Socioeconomic inequalities of Long COVID: a retrospective population-based cohort study in the United Kingdom

Supplementary Material

Figures

Figure S1: Long COVID symptoms in the survey questionnaire.

5.	Would you describe yourself as having "long COVID", that is, you are still experiencing symptoms more than 4 weeks after you first had COVID-19, that are not explained by something else? ☐ Yes ☐ No							
	If yes: (a) Does this reduce your ability to carry-out day-to-day activities compared with the time before you had COVID-19? *(select one)* ☐ Yes, a lot ☐ Yes, a little ☐ Not at all							
	(b) Have you had any of the following symptoms as part of your experience of long COVID? Please include any pre-existing symptoms which long COVID has made worse (answer Yes or No for each one)							
	Fever (including high temperature)	☐ Yes ☐ No	Headache	☐ Yes ☐ No	Muscle ache	☐ Yes ☐ No		
	Weakness/tiredness	☐ Yes ☐ No	Nausea/vomiting	☐ Yes ☐ No	Abdominal pain	☐ Yes ☐ No		
	Diarrhoea	☐ Yes ☐ No	Loss of appetite or eating less than usual	☐ Yes ☐ No	Loss of taste	☐ Yes ☐ No		
	Loss of smell	☐ Yes ☐ No	Sore throat	☐ Yes ☐ No	Cough	☐ Yes ☐ No		
	Shortness of breath	☐ Yes ☐ No	Chest pain	☐ Yes ☐ No	Palpitations	☐ Yes ☐ No		
	Vertigo/dizziness	☐ Yes ☐ No	Worry/anxiety	☐ Yes ☐ No	Low mood/not enjoying anything	☐ Yes ☐ No		
	More trouble sleeping than usual	☐ Yes ☐ No	Memory loss or confusion	☐ Yes ☐ No	Difficulty concentrating	☐ Yes ☐ No		
	Runny nose/ sneezing	☐ Yes ☐ No	Noisy breathing (wheezing)	☐ Yes ☐ No				

Reference: https://www.ndm.ox.ac.uk/covid-19/covid-19-infection-survey/case-record-forms?d3742abe-11b5-11ed-ab39-06d04f560572.

Tables

Table S1: The distribution of missing data for select covariates.

Variables	Total Participants	Participants with Missing Data*; N (%)
Long-term Health Conditions	201799	8581 (4.25)
Work Sector - Employed participants on the index date	201799	5579 (2.76)

*these were missing at the index date; we have imputed these with the most recent valid data.

Table S2: Occupation groups listed in the survey questionnaire.

Occupation groups	Included in the analysis
Teaching and education	Yes
Health care	Yes
Manufacturing or construction	Yes
Financial services incl. insurance	No
Civil service or Local Government	Yes
Information Technology and communication	No
Retail sector (incl. wholesale)	Yes
Transport (incl. storage, logistic)	No
Hospitality (e.g., hotel, restaurant)	Yes
Social care	Yes
Arts, Entertainment or Recreation	No
Food production, agriculture, farming	No
Personal services (e.g., hairdressers)	No
Armed forces	No
Other employment sector	No

Table S3: IMD distribution among participants who were included in the main analysis vs those who were excluded due to not having any visits 4 weeks after COVID-19

IMD Decile	Excluded participants Number of Participants (%)	Main Cohort Number of Participants (%)
1 (most deprived)	1375 (5.16)	9483 (4.70)
2	2037 (7.64)	13423 (6.65)
3	2318 (8.70)	16286 (8.07)
4	2607 (9.78)	18502 (9.17)
5	2619 (9.83)	20055 (9.94)
6	2850 (10.69)	22258 (11.03)
7	2934 (11.01)	23244 (11.52)
8	3161 (11.86)	24936 (12.36)
9	3324 (12.47)	26499 (13.13)
10 (least deprived)	3424 (12.85)	27113 (13.44)

Table S4: Number of participants experiencing Long COVID at least 4 weeks after having COVID-19, by IMD deciles.

IMD, deciles	Number of participants	Number of participants experiencing Long COVID, n (%)
1 (most deprived)	9483	1229 (12.96)
2	13423	1534 (11.43)
3	16286	1705 (10.47)
4	18502	1851 (10.0)
5	20055	1986 (9.9)
6	22258	2109 (9.48)
7	23244	2048 (8.81)
8	24936	2291 (9.19)
9	26499	2374 (8.96)
10 (least deprived)	27113	2188 (8.07)

1   **Table S5: Number of participants experiencing Long COVID at least 4 weeks after having COVID-19 by IMD deciles and occupational groups.**

IMD, deciles	Civil service or Local Government		Manufacturing or construction		Health care		Teaching and education	
	Total # of participants	Participants with Long COVID, n (%)	Total # of participants	Participants with Long COVID, n (%)	Total # of participants	Participants with Long COVID, n (%)	Total # of participants	Participants with Long COVID, n (%)
1 (most deprived)	488	66 (13.5)	674	74 (11.0)	950	140 (14.7)	854	136 (15.9)
2	820	110 (13.4)	1075	116 (10.8)	1343	195 (14.5)	1395	176 (12.6)
3	986	113 (11.5)	1227	129 (10.5)	1609	201 (12.5)	1806	222 (12.3)
4	1135	123 (10.8)	1447	131 (9.1)	1852	209 (11.3)	2095	255 (12.2)
5	1125	97 (8.6)	1645	155 (9.4)	2051	244 (11.9)	2346	295 (12.6)
6	1232	116 (9.4)	1834	149 (8.1)	2186	227 (10.4)	2758	350 (12.7)
7	1425	140 (9.8)	1843	150 (8.1)	2408	243 (10.1)	2826	298 (10.5)
8	1494	134 (9.0)	2064	165 (8.0)	2518	238 (9.5)	3158	372 (11.8)
9	1676	148 (8.8)	2205	194 (8.8)	2696	250 (9.3)	3260	349 (10.7)
10 (least deprived)	1571	144 (9.2)	2033	190 (9.4)	2760	238 (8.6)	3517	338 (9.6)
IMD, deciles	Hospitality (e.g. hotel, restaurant)		Retail sector (incl. wholesale)		Social care			
	Total # of participants	Participants with Long COVID, n (%)	Total # of participants	Participants with Long COVID, n (%)	Total # of participants	Participants with Long COVID, n (%)		
1 (most deprived)	388	52 (13.4)	776	105 (13.5)	379	50 (13.2)		
2	441	52 (11.8)	948	107 (11.3)	484	57 (11.8)		
3	560	57 (10.2)	1075	111 (10.3)	498	58 (11.7)		
4	608	60 (9.9)	1158	130 (11.2)	583	72 (12.4)		
5	622	66 (10.6)	1207	123 (10.2)	522	57 (10.9)		
6	650	67 (10.3)	1298	137 (10.6)	600	71 (11.8)		
7	659	60 (9.1)	1258	122 (9.7)	579	51 (8.8)		
8	671	73 (10.9)	1372	137 (10.0)	564	77 (13.7)		
9	646	55 (8.5)	1394	133 (9.5)	539	57 (10.6)		
10 (least deprived)	644	52 (8.1)	1290	117 (9.1)	519	42 (8.1)		

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Table S6: Association between deprivation and experiencing Long COVID at least 4 weeks after having COVID-19, for participants residing in England.

IMD, deciles	N=201,799	
	Odds ratio (95% CI)	P value
1 (most deprived)	1.41 (1.29, 1.54)	<0.001
2	1.30 (1.20, 1.41)	<0.001
3	1.25 (1.15, 1.35)	<0.001
4	1.22 (1.13, 1.32)	<0.001
5	1.18 (1.10, 1.28)	<0.001
6	1.20 (1.11, 1.29)	<0.001
7	1.09 (1.01, 1.17)	0.029
8	1.14 (1.06, 1.23)	<0.001
9	1.13 (1.05, 1.21)	0.001
10 (least deprived)	Reference	

Estimates Adjusted for age, ethnicity, urban/rural, comorbid conditions, household size, country, quarter of the year, healthcare and client-facing nature of the job in the multivariable logistic regression model using the logarithm of the follow-up time as an offset term.

Table S7: Association between deprivation and experiencing Long COVID at least 4 weeks after having COVID-19, using random-effects at country level.

IMD, deciles	N=201,799	
	Odds ratio (95% CI)	P value
1 (most deprived)	1.46 (1.31, 1.63)	<0.001
2	1.35 (1.22, 1.50)	<0.001
3	1.29 (1.17, 1.42)	<0.001
4	1.24 (1.18, 1.31)	<0.001
5	1.23 (1.12, 1.36)	<0.001
6	1.21 (1.16, 1.27)	<0.001
7	1.11 (1.03, 1.19)	0.004
8	1.17 (1.09, 1.24)	<0.001
9	1.13 (1.10, 1.17)	<0.001
10 (least deprived)	Reference	

Estimates adjusted for age, sex, ethnicity, urban/rural, comorbid conditions, household size, healthcare and patient/client-facing nature of the job, and time (as the quarter of the year) in the multilevel logistic regression model using random-effects at country level, and the logarithm of the follow-up time as an offset term.

Table S8: Association between deprivation and experiencing Long COVID at least 4 weeks after having COVID-19, excluding those who only had self-reported COVID-19 results.

IMD, deciles	N= 164,469	
	OR (95% CI)	P value
1 (most deprived)	1.52 (1.37, 1.69)	<0.001
2	1.35 (1.22, 1.49)	<0.001
3	1.33 (1.21, 1.46)	<0.001
4	1.23 (1.12, 1.35)	<0.001
5	1.27 (1.16, 1.39)	<0.001
6	1.16 (1.06, 1.27)	0.001
7	1.09 (0.99, 1.19)	0.069
8	1.14 (1.05, 1.25)	0.002
9	1.09 (1.00, 1.19)	0.044
10 (least deprived)	Reference	

Estimates adjusted for age, sex, ethnicity, urban/rural, comorbid conditions, household size, healthcare and patient/client-facing nature of the job, and time (as the quarter of the year) in the multilevel logistic regression model using random-effects at country level, and the logarithm of the follow-up time as an offset term.