness of breath	0.01	0.02 (0.02, 0.03)	0.99 (0.99, 0.99)	0.25 (0.2, 0.32)	0.84 (0.84, 0.85)	0.5 (0.5, 0.51)
Abdominal pain	0.19	0.19 (0.17, 0.2)	0.81 (0.8, 0.82)	0.16 (0.15, 0.17)	0.84 (0.83, 0.85)	0.5 (0.49, 0.51)
Blisters on feet	0.01	0.01 (0, 0.01)	0.99 (0.99, 0.99)	0.11 (0.06, 0.16)	0.84 (0.84, 0.85)	0.5 (0.5, 0.5)
Red welts on face or lips	0.02	0.01 (0.01, 0.02)	0.98 (0.98, 0.98)	0.1 (0.07, 0.14)	0.84 (0.83, 0.85)	0.5 (0.49, 0.5)
Chills or shivers	0.09	0.07 (0.06, 0.08)	0.91 (0.9, 0.91)	0.12 (0.1, 0.14)	0.84 (0.83, 0.84)	0.49 (0.48, 0.49)
Sore throat	0.47	0.45 (0.43, 0.47)	0.52 (0.52, 0.53)	0.15 (0.14, 0.16)	0.83 (0.83, 0.84)	0.49 (0.48, 0.5)
Eye soreness	0.08	0.05 (0.04, 0.06)	0.91 (0.91, 0.92)	0.09 (0.08, 0.11)	0.84 (0.83, 0.84)	0.48 (0.48, 0.49)
Dizzy or light headed	0.11	0.07 (0.06, 0.08)	0.89 (0.88, 0.89)	0.1 (0.08, 0.11)	0.83 (0.83, 0.84)	0.48 (0.47, 0.48)