

Worry and behaviour at the start of the COVID-19 outbreak: results from three UK surveys (the COVID-19 Rapid Survey of Adherence to Interventions and Responses [CORSAIR] study)

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HIGHLIGHTS

- At the very start of the COVID-19 outbreak, 20% were very or extremely worried.
- 40% of participants had completed hand or respiratory hygiene behaviours more than usual.
- 14% reported reducing the number of people they met, despite it not yet being official guidance.
- Greater worry, perceived effectiveness and self-efficacy for behaviours were associated with uptake.

ABSTRACT

We aimed to describe levels of worry and uptake of behaviours that prevent the spread of infection (respiratory and hand hygiene, distancing) in the UK at the very start of the COVID-19 outbreak and to investigate factors associated with worry and adopting protective behaviours. Three cross-sectional online surveys of UK adults (28 to 30 January, n=2016; 3 to 6 February, n=2002; 10 to 13 February 2020, n=2006) were conducted. We used logistic regressions to investigate associations between outcome measures (worry, respiratory and hand hygiene behaviour, distancing behaviour) and explanatory variables. 19.8% of participants (95% CI 18.8% to 20.8%) were very or extremely worried about COVID-19. People from minoritized ethnic groups were particularly likely to feel worried. 39.9% of participants (95% CI 37.7% to 42.0%) had completed one or more hand or respiratory hygiene behaviours more than usual in the last seven days. Uptake was associated with greater worry, perceived effectiveness of individual behaviours and self-efficacy for engaging in them, and having received more information. 13.7% (95% CI 12.2% to 15.2%) had reduced the number of people they had met. This was associated with greater worry, perceived effectiveness, and self-efficacy. Worry and uptake of protective behaviours were high at the start of the COVID-19 outbreak. A substantial minority reported adopting a behaviour that was not yet part of official guidance (reducing the number of people you met). At the start of novel infectious disease outbreaks, communications should emphasise perceived effectiveness of behaviours and ease with which they can be carried out.

Key words: COVID-19; hand cleansing; hand washing; respiratory behaviours; social distancing; physical distancing

INTRODUCTION

The early stages of novel infectious disease outbreaks are usually characterised by uncertainty. Unknowns include basic details about transmissibility, disease severity, risk factors for disease, mode of transmission, and degree of population immunity. In the very early stages of the COVID-19 outbreak, the UK public were exposed to a morass of epidemiological information, disagreements between scientists about the status of the outbreak and its likely future path, frequent admissions of uncertainty from trusted sources, and online confusion, speculation and conspiracy theories.(1) In the midst of this, national governments attempted to prepare their citizens for a possible public health crisis and to convey information about behaviours that may help to slow the spread of disease.(2)

The first two cases of COVID-19 in the UK were declared on 31 January 2020 (3) with seven further cases detected in the subsequent two weeks (see Box 1). On 2 February 2020, a public information campaign was launched by the Department of Health and Social Care, England.(4) This campaign was similar to the “Catch it, Bin it, Kill it” campaign developed during the 2009/10 influenza H1N1 pandemic, which advised the UK population to adopt respiratory and hand hygiene behaviours. At the same time, media reports discussed strategies used to prevent transmission in other countries, including restrictions of movement, such as placing regions under “lockdown” measures,(5) and reducing contact with others (physical distancing). In the UK, reducing contact with others was not officially recommended until 16 March 2020.(6) Trust in the source of information influences the impact of communications.(7-9) At the time of the emergence of COVID-19, political disputes about the UK’s relationship with the European Union saw trust in the UK Government decline, with politicians replacing advertising executives as the country’s least trusted profession.(10)

Box 1. Timeline of the start of the COVID-19 outbreak in the UK

- 31 January 2020. Two cases detected in the UK; both had recently returned from Hubei province, China [total cases = 2].
- 6 February 2020. One case detected; infection contracted in Singapore [total cases = 3].
- 9 February 2020. One case detected; contact of confirmed UK case, infections contracted in France [total cases = 4].
- 10 February 2020. Four cases detected; contact of confirmed UK case, infections contracted in France [total cases = 8].
- 11 February 2020. *World Health Organization names "COVID-19"*.
- 12 February 2020. One case detected; infection contracted in China [total cases = 9].
- 23 February 2020. Four cases detected; infections contracted on "Princess Diamond" cruise ship [total cases = 13].
- 27 February 2020. Two cases detected; one infection contracted in Italy, one infection contracted in Tenerife [total cases = 15].
- 28 February 2020. Five cases detected, including first case in Wales and first case in Northern Ireland; two infections contracted in Iran, two infections contracted in Italy (Welsh and Northern Irish infections), one infection contracted in England (first community transmission) [total cases = 20].
- 29 February 2020. Three cases detected; two infections contracted in Italy, one infection contracted in Asia [total cases = 23].
- 1 March 2020. Twelve cases detected; three contacts of confirmed UK case, one infection contracted in England (community transmission), six infections contracted in Italy, two infections contracted in Iran [total cases = 35].
- 5 March 2020. First COVID-19 death in UK announced [total cases = 271].
- 11 March 2020. *World Health Organization declares pandemic [total cases = 1,294]*.
- 16 March 2020. *First restrictions imposed in UK [total cases = 3,671]*.

The Protection Motivation Theory (PMT) postulates that uptake of protective behaviours are driven by a more negative appraisal of the threat (greater perceived susceptibility and severity) and a more positive appraisal of the coping response (greater perceived effectiveness and belief that if you wanted to carry out the behaviour, you could [greater perceived self-efficacy]).(11) These factors have been associated with uptake of a range of protective health behaviours,(12) including during the 2009/10 influenza A H1N1 pandemic.(13, 14)

In this study, we report data from the first three weekly waves (28 January to 13 February 2020) of a national survey carried out during the COVID-19 outbreak. We assessed

population levels of worry, respiratory and hand hygiene behaviours, and reducing the number of people that you met. We investigated associations between worry and sociodemographic characteristics and perceived risk of COVID-19. We investigated associations between behavioural outcomes and sociodemographic characteristics, psychological and contextual factors.

METHOD

Design

Weekly online surveys were conducted by BMG research on behalf of the English Department of Health and Social Care (DHSC. Wave 1: 28 to 30 January 2020, n=2016; wave 2: 3 to 6 February 2020, n=2002; wave 3: 10 to 13 February 2020, n=2006). We analysed these data as part of the CORSAIR study [the COVID-19 Rapid Survey of Adherence to Interventions and Responses study].(15) Standard opinion polling methods (non-probability sampling) were used to aid rapid data collection, which was essential during the evolving crisis.

Participants

Participants were recruited from Respondi, a specialist research panel provider (n=50,000) and were eligible for the study if they were aged 16 years or over and lived in the UK. Quotas based on age and gender (combined) and Government Office Region reflected targets based on the Office for National Statistics.(16) Participants were reimbursed in points (equivalent to approximately 25p) that could be redeemed in cash, gift vouchers or charitable donations.

Study materials

The survey for waves 1 and 2 was developed by DHSC, based on materials developed in 2014 in preparation for a future influenza pandemic by our team.(17) These items were refined in 2014 in three rounds of qualitative interviews (n=78) and had their test-retest reliability checked in two telephone surveys (n=621).(18). Survey materials were substantially expanded in wave 3 (see Appendix A for full items). Unless stated otherwise, we recoded answers of “don’t know” as missing data.

Outcome measures

Participants were asked how worried about COVID-19 they were on a five-point scale (asked in all survey waves). We recoded this item as a binary variable (“not at all”, “not very”, or “somewhat worried” versus “very” or “extremely worried”).

We asked participants if, in the last seven days, they had completed respiratory and hand hygiene behaviours such as washing hands thoroughly and regularly, using hand sanitiser and tissues, and cleaning surfaces “as much as usual,” “more than usual,” “not done this,” or “not applicable” (see Appendix A; wave 3 only). We created a single binary variable indicating whether a participant had completed one or more respiratory or hand hygiene behaviour “more than usual”. For these analyses, answers of “not applicable” were counted as not having completed the behaviour “more than usual”.

Participants were also asked whether they had reduced the number of people they had met in the past seven days (wave 3 only). Answers were recoded to give a single binary variable (reduced the number of people met versus not).

Perceived risk of COVID-19

Participants were asked to what extent they thought COVID-19 posed a risk to themselves and people in the UK (asked in all survey waves).

In wave 3, participants were asked to what extent they agreed that COVID-19 would be a serious illness for them.

Knowledge about COVID-19

In wave 3, participants were asked to what extent they agreed with seven items relating to misinformation that was circulating at the time of data collection (see Appendix A).

Individual items were scored from +2 (strong agreement with a correct answer) to -2 (strong disagreement with a correct answer); we coded “don’t know” as 0. Responses were judged as “true” or “false” based on information provided by the UK Government at the time. Scores were summed and rescaled (possible scores 1 to 29), with higher scores indicating higher knowledge.

Information heard about COVID-19

In wave 3, participants were asked how much they had seen or heard about COVID-19 in the past seven days. Participants were also asked if they had seen or heard the “Catch it, Bin it, Kill it” campaign, and advice on how to protect themselves and others from COVID-19.

Participants were asked to identify the three sources that they had received most of their information about COVID-19 from in the past seven days from a list of sixteen. We created

separate binary variables to indicate whether participants had received most of their information from official sources, the mainstream media, or unofficial sources (see Appendix A). For each information source, participants were said to have used that source if they indicated it as one of their top three.

Perceptions about the Government response

Participants were asked to state to what extent they agreed that the Government was putting the right measures in place to protect the British public, they were getting the information they needed, and they knew what to do to limit their risk of contracting COVID-19 (asked in all survey waves). We summed scores to give a single continuous variable indicating satisfaction with the Government response (range 3 to 15, Cronbach's $\alpha=.76$). Higher scores indicated greater satisfaction.

In wave 3, participants completed an adapted form of the Meyer Credibility Index, focussed on assessing the perceived credibility of Government information.⁽¹⁹⁾ Scores for individual items were summed (range 4 to 20, Cronbach's $\alpha=.76$). Lower scores indicated less satisfaction or less credibility.

Effectiveness of, and self-efficacy for, behaviours

Participants were asked to what extent they agreed that individual behaviours were effective at preventing the spread of COVID-19 and how confident they were that they could perform that behaviour (self-efficacy; wave 3 only). We created separate binary variables for perceived effectiveness and self-efficacy for each behaviour ("strongly agree" or "agree" versus "neither agree nor disagree," "disagree" or "strongly disagree").

Sociodemographic characteristics

Participants were asked to state: their age at questionnaire completion; gender; whether they had dependent children; whether they themselves or another household member had a chronic illness; their employment status; whether they themselves, a family member, or friend worked for the NHS; and their ethnicity. Socioeconomic grade was derived from participants' postcode. In wave 3, participants were also asked their highest level of education.

Ethics

This work was conducted as service evaluation of the Department of Health and Social Care's public communications campaign and was exempt from ethical approval following

advice from the King's College London Psychiatry, Nursing and Midwifery Research Ethics Subcommittee.

Power

A target sample size of 2,000 was used for each wave, allowing a 95% confidence interval of, at most, plus or minus 2.2% for the prevalence estimate for each survey item.

Analysis

Sociodemographic characteristics of participants by wave were compared using χ^2 tests for categorical data and one-way ANOVAs for continuous data.

We used binary logistic regressions to calculate univariable associations between worry and sociodemographic characteristics and perceived risk of COVID-19. We used a second set of logistic regressions adjusting for sociodemographic characteristics (excluding education¹).

We used separate binary logistic regressions to calculate univariable associations between behavioural outcomes (uptake of a respiratory and hand hygiene behaviours, reducing the number of people met) and sociodemographic characteristics, worry about COVID-19, perceived risk of COVID-19, knowledge about COVID-19, information heard about COVID-19, and perceptions about UK Government response. We tested the associations between behaviour, effectiveness and self-efficacy separately for each behaviour. We used a second set of logistic regressions adjusting for all sociodemographic characteristics (including education).

For analyses investigating behaviour, we ran *post hoc* logistic regression analyses adjusting for worry about COVID-19 as well as sociodemographic characteristics.

The survey method used quota sampling with weightings. In practice, the weights did not substantially affect rates of worry or uptake of behaviours. Therefore, the analyses reported in this paper are unweighted.

¹ We did not control for education because it was only asked about in wave 3 and was not independently associated with worry about COVID-19.

RESULTS

Participants

Approximately 50% of participants were female (Table 1). There were no significant differences between waves, apart from for age ($F(2,6021)=3.6, p=.03$), with participants being slightly younger in later survey waves.

Participant characteristics	Level	Wave of the questionnaire			p-value
		Wave 1 (n=2016)	Wave 2 (n=2002)	Wave 3 (n=2006)	
Gender	Male	953 (47.5)	971 (48.8)	986 (49.4)	.47
	Female	1053 (52.5)	1020 (51.2)	1009 (50.6)	
Age	N, M, SD	N=2016, M=48.5, SD=17.8	N=2002, M=48.2, SD=18.2	N=2006, M=48.1, SD=18.5	.03*
Dependent children	No	1420 (70.4)	1391 (69.5)	1412 (70.4)	.76
	Yes	596 (29.6)	611 (30.5)	594 (29.6)	
Chronic illness - self	None	1406 (70.9)	1409 (71.6)	1365 (69.1)	.22
	Present	577 (29.1)	559 (28.4)	609 (30.9)	
Chronic illness – other household member	None	1740 (87.7)	1699 (86.3)	1681 (85.2)	.06
	Present	243 (12.3)	269 (13.7)	293 (14.8)	
Employment status	Not working	891 (44.4)	860 (43.3)	897 (45.2)	.50
	Working	1115 (55.6)	1125 (56.7)	1089 (54.8)	
Work for NHS - self	No	1093 (94.7)	1859 (93.7)	1855 (93.6)	.28
	Yes	106 (5.3)	124 (6.3)	126 (6.4)	
Work for NHS – members of my family	No	1772 (88.2)	1703 (85.9)	1728 (87.2)	.09
	Yes	237 (11.8)	280 (14.1)	253 (12.8)	
Work for NHS - friends	No	1796 (89.4)	1791 (90.3)	1792 (90.5)	.48
	Yes	213 (10.6)	192 (9.7)	189 (9.5)	
Highest educational or professional qualification†	GCSE/vocational/A-level/No formal qualifications	-	-	1350 (67.3)	-
	Degree or higher (Bachelors, Masters, PhD)	-	-	656 (32.7)	-
Socioeconomic group (Index of multiple deprivation)	1 st quartile (least deprived)	457 (22.7)	436 (21.8)	453 (22.6)	.92
	2 nd quartile	507 (25.1)	486 (24.3)	477 (23.8)	
	3 rd quartile	516 (25.6)	535 (26.7)	524 (26.1)	
	4 th quartile (most deprived)	536 (26.6)	545 (27.2)	552 (27.5)	
Ethnicity	White	1850 (92.2)	1821 (91.4)	1840 (92.4)	.43
	Black and minoritized ethnic groups	156 (7.8)	172 (8.6)	151 (7.6)	

* $p \leq .05$

†Only asked in Wave 3

Table 1. Participants' sociodemographic characteristics by questionnaire wave.

Worry

Overall, 19.8% of participants (95% CI 18.8% to 20.8%, n=1191/6024) reported being very or extremely worried about COVID-19. Although rates of worry in wave 2 were significantly lower than waves 1 or 3, this difference was small.

Worry was associated with: greater perceived risk of COVID-19 (to oneself and others in the UK); having dependent children; having a chronic illness (oneself or another household member); being employed; working for the NHS; higher level of deprivation; and belonging to a minoritized ethnic group (Table 2). Having a family member working for the NHS was associated with a lower likelihood of worry. Age was associated with worry in a non-linear manner, with worry declining with increasing age and then flattening.

Participant characteristics	Level	Worry about COVID-19		Odds ratio (95% CI) for greater worry	Adjusted odds ratio (95% CI) for greater worry
		Not at all/not very/somewhat worried n=4731, n (%)	Very/extremely worried n=1191, n (%)		
Gender	Male	2295 (79.8)	582 (20.2)	Reference	Reference
	Female	2411 (80.0)	603 (20.0)	0.99 (0.87 to 1.12)	1.01 (0.88 to 1.16)
Age	N, M, SD	N=4731, M=50.2, SD=18.0	N=1191, M=42.6, SD=17.7	0.98 (0.97 to 0.98)*	0.93 (0.91 to 0.96)*
Age: quadratic (age-mean) ²	-	-	-	-	3.64 (2.07 to 6.42)*
Dependent children	No	3459 (83.3)	694 (16.7)	Reference	Reference
	Yes	1272 (71.9)	497 (28.1)	1.95 (1.71 to 2.22)*	1.53 (1.31 to 1.79)*
Chronic illness – self	None	3271 (79.4)	848 (20.6)	Reference	Reference
	Present	1390 (81.2)	321 (18.8)	0.89 (0.77 to 1.03)	1.22 (1.04 to 1.43)*
Chronic illness – other household member	None	4044 (80.3)	994 (19.7)	Reference	Reference
	Present	617 (77.9)	175 (22.1)	1.15 (0.96 to 1.38)	1.26 (1.03 to 1.53)*
Employment status	Not working	2175 (83.8)	419 (16.2)	Reference	Reference
	Working	2521 (76.7)	765 (23.3)	1.58 (1.38 to 1.80)*	1.31 (1.11 to 1.55)*
Work for NHS – self	No	4468 (80.9)	1052 (19.1)	Reference	Reference
	Yes	236 (66.3)	120 (33.7)	2.16 (1.72 to 2.72)*	1.51 (1.17 to 1.93)*
Work for NHS – members of my family	No	4081 (79.7)	1037 (20.3)	Reference	Reference
	Yes	623 (82.2)	135 (17.8)	0.85 (0.70 to 1.04)	0.79 (0.64 to 0.97)*
Work for NHS – friends	No	4243 (80.2)	1047 (19.8)	Reference	Reference
	Yes	461 (78.7)	125 (31.3)	1.10 (0.89 to 1.35)	0.98 (0.79 to 1.23)
Highest educational or professional qualification†	GCSE/vocational/A-level/No formal qualifications	1054 (78.9)	282 (21.1)	Reference	Reference
	Degree or higher (Bachelors, Masters, PhD)	501 (76.7)	152 (23.3)	1.13 (0.91 to 1.42)	1.00 (0.78 to 1.28)‡
Socioeconomic group (Index of multiple deprivation)	1 st quartile (least deprived)	1121 (84.5)	205 (15.5)	Reference	Reference
	2 nd quartile	1171 (80.9)	277 (19.1)	1.29 (1.06 to 1.58)*	1.21 (0.98 to 1.49)
	3 rd quartile	1233 (79.5)	317 (20.5)	1.41 (1.16 to 1.71)*	1.29 (1.05 to 1.59)*
	4 th quartile (most deprived)	1206 (75.5)	392 (24.5)	1.78 (1.47 to 2.14)*	1.49 (1.22 to 1.82)*

Ethnicity	White	4442 (82.0)	974 (18.0)	Reference	Reference
	Minoritised ethnic groups	269 (57.0)	203 (43.0)	3.44 (2.83 to 4.18)	2.50 (2.02 to 3.09)*
Questionnaire wave	Wave 1	1557 (79.8)	393 (20.2)	Reference	Reference
	Wave 2	1619 (81.6)	364 (18.4)	0.89 (0.76 to 1.04)	0.84 (0.71 to 0.99)*
	Wave 3	1555 (78.2)	434 (21.8)	1.11 (0.95 to 1.29)	1.04 (0.88 to 1.23)
Perceived risk to oneself	5-point Likert-type (1=no risk at all, 5=major risk)	N=4615, M=2.06, SD=0.78	N=1152, M=3.36, SD=1.07	4.12 (3.79 to 4.49)*	4.06 (3.71 to 4.45)*
Perceived risk to people in the UK	5-point Likert-type (1=no risk at all, 5=major risk)	N=4622, M=2.58, SD=0.77	N=1173, M=3.84, SD=0.92	4.96 (4.51 to 5.44)*	4.87 (4.41 to 5.38)*

*p≤.05

†Only asked in Wave 3

‡Does not include survey wave as a co-variate as education was only asked about in Wave 3.

Table 2. Table showing associations between worry about COVID-19 and sociodemographic characteristics and perceived risk of COVID-19.

As *post hoc* analyses, we used independent samples *t*-tests to test whether working for the NHS might be linked to higher knowledge or amount heard about the outbreak. Those who worked for the NHS (n=126) had lower knowledge about COVID-19 ($t(1979)=5.25$, $p<.001$) than those not working for the NHS (n=1855). No difference in amount heard about the outbreak was identified.

Respiratory and hand hygiene behaviours

39.9% of participants (95% CI 37.7% to 42.0%, n=800/2006) indicated that they had completed one or more respiratory or hand hygiene behaviour recommended by the UK Government more than usual in the last seven days. 60.1% of participants (95% CI 58.0% to 62.3%, n=1206/2006) reported no behaviour change.

Uptake of at least one respiratory or hand hygiene behaviour was associated with: greater worry about COVID-19; having seen or heard information from official sources; having seen recommendations to “Catch it, Bin it, Kill it;” having seen advice on how to protect oneself and others from COVID-19; greater perceived risk from COVID-19 (to oneself and people in the UK); greater perceived severity of COVID-19; greater amount of information heard about COVID-19; having seen or heard information from unofficial sources; greater perceived credibility of the government; poorer knowledge about COVID-19; having a dependent child and working for the NHS (self; Tables 3 and 4). Age was associated with adopting a Government recommended behaviour in a non-linear manner, with behaviour change declining with older age, and then flattening.

Participant characteristics	Level	Respiratory and hand hygiene behaviour			Adjusted odds ratio (95% CI) for completing at least one behaviour more than usual
		Not changed behaviour n=1206, n (%)	Completed at least one behaviour more than usual n=800, n (%)	Odds ratio (95% CI) for completing at least one behaviour more than usual	
Gender	Male	573 (58.1)	413 (41.9)	Reference	Reference
	Female	635 (61.9)	384 (38.1)	0.85 (0.71 to 1.02)	0.86 (0.71 to 1.04)
Age	N, M, SD	N=1206, M=48.92, SD=17.83	N=800, M=46.84, SD=19.45	0.99 (0.99 to 1.00)*	0.92 (0.89 to 0.95)*
Age: quadratic (age-mean) ²	-	-	-	-	7.45 (3.53 to 15.70)*
Dependent children	No	881 (62.4)	531 (37.6)	Reference	Reference
	Yes	325 (54.7)	269 (45.3)	1.37 (1.13 to 1.67)*	1.39 (1.11 to 1.74)*
Chronic illness - self	None	830 (60.8)	535 (39.2)	Reference	Reference
	Present	360 (59.1)	249 (40.9)	1.07 (0.88 to 1.30)	1.18 (0.95 to 1.46)
Chronic illness - other household member	None	1015 (60.4)	666 (39.6)	Reference	Reference
	Present	175 (59.7)	118 (40.3)	1.03 (0.80 to 1.32)	1.09 (0.83 to 1.42)
Employment status	Not working	557 (62.1)	340 (37.9)	Reference	Reference
	Working	639 (58.7)	450 (41.3)	1.15 (0.96 to 1.38)	1.23 (0.97 to 1.55)
Work for NHS - self	No	1138 (61.3)	717 (38.7)	Reference	Reference
	Yes	53 (42.1)	73 (57.9)	2.19 (1.52 to 3.15)*	1.83 (1.24 to 2.70)*
Work for NHS - members of my family	No	1036 (60.0)	692 (40.0)	Reference	Reference
	Yes	155 (61.3)	98 (38.7)	0.95 (0.72 to 1.24)	0.94 (0.71 to 1.25)
Work for NHS - friends	No	1073 (59.9)	719 (40.1)	Reference	Reference
	Yes	118 (62.4)	71 (37.6)	0.90 (0.66 to 1.22)	0.89 (0.64 to 1.23)
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	812 (60.1)	538 (39.9)	Reference	Reference
	Degree or higher (Bachelors, Masters, PhD)	394 (60.1)	262 (39.9)	1.00 (0.83 to 1.21)	0.94 (0.77 to 1.15)
Socioeconomic group (Index of multiple deprivation)	1 st quartile (least deprived)	282 (62.3)	171 (37.7)	Reference	Reference
	2 nd quartile	297 (62.3)	180 (37.7)	1.00 (0.77 to 1.30)	0.97 (0.74 to 1.28)
	3 rd quartile	301 (57.4)	223 (42.6)	1.22 (0.94 to 1.58)	1.13 (0.87 to 1.48)
	4 th quartile (most deprived)	326 (59.1)	226 (40.9)	1.14 (0.89 to 1.47)	1.08 (0.83 to 1.42)
Ethnicity	White	1123 (61.0)	717 (39.0)	Reference	Reference
	Black and minoritized ethnic groups	75 (49.5)	76 (50.3)	1.59 (1.14 to 2.21)*	1.30 (0.91 to 1.87)

*p≤.05

Table 3. Table showing associations between completing at least one respiratory or hand hygiene behaviour more than usual and sociodemographic characteristics.

Participant characteristics	Level	Respiratory and hand hygiene behaviour				
		Not changed behaviour n=1206, n (%)	Completed at least one behaviour more than usual n=800, n (%)	Odds ratio (95% CI) for completing at least one behaviour more than usual	Adjusted odds ratio (95% CI) for completing at least one behaviour more than usual	
Worry	Worry	Not at all/not very/somewhat worried	1026 (66.0)	529 (34.0)	Reference	Reference
		Very/extremely worried	169 (38.9)	265 (61.1)	3.04 (2.44 to 3.79)*	2.88 (2.28 to 3.65)*
Perceived risk	To oneself	5-point Likert-type (1=no risk at all, 5=major risk)	N=1171, M=2.26, SD=0.93	N=785, M=2.71, SD=1.09	1.56 (1.42 to 1.71)*	1.51 (1.37 to 1.67)*
	To people in the UK	5-point Likert-type (1=no risk at all, 5=major risk)	N=1174, M=2.79, SD=0.89	N=794, M=3.18, SD=1.03	1.53 (1.39 to 1.68)*	1.51 (1.37 to 1.68)*
	Severity of COVID-19 (self)	5-point Likert (1=strongly disagree, 5=strongly agree)	N=1065, M=3.71, SD=1.13	N=748, M=3.93, SD=1.03	1.21 (1.11 to 1.32)*	1.22 (1.11 to 1.34)*
Knowledge	Knowledge	Range 6 to 29	N=1206, M=19.69, SD=3.60	N=800, M=18.66, SD=4.09	0.93 (0.91 to 0.95)*	0.94 (0.92 to 0.97)*
Information	Amount heard	4-point Likert-type (1=have not seen or heard anything, 4=seen or heard a lot)	N=1198, M=3.26, SD=0.74	N=798, M=3.39, SD=0.69	1.28 (1.13 to 1.46)*	1.29 (1.13 to 1.48)*
	Information source – official sources	No	1005 (63.9)	567 (36.1)	Reference	Reference
		Yes	201 (46.3)	233 (53.7)	2.05 (1.66 to 2.55)*	1.79 (1.42 to 2.26)*
	Information source – mainstream media	No	129 (59.2)	89 (40.8)	Reference	Reference
		Yes	1077 (60.2)	711 (39.8)	0.96 (0.72 to 1.27)*	1.15 (0.84 to 1.58)
	Information source – unofficial sources	No	804 (62.7)	479 (37.3)	Reference	Reference
		Yes	402 (55.6)	321 (44.4)	1.34 (1.11 to 1.61)*	1.29 (1.04 to 1.59)*
Advice on protection	No	518 (68.2)	242 (31.8)	Reference	Reference	
	Yes	688 (55.2)	558 (44.8)	1.74 (1.44 to 2.10)*	1.69 (1.39 to 2.06)*	
Recommendations to “Catch it, Bin it, Kill it”	No	612 (67.0)	301 (33.0)	Reference	Reference	
	Yes	594 (54.3)	499 (45.7)	1.71 (1.42 to 2.05)*	1.75 (1.45 to 2.13)*	
Government response	Satisfaction with government response	Range 3 (lowest) to 15 (highest)	N=967, M=10.67, SD=2.40	N=727, M=10.83, SD=2.44	1.03 (0.99 to 1.07)	1.03 (0.99 to 1.07)
	Credibility of government	Range 4 (lowest) to 20 (highest)	N=836, M=12.84, SD=2.45	N=647, M=13.3, SD=2.63	1.08 (1.03 to 1.12)*	1.07 (1.02 to 1.12)*

*p≤.05

Table 4. Table showing associations between completing at least one respiratory and hand hygiene behaviour more than usual and worry, perceived risk, knowledge about COVID-19, information about COVID-19, and evaluation of the Government response.

The perceived effectiveness of each behaviour was associated with adopting four of eight individual respiratory and hand hygiene behaviours (see Appendix B). Perceived self-efficacy was associated with adopting four of eight individual respiratory and hand hygiene behaviours.

Post hoc analyses investigating uptake of recommended behaviours when controlling for worry about COVID-19 did not show meaningful changes in the results for the sociodemographic characteristics.

Reducing the number of people met

13.7% (95% CI 12.2% to 15.2%, n=274/2006) people indicated that they had reduced the number of people they had met in the last seven days. 24.4% (95% CI 22.5% to 26.3%, n=490/2006) had met people as usual; 56.1% (95% CI 53.9% to 58.3%, n=1125/2006) had not reduced the number of people they had met; and 5.8% (95% CI 4.8% to 6.9%, n=117/2006) answered “not applicable.”

Reducing the number of people met in the last seven days was associated with: greater worry; greater perceived risk of COVID-19 (to oneself and people in the UK); greater perceived severity of COVID-19; having seen or heard information from official sources; having seen recommendations to “Catch it, Bin it, Kill it”; poorer knowledge about the COVID-19 outbreak; being from a minoritized ethnic group or area of greater deprivation; being male; having dependent children; not having a family member working for the NHS; and not having a friend working for the NHS (Tables 5 and 6). Age was associated with reducing the number of people met in a non-linear manner, with behaviour declining with increasing age (until approximately 60 years old) and then flattening.

Participant characteristics	Level	Reducing the number of people you met			
		Not changed behaviour n=1732, n (%)	Reduced the number of people you met n=274, n (%)	Odds ratio (95% CI) for reducing the number of people you met	Adjusted odds ratio (95% CI) for reducing the number of people you met
Gender	Male	821 (83.3)	165 (16.7)	Reference	Reference
	Female	902 (89.4)	107 (10.6)	0.59 (0.45 to 0.77)*	0.60 (0.45 to 0.79)*
Age	N, M, SD	N=1732, M=48.64, SD=18.45	N=274, M=44.63, SD=18.61	0.99 (0.98 to 1.00)*	0.95 (0.91 to 1.00)*
Age: quadratic (age-mean) ²	-	-	-	-	2.78 (0.95 to 8.14)
Dependent children	No	1242 (88.0)	170 (12.0)	Reference	Reference
	Yes	490 (82.5)	104 (17.5)	1.55 (1.19 to 2.02)*	1.41 (1.03 to 1.93)*
Chronic illness - self	None	1181 (86.5)	184 (13.5)	Reference	Reference
	Present	525 (86.2)	84 (13.8)	1.03 (0.78 to 1.36)	1.27 (0.93 to 1.74)
Chronic illness – other household member	None	1450 (86.3)	231 (13.7)	Reference	Reference
	Present	256 (87.4)	37 (12.6)	0.91 (0.63 to 1.32)	0.92 (0.62 to 1.36)
Employment status	Not working	793 (88.4)	104 (11.6)	Reference	Reference
	Working	920 (84.5)	169 (15.5)	1.40 (1.08 to 1.82)*	1.22 (0.87 to 1.72)
Work for NHS – self	No	1614 (87.0)	241 (13.0)	Reference	Reference
	Yes	101 (80.2)	25 (19.8)	1.66 (1.05 to 2.62)*	1.07 (0.65 to 1.77)
Work for NHS – members of my family	No	1484 (85.9)	244 (14.1)	Reference	Reference
	Yes	231 (91.3)	22 (8.7)	0.58 (0.37 to 0.92)*	0.55 (0.34 to 0.89)*
Work for NHS – friends	No	1536 (85.7)	256 (14.3)	Reference	Reference
	Yes	179 (94.7)	10 (5.3)	0.34 (0.17 to 0.64)*	0.29 (0.15 to 0.59)*
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	1176 (87.1)	174 (12.9)	Reference	Reference
	Degree or higher (Bachelors, Masters, PhD)	556 (84.8)	100 (15.2)	1.22 (0.93 to 1.59)	1.17 (0.88 to 1.58)
Socioeconomic group (Index of multiple deprivation)	1 st quartile (least deprived)	407 (89.8)	46 (10.2)	Reference	Reference
	2 nd quartile	425 (89.1)	52 (10.9)	1.08 (0.71 to 1.65)	0.95 (0.61 to 1.47)
	3 rd quartile	432 (82.4)	92 (17.6)	1.88 (1.29 to 2.75)*	1.66 (1.12 to 2.47)*
	4 th quartile (most deprived)	468 (84.8)	84 (15.2)	1.59 (1.08 to 2.33)*	1.41 (0.94 to 2.11)
Ethnicity	White	1605 (87.2)	235 (12.8)	Reference	Reference
	Minoritized ethnic groups	115 (76.2)	36 (23.8)	2.14 (1.44 to 3.18)*	1.83 (1.18 to 2.83)*

*p≤.05

Table 5. Associations between reducing the number of people you met and sociodemographic characteristics.

Participant characteristics	Level	Reducing the number of people you met		Odds ratio (95% CI) for reducing the number of people you met	Adjusted odds ratio (95% CI) for reducing the number of people you met	
		Not changed behaviour n=1732, n (%)	Reduced the number of people you met n=274, n (%)			
Worry	Worry	Not at all/not very/somewhat worried	1414 (90.9)	141 (9.1)	Reference	Reference
		Very/extremely worried	306 (70.5)	128 (29.5)	4.19 (3.20 to 5.49)*	3.76 (2.79 to 5.07)*
Perceived risk	To oneself	5-point Likert-type (1=no risk at all, 5=major risk)	N=1685, M=2.35, SD=0.97	N=271, M=2.96, SD=1.14	1.70 (1.51 to 1.92)*	1.65 (1.45 to 1.88)*
	To people in the UK	5-point Likert-type (1=no risk at all, 5=major risk)	N=1696, M=2.86, SD=0.93	N=272, M=3.49, SD=1.05	1.88 (1.65 to 2.14)*	1.83 (1.59 to 2.11)*
	Severity of COVID-19 (self)	5-point Likert (1=strongly disagree, 5=strongly agree)	N=1555, M=3.77, SD=1.11	N=258, M=4.01, SD=0.98	1.24 (1.09 to 1.41)*	1.26 (1.09 to 1.45)*
Knowledge	Knowledge	Range 6 to 29	N=1732, M=19.52, SD=3.71	N=274, M=17.75, SD=4.28	0.89 (0.86 to 0.92)*	0.90 (0.87 to 0.94)*
Information	Amount heard	4-point Likert-type (1=have not seen or heard anything, 4=seen or heard a lot)	N=1723, M=3.31, SD=0.72	N=273, M=3.32, SD=0.74	1.02 (0.85 to 1.22)	1.02 (0.84 to 1.23)
		Information source – official sources	No	1387 (88.2)	185 (11.8)	Reference
	Yes		345 (79.5)	89 (20.5)	1.93 (1.46 to 2.56)*	1.78 (1.31 to 2.44)*
	Information source – mainstream media	No	179 (82.1)	39 (17.9)	Reference	Reference
		Yes	1553 (86.9)	235 (13.1)	0.69 (0.48 to 1.01)	0.83 (0.54 to 1.25)
	Information source – unofficial sources	No	1116 (87.0)	167 (13.0)	Reference	Reference
		Yes	616 (85.2)	107 (14.8)	1.16 (0.89 to 1.51)	0.95 (0.70 to 1.28)
	Advice on protection	No	671 (88.3)	89 (11.7)	Reference	Reference
Yes		1061 (85.2)	185 (14.8)	1.31 (1.00 to 1.72)*	1.29 (0.97 to 1.73)	
Recommendations to “catch it, bin it, kill it”	No	811 (88.8)	102 (11.2)	Reference	Reference	
	Yes	921 (84.3)	172 (15.7)	1.48 (1.14 to 1.93)*	1.47 (1.11 to 1.94)*	
Government response	Satisfaction with government response	Range 3 (lowest) to 15 (highest)	N=1447, M=10.79, SD=2.37	N=247, M=10.41, SD=2.65	0.94 (0.89 to 0.99)*	0.95 (0.89 to 1.00)
	Credibility of government	Range 4 (lowest) to 20 (highest)	N=1250, M=13.00, SD=2.48	N=233, M=13.26, SD=2.87	1.04 (0.99 to 1.10)	1.02 (0.96 to 1.08)
Perceived effectiveness and self-efficacy	Perceived effectiveness	Not effective	912 (94.1)	57 (5.9)	Reference	Reference
		Effective	738 (77.7)	212 (22.3)	4.60 (3.38 to 6.25)*	4.70 (3.38 to 6.55)*
	Perceived self-efficacy	Could not carry out behaviour	735 (92.5)	60 (7.5)	Reference	Reference
		Could carry out behaviour	950 (81.8)	212 (18.2)	2.73 (2.02 to 3.70)*	2.95 (2.13 to 4.08)*

*p≤.05

Table 6. Table showing associations between reducing the number of people you met and worry, perceived risk, knowledge about COVID-19, information about COVID-19 and evaluation of the Government response.

In *post hoc* analyses controlling for worry and sociodemographic characteristics, associations between reducing the number of people met and age; having a dependent child; socioeconomic status; ethnicity; and perceived severity of COVID-19 for oneself were no longer statistically significant.

DISCUSSION

This study provides a snapshot of worry and uptake of protective behaviours in the UK population at the start of the COVID-19 outbreak, when the first UK cases of COVID-19 were confirmed. Our findings suggest that there was moderate public concern about COVID-19, with around 20% of the public reporting high levels of worry before community transmission in the UK was confirmed. Worry increased sharply at the start of the COVID-19 outbreak, with another survey conducted on 27 to 29 February 2020 indicating that 56% were concerned or very concerned about COVID-19.(20)

Worry was associated with being younger, a parent, having a chronic illness yourself or in your household, being employed, working for the NHS, being from a minoritized ethnic group, and living in a more deprived area of the country. Many of these make intuitive sense, being linked to classic risk factors for more severe illness from respiratory diseases. As the pandemic progressed, these groups were identified as those most at risk of severe disease (e.g. people with specific chronic illnesses and from minoritized ethnic groups); disproportionately affected by restrictions put in place to prevent the spread of infection (e.g. younger people, those living in more deprivation and those with dependent children); and at greater risk of infection (e.g. higher rates of infection in frontline healthcare workers than in the general population).(21-23) Research carried out at the start of the COVID-19 outbreak in Croatia also found that people with a dependent child and those with a chronic health condition had more COVID-19 concerns.(24) Unexpectedly, NHS workers had lower knowledge about the outbreak which may have contributed to their higher levels of worry. We are not clear why family members of NHS workers were less worried, but speculate this may be linked to greater access to informal medical advice about their personal risk from COVID-19 or to greater perceived access to healthcare services.

Respiratory and hand hygiene behaviours reduce the spread of acute respiratory infections.(25) Forty percent of participants reported having completed at least one respiratory or hand hygiene behaviour more than usual. Rates of uptake were similar to those reported in the early stages of the H1N1 pandemic (38%).(8) By the end of February 2020, uptake of protective behaviours had increased, with 62% reported washing their hands with soap and water as a precaution from COVID-19.(20) Reducing physical contact with others also prevents the spread of viral illnesses.(26, 27) Approximately 14% of participants had reduced the number of people they had met in the last seven days, even though it was not yet part of official guidance. One explanation for this may be that people were emulating restrictions imposed in other countries.(5) It is likely that in future outbreaks of respiratory viruses, people may spontaneously adopt respiratory, hand hygiene and physical distancing behaviours.

As in previous outbreaks, and in line with other research carried out at the start of the COVID-19 pandemic, worry and perceived risk were associated with adopting protective behaviours.(8, 28) Theoretically-driven factors including greater perceived effectiveness of, and self-efficacy for, the behaviour were also associated with uptake.(11, 28-30) Preparedness plans for future outbreaks should include a communications campaign that can be readily deployed when a novel respiratory virus emerges that emphasises the effectiveness of protective behaviours and the ease with which behaviours can be completed. Deliberate attempts to increase worry or risk perception to promote uptake of protective behaviours may have unintended negative consequences and should be considered only where levels of risk perception appear disproportionately low and if accompanied by messages emphasising the efficacy of protective behaviours.(31)

Our results suggest that the “Catch it, Bin it, Kill it” campaign had some success at the start of the COVID-19 outbreak in the UK. Having heard more about COVID-19 was also associated with adopting a protective behaviour. For respiratory and hand hygiene behaviours, receipt of information from almost any source produced this effect, suggesting that widespread dissemination of information about COVID-19 had a positive effect on behaviour. For reducing the number of people met, only having heard information from official sources was associated with adopting this behaviour. Another study, conducted at the start of the COVID-19 outbreak in Italy, found that media exposure was positively correlated with uptake of protective behaviours.(32) Taken together, results suggest that people who had

heard more about the outbreak and who received their information from credible, official sources were more likely to adopt protective behaviours.

Having completed at least one respiratory or hand hygiene behaviour more than usual was associated with being younger, having a dependent child in your household, and working for the NHS. These associations remained even when adjusting for worry. Parents were also more likely to adopt protective behaviours in another study carried out in Croatia at the start of the COVID-19 outbreak; this study found no evidence for an age effect.(24) For NHS workers and parents, increased uptake of recommended behaviours may have reflected a greater familiarity with, and habitual use of, hygiene behaviours. However, NHS workers were less likely to report having reduced the number of people they had met, as were females. This may have been due to greater occupational contact with people and caring responsibilities in these groups respectively.

Several limitations should be considered for this study. First, behavioural outcomes were self-reported. Social desirability and recall bias may have inflated reported rates of uptake of protective behaviours. However, research suggests that there is no association between social desirability and self-report of health behaviours in online samples.(33) Whether participants understood the description of the behaviour (e.g. “thorough handwashing”) in the way that we intended is also unclear. Second, while the use of an online market research panel is helpful in ensuring data are collected quickly, people who actively sign up for such panels may not be representative of the general public in terms of, for example, the amount of time they spend online and hence the likelihood of them encountering online public health campaigns. Third, the cross-sectional nature of the data makes it impossible to imply direction of causality. Fourth, given the large number of statistical tests conducted, Type 1 errors may be apparent.

CONCLUSION

Relative to the early stage of the outbreak, worry and adoption of protective behaviours was high, with a substantial minority reducing the number of people met before it became part of official guidance. Uptake of protective behaviours was associated with greater worry, risk perceptions, perceived effectiveness of, and self-efficacy for behaviours, and information receipt. Preparedness plans should include designing official communications encouraging the uptake of respiratory, hand hygiene and distancing behaviours for use in novel infectious disease outbreaks. Communications should emphasise the effectiveness of these behaviours

at preventing the spread of illness and ease with which they can be adopted. Whether worry and uptake of protective behaviours in future novel infectious disease outbreaks will start low or follow the pattern of their predecessor will only be uncovered with time.

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Appendix A. Questionnaire materials and top-line results

- Questions 1, 2, 3a-c were asked in all survey waves
- Questions 3d-g, 4 to 9 were only asked in survey wave 3

Questionnaire

The following questions are about the current coronavirus outbreak.

1) Overall, how worried are you about coronavirus?

	Wave 1, n (%)	Wave 2, n (%)	Wave 3, n (%)
Extremely worried	167 (8.6)	120 (6.1)	178 (8.9)
Very worried	226 (11.6)	244 (12.3)	256 (12.9)
Somewhat worried	707 (36.3)	677 (34.1)	731 (36.8)
Not very worried	617 (31.6)	676 (34.1)	607 (30.5)
Not at all worried	233 (11.9)	266 (13.4)	217 (10.9)

Wave 1 base, n=1950 (excluding 66 “don’t know”); Wave 2 base, n=1983 (excluding 19 “don’t know”); Wave 3 base, n=1989 (excluding 17 “don’t know”)

2) To what extent do you think coronavirus poses a risk to:

a. People in the UK?

	Wave 1, n (%)	Wave 2, n (%)	Wave 3, n (%)
Major risk	125 (6.5)	101 (5.2)	163 (8.3)
Significant risk	279 (14.5)	252 (12.9)	353 (17.9)
Moderate risk	657 (34.2)	703 (35.9)	711 (36.1)
Minor risk	804 (41.9)	841 (43.0)	702 (35.7)
No risk at all	55 (2.9)	61 (3.1)	39 (2.0)

Wave 1 base, n=1920 (excluding 96 “don’t know”); Wave 2 base, n=1945 (excluding 57 “don’t know”); Wave 3 base, n=1968 (excluding 38 “don’t know”)

b. To you personally?

	Wave 1, n (%)	Wave 2, n (%)	Wave 3, n (%)
Major risk	85 (4.4)	57 (2.9)	102 (5.2)
Significant risk	127 (6.6)	159 (8.2)	191 (9.8)
Moderate risk	337 (17.6)	383 (19.7)	446 (22.8)
Minor risk	966 (50.4)	974 (50.1)	939 (48.0)
No risk at all	392 (20.4)	372 (19.1)	278 (14.2)

Wave 1 base, n=1917 (excluding 99 “don’t know”); Wave 2 base, n=1958 (excluding 44 “don’t know”); Wave 3 base, n=1956 (excluding 50 “don’t know”)

3) To what extent do you agree or disagree with the following statements:

- ##### a. The Government is putting the right measures in place to protect the British public from coronavirus

	Wave 1, n (%)	Wave 2, n (%)	Wave 3, n (%)
Strongly agree	167 (10.0)	240 (13.8)	254 (14.4)

Agree	707 (42.4)	876 (50.2)	889 (50.5)
Neither agree nor disagree	420 (25.1)	374 (21.4)	374 (21.3)
Disagree	241 (14.4)	184 (10.5)	180 (10.2)
Strongly disagree	91 (5.4)	71 (4.1)	62 (3.5)

Wave 1 base, n=1676 (excluding 340 “don’t know”); Wave 2 base, n=1745 (excluding 257 “don’t know”); Wave 3 base, n=1759 (excluding 247 “don’t know”)

b. I feel that I am getting the information I need from the Government and other public authorities on coronavirus

	Wave 1, n (%)	Wave 2, n (%)	Wave 3, n (%)
Strongly agree	141 (7.6)	205 (11.0)	182 (9.7)
Agree	642 (34.4)	793 (42.4)	863 (46.1)
Neither agree nor disagree	461 (24.7)	428 (22.9)	408 (21.8)
Disagree	446 (23.9)	314 (16.8)	307 (16.4)
Strongly disagree	175 (9.4)	131 (7.0)	112 (6.0)

Wave 1 base, n= 1865 (excluding 151 “don’t know”); Wave 2 base, n=1871 (excluding 131 “don’t know”); Wave 3 base, n=1872 (excluding 134 “don’t know”)

c. I know what I need to do to limit my risk of contracting coronavirus

	Wave 1, n (%)	Wave 2, n (%)	Wave 3, n (%)
Strongly agree	227 (12.1)	284 (15.1)	319 (16.7)
Agree	751 (40.1)	892 (47.3)	971 (51.0)
Neither agree nor disagree	364 (19.5)	347 (18.4)	321 (16.9)
Disagree	363 (19.4)	267 (14.2)	209 (11.0)
Strongly disagree	166 (8.9)	94 (5.0)	85 (4.5)

Wave 1 base, n=1871 (excluding 145 “don’t know”); Wave 2 base, n=1884 (excluding 118 “don’t know”); Wave 3 base, n=1905 (excluding 101 “don’t know”)

d. Information from the Government about coronavirus can be trusted

	Wave 3, n (%)
Strongly agree	200 (11.2)
Agree	868 (48.5)
Neither agree nor disagree	467 (26.1)
Disagree	190 (10.6)
Strongly disagree	66 (3.7)

Wave 3 base, n=1791 (excluding 215 “don’t know”)

e. Information for the Government about coronavirus is accurate

	Wave 3, n (%)
Strongly agree	157 (9.5)
Agree	770 (46.8)
Neither agree nor disagree	492 (29.9)
Disagree	180 (10.9)
Strongly disagree	47 (2.9)

Wave 3 base, n=1646 (excluding 360 “don’t know”)

f. Information from the Government about coronavirus tells the whole story

	Wave 3, n (%)
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Strongly agree	125 (7.3)
Agree	500 (29.2)
Neither agree nor disagree	521 (30.5)
Disagree	441 (25.8)
Strongly disagree	123 (7.2)

Wave 3 base, n=1710 (excluding 296 “don’t know”)

g. Information from the Government about coronavirus is biased or one-sided

	Wave 3, n (%)
Strongly agree	103 (6.1)
Agree	361 (21.2)
Neither agree nor disagree	583 (34.3)
Disagree	501 (29.5)
Strongly disagree	152 (8.9)

Wave 3 base, n=1700 (excluding 306 “don’t know”)

4) a) How much have you seen or heard about coronavirus in the past 7 days?

	Wave 3, n (%)
I have seen or heard a lot	914 (45.8)
I have seen or heard a fair amount	817 (40.9)
I have seen or heard a little	242 (12.1)
I have not seen or heard anything	23 (1.2)

Wave 3 base, n=1996 (excluding 10 “don’t know”)

4) b) Please tell us for the following options, if you have seen or heard this in the last 7 days...

a. Advice on how to protect yourself and others from coronavirus

	Wave 3, n (%)
Yes, I have seen or heard this	1246 (62.1)
No, I haven’t seen or heard this	760 (37.9)

b. Recommendations to “catch it, bin it, kill it”

	Wave 3, n (%)
Yes, I have seen or heard this	1093 (54.5)
No, I haven’t seen or heard this	913 (45.5)

5) What three places have you received most of your information about coronavirus from in the past seven days?

	Wave 3, n (%)	Grouping
Official helplines (e.g. NHS 111)	31 (1.5)	Official
An NHS website (e.g. NHS.UK)	172 (8.6)	Official
GOV.UK or another Government website	122 (6.1)	Official

National TV news	1216 (60.6)	Mainstream media
Regional TV news	512 (25.5)	Mainstream media
National newspapers (in print)	353 (17.6)	Mainstream media
Regional or local newspapers (in print)	104 (5.2)	Mainstream media
Online news websites (e.g. Guardian, Daily Mail)	493 (24.6)	Mainstream media
Social media sites (e.g. Facebook, Twitter, Instagram)	461 (23.0)	Social media
Search engines (e.g. Google)	201 (10.0)	Social media
National radio	379 (18.9)	Mainstream media
Local radio	192 (9.6)	Mainstream media
Friends/relatives	241 (12.0)	Social media
An NHS GP practice, clinic or hospital	145 (7.2)	Official
Leaflets	26 (1.3)	Official
Posters	48 (2.4)	Official
Other [open end]	82 (4.1)	

(Answer was multi-code, so percentages add to more than 100%, base for all =2006)

6) For each of the following statements, please tell us to what extent, if at all, you agree or disagree:

a. I could catch coronavirus from animals [false]

	Wave 3, n (%)
Strongly agree	154 (10.6)
Agree	403 (27.8)
Neither agree nor disagree	287 (19.8)
Disagree	391 (27.0)
Strongly disagree	214 (14.8)

Wave 3 base, n=1449 (excluding 557 “don’t know”)

b. I could catch coronavirus from packages or products ordered from China [false]

	Wave 3, n (%)
Strongly agree	117 (7.6)
Agree	292 (19.1)
Neither agree nor disagree	293 (19.1)
Disagree	499 (32.6)
Strongly disagree	330 (21.6)

Wave 3 base, n=1531 (excluding 475 “don’t know”)

c. I could catch coronavirus from someone else who has it, even if they do not have any symptoms yet [true]

	Wave 3, n (%)
Strongly agree	809 (44.0)
Agree	842 (45.8)
Neither agree nor disagree	137 (7.4)
Disagree	35 (1.9)
Strongly disagree	17 (0.9)

Wave 3 base, n=1840 (excluding 166 “don’t know”)

d. Coronavirus would be a serious illness for me

	Wave 3, n (%)
Strongly agree	558 (30.8)
Agree	670 (37.0)
Neither agree nor disagree	309 (17.0)
Disagree	220 (12.1)
Strongly disagree	56 (3.1)

Wave 3 base, n=1813 (excluding 193 “don’t know”)

e. It is likely that I have some natural immunity to coronavirus [false]

	Wave 3, n (%)
Strongly agree	77 (5.1)
Agree	270 (18.0)
Neither agree nor disagree	445 (29.7)
Disagree	416 (27.8)
Strongly disagree	290 (19.4)

Wave 3 base, n=1498 (excluding 508 “don’t know”)

f. There is a vaccine available to protect against coronavirus [false]

	Wave 3, n (%)
Strongly agree	64 (4.1)
Agree	117 (7.4)
Neither agree nor disagree	200 (12.7)
Disagree	538 (34.2)
Strongly disagree	652 (41.5)

Wave 3 base, n=1571 (excluding 435 “don’t know”)

g. Antibiotics are an effective treatment for coronavirus [false]

	Wave 3, n (%)
Strongly agree	77 (5.3)
Agree	211 (14.6)
Neither agree nor disagree	296 (20.5)
Disagree	420 (29.1)
Strongly disagree	440 (30.5)

Wave 3 base, n=1444 (excluding 562 “don’t know”)

- h. It is currently unsafe to come into contact with someone who has been to Wuhan in China in the past 14 days, regardless of whether they seem ill or well [true]

	Wave 3, n (%)
Strongly agree	890 (47.4)
Agree	706 (37.6)
Neither agree nor disagree	177 (9.4)
Disagree	74 (3.9)
Strongly disagree	30 (1.6)

Wave 3 base, n=1877 (excluding 129 “don’t know”)

7) In the past seven days have you...

- a. Washed your hands thoroughly and regularly with soap and water

	Wave 3, n (%)
Done this, same amount as usual	1362 (67.9)
Done this, more than usual	465 (23.2)
Not done this	147 (7.3)
Not applicable	32 (1.6)

- b. Carried tissues with you when out and about

	Wave 3, n (%)
Done this, same amount as usual	1152 (57.4)
Done this, more than usual	300 (15.0)
Not done this	496 (24.7)
Not applicable	58 (2.9)

- c. Used tissues when sneezing or coughing

	Wave 3, n (%)
Done this, same amount as usual	1252 (62.4)
Done this, more than usual	301 (15.0)
Not done this	305 (15.2)
Not applicable	148 (7.4)

- d. *If yes to previous question:* Put tissues in the bin after use

	Wave 3, n (%)
Done this, same amount as usual	1202 (77.4)
Done this, more than usual	269 (17.3)
Not done this	66 (4.2)
Not applicable	16 (1.0)

Base, n=1553 (excluding 453 not asked)

- e. Limited the amount you touch your eyes, nose or mouth

	Wave 3, n (%)
Done this, same amount as usual	736 (36.7)
Done this, more than usual	323 (16.1)

Not done this	893 (44.5)
Not applicable	54 (2.7)

f. Cleaned or disinfected surfaces you might touch (such as door knobs or hard surfaces)

	Wave 3, n (%)
Done this, same amount as usual	845 (42.1)
Done this, more than usual	312 (15.6)
Not done this	799 (39.8)
Not applicable	50 (2.5)

g. Carried sanitising hand gel with you when out and about

	Wave 3, n (%)
Done this, same amount as usual	613 (30.6)
Done this, more than usual	280 (14.0)
Not done this	1033 (51.5)
Not applicable	80 (4.0)

h. Used sanitising hand gel to clean your hands

	Wave 3, n (%)
Done this, same amount as usual	814 (40.6)
Done this, more than usual	377 (18.8)
Not done this	751 (37.4)
Not applicable	64 (3.2)

i. Reduced the number of people you meet

	Wave 3, n (%)
Done this, same amount as usual	490 (24.4)
Done this, more than usual	274 (13.7)
Not done this	1125 (56.1)
Not applicable	117 (5.8)

8) For each of the following statements, please tell us to what extent, if at all, you agree or disagree:

An effective way to prevent the spread of coronavirus is to...

a. Reduce the number of people you meet

	Wave 3, n (%)
Strongly agree	289 (15.1)
Agree	661 (34.4)
Neither agree nor disagree	613 (31.9)
Disagree	301 (15.7)
Strongly disagree	55 (2.9)

Wave 3 base, n=1919 (excluding 87 “don’t know”)

- b. Clean or disinfect surfaces that you might touch (such as door knobs or hard surfaces)

	Wave 3, n (%)
Strongly agree	543 (28.0)
Agree	936 (48.3)
Neither agree nor disagree	363 (18.7)
Disagree	81 (4.2)
Strongly disagree	15 (0.8)

Wave 3 base, n=1938 (excluding 68 “don’t know”)

- c. Wash your hands thoroughly and regularly with soap and water

	Wave 3, n (%)
Strongly agree	973 (49.5)
Agree	837 (42.6)
Neither agree nor disagree	119 (6.1)
Disagree	31 (1.6)
Strongly disagree	5 (0.3)

Wave 3 base, n=1965 (excluding 41 “don’t know”)

- d. Use sanitising hand gel to clean your hands

	Wave 3, n (%)
Strongly agree	599 (30.9)
Agree	998 (51.4)
Neither agree nor disagree	258 (13.3)
Disagree	73 (3.8)
Strongly disagree	12 (0.6)

Wave 3 base, n=1940 (excluding 66 “don’t know”)

- e. Cough or sneeze into tissues, instead of your hands

	Wave 3, n (%)
Strongly agree	924 (47.0)
Agree	844 (43.0)
Neither agree nor disagree	143 (7.3)
Disagree	43 (2.2)
Strongly disagree	11 (0.6)

Wave 3 base, n=1965 (excluding 41 “don’t know”)

- f. Put tissues in the bin after you have used them

	Wave 3, n (%)
Strongly agree	894 (45.8)
Agree	867 (44.4)
Neither agree nor disagree	133 (6.8)
Disagree	47 (2.4)
Strongly disagree	13 (0.7)

Wave 3 base, n=1954 (excluding 52 “don’t know”)

g. Limit the amount you touch your eyes, nose or mouth

	Wave 3, n (%)
Strongly agree	473 (24.9)
Agree	850 (44.7)
Neither agree nor disagree	434 (22.8)
Disagree	123 (6.5)
Strongly disagree	20 (1.1)

Wave 3 base, n=1900 (excluding 106 “don’t know”)

h. Keep away from crowded places generally

	Wave 3, n (%)
Strongly agree	378 (19.5)
Agree	890 (46.0)
Neither agree nor disagree	435 (22.5)
Disagree	190 (9.8)
Strongly disagree	43 (2.2)

Wave 3 base, n=1936 (excluding 70 “don’t know”)

9) For the following statements, please tell us to what extent, if at all, you agree or disagree:

How confident are you that, if you wanted to, you could...

a. Reduce the number of people you meet

	Wave 3, n (%)
Strongly agree	429 (21.9)
Agree	733 (37.5)
Neither agree nor disagree	434 (22.2)
Disagree	306 (15.6)
Strongly disagree	55 (2.8)

Wave 3 base, n=1957 (excluding 49 “don’t know”)

b. Keep surfaces that you might touch clean or disinfected

	Wave 3, n (%)
Strongly agree	714 (36.1)
Agree	942 (47.7)
Neither agree nor disagree	221 (11.2)
Disagree	86 (4.4)
Strongly disagree	13 (0.7)

Wave 3 base, n=1976 (excluding 30 “don’t know”)

c. Wash your hands thoroughly and regularly with soap and water

	Wave 3, n (%)
Strongly agree	1063 (53.5)
Agree	786 (39.6)

Neither agree nor disagree	110 (5.5)
Disagree	18 (0.9)
Strongly disagree	9 (0.5)

Wave 3 base, n=1986 (excluding 20 “don’t know”)

d. Carry sanitising hand gel with you when out and about

	Wave 3, n (%)
Strongly agree	765 (38.9)
Agree	815 (41.1)
Neither agree nor disagree	264 (13.4)
Disagree	102 (5.2)
Strongly disagree	23 (1.2)

Wave 3 base, n=1969 (excluding 37 “don’t know”)

e. Use hand sanitising gel to clean your hands

	Wave 3, n (%)
Strongly agree	810 (41.0)
Agree	892 (45.2)
Neither agree nor disagree	202 (10.2)
Disagree	56 (2.8)
Strongly disagree	14 (0.7)

Wave 3 base, n=1974 (excluding 32 “don’t know”)

f. Carry tissues with you when out and about

	Wave 3, n (%)
Strongly agree	991 (50.2)
Agree	799 (40.4)
Neither agree nor disagree	146 (7.4)
Disagree	30 (1.5)
Strongly disagree	10 (0.5)

Wave 3 base, n=1976 (excluding 30 “don’t know”)

g. Put tissues in the bin after you have used them

	Wave 3, n (%)
Strongly agree	1093 (55.4)
Agree	736 (37.3)
Neither agree nor disagree	109 (5.5)
Disagree	24 (1.2)
Strongly disagree	10 (0.5)

Wave 3 base, n=1972 (excluding 34 “don’t know”)

h. Limit the amount you touch your eyes, nose or mouth

	Wave 3, n (%)
Strongly agree	627 (32.0)
Agree	867 (44.3)

Neither agree nor disagree	322 (16.4)
Disagree	130 (6.6)
<u>Strongly disagree</u>	<u>13 (0.7)</u>
Wave 3 base, n=1959 (excluding 47 “don’t know”)	

Appendix B. Perceived effectiveness of, and self-efficacy for, behaviours

<i>Perceived effectiveness of behaviour</i>			
An effective way to prevent the spread of coronavirus is to...	Not effective, n (valid %)	Effective, n (valid %)	Missing, n (total valid)
Clean or disinfect surfaces that you might touch (such as door knobs or hard surfaces)	459 (23.7)	1479 (76.3)	68 (1938)
Wash your hands thoroughly and regularly with soap and water	155 (7.9)	1810 (92.1)	41 (1965)
Use sanitising hand gel to clean your hands	343 (17.7)	1597 (82.3)	66 (1940)
Cough or sneeze into tissues, instead of your hands	197 (10.0)	1768 (90.0)	41 (1965)
Put tissues in the bin after you have used them	193 (9.9)	1761 (90.1)	52 (1954)
Limit the amount you touch your eyes, nose or mouth	577 (30.4)	1323 (69.6)	106 (1900)
Keep away from crowded places generally	668 (34.5)	1268 (65.5)	70 (1936)
<i>Self-efficacy for a behaviour</i>			
How confident are you that, if you wanted to, you could...	Could not carry out behaviour, n (valid %)	Could carry out behaviour, n (valid %)	Missing, n (total valid)
Keep surfaces that you might touch clean or disinfected	320 (16.2)	1656 (83.8)	30 (2006)
Wash your hands thoroughly and regularly with soap and water	137 (6.9)	1849 (93.1)	20 (1986)
Carry sanitising hand gel with you when out and about	389 (19.8)	1580 (80.2)	37 (1969)
Use hand sanitising gel to clean your hands	272 (13.8)	1702 (86.2)	32 (1974)
Carry tissues with you when out and about	186 (9.4)	1790 (90.6)	30 (1976)
Put tissues in the bin after you have used them	143 (7.3)	1829 (92.7)	34 (1972)
Limit the amount you touch your eyes, nose or mouth	465 (23.7)	1494 (76.3)	47 (1959)

Table A.1. Table showing frequencies of people stating that individual respiratory and hand hygiene behaviours were effective at preventing the spread of COVID-19, or that they could carry out the behaviour if they wanted.

Relevant behaviour (In the past seven days have you...)	An effective way to prevent the spread of coronavirus is to...	OR (95%) for completing relevant behaviour more than usual	aOR (95% CI) for completing relevant behaviour more than usual †
Limited the amount you touch your eyes, nose or mouth	Limit the amount you touch your eyes, nose or mouth	3.12 (2.23 to 4.36)*	3.22 (2.27 to 4.57)*
Used sanitising hand gel to clean your hands	Use sanitising hand gel to clean your hands	2.53 (1.73 to 3.70)*	2.78 (1.85 to 4.17)*
Cleaned or disinfected surfaces you might touch (such as door knobs or hard surfaces)	Clean or disinfect surfaces that you might touch (such as door knobs or hard surfaces)	2.58 (1.80 to 3.70)*	2.64 (1.81 to 3.87)*
Put tissues in the bin after use	Put tissues in the bin after you have used them	1.61 (0.97 to 2.66)	1.84 (1.09 to 3.12)*
Carried sanitising hand gel with you when out and about	Use sanitising hand gel to clean your hands	1.52 (1.05 to 2.21)*	1.43 (0.97 to 2.12)
Used tissues when sneezing or coughing	Cough or sneeze into tissues, instead of your hands	1.14 (0.75 to 1.75)	1.36 (0.86 to 2.15)
Washed your hands thoroughly and regularly with soap and water	Wash your hands thoroughly and regularly with soap and water	1.14 (0.76 to 1.70)	1.29 (0.84 to 1.97)
Carried tissues with you when out and about	Cough or sneeze into tissues, instead of your hands	0.88 (0.59 to 1.30)	1.06 (0.69 to 1.62)

† Adjusting for all sociodemographic characteristics

Table A.2. Table showing associations between perceived effectiveness of individual respiratory and hand hygiene behaviours and uptake of individual behaviours

Behaviour	How confident are you that, if you wanted to, you could...	OR (95%) for completing relevant behaviour more than usual	aOR (95% CI) for completing relevant behaviour more than usual†
Limited the amount you touch your eyes, nose or mouth	Limit the amount you touch your eyes, nose or mouth	2.69 (1.88 to 3.86)*	2.83 (1.94 to 4.13)*
Used sanitising hand gel to clean your hands	Use hand sanitising gel to clean your hands	2.44 (1.60 to 3.72)*	2.69 (1.71 to 4.23)*
Cleaned or disinfected surfaces you might touch (such as door knobs or hard surfaces)	Keep surfaces that you might touch clean or disinfected	1.52 (1.05 to 2.19)*	1.69 (1.14 to 2.51)*
Carried sanitising hand gel with you when out and about	Carry sanitising hand gel with you when out and about	1.65 (1.15 to 2.38)*	1.51 (1.03 to 2.22)*
Carried tissues with you when out and about	Carry tissues with you when out and about	1.05 (0.68 to 1.61)	1.26 (0.79 to 2.01)
Put tissues in the bin after use	Put tissues in the bin after you have used them	0.96 (0.59 to 1.58)	1.14 (0.67 to 1.91)
Used tissues when sneezing or coughing	Carry tissues with you when out and about	0.85 (0.57 to 1.27)	1.01 (0.66 to 1.56)
Washed your hands thoroughly and regularly with soap and water	Wash your hands thoroughly and regularly with soap and water	0.64 (0.44 to 0.94)*	0.77 (0.51 to 1.15)

† Adjusting for all sociodemographic characteristics

Table A.3. Table showing associations between self-efficacy for individual respiratory and hand hygiene behaviours and uptake of individual behaviours