

Appendix 1

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Note in the tables below:

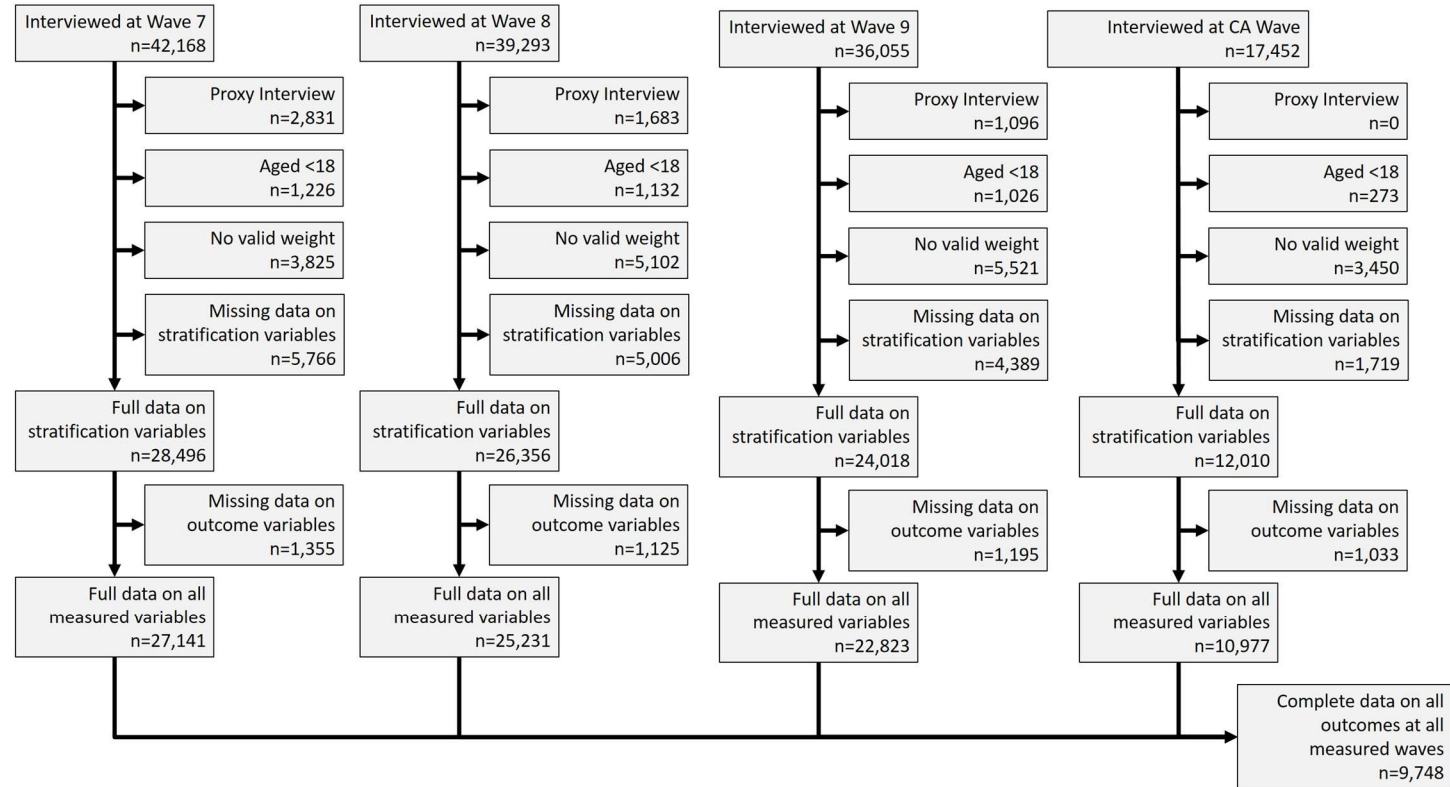
CI: confidence interval; Ref=reference category; RR=Risk ratio

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Methodological details about the creation of weights

Figure S1 shows the derivation of the analytical samples. Understanding Society began in 2009 as a stratified clustered probability sample in England, Wales and Scotland and simple probability sample of Northern Ireland. With two ethnic minority boost samples added at waves 1 and 6. Participants are followed up annually. This study begins at wave 7 (2015-2017). Within the group interviewed at each wave we excluded proxy respondents, those aged <18 years, and those who did not have a valid sampling weight. We also excluded those who had missing data on a key stratification variable (age, gender, ethnicity or education), with missing data on education being the main reason for exclusion at this stage. We further limited the sample at each wave to those with complete outcome data, but since those excluded for missing outcome data differed in terms of age, gender, ethnicity and education from those included we calculated some additional inverse probability weights (based on age, gender, ethnicity and education) within each wave to account for this. For the longitudinal models, we started with those who had full data at wave 9 (2017-19), and limited to those who participated and had valid weights and stratification data in the CA wave during April 2020 (since the CA wave sampling weights were designed to weight respondents to the CA wave to resemble the population at wave 9 during 2017-19). We then limited the longitudinal sample to those with full outcome data at all waves where outcomes were measured and calculated additional inverse probability weights to adjust for this based on wave 9 (2017-19), characteristics. Sample characteristics at wave 9 (2017-19), and how these were affected by each stage of exclusion and weighting in construction of the longitudinal sample are shown in Table S1.

Figure S1: STROBE flowcharts for cross-sectional and longitudinal analyses



Box S1: Lockdown measures introduced in four nations of UK, March-April 2020

Information sourced from *The Health Foundation's COVID-19 policy tracker for England*¹, *BBC News website*², and *archived Government webpages*³ accessed via the *Internet Archive*⁴

Date	Lockdown measure introduced	Where applicable
12th March 2020	All with symptoms of possible COVID-19 required to isolate for 7 days	Whole UK
16th March 2020	All living with someone with symptoms of possible COVID-19 required to isolate for 14 days	Whole UK
	All others advised against unnecessary social contact and travel	Whole UK
	Mass gatherings banned	Whole UK
17th March 2020	Foreign and Commonwealth Office advises against all non-essential world-wide travel	Whole UK
20th March 2020	Entertainment, hospitality and indoor leisure premises ordered to close	Whole UK
	Schools, colleges and nurseries close for all except children of key workers or children identified as vulnerable by social services	Whole UK
	Key workers are defined as those working in sectors considered critical to the COVID-19 response, which includes: Health and Social Care; Education and Childcare;	

¹ <https://www.health.org.uk/news-and-comment/charts-and-infographics/covid-19-policy-tracker>

² www.bbc.co.uk/news

³ <https://www.gov.uk/>; <https://www.gov.scot/>; <https://gov.wales/>; www.nidirect.gov.uk/

⁴ <https://archive.org/web/>

	Key Public Services, such as Justice and Broadcasting; Local and National Government; Food and other necessary goods; Public Safety and National Security; Transport; and Utilities, Communication and Financial Services)	
22nd March 2020	Those identified as being extremely clinically vulnerable (i.e. those at highest risk of severe illness if they contract COVID-19) advised to begin ‘shielding’ – they should not leave their house for any reason, necessary food/ supplies will be provided by Local Authorities where needed Shielded individuals include: solid organ transplant recipients; people with specific cancers; people with severe respiratory conditions; people who are immunosuppressed secondary to disease, treatment or medications; pregnant women with significant heart disease	Whole UK
23rd March 2020	Whole population not permitted to leave home except for very limited purposes (to buy food; to exercise once per day; for any medical need; to care for a vulnerable person; to travel to/from essential work) All gatherings of more than two people in public banned Lockdown measures to be reviewed every three weeks	Whole UK Whole UK Whole UK
27th March 2020	Public advised to only use open spaces near own house for exercise, and to stay at least 2 metres apart from other households while outdoors	Whole UK
April 2020	No significant change to lockdown measures	Whole UK

Table S1: Comparison of Wave 9, COVID-19 (CA) Wave and Longitudinal Sample

	Wave 9 Analytical Sample ^a %	Complete Case Sample ^a %	Complete Case Sample, Weighted ^b %
	n=22,823	n=9,748	n=9,748
Age			
18-24	11.6	6.4	11.7
25-44	29.5	29.1	30.2
45-64	35.3	43.3	35.5
65+	23.6	21.1	22.6
Gender			
Men	47.8	44.3	47.8
Women	52.2	55.7	52.2
Ethnicity			
White	92.1	94.9	91.5
Asian	4.3	2.7	4.7
Black	1.9	0.9	1.9
Mixed	1.2	1.1	1.3
Other	0.6	0.4	0.5
Education			
Degree	37.4	47.1	37.4
A-Level	11.9	11.6	12.0
GCSE	28.2	25.8	28.3
None	22.4	15.5	22.3
Wave 9 Binge Drinking			
No	89.2	90.1	89.2
Yes	10.8	9.9	10.8
Wave 9 Typical Number of Drinks			

0-4 drinks	86.4	88.7	87.1
5+ drinks	13.6	11.3	12.7
Wave 9 Alcohol Frequency			
0-3 days per week	86.3	83.8	85.2
4+ days per week	13.7	16.2	14.8
Wave 9 Smoking			
Non-Smoker	85.0	90.1	84.4
<10/day	4.9	3.0	5.0
10-19/day	6.6	4.6	6.9
20+/day	3.5	2.4	3.6
Wave 9 Weekly E-Cigarette Use			
No	95.1	95.7	94.8
Yes	4.9	4.3	5.2
GHQ Case			
No	80.6	82.0	80.2
Yes	19.4	18.0	19.8
Loneliness			
No (hardly ever, never, sometimes)	91.4	92.5	90.9
Yes (often)	8.6	7.5	9.1

^aWeighted for sample representativeness and missing outcome data at wave 9.

^bAdditionally weighted for complete data at all waves.

Table S2: Mental health and health behaviours before and during the COVID-19 lockdown

	Wave 7 (2015-2017)	Wave 8 (2016-18)	Wave 9 (2017-19)	COVID-19 (CA) Wave (April 2020)
	Percentage [95% CI]	Percentage [95% CI]	Percentage [95% CI]	Percentage [95% CI]
Psychological distress (GHQ-12, 4+ cut-off)				
No	82.4 [81.8,83.0]	81.1 [80.5,81.8]	80.6 [79.9,81.3]	69.4 [67.8,70.9]
Yes	17.6 [17.0,18.2]	18.9 [18.2,19.5]	19.4 [18.7,20.1]	30.6 [29.1,32.3]
Psychological distress (GHQ-12, 3+ cut-off)				
No	78.0 [77.4,78.7]	77.0 [76.3,77.7]	76.3 [75.5,77.0]	62.0 [60.3,63.7]
Yes	22.0 [21.3,22.6]	23.0 [22.3,23.7]	23.7 [23.0,24.5]	38.0 [36.3,39.7]
Psychological distress (GHQ-12 4+ excluding activities item)				
No	83.6 [83.0,84.2]	82.6 [81.9,83.2]	81.8 [81.1,82.5]	73.2 [71.7,74.7]
Yes	16.4 [15.8,17.0]	17.4 [16.8,18.1]	18.2 [17.6,18.9]	26.8 [25.4,28.3]
Loneliness				
Never or hardly ever	-	-	62.4 [61.5,63.2]	61.3 [59.7,62.9]
Sometimes	-	-	29.0 [28.3,29.8]	29.9 [28.5,31.4]
Often	-	-	8.6 [8.1,9.1]	8.8 [7.8,9.9]
Binge drinking (weekly or more)				
No	88.5 [88.0,89.0]	-	89.2 [88.7,89.7]	83.8 [82.6,85.0]
Yes	11.5 [11.1,12.0]	-	10.8 [10.3,11.3]	16.2 [15.0,17.4]
Number of drinks on typical drinking day				
0-4	86.7	-	86.4	94.5

	[86.1,87.2]		[85.7,87.0]	[93.6,95.2]
5+	13.3 [12.8,13.9]	-	13.6 [13.0,14.3]	5.6 [4.8,6.4]
Alcohol frequency				
0-3 times per week	87.2 [86.6,87.7]	-	86.3 [85.7,86.9]	78.0 [76.6,79.4]
4+ times per week	12.8 [12.3,13.4]	-	13.7 [13.1,14.3]	22.0 [20.6,23.4]
Cigarette smoking				
Non-smoker	82.8 [82.2,83.5]	83.7 [83.1,84.4]	84.9 [84.2,85.6]	87.9 [86.5,89.2]
Current Smoker	17.2 [16.5,17.8]	16.3 [15.6,16.9]	15.1 [14.4,15.8]	12.1 [10.8,13.6]
Number of cigarettes per day				
Non-Smoker	82.9 [82.3,83.6]	83.8 [83.1,84.4]	85.0 [84.3,85.7]	87.9 [86.5,89.3]
<10	5.4 [5.1,5.8]	5.1 [4.8,5.4]	4.9 [4.5,5.3]	2.9 [2.4,3.4]
10-19	7.5 [7.1,8.0]	7.3 [6.9,7.8]	6.6 [6.1,7.1]	5.9 [5.0,7.0]
20+	4.1 [3.8,4.5]	3.9 [3.5,4.2]	3.5 [3.2,3.9]	3.3 [2.5,4.3]
Weekly e-cigarette use				
No	-	95.7 [95.3,96.1]	95.1 [94.7 to 95.5]	95.3 [94.3,96.1]
Yes	-	4.3 [4.0,4.7]	4.9 [4.5,5.3]	4.7 [3.9,5.7]

Table S3: Psychological distress (GHQ-12, 4+ cut-off) and the interactions between period (pre-COVID-19 and during COVID-19) and age group, gender, ethnicity and education level

	Model 1	Model 2	Model 3	Model 4
	RR [95% CI]	RR [95% CI]	RR [95% CI]	RR [95% CI]
GHQ				
Year	1.06*** [1.03,1.09]	1.06*** [1.03,1.09]	1.06*** [1.03,1.09]	1.05*** [1.03,1.09]
Age group:	2.32*** [1.96,2.75]	2.33*** [2.03,2.67]	2.33*** [2.03,2.67]	-
18-24				
25-44	2.01*** [1.78,2.26]	2.01*** [1.83,2.22]	2.01*** [1.83,2.22]	1.98*** [1.79,2.18]
45-64	1.81*** [1.61,2.03]	1.71*** [1.55,1.88]	1.71*** [1.55,1.88]	1.70*** [1.54,1.86]
65+ (ref)				
Gender: Male (ref)				
Female	1.58*** [1.48,1.69]	1.52*** [1.40,1.64]	1.58*** [1.48,1.69]	1.58*** [1.48,1.69]
Ethnicity: White (ref)				
Non-white	1.14* [1.02,1.27]	1.14* [1.02,1.27]	1.16* [1.01,1.33]	1.18** [1.05,1.32]
Period: Pre-COVID-19 (ref)				
During COVID-19	1.35*** [1.16,1.57]	1.18* [1.04,1.34]	1.29*** [1.16,1.43]	1.43*** [1.27,1.61]
Age group interaction with period (Pre-COVID-19 is ref):				
a18to24 # During COVID-19	1.00 [0.81,1.24]			
a25to44 # During COVID-19	1.01 [0.88,1.17]			
a45to64 # During COVID-19	0.84* [0.74,0.97]			
a65over # During COVID-19 (ref)				
Gender interaction with period (Pre-COVID-19 /male)				

is ref): Male # During COVID-19				
Female # During COVID-19		1.14* [1.03,1.26]		
Ethnicity interaction with period (Pre-COVID-19 / white is ref): White # During COVID-19				
Non-white # During COVID-19			0.94 [0.78,1.14]	
Education level: Degree (ref)				
A Level				1.08 [0.95,1.23]
GCSE				1.01 [0.92,1.11]
None				1.05 [0.94,1.17]
Education level interaction with period (Pre-COVID-19 / Degree is ref): Degree # During COVID-19				
A Level # During COVID-19				0.84* [0.72,0.99]
GCSE # During COVID-19				0.86** [0.77,0.96]
None # During COVID-19				0.76*** [0.67,0.87]
Observations	38992	38992	38992	36984

Model 1: Year, age group, gender, ethnicity, period and period x age group interaction

Model 2: Year, age group, gender, ethnicity, period and period x gender interaction

Model 3: Year, age group, gender, ethnicity, period and period x ethnicity interaction

Model 4: Year, age group, gender, ethnicity, period, education level and period x education level interaction (sample limited to individuals aged 25+ years)

Table S4: Loneliness and the interactions between period (pre-COVID-19 and during COVID-19) and age group, gender, ethnicity and education level

	Model 1	Model 2	Model 3	Model 4
Loneliness	RR	RR	RR	RR
	[95% CI]	[95% CI]	[95% CI]	[95% CI]
Year	1.00	1.00	0.99	0.91
	[0.82,1.21]	[0.83,1.20]	[0.82,1.20]	[0.77,1.07]
Age group:	4.89***	4.76***	4.76***	
18-24	[3.33,7.20]	[3.55,6.39]	[3.55,6.39]	
25-44	3.01***	2.73***	2.73***	2.79***
	[2.23,4.06]	[2.15,3.46]	[2.15,3.45]	[2.19,3.56]
45-64	2.12***	2.02***	2.02***	2.02***
	[1.58,2.84]	[1.61,2.54]	[1.61,2.54]	[1.60,2.54]
65+ (ref)				
Gender: Male (ref)				
Female	1.64***	1.42***	1.64***	1.72***
	[1.41,1.91]	[1.17,1.71]	[1.41,1.91]	[1.46,2.02]
Ethnicity: White (ref)				
Non-white	1.12	1.12	1.26	1.37*
	[0.88,1.44]	[0.88,1.44]	[0.93,1.70]	[1.06,1.77]
Period: Pre-COVID-19 (ref)				
During COVID-19	1.01	0.74	0.94	1.26
	[0.58,1.76]	[0.44,1.25]	[0.56,1.56]	[0.82,1.92]
Age group interaction with period (Pre-COVID-19 is ref): a18to24 # During COVID-19	0.95			
	[0.59,1.53]			
a25to44 # During COVID-19	0.81			
	[0.57,1.16]			
a45to64 # During COVID-19	0.90			
	[0.64,1.28]			
a65over # During COVID-19 (ref)				
Gender interaction with period (Pre-COVID-19 /male is ref): Male # During				

COVID-19				
Female # During COVID-19		1.37* [1.07,1.77]		
Ethnicity interaction with period (Pre-COVID-19 / white is ref): White # During COVID-19				
Non-white # During COVID-19			0.78 [0.52,1.15]	
Education level: Degree (ref)				
A Level				1.34 [0.98,1.83]
GCSE				1.52*** [1.21,1.90]
None				1.45** [1.12,1.88]
Education level interaction with period (Pre-COVID-19 / Degree is ref): Degree # During COVID-19				
A Level # During COVID-19				0.91 [0.62,1.36]
GCSE # During COVID-19				0.78 [0.59,1.03]
None # During COVID-19				0.87 [0.66,1.15]
Observations	19496	19496	19496	18492

Model 1: Year, age group, gender, ethnicity, period and period x age group interaction

Model 2: Year, age group, gender, ethnicity, period and period x gender interaction

Model 3: Year, age group, gender, ethnicity, period and period x ethnicity interaction

Model 4: Year, age group, gender, ethnicity, period, education level and period x education level interaction (sample limited to individuals aged 25+ years)

Table S5: Binge drinking and the interactions between period (pre-COVID-19 and during COVID-19) and age group, gender, ethnicity and education level

	Model 1	Model 2	Model 3	Model 4
Binge drinking	RR [95% CI]	RR [95% CI]	RR [95% CI]	RR [95% CI]
Year	1.02 [0.98,1.06]	1.02 [0.98,1.06]	1.02 [0.98,1.06]	0.99 [0.95,1.02]
Age group:	1.55** [1.18,2.04]	1.59*** [1.25,2.01]	1.59*** [1.25,2.01]	
18-24				
25-44	1.39*** [1.17,1.66]	1.73*** [1.50,2.01]	1.73*** [1.50,2.01]	1.73*** [1.49,2.00]
45-64	1.87*** [1.60,2.18]	1.98*** [1.74,2.26]	1.98*** [1.74,2.26]	1.95*** [1.71,2.22]
65+ (ref)				
Gender: Male (ref)				
Female	0.53*** [0.49,0.59]	0.45*** [0.40,0.50]	0.53*** [0.49,0.59]	0.52*** [0.47,0.57]
Ethnicity: White (ref)				
Non-white	0.27*** [0.20,0.36]	0.27*** [0.20,0.36]	0.23*** [0.16,0.34]	0.30*** [0.22,0.41]
Period: Pre-COVID-19 (ref)				
During COVID-19	1.18 [0.97,1.45]	1.27** [1.08,1.48]	1.47*** [1.25,1.71]	1.95*** [1.67,2.27]
Age group interaction with period (Pre-COVID-19 is ref): a18to24 #	1.06 [0.77,1.46]			
During COVID-19				
a25to44 # During COVID-19	1.64*** [1.35,1.98]			
a45to64 # During COVID-19	1.16 [0.98,1.37]			
a65over # During COVID-19 (ref)				
Gender interaction with period (Pre-COVID-19 /male is ref): Male #				
During COVID-19				
Female # During COVID-19		1.49***		

		[1.31,1.69]		
Ethnicity interaction with period (Pre-COVID-19 / white is ref):				
White # During COVID-19				
Non-white # During COVID-19			1.37 [0.88,2.15]	
Education level: Degree (ref)				
Alevel				1.18 [0.96,1.46]
GCSE				1.29*** [1.12,1.49]
None				1.20* [1.02,1.42]
Education level interaction with period (Pre-COVID-19 / Degree is ref): Degree # During COVID-19				
Alevel # During COVID-19				0.85 [0.69,1.03]
GCSE # During COVID-19				0.85* [0.74,0.98]
None # During COVID-19				0.69*** [0.59,0.82]
Observations	29244	29244	29244	27738

Model 1: Year, age group, gender, ethnicity, period and period x age group interaction

Model 2: Year, age group, gender, ethnicity, period and period x gender interaction

Model 3: Year, age group, gender, ethnicity, period and period x ethnicity interaction

Model 4: Year, age group, gender, ethnicity, period, education level and period x education level interaction (sample limited to individuals aged 25+ years)

Table S6: Alcohol frequency (drinking 4+ days per week) and the interactions between period (pre-COVID-19 and during COVID-19) and age group, gender, ethnicity and education level

	Model 1	Model 2	Model 3	Model 4
Drinking 4+ days per week	RR [95% CI]	RR [95% CI]	RR [95% CI]	RR [95% CI]
Year	1.05*** [1.03,1.08]	1.05*** [1.03,1.08]	1.05*** [1.03,1.08]	1.04** [1.02,1.06]
Age group:	0.10*** [0.06,0.16]	0.17*** [0.13,0.23]	0.17*** [0.13,0.23]	
18-24	0.35*** [0.31,0.41]	0.48*** [0.43,0.54]	0.48*** [0.43,0.54]	0.44*** [0.40,0.50]
25-44	0.79*** [0.71,0.88]	0.87** [0.79,0.95]	0.87** [0.79,0.95]	0.84*** [0.77,0.92]
45-64				
65+ (ref)				
Gender: Male (ref)				
Female	0.62*** [0.57,0.67]	0.54*** [0.49,0.59]	0.62*** [0.57,0.67]	0.62*** [0.57,0.67]
Ethnicity: White (ref)				
Non-white	0.34*** [0.26,0.43]	0.34*** [0.26,0.43]	0.34*** [0.25,0.47]	0.33*** [0.26,0.43]
Period: Pre-COVID-19 (ref)				
During COVID-19	1.06 [0.96,1.17]	1.23*** [1.11,1.35]	1.38*** [1.26,1.51]	1.44*** [1.31,1.58]
Age group interaction with period (Pre-COVID-19 is ref):	2.90*** [1.63,5.15]			
a18to24 # During COVID-19	1.91*** [1.66,2.20]			
a25to44 # During COVID-19	1.25*** [1.15,1.35]			
a45to64 # During COVID-19				
a65over # During COVID-19 (ref)				
Gender interaction with period (Pre-COVID-19 /male is ref): Male # During COVID-19				
Female # During COVID-19		1.34*** [1.23,1.47]		

Ethnicity interaction with period (Pre-COVID-19 / white is ref): White # During COVID-19				
Non-white # During COVID-19			0.98 [0.67,1.42]	
Education level: Degree (ref)				
A Level				0.81* [0.69,0.96]
GCSE				0.71*** [0.63,0.79]
None				0.60*** [0.52,0.68]
Education level interaction with period (Pre-COVID-19 / Degree is ref): Degree # During COVID-19				
A Level # During COVID-19				0.96 [0.82,1.12]
GCSE # During COVID-19				0.95 [0.86,1.05]
None # During COVID-19				0.96 [0.86,1.08]
Observations	29244	29244	29244	27738

Model 1: Year, age group, gender, ethnicity, period and period x age group interaction

Model 2: Year, age group, gender, ethnicity, period and period x gender interaction

Model 3: Year, age group, gender, ethnicity, period and period x ethnicity interaction

Model 4: Year, age group, gender, ethnicity, period, education level and period x education level interaction (sample limited to individuals aged 25+ years)

Table S7: Heavy drinking (5+ drinks on a typical day when drinking) and the interactions between period (pre-COVID-19 and during COVID-19) and age group, gender, ethnicity and education level

	Model 1	Model 2	Model 3	Model 4
5+ drinks on typical day	RR [95% CI]	RR [95% CI]	RR [95% CI]	RR [95% CI]
Year	1.02 [0.98,1.06]	1.02 [0.98,1.06]	1.02 [0.98,1.06]	0.98 [0.94,1.01]
Age group:	18.04*** [13.65,23.83]	15.29*** [11.73,19.93]	15.29*** [11.73,19.92]	
18-24	8.26*** [6.48,10.54]	7.62*** [6.06,9.59]	7.62*** [6.06,9.58]	8.03*** [6.36,10.13]
25-44	4.62*** [3.62,5.91]	4.46*** [3.55,5.62]	4.46*** [3.55,5.62]	4.45*** [3.53,5.62]
45-64				
65+ (ref)				
Gender: Male (ref)				
Female	0.52*** [0.46,0.59]	0.56*** [0.49,0.63]	0.52*** [0.46,0.59]	0.49*** [0.43,0.56]
Ethnicity: White (ref)				
Non-white	0.30*** [0.22,0.40]	0.30*** [0.22,0.40]	0.33*** [0.24,0.45]	0.32*** [0.23,0.46]
Period: Pre-COVID-19 (ref)				
During COVID-19	0.60** [0.42,0.86]	0.46*** [0.38,0.55]	0.41*** [0.35,0.49]	0.58*** [0.48,0.72]
Age group interaction with period (Pre-COVID-19 is ref): a18to24 #	0.37*** [0.22,0.63]			
During COVID-19				
a25to44 # During COVID-19	0.68* [0.47,0.99]			
a45to64 # During COVID-19	0.86 [0.60,1.23]			
a65over # During COVID-19 (ref)				
Gender interaction with period (Pre-COVID-19 /male is ref): Male # During COVID-19				
Female # During COVID-19		0.70**		

		[0.56,0.88]		
Ethnicity interaction with period (Pre-COVID-19 / white is ref): White #				
During COVID-19				
Non-white # During COVID-19			0.53 [0.23,1.20]	
Education level: Degree (ref)				
Alevel				1.43** [1.14,1.78]
GCSE				1.67*** [1.43,1.96]
None				1.33** [1.09,1.62]
Education level interaction with period (Pre-COVID-19 / Degree is ref): Degree # During COVID-19				
Alevel # During COVID-19				0.92 [0.66,1.29]
GCSE # During COVID-19				0.85 [0.66,1.09]
None # During COVID-19				0.90 [0.68,1.20]
Observations	29244	29244	29244	27738

Model 1: Year, age group, gender, ethnicity, period and period x age group interaction

Model 2: Year, age group, gender, ethnicity, period and period x gender interaction

Model 3: Year, age group, gender, ethnicity, period and period x ethnicity interaction

Model 4: Year, age group, gender, ethnicity, period, education level and period x education level interaction (sample limited to individuals aged 25+ years)

Table S8: Current smoking and the interactions between period (pre-COVID-19 and during COVID-19) and age group, gender, ethnicity and education level

	Model 1	Model 2	Model 3	Model 4
Current smoking	RR [95% CI]	RR [95% CI]	RR [95% CI]	RR [95% CI]
Year	0.99 [0.97,1.01]	0.99 [0.97,1.01]	0.99 [0.97,1.01]	0.98 [0.96,1.00]
Age group:	2.72*** [1.54,4.81]	2.85*** [1.62,5.02]	2.85*** [1.62,5.02]	
18-24				
25-44	6.46*** [4.34,9.60]	6.56*** [4.42,9.75]	6.56*** [4.42,9.75]	7.26*** [5.14,10.28]
45-64	5.14*** [3.46,7.65]	5.29*** [3.56,7.87]	5.29*** [3.56,7.87]	4.96*** [3.52,6.98]
65+ (ref)				
Gender: Male (ref)				
Female	1.00 [0.82,1.22]	0.99 [0.81,1.21]	1.00 [0.82,1.22]	1.01 [0.83,1.22]
Ethnicity: White (ref)				
Non-white	1.19 [0.88,1.61]	1.19 [0.88,1.61]	1.20 [0.88,1.63]	1.54** [1.14,2.08]
Period: Pre-COVID-19 (ref)				
During COVID-19	0.80** [0.69,0.93]	0.88* [0.78,0.98]	0.90* [0.82,0.98]	0.90 [0.80,1.02]
Age group interaction with period (Pre-COVID-19 is ref): a18to24 # During COVID-19	1.23 [0.95,1.60]			
a25to44 # During COVID-19	1.08 [0.91,1.28]			
a45to64 # During COVID-19	1.14 [0.99,1.32]			
a65over # During COVID-19 (ref)				
Gender interaction with period (Pre-COVID-19 /male is ref): Male # During COVID-19				
Female # During COVID-19		1.03 [0.93,1.16]		

Ethnicity interaction with period (Pre-COVID-19 / white is ref): White # During COVID-19				
Non-white # During COVID-19			0.95 [0.74,1.22]	
Education level: Degree (ref)				
Alevel				2.64*** [1.89,3.69]
GCSE				3.84*** [3.03,4.87]
None				4.43*** [3.40,5.77]
Education level interaction with period (Pre-COVID-19 / Degree is ref): Degree # During COVID-19				
Alevel # During COVID-19				0.93 [0.76,1.14]
GCSE # During COVID-19				1.10 [0.98,1.23]
None # During COVID-19				0.92 [0.78,1.08]
Observations	38992	38992	38992	36984

Model 1: Year, age group, gender, ethnicity, period and period x age group interaction

Model 2: Year, age group, gender, ethnicity, period and period x gender interaction

Model 3: Year, age group, gender, ethnicity, period and period x ethnicity interaction

Model 4: Year, age group, gender, ethnicity, period, education level and period x education level interaction (sample limited to individuals aged 25+ years)

Table S9: Regular e-cigarette use and the interactions between period (pre-COVID-19 and during COVID-19) and age group, gender, ethnicity and education level

	Model 1	Model 2	Model 3	Model 4
Regular e-cigarettes	RR [95% CI]	RR [95% CI]	RR [95% CI]	RR [95% CI]
Year	1.11* [1.00,1.22]	1.10 [1.00,1.22]	1.10* [1.00,1.21]	1.08 [0.98,1.19]
Age group:	2.04	2.04	2.04	
18-24	[0.89,4.64]	[0.95,4.39]	[0.95,4.39]	
25-44	6.40*** [4.19,9.75]	6.23*** [4.14,9.37]	6.23*** [4.14,9.37]	6.94*** [4.58,10.51]
45-64	3.94*** [2.67,5.82]	3.94*** [2.70,5.74]	3.94*** [2.70,5.74]	3.99*** [2.71,5.88]
65+ (ref)				
Gender: Male (ref)				
Female	0.76* [0.58,0.99]	0.71* [0.54,0.95]	0.76* [0.58,0.99]	0.74* [0.56,0.96]
Ethnicity: White (ref)				
Non-white	0.52* [0.32,0.86]	0.52* [0.32,0.86]	0.57 [0.32,1.02]	0.52* [0.31,0.88]
Period: Pre-COVID-19 (ref)				
During COVID-19	0.68 [0.46,1.01]	0.61** [0.43,0.86]	0.68** [0.51,0.91]	0.84 [0.60,1.17]
Age group interaction with period (Pre-COVID-19 is ref):	1.01			
a18to24 # During COVID-19	[0.40,2.58]			
a25to44 # During COVID-19	0.92 [0.64,1.31]			
a45to64 # During COVID-19	1.00 [0.71,1.39]			
a65over # During COVID-19 (ref)				
Gender interaction with period (Pre-COVID-19 /male is ref):				
Male # During COVID-19				
Female # During COVID-19		1.20 [0.91,1.58]		
Ethnicity interaction with period (Pre-COVID-19 / white is				

ref): White # During COVID-19				
Non-white # During COVID-19			0.73 [0.22,2.43]	
Education level: Degree (ref)				
Alevel				1.95** [1.21,3.14]
GCSE				2.76*** [1.99,3.84]
None				2.40*** [1.62,3.57]
Education level interaction with period (Pre-COVID-19 / Degree is ref): Degree # During COVID-19				
Alevel # During COVID-19				0.79 [0.53,1.16]
GCSE # During COVID-19				0.82 [0.65,1.05]
None # During COVID-19				0.75 [0.55,1.01]
Observations	29244	29244	29244	27738

Model 1: Year, age group, gender, ethnicity, period and period x age group interaction

Model 2: Year, age group, gender, ethnicity, period and period x gender interaction

Model 3: Year, age group, gender, ethnicity, period and period x ethnicity interaction

Model 4: Year, age group, gender, ethnicity, period, education level and period x education level interaction (sample limited to individuals aged 25+ years)