Tiered restrictions for COVID-19 in England: knowledge, motivation to adhere and self-reported behaviour (the COVID-19 Rapid Survey of Adherence to Interventions and Responses [CORSAIR] study)

Tiers: knowledge, motivation, behaviour

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Data availability statement:

The data are owned by the UK's Department of Health and Social Care, so no additional data are available from the authors.

Conflict of interest:

All authors had financial support from NIHR for the submitted work. RA is an employee of Public Health England; HWWP receives additional salary support from Public Health England and NHS England; HWWP receives consultancy fees to his employer from Ipsos MORI and has a PhD student who works at and has fees paid by Astra Zeneca; NTF is a participant of an independent group advising NHS Digital on the release of patient data. All authors are participants of the UK's Scientific Advisory Group for Emergencies or its subgroups. There are no other financial relationships with any organisations that might have an interest in the submitted work in the previous three years and no other relationships or activities that could appear to have influenced the submitted work.

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Abstract:

Objectives: To test whether public knowledge and confidence in one's understanding of the local restrictions, motivation to adhere, and self-reported behaviour differed according to tier level.

Design: Cross-sectional nationally representative online survey of 1728 participants living in England (data collection: 26 to 28 October 2020).

Methods: We conducted logistic regression analyses to investigate whether knowledge of restrictions, confidence in knowledge of restrictions, motivation to adhere to restrictions, and self-reported behaviour were associated with personal characteristics and tier.

Results: Between 81% (tier 2) and 89% (tier 3) of participants correctly identified which tier they lived in. Knowledge of specific restrictions was variable. 73% were confident they understood which tier was in place in their local area, while 71% were confident they understood the guidance in their local area. Confidence was associated with being older and living in a less deprived area. 73% were motivated to adhere to restrictions imposed for their local area. Motivation was associated with being female and older. People living in tiers with greater restrictions were less likely to report going out to meet people from another household; reported rates of going out for exercise and for work did not differ.

Conclusions: While recognition of local tier level was high, knowledge of specific guidance for tiers was variable. There was some indication that nuanced guidance (e.g. behaviour allowed in some settings but not others) was more poorly understood than guidance which was absolute (i.e. behaviour is either allowed or not allowed).

Keywords:

COVID-19; adherence; restrictions; guidance; physical distancing; social distancing

Introduction

The first COVID-19 pandemic restrictions in England were nationwide. As the pandemic progressed, different infection rates in areas across the country led to a more localised approach being applied. For example, the city of Leicester continued to follow more stringent restrictions when those in the rest of the country were eased on 4 July 2020.(1, 2) Over time, additional restrictions were imposed and eased in other areas.(3) This led to a complicated patchwork of restrictions throughout England. On 14 October 2020, a three tiered system was introduced in an attempt to simplify local restrictions for COVID-19.(4) English areas were assigned to tiers by the UK Government based on transmission levels, rates of increase of infection, age distributions, and the capacity of local healthcare services. The main restrictions that were in place in each tier are shown in Table 1. In response to growing infection rates, a second period of national lockdown was imposed from 5 November to 2 December 2020,(5) before reverting to a slightly stricter three tier system.(6)

Table 1. Main restrictions in place in each tier from October to November 2020 in England.

Tier 1	Tier 2	Tier 3
Up to six people could meet indoors, outdoors in private gardens, and outdoors in public spaces	Up to six people could meet outdoors in private gardens and outdoors in public spaces	Up to six people could meet outdoors in public spaces
	No household mixing indoors	No household mixing indoors
Hospitality venues remained open, but the majority had to close between 10pm and 5am	Hospitality venues remained open, but the majority had to close between 10pm and 5am	Hospitality venues such as pubs and bars had to close, unless they operated as a restaurant, serving "substantial meals". Closures between 10pm and 5am remained in place
		Travelling to areas in other tiers discouraged

Knowledge of the restrictions in place to prevent the spread of COVID-19 has been sub-optimal throughout the pandemic.(7) People have found guidance about social distancing and self-isolation confusing,(8) with frequent changes to the guidance contributing to this.(9, 10)

Throughout the pandemic, the use of clear and specific guidance has been emphasised to promote adherence to restrictions.(11) As clarity in the guidance around tiers appears to increase as restrictions tighten, it is plausible that understanding of the guidance, and adherence to them, and potentially motivation,(12) is higher in tiers with more stringent restrictions.

Regional restrictions have also been used in other countries, for example, using colour coded zones (e.g. red, orange, yellow zones) in Italy, France and the Quebec province in Canada, or tiered local alert levels, such as in New Zealand.(13) At the time of writing, tiers are still being used in Scotland. While the influence of tiered restrictions on infection rates has been investigated,(14-16) there is limited information available on how well members of the public understand and adhere to tiered levels of restrictions.

The aim of this study was to investigate people's knowledge of and confidence in understanding restrictions in place in their local area, motivation to adhere to restrictions and self-reported behaviour under the tier system implemented in October 2020, and whether there were differences by tier.

Methods

Design

Throughout the COVID-19 pandemic, BMG Research has been conducting series of cross-sectional nationally representative surveys for the Department of Health and Social Care, England. We analysed these data as part of the CORSAIR study (the COVID-19 Rapid Survey of Adherence to Interventions and Responses study). For this paper, we used data collected on 26 to 28 October 2020 (wave 31) as it gave insight into participants' knowledge and self-reported behaviour while the tier system was in place in October to November 2020. Additional details are described in Smith et al., 2021.(17)

Participants

Participants were eligible for the survey if they were aged 16 years or over and living in the UK. Of 2043 participants who completed wave 31, 1728 lived in England. Participants were recruited from two specialist research panel providers (Respondi, n=50,000; Savanta, n=31,500). Quota sampling (based on age and gender combined) was used to ensure the sample was broadly representative of the population. Participants were reimbursed for having completed the survey in points, which could be redeemed as cash, gift vouchers or charitable donations (up to 70p per survey).

Measures

We asked participants which COVID-19 'local alert level' they thought applied to where they lived. Response options were "Tier 1 (medium)," "Tier 2 (high)," "Tier 3 (very high)," and "don't know". We recoded participants as knowing their COVID-19 level if they correctly identified which tier their local area was in. For this variable, we coded answers of "don't know" as incorrect. We used a four-point scale to measure participants' confidence in their

understanding of the tier that applied to where they lived (recoded to a binary variable: "not at all confident" and "not very confident" versus "fairly confident" and "very confident").

To investigate knowledge of individual guidance in one's local area, we asked participants a series of statements about the guidance on socialising "where [you] live". These statements covered meeting in groups outdoors in public spaces, in private gardens and indoors; meeting with members of your 'support' or 'childcare' bubbles[1] outdoors and indoors; staying overnight in someone else's home; travelling to other parts of the UK for leisure; sharing a car with someone not in your household; and taking part in group worship. Possible answers were "true," "false," and "don't know." We also asked participants how confident they were that they understood the guidance currently in place in their local area (recoded to a binary variable using groupings described above).

Participants were asked how motivated they were to adhere to restrictions put in place by the Government in their local area on a four-point scale (recoded to a binary variable: "not at all" and "slightly" versus "quite a bit" and "strongly").

We asked participants how many times in the last seven days they had left their home for different reasons, including for exercise; spending time outdoors for recreational purposes; work; and meeting up with friends and/or family that they did not live with. We grouped going out for a walk or some exercise and spending time outdoors for recreational purposes into a single variable. We recoded these variables to indicate whether participants reported going out for that reason at least once in the last week.

[1] Support and childcare bubbles were introduced to provide social support to people who live alone and to allow informal childcare for people who have children. Guidance about support bubbles can be found here: https://www.gov.uk/guidance/making-a-support-bubble-with-another-household. Guidance about childcare bubbles can be found here: https://www.gov.uk/guidance/making-a-childcare-bubble-with-another-household.

Personal characteristics

Participants were asked their age, gender, whether there was a dependent child in the household, their employment status, socio-economic grade, highest educational or professional qualification, ethnicity, and how many people lived in their household.

Participants had to provide their full postcode, from which we assigned their region, index of multiple deprivation and whether they were categorised as living in a tier 1, 2, or 3 area at the time of data collection.

Ethics

This work was conducted as a service evaluation of the Department of Health and Social Care's public communications campaign and, following advice from the University Research Ethics Subcommittee, was exempt from ethical approval.

Analysis

Logistic regression analyses were undertaken to investigate whether personal characteristics and tier level were associated with: knowledge of which tier you live in; confidence in understanding your local tier; confidence in guidance in place in your local area; motivation to adhere to restrictions in your local area; and self-reported outings (separate analyses for outings for exercise or recreation outside, going to work, and meeting up with friends or family from another household). We restricted analyses of people going out to work to those who reported working (n=868). For each set of analyses, we ran univariable analyses and multivariable analyses (controlling for region, gender, age [raw and quadratic], presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone). We controlled for these variables based on theoretical grounds and the results of previous analyses on this data set.(17-19)

We assumed that people might be most likely to understand a rule if it directly related to activities that they personally engaged in. We therefore conducted an additional analysis, restricting the sample only to those who reported having met up with friends and family not living in their household in the last week. We created a single binary variable denoting if participants knew the guidance in their local area regarding meeting in groups in public spaces, in private gardens, and indoors. For this variable, we coded answers of "don't know" as incorrect. We used logistic regressions to investigate associations between knowledge about meeting others and personal characteristics and tier. In other words, we tested whether people who met up with others knew the guidance about meeting up with others.

To take account of the number analyses undertaken (n=15), we only report narratively on results that remained statistically significant after a Bonferroni correction ($p<.003$). Uncorrected p-values are given in the results tables.

Results

Knowledge and confidence in understanding the tier system

There were no observable differences between tier levels in terms of correct identification of which tier level applied. Overall, between 81.1% (tier 2) and 89.1% (tier 3) of people knew their tier level (see supplementary materials for full breakdown). When adjusting for other personal characteristics, correct knowledge of which tier applied was associated with being female and older (see Table 2).

Table 2. Associations between correct knowledge of tier, and participant characteristics and tier.

		Incorrect knowledge of tier or did not know n=282, n (%)	Correct knowledge of tier n=1446, n (%)	Odds ratio for correct knowledge of tier (95% CI)	p-value	Adjusted odds ratio for correct knowledge of tier (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=7.4$	.03	$\chi^2(2)=5.8$	.06
	Midlands (East and West)	58 (16.1)	303 (83.9)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	62 (12.7)	425 (87.3)	1.31 (0.89 to 1.93)	.17	1.32 (0.87 to 2.02)	0.20
	South England (South East, South West, London, East of England)	162 (18.4)	718 (81.6)	0.85 (0.61 to 1.18)	.33	0.86 (0.60 to 1.24)	0.42
Gender	Male	145 (19.4)	604 (80.6)	Reference	-	Reference	-
	Female	136 (14.0)	834 (86.0)	1.47 (1.14 to 1.90)	.003	1.68 (1.27 to 2.22)	<.001
Age	Raw age (range 16 to 90)	M=40.9, SD=17.8	M=50.7, SD=17.4	1.03 (1.02 to 1.04)	<.001	1.02 (1.01 to 1.03)	<.001
Age: quadratic (age-mean)^2	-	-	-	-	-	0.9995 (0.9990 to 1.0000)	.05
Presence of dependent children in the household	None	158 (13.2)	1037 (86.8)	Reference	-	Reference	-
	Child present	124 (23.3)	409 (76.7)	0.50 (0.39 to 0.65)	<.001	0.65 (0.47 to 0.89)	.01
Employment status	Not working	118 (14.2)	715 (85.8)	Reference	-	Reference	-
	Working	153 (17.6)	715 (82.4)	0.77 (0.59 to 1.00)	.05	0.96 (0.70 to 1.32)	.82
Socio-economic grade	ABC1	188 (15.6)	1016 (84.4)	Reference	-	Reference	-
	C2DE	87 (18.0)	395 (82.0)	0.84 (0.64 to 1.11)	.22	1.07 (0.78 to 1.45)	.69
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.8, SD=1.1	M=2.6, SD=1.1	0.81 (0.72 to 0.91)	<.001	0.90 (0.79 to 1.02)	.09
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	202 (16.5)	1022 (83.5)	Reference	-	Reference	-
	Degree or higher (Bachelor's, Master's, PhD)	80 (15.9)	424 (84.1)	1.05 (0.79 to 1.39)	.75	1.30 (0.94 to 1.79)	.11
Ethnicity	Overall	-	-	$\chi^2(2)=43.5$	<.001	$\chi^2(2)=7.3$	.03
	White British	193 (13.5)	1237 (86.5)	Reference	-	Reference	-
	White Other	34 (29.6)	81 (70.4)	0.37 (0.24 to 0.57)	<.001	0.55 (0.34 to 0.89)	.02
	Black/Asian/Mixed/Other	52 (29.5)	124 (70.5)	0.37 (0.26 to 0.53)	<.001	0.69 (0.45 to 1.05)	.08
Living alone	Not living alone	228 (16.3)	1170 (83.7)	Reference	-	Reference	-
	Living alone	54 (16.4)	276 (83.6)	1.00 (0.72 to 1.38)	.98	0.66 (0.46 to 0.97)	.03
Tier (local COVID-19 alert level)	Overall	-	-	$\chi^2(2)=8.3$	.02	$\chi^2(2)=3.9$	.14
	Tier 1 (medium)	133 (16.0)	700 (84.0)	Reference	-	Reference	-
	Tier 2 (high)	122 (18.9)	525 (81.1)	0.82 (0.62 to 1.07)	.14	0.97 (0.70 to 1.34)	.86
	Tier 3 (very high)	27 (10.9)	221 (89.1)	1.56 (1.00 to 2.42)	.05	1.77 (0.93 to 3.37)	.08

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

72.8% (95% CI 70.7% to 74.9%) of respondents reported being confident that they understood which tier applied to their local area. Confidence was associated with being older and living in a less deprived area; there was no association with tier (see supplementary materials).

Knowledge and confidence in understanding local guidance

Knowledge of local guidance was mixed (see Table 3). Incorrect knowledge was particularly common for guidance about: staying overnight in someone else's home; travelling to other parts of the UK for leisure; sharing a car with someone not in your household; and taking part in group worship.

Table 3. Knowledge of guidance in your local area. Bolding denotes the correct answer.

You can…	Tier 1 (medium), total n=833, n (%)			Tier 2 (high), total n=647, n (%)			Tier 3 (very high), total n=248, n (%)		
	True	False	Don't know	True	False	Don't know	True	False	Don't know
Meet in groups of up to six people from different households outdoors, in private gardens	**610 (73.2)**	133 (16.0)	90 (10.8)	**340 (52.6)**	230 (35.5)	77 (11.9)	47 (19.0)	**184 (74.2)**	17 (6.9)
Meet in groups of up to six people from different households outdoors, in a public space e.g. a park	**675 (81.0)**	91 (10.9)	67 (8.0)	**433 (66.9)**	145 (22.4)	69 (10.7)	**130 (52.4)**	93 (37.5)	25 (10.1)
Meet in groups of up to six people from different household indoors e.g. in a pub, restaurant or café or at someone's home	**549 (65.9)**	184 (22.1)	100 (12.0)	139 (21.5)	**438 (67.7)**	70 (10.8)	39 (15.7)	**189 (76.2)**	20 (8.1)
Meet with your support or childcare bubble indoors, if you have one	**594 (71.3)**	80 (9.6)	159 (19.1)	**431 (66.6)**	117 (18.1)	99 (15.3)	**146 (58.9)**	64 (25.8)	38 (15.3)
Meet with your support or childcare bubble outdoors, if you have one	**625 (75.0)**	57 (6.8)	151 (18.1)	**450 (69.6)**	94 (14.5)	103 (15.9)	**162 (65.3)**	46 (18.5)	40 (16.1)
Stay overnight in someone else's home	**276 (33.1)**	369 (44.3)	188 (22.6)	69 (9.1)	**508 (78.5)**	80 (12.4)	25 (10.1)	**197 (79.4)**	26 (10.5)
Travel to other parts of the UK for leisure (e.g. for a day trip or to see friends or family)	**415 (49.8)**	237 (28.5)	181 (21.7)	**188 (29.1)**	330 (51.0)	129 (19.9)	37 (14.9)	**190 (76.6)**	21 (8.5)
Share a car with someone not in your household but are advised to take precautions like wearing a mask or opening the windows	**494 (59.3)**	174 (20.9)	165 (19.8)	**209 (32.3)**	287 (44.4)	151 (23.3)	**82 (33.1)**	127 (51.2)	39 (15.7)
Take part in group worship at a place of worship	**365 (43.8)**	171 (20.5)	297 (35.7)	**213 (32.9)**	231 (35.7)	203 (31.4)	67 (27.0)	**112 (45.2)**	69 (27.8)

70.9% (95% CI 68.7% to 73.0%) of respondents were confident that they understood the guidance currently in place in their local area. Confidence was associated with being older and living in a less deprived area. There was no association with tier (see supplementary materials).

Meeting up with people from another household

There were 602 respondents (34.8%) who reported having met up with friends or family they did not live with, in the last week. Among these respondents, 50.8% (95% CI 46.8% to 54.8%) knew the guidance surrounding meeting up with people from another household in their local area. Knowledge differed by tier, with people in tier 1 being most likely to know the guidance (see Table 4). Correct knowledge of the guidance was also associated with living in less deprived areas.

Table 4. Associations between correct knowledge of guidance about meeting others from another household, and participant characteristics and tier.

		Incorrect knowledge of guidance n=296, n (%)	Correct knowledge of guidance n=306, n (%)	Odds ratio for correct knowledge of guidance (95% CI)	p-value	Adjusted odds ratio for correct knowledge of guidance (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=10.4$	.01	$\chi^2(2)=10.3$	.01
	Midlands (East and West)	59 (48.0)	64 (52.0)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	79 (61.7)	49 (38.3)	0.57 (0.35 to 0.94)	.03	0.56 (0.33 to 0.97)	.04
	South England (South East, South West, London, East of England)	158 (45.0)	193 (55.0)	1.13 (0.75 to 1.70)	.57	1.16 (0.74 to 1.82)	.52
Gender	Male	135 (54.9)	111 (45.1)	Reference	-	Reference	-
	Female	159 (45.0)	194 (55.0)	1.48 (1.07 to 2.06)	.02	1.46 (1.02 to 2.08)	.04
Age	Raw age (range 16 to 90)	M=43.8, SD=19.6	M=46.0, SD=17.5	1.01 (1.00 to 1.02)	.15	1.00 (0.99 to 1.01)	.78
Age: quadratic $(age\text{-}mean)^2$	-	-	-	-	-	0.9988 (0.9982 to 0.9994)	<.001
Presence of dependent children in the household	None	184 (47.9)	200 (52.1)	Reference	-	Reference	-
	Child present	112 (51.4)	106 (48.6)	0.87 (0.62 to 1.21)	.41	0.75 (0.49 to 1.13)	.17
Employment status	Not working	131 (49.1)	136 (50.9)	Reference	-	Reference	-
	Working	161 (49.2)	166 (50.8)	0.99 (0.72 to 1.37)	.97	0.79 (0.53 to 1.19)	.26
Socio-economic grade	ABC1	194 (48.0)	210 (52.0)	Reference	-	Reference	-
	C2DE	92 (51.1)	88 (48.9)	0.88 (0.62 to 1.26)	.49	0.95 (0.65 to 1.40)	.79
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.7, SD=1.1	M=2.3, SD=1.1	0.71 (0.62 to 0.83)	<.001	0.75 (0.64 to 0.88)	.001
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	210 (51.3)	199 (48.7)	Reference	-	Reference	-
	Degree or higher (Bachelor's, Master's, PhD)	86 (44.6)	107 (55.4)	1.31 (0.93 to 1.85)	.12	1.35 (0.91 to 2.00)	.14
Ethnicity	Overall	-	-	$\chi^2(2)=7.7$	.02	$\chi^2(2)=4.2$	.12
	White British	232 (47.3)	259 (52.7)	Reference	-	Reference	-
	White Other	29 (47.5)	32 (52.5)	0.99 (0.58 to 1.68)	.97	1.15 (0.62 to 2.11)	.66
	Black/Asian/Mixed/Other	33 (68.8)	15 (31.3)	0.41 (0.22 to 0.77)	.01	0.50 (0.25 to 1.02)	.06
Living alone	Not living alone	226 (48.2)	243 (51.8)	Reference	-	Reference	-
	Living alone	70 (52.6)	63 (47.4)	0.84 (0.57 to 1.23)	.37	0.78 (0.49 to 1.24)	.29
Tier (local COVID-19 alert level)	Overall	-	-	$\chi^2(2)=47.8$	<.001	$\chi^2(2)=28.0$	<.001
	Tier 1 (medium)	124 (36.6)	215 (63.4)	Reference	-	Reference	-
	Tier 2 (high)	141 (65.9)	73 (34.1)	0.30 (0.21 to 0.43)	<.001	0.32 (0.21 to 0.49)	<.001
	Tier 3 (very high)	31 (63.3)	18 (36.7)	0.33 (0.18 to 0.62)	.001	0.41 (0.18 to 0.94)	.04

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

Motivation to adhere to restrictions and self-reported behaviour

73.1% (95% CI 71.1% to 75.2%) of respondents were motivated to adhere to restrictions in place in their local area. Motivation to adhere to restrictions in place in one's local area was associated with being female and older; there was no association with tier (see supplementary materials).

The percentage of people who reported having gone out in the last week to meet friends or family that they did not live with was lower in tiers 2 and 3 compared to tier 1 (see Table 5). Self-reported outings for exercise or recreation and going out to work did not differ by tier.

Table 5. Self-reported outings in the last seven days, by tier.

Tier (local COVID-19 alert level)	Been out for a walk or some other exercise, or to spend time outdoors for recreational purposes (including to sit in parks etc) Did not go out in last week n=551, n (%)	Went out in last week n=1177, n (%)	Odds ratio for having been out at least once in the last week (95% CI)	p-value	Adjusted odds ratio for having been out at least once in the last week (95% CI)†	p-value
Overall	-	-	$\chi^2(2)=7.2$	.03	$\chi^2(2)=6.3$	.04
Tier 1 (medium)	247 (29.7)	586 (70.3)	Reference	-	Reference	-
Tier 2 (high)	208 (32.1)	439 (67.9)	0.89 (0.71 to 1.11)	.30	0.89 (0.69 to 1.15)	.38
Tier 3 (very high)	96 (38.7)	152 (61.3)	0.67 (0.50 to 0.90)	.01	0.57 (0.36 to 0.88)	.01
	Been out to work (in those who reported working)					
	Did not go out in last week n=363, n (%)	Went out in last week n=505, n (%)	Odds ratio for having been out at least once in the last week (95% CI)	p-value	Adjusted odds ratio for having been out at least once in the last week (95% CI)‡	p-value
Overall	-	-	$\chi^2(2)=0.2$	.89	$\chi^2(2)=4.1$	.13
Tier 1 (medium)	161 (41.5)	227 (58.5)	Reference	-	Reference	-
Tier 2 (high)	143 (41.4)	202 (58.6)	1.00 (0.75 to 1.34)	.99	0.89 (0.63 to 1.26)	.52
Tier 3 (very high)	59 (43.7)	76 (56.3)	0.91 (0.62 to 1.36)	.65	0.52 (0.28 to 0.98)	.04
	Been out to meet up with friends and/or family that you do not live with					
	Did not go out in last week n=1126, n (%)	Went out in last week n=602, n (%)	Odds ratio for having been out at least once in the last week (95% CI)	p-value	Adjusted odds ratio for having been out at least once in the last week (95% CI)†	p-value
Overall	-	-	$\chi^2(2)=36.9$	<.001	$\chi^2(2)=12.8$	.002
Tier 1 (medium)	494 (59.3)	339 (40.7)	Reference	-	Reference	-
Tier 2 (high)	433 (66.9)	214 (33.1)	0.72 (0.58 to 0.89)	.003	0.74 (0.58 to 0.96)	.02
Tier 3 (very high)	199 (80.2)	49 (19.8)	0.36 (0.25 to 0.51)	<.001	0.44 (0.27 to 0.70)	.001

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

‡ Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

Going out for a walk or recreation was associated with region (with those in South England being more likely to than those in the Midlands), living in a less deprived area, and identifying as White Other (compared to White British; see supplementary materials). Going out to work was associated with lower socio-economic grade (C2DE compared to ABC1; see supplementary materials). Meeting up with others from another household was associated with region (although no individual region reached our threshold for statistical significance), younger age, living in a less deprived area, and living alone (see supplementary materials).

People identifying as Black, Asian, Mixed or Other ethnicities were less likely to meet others from another household (compared to White British).

Discussion

Our analysis indicates that, in the case of the English tier system, recognition of which tier applied to a person's local area was high (81% to 89%), but knowledge of the specific restrictions that were in place was poorer (29% to 81%). Women and older participants were more likely to correctly identify their local tier. This is in line with other research finding that, overall, women and older adults have better knowledge, and confidence in their knowledge, about COVID-19.(17, 20, 21)

Clearly, people do not need to understand all of the rules that apply to their local area. There is no reason, for example, for people without children to have detailed knowledge of the rules relating to childcare. However, even restricting our analyses to the most common activity that is governed by COVID-19 restrictions (meeting up with people from another household), we found that people who reported that they had met with friends or family the last week had poor knowledge about the restrictions for meeting people. Only 50% correctly identified the specific restrictions that applied in their local area. Guidance was particularly poorly understood by people living in tier 2 and in more deprived areas. In part, this may relate to the various nuances that existed within this guidance (e.g. specifying how many people could meet, and where meetings could occur). Restrictions that are absolute (e.g. behaviour is or is not permitted) may be clearer and more easily understood.

While knowledge of specific guidance was poor, confidence in people's understanding of guidance was higher. This may reflect the gap between actual and perceived knowledge that is seen in other health-related situations.(22, 23) Although we did not found an association between motivation to adhere to local restrictions and living in a more deprived area, poorer confidence in knowledge about the tier system and local restrictions was associated with living in a more deprived area and younger age. Poorer adherence in these groups has been a

common theme throughout the pandemic.(17) Greater attention to ensuring that regulations and guidelines are clearly communicated may be helpful to improve adherence in these groups.

We found a complex and varied impact of tiered guidance on behaviour. All behaviours we investigated (going out for a walk or exercise, to work, and to meet friends or family from another household) were allowed in all tiers. Going out to meet someone from another household was associated with tier level, with fewer people reporting meeting up with others in higher tiers. One explanation for this is that people had control over this behaviour, which they adjusted in accordance with higher perceptions of risk in their local area. Another explanation is that people had less opportunity to meet up, for example in indoor settings such as restaurants. There was no evidence that going out to work differed by tier. However, going out for a walk or exercise, a behaviour which participants had control over, but which was not explicitly mentioned by tiered guidance, showed a trend towards declining in higher tiers, suggesting a spill-over effect of the guidance that may have related to risk perception.(24) Going out for a walk or exercise alone or with members of one's own household is a low risk activity with respect to COVID-19 transmission and should be encouraged for its effects on wellbeing. It is therefore a concern if people avoid these behaviours.

Strengths of this study include that data were collected soon after the behaviour, limiting recall bias. However, behaviour was self-reported and may have been subject to social desirability bias. The use of an anonymous online survey should have mitigated the impact of this. Limitations include the use of cross-sectional data meaning that we cannot infer causation. While the sample was recruited to be representative of the population based on age, gender and region, we cannot be certain that the views and behaviours of survey respondents are representative of those of the general population.

Results from our study suggest that while overall tier level was well-recognised, individual restrictions were poorly understood. Clear, unambiguous restrictions (e.g. behaviour is or is not allowed), where possible, are likely to be better understood than nuanced restrictions. Better communications may be needed to reach people in groups with poorer understanding and confidence in their understanding. It was notable that two behaviours over which people had control (meeting others and going out for exercise) declined with more restrictive tier. This suggests that the impact of tiers is not solely due to the specific guidance involved, but has a broader impact.

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Supplementary materials

Table 1. Self-reported COVID-19 local alert level, by tier.

		Which of the three Covid local alert levels applies to where you live?			
		Tier 1 (medium)	Tier 2 (high)	Tier 3 (very high)	Don't know
Alert level at time	Medium (tier 1)	700 (84.0)	72 (8.6)	10 (1.2)	51 (6.1)
	High (tier 2)	40 (6.2)	525 (81.1)	44 (6.8)	38 (5.9)
	Very high (tier 3)	6 (2.4)	14 (5.6)	221 (89.1)	7 (2.8)

Table 2. Associations between confidence in understanding of local tier, and participant characteristics and tier level.

		Not at all confident / not very confident / don't know n=470, n (%)	Fairly confident / very confident n=1258, n (%)	Odds ratio for confidence in understanding of tier (95% CI)	p-value	Adjusted odds ratio for confidence in understanding of tier (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=0.2$	.90	$\chi^2(2)=0.1$	.97
	England – Midlands (East and West)	96 (26.6)	265 (73.4)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	136 (27.9)	351 (72.1)	0.93 (0.69 to 1.27)	.67	1 (0.72 to 1.39)	.99
	South England (South East, South West, London, East of England)	238 (27.0)	642 (73.0)	0.98 (0.74 to 1.29)	.87	0.97 (0.72 to 1.3)	.85
Gender	Male	188 (25.1)	561 (74.9)	Reference	-	Reference	-
	Female	280 (28.9)	690 (71.1)	0.83 (0.67 to 1.02)	.08	0.86 (0.69 to 1.08)	.20
Age	Raw age (range 16 to 90)	M=44.1, SD=16.8	M=51.0, SD=17.9	1.022 (1.016 to 1.029)	<.001	1.02 (1.01 to 1.03)	<.001
Age: quadratic $(age\text{-}mean)^2$	-	-	-	-	-	1.0005 (1.0001 to 1.0009)	.02
Presence of dependent children in the household	None	297 (24.9)	898 (75.1)	Reference	-	Reference	-
	Child present	173 (32.5)	360 (67.5)	0.69 (0.55 to 0.86)	.001	1.01 (0.77 to 1.32)	.94
Employment status	Not working	205 (24.6)	628 (75.4)	Reference	-	Reference	-
	Working	254 (29.3)	614 (70.7)	0.79 (0.64 to 0.98)	.03	1.00 (0.78 to 1.29)	.99
Socio-economic grade	ABC1	328 (27.2)	876 (72.8)	Reference	-	Reference	-
	C2DE	130 (27.0)	352 (73.0)	1.01 (0.80 to 1.29)	.91	1.22 (0.95 to 1.58)	.12
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.8, SD=1.1	M=2.5, SD=1.1	0.78 (0.71 to 0.86)	<.001	0.82 (0.74 to 0.91)	<.001
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	349 (28.5)	875 (71.5)	Reference	-	Reference	-
	Degree or higher (Bachelor's, Master's, PhD)	121 (24.0)	383 (76.0)	1.26 (0.99 to 1.60)	.06	1.43 (1.10 to 1.87)	.01
Ethnicity	Overall	-	-	$\chi^2(2)=4.8$	.09	$\chi^2(2)=0.6$	.97
	White British	373 (26.1)	1057 (73.9)	Reference	-	Reference	-
	White Other	36 (31.3)	79 (68.7)	0.77 (0.51 to 1.17)	.22	0.96 (0.61 to 1.52)	.87
	Black/Asian/Mixed/Other	58 (33.0)	118 (67.0)	0.72 (0.51 to 1)	.05	0.96 (0.66 to 1.39)	.83
Living alone	Not living alone	386 (27.6)	1012 (72.4)	Reference	-	Reference	-
	Living alone	84 (25.5)	246 (74.5)	1.12 (0.85 to 1.47)	.43	0.88 (0.65 to 1.20)	.42

Tier (local COVID-19 alert level)	Overall	-	-	$\chi^2(2)=7.9$	.02	$\chi^2(2)=5.8$	.05
	Tier 1 (medium)	209 (25.1)	624 (74.9)	Reference	-	Reference	-
	Tier 2 (high)	201 (31.1)	446 (68.9)	0.74 (0.59 to 0.93)	.01	0.92 (0.70 to 1.20)	.52
	Tier 3 (very high)	60 (24.2)	188 (75.8)	1.05 (0.75 to 1.46)	.77	1.55 (0.97 to 2.49)	.07

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

Table 3. Associations between confidence in understanding of local guidance, and participant characteristics and tier.

		Not at all confident / not very confident / don't know n=503, n (%)	Fairly confident / very confident n=1225, n (%)	Odds ratio for confidence in understanding of local guidance (95% CI)	p-value	Adjusted odds ratio for confidence in understanding of local guidance (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=2.9$	.24	$\chi^2(2)=2.2$	.33
	England – Midlands (East and West)	106 (29.4)	255 (70.6)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	155 (31.8)	332 (68.2)	0.89 (0.66 to 1.20)	.44	0.98 (0.71 to 1.33)	.88
	South England (South East, South West, London, East of England)	242 (27.5)	638 (72.5)	1.10 (0.84 to 1.44)	.51	1.17 (0.88 to 1.55)	.29
Gender	Male	216 (28.8)	533 (71.2)	Reference	-	Reference	-
	Female	285 (29.4)	685 (70.6)	0.97 (0.79 to 1.20)	.81	1.00 (0.80 to 1.25)	1.00
Age	Raw age (range 16 to 90)	M=45.1, SD=16.9	M=50.8, SD=18.0	1.018 (1.012 to 1.024)	<.001	1.02 (1.01 to 1.03)	<.001
Age: quadratic $(age\text{-}mean)^2$	-	-	-	-	-	1.0006 (1.0002 to 1.001)	.004
Presence of dependent children in the household	None	328 (27.4)	867 (72.6)	Reference	-	Reference	-
	Child present	175 (32.8)	358 (67.2)	0.77 (0.62 to 0.97)	.02	1.07 (0.82 to 1.39)	.60
Employment status	Not working	224 (26.9)	609 (73.1)	Reference	-	Reference	-
	Working	269 (31.0)	599 (69.0)	0.82 (0.66 to 1.01)	.06	1.05 (0.82 to 1.34)	.71
Socio-economic grade	ABC1	351 (29.2)	853 (70.8)	Reference	-	Reference	-
	C2DE	141 (29.3)	341 (70.7)	1.00 (0.79 to 1.26)	.97	1.17 (0.91 to 1.50)	.22
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.8, SD=1.1	M=2.5, SD=1.1	0.80 (0.73 to 0.88)	<.001	0.86 (0.77 to 0.95)	.003
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	369 (30.1)	855 (69.9)	Reference	-	Reference	-
	Degree or higher (Bachelor's, Master's, PhD)	134 (26.6)	370 (73.4)	1.19 (0.94 to 1.50)	.14	1.38 (1.07 to 1.79)	.01
Ethnicity	Overall	-	-	$\chi^2(2)=7.5$	.02	$\chi^2(2)=2.1$	.34
	White British	396 (27.7)	1034 (72.3)	Reference	-	Reference	-
	White Other	41 (35.7)	74 (64.3)	0.69 (0.46 to 1.03)	.07	0.78 (0.50 to 1.22)	.28
	Black/Asian/Mixed/Other	63 (35.8)	113 (64.2)	0.69 (0.49 to 0.95)	.03	0.80 (0.56 to 1.16)	.24
Living alone	Not living alone	409 (29.3)	989 (70.7)	Reference	-	Reference	-
	Living alone	94 (28.5)	236 (71.5)	1.04 (0.80 to 1.35)	.78	0.87 (0.65 to 1.17)	.35

Tier (local COVID-19 alert level)	Overall	-	-	$\chi^2(2)=11.1$	.004	$\chi^2(2)=2.6$	.27
	Tier 1 (medium)	211 (25.3)	622 (74.7)	Reference	-	Reference	-
	Tier 2 (high)	211 (32.6)	436 (67.4)	0.70 (0.56 to 0.88)	.002	0.81 (0.62 to 1.05)	.11
	Tier 3 (very high)	81 (32.7)	167 (67.3)	0.70 (0.51 to 0.95)	.02	0.80 (0.51 to 1.26)	.34

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

Table 4. Associations between motivation to adhere to restrictions in place in your local area, and participant characteristics and tier.

		Not at all / slightly n=464, n (%)	Quite a bit / strongly n=1264, n (%)	Odds ratio for being motivated (95% CI)	p-value	Adjusted odds ratio for being motivated (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=4.1$	.13	$\chi^2(2)=2.1$	.34
	England – Midlands (East and West)	82 (22.7)	279 (77.3)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	133 (27.3)	354 (72.7)	0.78 (0.57 to 1.07)	.13	0.85 (0.6 to 1.2)	.36
	South England (South East, South West, London, East of England)	249 (28.3)	631 (71.7)	0.74 (0.56 to 0.99)	.04	0.79 (0.58 to 1.08)	.14
Gender	Male	222 (29.6)	527 (70.4)	Reference	-	Reference	-
	Female	240 (24.7)	730 (75.3)	1.28 (1.03 to 1.59)	.02	1.51 (1.19 to 1.92)	.001
Age	Raw age (range 16 to 90)	M=39.9, SD=15.8	M=52.5, SD=17.3	1.044 (1.037 to 1.051)	<.001	1.04 (1.03 to 1.05)	<.001
Age – quadratic (age-mean)^2	-	-	-	-	-	1.0001 (0.9996 to 1.0005)	.81
Presence of dependent children in the household	None	266 (22.3)	929 (77.7)	Reference	-	Reference	-
	Child present	198 (37.1)	335 (62.9)	0.48 (0.39 to 0.61)	<.001	0.84 (0.64 to 1.1)	.21
Employment status	Not working	162 (19.4)	671 (80.6)	Reference	-	Reference	-
	Working	292 (33.6)	576 (66.4)	0.48 (0.38 to 0.59)	<.001	0.72 (0.55 to 0.94)	.01
Socio-economic grade	ABC1	302 (25.1)	902 (74.9)	Reference	-	Reference	-
	C2DE	152 (31.5)	330 (68.5)	0.73 (0.58 to 0.92)	.01	0.95 (0.73 to 1.23)	.68
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.8, SD=1.1	M=2.5, SD=1.1	0.81 (0.74 to 0.89)	<.001	0.87 (0.78 to 0.97)	.01
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	311 (25.4)	913 (74.6)	Reference	-	Reference	-
	Degree or higher (Bachelors, Masters, PhD)	153 (30.4)	351 (69.6)	0.78 (0.62 to 0.98)	.04	1.01 (0.77 to 1.31)	.97
Ethnicity	Overall	-	-	$\chi^2(2)=19.7$	<.001	$\chi^2(2)=0.1$	.95
	White British	353 (24.7)	1077 (75.3)	Reference	-	Reference	-
	White Other	43 (37.4)	72 (62.6)	0.55 (0.37 to 0.82)	.003	1.07 (0.68 to 1.68)	.78
	Black/Asian/mixed/other	66 (37.5)	110 (62.5)	0.55 (0.39 to 0.76)	<.001	1.05 (0.72 to 1.53)	.82
Living alone	Not living alone	393 (28.1)	1005 (71.9)	Reference	-	Reference	-
	Living alone	71 (21.5)	259 (78.5)	1.43 (1.07 to 1.90)	.02	0.96 (0.68 to 1.34)	.80
Tier (local COVID-19 alert level)	Overall	-	-	$\chi^2(2)=8.1$	.02	$\chi^2(2)=1.0$	.62
	Tier 1 (medium)	198 (23.8)	635 (76.2)	Reference	-	Reference	-
	Tier 2 (high)	196 (30.3)	451 (69.7)	0.72 (0.57 to 0.90)	.005	0.87 (0.66 to 1.15)	.33
	Tier 3 (very high)	70 (28.2)	178 (71.8)	0.79 (0.58 to 1.09)	.15	0.87 (0.53 to 1.42)	.57

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

Table 5. Associations between having been out for exercise or recreation, and participant characteristics.

		Did not go out in last week n=551, n (%)	Went out in last week n=1177, n (%)	Odds ratio for going out for a walk or recreation (95% CI)	p-value	Adjusted odds ratio for going out for a walk or recreation (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=16.0$	<.001	$\chi^2(2)=11.9$	.003
	England – Midlands (East and West)	141 (39.1)	220 (60.9)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	165 (33.9)	322 (66.1)	1.25 (0.94 to 1.66)	.12	1.32 (0.98 to 1.78)	.07
	South England (South East, South West, London, East of England)	245 (27.8)	635 (72.2)	1.66 (1.28 to 2.15)	<.001	1.61 (1.22 to 2.10)	.001
Gender	Male	237 (31.6)	512 (68.4)	Reference	-	Reference	-
	Female	311 (32.1)	659 (67.9)	0.98 (0.80 to 1.20)	.85	0.95 (0.76 to 1.17)	.62
Age	Raw age (range 16 to 90)	M=51.3, SD=17.7	M=48.1, SD=17.8	0.990 (0.984 to 0.995)	<.001	0.994 (0.986 to 1.001)	.09
Age: quadratic $(age\text{-}mean)^2$	-	-	-	-	-	1 (0.9996 to 1.0004)	.94
Presence of dependent children in the household	None	401 (33.6)	794 (66.4)	Reference	-	Reference	-
	Child present	150 (28.1)	383 (71.9)	1.29 (1.03 to 1.61)	.03	1.11 (0.84 to 1.45)	.47
Employment status	Not working	283 (34.0)	550 (66.0)	Reference	-	Reference	-
	Working	260 (30.0)	608 (70.0)	1.20 (0.98 to 1.48)	.08	1.07 (0.83 to 1.36)	.62
Socio-economic grade	ABC1	380 (31.6)	824 (68.4)	Reference	-	Reference	-
	C2DE	156 (32.4)	326 (67.6)	0.96 (0.77 to 1.21)	.75	0.92 (0.72 to 1.17)	.48
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.7, SD=1.1	M=2.5, SD=1.1	0.86 (0.79 to 0.94)	.001	0.86 (0.77 to 0.94)	.002
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	411 (33.6)	813 (66.4)	Reference	-	Reference	-
	Degree or higher (Bachelor's, Master's, PhD)	140 (27.8)	364 (72.2)	1.31 (1.05 to 1.65)	.02	1.15 (0.89 to 1.48)	.28
Ethnicity	Overall	-	-	$\chi^2(2)=18.0$	<.001	$\chi^2(2)=15.8$	<.001
	White British	471 (32.9)	959 (67.1)	Reference	-	Reference	-
	White Other	15 (13.0)	100 (87.0)	3.27 (1.88 to 5.70)	<.001	3.29 (1.75 to 6.17)	<.001
	Black/Asian/Mixed/Other	60 (34.1)	116 (65.9)	0.95 (0.68 to 1.32)	.76	0.84 (0.58 to 1.21)	.35
Living alone	Not living alone	423 (30.3)	975 (69.7)	Reference	-	Reference	-
	Living alone	128 (38.8)	202 (61.2)	0.68 (0.53 to 0.88)	.003	0.75 (0.57 to 0.99)	.04

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

Table 6. Associations between having been out to work, and participant characteristics in those who reported working.

		Did not go out in last week n=363, n (%)	Went out in last week n=505, n (%)	Odds ratio for going out to work (95% CI)	p-value	Adjusted odds ratio for going out to work (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=1.1$	.59	$\chi^2(2)=0.6$	.74
	England – Midlands (East and West)	76 (41.8)	106 (58.2)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	92 (39.1)	143 (60.9)	1.11 (0.75 to 1.65)	.59	0.93 (0.61 to 1.42)	.74
	South England (South East, South West, London, East of England)	195 (43.2)	256 (56.8)	0.94 (0.66 to 1.33)	.73	0.87 (0.60 to 1.26)	.45
Gender	Male	161 (41.8)	224 (58.2)	Reference	-	Reference	-
	Female	201 (42.0)	278 (58.0)	0.99 (0.76 to 1.30)	.97	1.01 (0.76 to 1.34)	.96
Age	Raw age (range 16 to 90)	M=45.1, SD=14.1	M=42.2, SD=13.5	0.98 (0.97 to 0.99)	.002	0.98 (0.97 to 1.00)	.03
Age: quadratic (age-mean)^2	-	-	-	-	-	1 (0.999 to 1.001)	.59
Presence of dependent children in the household	None	230 (45.4)	277 (54.6)	Reference	-	Reference	-
	Child present	133 (36.8)	228 (63.2)	1.42 (1.08 to 1.88)	.01	1.18 (0.85 to 1.63)	.33
Socio-economic grade	ABC1	274 (48.8)	287 (51.2)	Reference	-	Reference	-
	C2DE	82 (28.4)	207 (71.6)	2.41 (1.78 to 3.27)	<.001	2.05 (1.49 to 2.83)	<.001
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.4, SD=1.1	M=2.7, SD=1.1	1.27 (1.13 to 1.44)	<.001	1.18 (1.03 to 1.34)	.02
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	214 (39.5)	328 (60.5)	Reference	-	Reference	-
	Degree or higher (Bachelor's, Master's, PhD)	149 (45.7)	177 (54.3)	0.78 (0.59 to 1.02)	.07	0.83 (0.61 to 1.14)	.25
Ethnicity	Overall	-	-	$\chi^2(2)=1.5$	.48	$\chi^2(2)=0.5$	.76
	White British	292 (42.3)	399 (57.7)	Reference	-	Reference	-
	White Other	24 (34.8)	45 (65.2)	1.37 (0.82 to 2.30)	.23	1.15 (0.66 to 2.03)	.62
	Black/Asian/Mixed/Other	44 (42.3)	60 (57.7)	1.00 (0.66 to 1.51)	.99	0.90 (0.57 to 1.43)	.66
Living alone	Not living alone	298 (40.9)	430 (59.1)	Reference	-	Reference	-
	Living alone	65 (46.4)	75 (53.6)	0.80 (0.56 to 1.15)	.23	0.86 (0.57 to 1.29)	.47

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.

Table 7. Associations between meeting up with others from another household and participant characteristics.

		Did not go out in last week n=1126, n (%)	Went out in last week n=602, n (%)	Odds ratio for going out to meet others (95% CI)	p-value	Adjusted odds ratio for going out to meet others (95% CI)†	p-value
Region	Overall	-	-	$\chi^2(2)=25.4$	<.001	$\chi^2(2)=16.2$	<.001
	England – Midlands (East and West)	238 (65.9)	123 (34.1)	Reference	-	Reference	-
	North England (North East, North West, Yorkshire and the Humber)	359 (73.7)	128 (26.3)	0.69 (0.51 to 0.93)	.01	0.69 (0.50 to 0.95)	.02
	South England (South East, South West, London, East of England)	529 (60.1)	351 (39.9)	1.28 (0.99 to 1.66)	.06	1.18 (0.89 to 1.55)	.24
Gender	Male	503 (67.2)	246 (32.8)	Reference	-	Reference	-
	Female	617 (63.6)	353 (36.4)	1.17 (0.96 to 1.43)	.13	1.1 (0.88 to 1.36)	.40
Age	Raw age (range 16 to 90)	M=51.4, SD=17.0	M=44.9, SD=18.6	0.979 (0.974 to 0.985)	<.001	0.977 (0.969 to 0.984)	<.001
Age: quadratic $(age-mean)^2$	-	-	-	-	-	1.0008 (1.0004 to 1.0011)	<.001
Presence of dependent children in the household	None	811 (67.9)	384 (32.1)	Reference	-	Reference	-
	Child present	315 (59.1)	218 (40.9)	1.46 (1.18 to 1.81)	<.001	1.31 (1.01 to 1.70)	.04
Employment status	Not working	566 (67.9)	267 (32.1)	Reference	-	Reference	-
	Working	541 (62.3)	327 (37.7)	1.28 (1.05 to 1.57)	.02	1.1 (0.86 to 1.41)	.44
Socio-economic grade	ABC1	800 (66.4)	404 (33.6)	Reference	-	Reference	-
	C2DE	302 (62.7)	180 (37.3)	1.18 (0.95 to 1.47)	.14	1.15 (0.90 to 1.47)	.25
Index of multiple deprivation	1st quartile (least deprived) to 4th quartile (most deprived)	M=2.7, SD=1.1	M=2.5, SD=1.1	0.88 (0.80 to 0.96)	.003	0.84 (0.76 to 0.93)	.001
Highest educational or professional qualification	GCSE/vocational/A-level/No formal qualifications	815 (66.6)	409 (33.4)	Reference	-	Reference	-
	Degree or higher (Bachelor's, Master's, PhD)	311 (61.7)	193 (38.3)	1.24 (1.00 to 1.53)	.05	1.07 (0.84 to 1.37)	.56
Ethnicity	Overall	-	-	$\chi^2(2)=20.6$	<.001	$\chi^2(2)=21.2$	<.001
	White British	939 (65.7)	491 (34.3)	Reference	-	Reference	-
	White Other	54 (47.0)	61 (53.0)	2.16 (1.47 to 3.17)	<.001	1.39 (0.90 to 2.14)	.14
	Black/Asian/Mixed/Other	128 (72.7)	48 (27.3)	0.72 (0.51 to 1.02)	.06	0.44 (0.30 to 0.66)	<.001
Living alone	Not living alone	929 (66.5)	469 (33.5)	Reference	-	Reference	-
	Living alone	197 (59.7)	133 (40.3)	1.34 (1.05 to 1.71)	.02	1.83 (1.38 to 2.43)	<.001

† Adjusted for region, gender, age (raw and quadratic), presence of dependent children in the household, employment status, socio-economic grade, index of multiple deprivation, highest educational or professional qualification, ethnicity, and living alone.