

SUPPLEMENTARY MATERIAL FOR:**Evaluating access to health and care services during lockdown by the COVID-19 survey in five UK national longitudinal studies**

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Supplementary Table S1. Data missingness per outcome.

Outcome	Cohort study birth year	Sex[^]	Ethnicity[*]	Socio-economic position[†]	Chronic Illness[§]
Cancelled surgery, medical procedures or other medical appointments during lockdown	1946 (n=1170)	0	N/A	64	17
	1958 (n=5073)	0	N/A	761	58
	1970 (n=4099)	0	N/A	578	62
	1989-1990 (n=1849)	0	2	96	49
	2000-2002 (n=2605)	0	19	407	118
Number of care hours during lockdown	1946 (n=1170)	0	N/A	64	17
	1958 (n=4884)	0	N/A	731	53
	1970 (n=3972)	0	N/A	554	60
	1989-1990 (n=1787)	0	2	98	47
	2000-2002 (n=2605)	0	19	407	118

n represents the number of individuals for which we had the corresponding outcome, the combined weight and the receipt of a shielding letter.

[^] Sex missing value per outcome.

^{*} Ethnicity missing values per outcome.

[†] Socio-economic position missing values per outcome.

[§] Chronic illness missing values per outcome.

1946, refers to National Study of Health and Development (NSHD); 1958, refers to National Child Development Study (NCDS); 1970, refers to British Cohort Study (BCS70); 1989-1990, refers to Next Steps (NS); 2000-2002, refers to Millennium Cohort Study (MCS).

Supplementary Table S2. Chronic Disease breakdown.

Disease	1946	1958	1970	1989-1990	2000-2002
Cancer	65	147	45	4	2
Cystic fibrosis	0	0	0	0	1
Asthma	85	521	498	248	351
COPD	45	126	30	1	1
Wheezy bronchitis	13	46	21	3	3
Diabetes	104	404	156	21	19
Recurrent backache/prolapsed disc/sciatica/other back problems	217	838	587	138	104
Hearing difficulties	265	606	222	41	46
Hypertension	375	1261	443	28	12
Heart disease	100	236	43	2	11
Mental health disease	59	475	480	286	408
Obesity	85	542	439	154	49
Chronic obstructive airways disease (other than COPD)	9	23	7	1	1
Infection	12	53	30	14	20
Immunodeficiency (including HIV)	7	32	28	12	7
Neurological disease	24	51	51	12	12

Results are present as counts.

COPD, chronic obstructive pulmonary disease, HIV, human immunodeficiency virus. Other abbreviations as in Supplementary Table S1.

Supplementary Table S3. Comparison of participants with multiple co-morbidities vs participants with a single chronic disease in terms of the outcomes.

Cohort study birth year	Cancelled surgery, medical procedures or other medical appointments during lockdown [^]	Number of care hours during lockdown [*]
1946	0·0001	0·332
1958	<0·0001	<0·0001
1970	<0·0001	<0·0001
1989-1990	0·450	0·0003
2000-2002	0·017	0·196

P-values are presented.

[^]p-values were obtained from Chi squared test.

^{*}p-values were obtained from Mann-Whitney U test.

Abbreviations as in Supplementary Table S1.

Supplementary Table S4. Associations of sex with cancelled surgery, medical procedures or other medical appointments during lockdown after adjustment for children under 16 in the household.

Cohort study birth year	Sex [^]	
	OR (95% CI)	<i>p</i> -value
1946 (<i>n</i> =1154)	0.98 (0.76, 1.25)	0.839
1958 (<i>n</i> =4940)	1.18 (1.01, 1.39)	0.040
1970 (<i>n</i> =4008)	1.78 (1.45, 2.21)	<0.0001
1989-1990 (<i>n</i> =1796)	1.66 (1.20, 2.34)	0.003
2000-2002 (<i>n</i> =2510)	2.29 (1.66, 3.25)	<0.0001

Sex was coded as 0=male and 1=female.

All analyses used generalized linear models with logit link. Significant *p*-values are highlighted in bold.

[^]Adjustment was made for non-response weight, shielding letter and children under 16 in the household.

CI, confidence interval; OR, odds ratio. Other abbreviations as in *Supplementary Table S1*.

Supplementary Table S5. Associations of sex with cancelled surgery, medical procedures or other medical appointments during lockdown after adjustment for psychological distress.

Cohort study birth year	Sex [^]	
	OR (95% CI)	<i>p</i> -value
1946 (<i>n</i> =1059)	1.00 (0.77, 1.30)	0.983
1958 (<i>n</i> =4612)	1.12 (0.95, 1.32)	0.191
1970 (<i>n</i> =3481)	1.82 (1.34, 2.30)	<0.0001
1989-1990 (<i>n</i> =1697)	1.71 (1.23, 2.44)	0.002
2000-2002 (<i>n</i> =2461)	2.18 (1.55, 3.11)	<0.0001

Sex was coded as 0=male and 1=female.

All analyses used generalized linear models with logit link. Significant *p*-values are highlighted in bold.

[^]Adjustment was made for non-response weight, shielding letter and psychological distress.

Abbreviations as in *Supplementary Table S4*.

Supplementary Table S6. Associations of sex with cancelled surgery, medical procedures or other medical appointments during lockdown after adjustment for chronic illness.

Cohort study birth year	Sex [^]	
	OR (95% CI)	<i>p</i> -value
1946 (<i>n</i> =1121)	1.01 (0.79, 1.30)	0.822
1958 (<i>n</i> =5015)	1.24 (1.06, 1.46)	0.007
1970 (<i>n</i> =4037)	1.79 (1.45, 2.21)	<0.0001
1989-1990 (<i>n</i> =1800)	1.64 (1.19, 2.30)	0.003
2000-2002 (<i>n</i> =2487)	2.08 (1.51, 2.93)	<0.0001

Sex was coded as 0=male and 1=female.

All analyses used generalized linear models with logit link. Significant *p*-values are highlighted in bold.

[^]Adjustment was made for non-response weight, shielding letter and chronic illness.

Abbreviations as in *Supplementary Table S4*.

Supplementary Table S7. Meta-regression for the effect of age on cancelled surgery, medical procedures or other medical appointments and number of care hours needed during lockdown.

Analysis	Outcome	n	p-value [^]
Cancelled appointments	Sex	14796	0.196
	Chronic Illness	12584	0.928
Number of care hours	Ethnicity*	4371	N/A
	Chronic Illness	12684	0.352

[^]p-values for the test of moderators for the restricted cubic spline model are provided.

*Meta-regression was not feasible as only 2 studies recorded ethnicity.

N/A, not available.

Supplementary Table S8. Associations of ethnicity with the number of care hours during lockdown after adjustment for keyworker status.

Cohort study birth year	Ethnicity [^]	
	OR (95% CI)	p-value
1989-1990 (n=1785)	0.45 (0.28, 0.75)	0.002
2000-2002 (n=2586)	0.76 (0.40, 1.63)	0.453

Ethnicity was coded as 0=non-White and 1=White.

All analyses used generalized linear models with logit link. Significant p-values are highlighted in bold.

[^]Adjustment was made for non-response weight, shielding letter, sex and keyworker status.

Abbreviations as in *Supplementary Table S4*.

Supplementary Table S9. Associations of ethnicity with the number of care hours during lockdown after adjustment for COVID-19 infection.

Cohort study birth year	Ethnicity [^]	
	OR (95% CI)	p-value
1989-1990 (n=1785)	0.45 (0.28, 0.74)	0.001
2000-2002 (n=2586)	0.76 (0.39, 1.60)	0.429

Ethnicity was coded as 0=non-White and 1=White.

All analyses used generalized linear models with logit link. Significant p-values are highlighted in bold.

[^]Adjustment was made for non-response weight, shielding letter, sex and keyworker status.

Abbreviations as in *Supplementary Table S4*.

Supplementary Table S10. Associations of sex and with cancelled surgery, medical procedures or other medical appointments during lockdown after multiple imputation.

Cohort study birth year	Sex [^]	
	OR (95% CI)	<i>p</i> -value
1958	1.19 (1.08, 1.30)	<0.0001
1970	1.83 (1.61, 2.07)	<0.0001
1989-1990	1.50 (1.23, 1.83)	0.002
2000-2002	1.75 (1.32, 2.33)	0.003

Sex was coded as 0=male and 1=female.

All analyses used generalized linear models with logit link. Significant *p*-values are highlighted in bold.

[^] Adjustment was made for shielding letter.

Abbreviations as in *Supplementary Table S4*.

Supplementary Table S11. Association of sex, ethnicity, socio-economic position and the presence of chronic illness with number of care hours during lockdown after further adjustment for hours of care before lockdown.

Cohort study birth year	Sex [^]			Ethnicity [*]			Socio-economic position [†]			Chronic Illness [§]		
	OR (95% CI)	<i>p</i> -value	Brant test <i>p</i> -value	OR (95% CI)	<i>p</i> -value	Brant test <i>p</i> -value	OR (95% CI)	<i>p</i> -value	Brant test <i>p</i> -value	OR (95% CI)	<i>p</i> -value	Brant test <i>p</i> -value
1946 (<i>n</i> =1170)	1.25 (0.76, 2.07)	0.377	<0.0001	N/A	N/A	N/A	0.85 (0.35, 2.06)	0.718	0.148	1.93 (1.02, 4.00)	0.048	0.260
1958 (<i>n</i> =4860)	1.42 (1.02, 1.99)	0.038	0.004	N/A	N/A	N/A	1.22 (0.66, 2.26)	0.523	0.046	1.59 (1.05, 2.45)	0.031	0.015
1970 (<i>n</i> =3960)	0.91 (0.61, 1.37)	0.654	<0.0001	N/A	N/A	N/A	1.37 (0.67, 2.84)	0.389	<0.0001	1.75 (1.10, 2.81)	0.020	<0.0001
1989-1990 (<i>n</i> =1782)	0.60 (0.33, 1.10)	0.097	0.153	0.55 (0.29, 1.11)	0.086	<0.0001	1.34 (0.48, 3.83)	0.457	<0.0001	1.61 (0.87, 2.98)	0.128	<0.0001
2000-2002 (<i>n</i> =2478)	0.95 (0.51, 1.81)	0.868	0.967	0.70 (0.32, 1.76)	0.404	1.00	2.18 (0.76, 6.42)	0.148	0.998	1.21 (0.62, 2.28)	0.562	0.938

Sex was coded as 0=male and 1=female and ethnicity as 0=non-White and 1=White. Socio-economic was coded using childhood social class from 1=managerial to 6=unskilled, but ridit scores were used. Chronic illness was coded as 0=absent and 1=present.

All analyses used generalized linear models with ordinal logit link. Significant *p*-values are highlighted in bold.

[^] Adjustment was made for survey non-response weight, previous care hours and shielding letter.

^{*} Adjustment was made for survey non-response weight, previous care hours, shielding letter and sex.

[†] Adjustment was made for survey non-response weight, previous care hours, shielding letter, sex and ethnicity.

[§] Adjustment was made for survey non-response weight, previous care hours shielding letter, sex, ethnicity and SEP.

N/A, not available. Other abbreviations as in **Supplementary Table S4**.

Supplementary Table S12. Association of sex, ethnicity, socio-economic position and the presence of chronic illness with number of care hours during lockdown using multinomial logistic regression.

Cohort study birth year	Sex [^]			Ethnicity [*]			Socio-economic position [†]			Chronic Illness [§]		
	Never [∅]	Low RRR [↙] (95% CI)	High RRR [↘] (95% CI)	Never	Low RRR (95% CI)	High RRR (95% CI)	Never	Low RRR (95% CI)	High RRR (95% CI)	Never	Low RRR (95% CI)	High RRR (95% CI)
1946 (n=1170)	ref	1.30 (0.79, 2.17)	0.82 (0.38, 1.81)	N/A	N/A	N/A	ref	0.93 (0.39, 2.19)	2.18 (0.55, 8.70)	ref	1.90 (0.97, 3.72)	3.15 (0.93, 10.28)
1958 (n=4884)	ref	1.34 (0.67, 1.50)	1.01 (0.94, 1.92)	N/A	N/A	N/A	ref	1.34 (0.94, 1.91)	1.24 (0.62, 2.48)	ref	2.27 (1.46, 3.53)	2.08 (1.27, 3.40)
1970 (n=3972)	ref	1.02 (0.66, 1.60)	1.27 (0.72, 2.23)	N/A	N/A	N/A	ref	0.74 (0.35, 1.57)	0.69 (0.27, 1.77)	ref	2.07 (1.28, 3.36)	4.39 (2.18, 8.84)
1989-1990 (n=1787)	ref	0.49 (0.27, 0.89)	1.11 (0.49, 2.51)	ref	0.73 (0.20, 0.70)	0.37 (0.27, 1.99)	ref	0.64 (0.24, 1.76)	1.41 (0.36, 5.43)	ref	1.53 (0.84, 2.78)	1.83 (0.83, 4.05)
2000-2002 (n=2605)	ref	0.50 (0.44, 1.84)	0.90 (0.01, 3.53)	ref	0.92 (0.01, 1.6)	0.19 (0.36, 2.36)	ref	1.98 (0.19, 11.16)	4.62 (0.66, 5.97)	ref	1.08 (0.55, 2.12)	9.24 (1.03, 83.25)

Sex was coded as 0=male and 1=female and ethnicity as 0=non-White and 1=White. Socio-economic was coded using childhood social class from 1=managerial to 6=unskilled, but ridit scores were used. Chronic illness was coded as 0=absent and 1=present.

All analyses used multinomial logistic regression.

Statistically significant findings (95% CI exclude the null value) are highlighted in bold.

[^] Adjustment was made for survey non-response weight and shielding letter.

^{*} Adjustment was made for survey non-response weight, shielding letter and sex.

[†] Adjustment was made for survey non-response weight, shielding letter, sex and ethnicity.

[§] Adjustment was made for survey non-response weight shielding letter, sex, ethnicity and SEP.

[∅] Defined as 0 hours of care needed post-COVID-19.

[↙] Defined as 1-9 hours of care needed post-COVID-19.

[↘] Defined as 10+ hours of care needed post-COVID-19.

ref, reference; RRR, relative risk ratio. Other abbreviations as in *Supplementary Table S4*.

Supplementary Table S13. Association of socio-economic position surrogates with cancelled surgery, medical procedures or other medical appointments during lockdown.

Cohort study birth year	SEP as highest educational attainment ridit score [^]			SEP as pre-COVID financial difficulties ridit score [^]		
	<i>n</i>	OR (95% CI)	<i>p</i> -value	<i>n</i>	OR (95% CI)	<i>p</i> -value
1946	1089	1.43 (0.92, 2.21)	0.111	1145	1.28 (0.84, 1.97)	0.246
1958	4972	1.09 (0.83, 1.42)	0.559	4878	1.11 (0.85, 1.46)	0.454
1970	3850	1.12 (0.80, 1.58)	0.501	3978	1.10 (0.79, 1.54)	0.576
1989-1990	1722	1.41 (0.84, 2.37)	0.190	1768	1.49 (0.91, 2.44)	0.119
2000-2002	2444	0.84 (0.54, 1.31)	0.477	2413	0.90 (0.58, 1.40)	0.654

All analyses used generalized linear models with logit link.

[^] Adjustment was made for survey non-response weight, shielding letter, sex and ethnicity.

Abbreviations as in **Supplementary Table S4**.

Supplementary Table S14. Association of socio-economic position surrogates with the number of care hours during lockdown.

Cohort study birth year	SEP as highest educational attainment ridity score [^]			SEP as pre-COVID financial difficulties ridity score [^]		
	<i>n</i>	OR (95% CI)	<i>p</i> -value	<i>n</i>	OR (95% CI)	<i>p</i> -value
1946	1170	1.17 (0.77, 1.79)	0.672	1170	1.18 (0.58, 2.40)	0.657
1958	4789	1.12 (0.72, 1.75)	0.609	4836	1.20 (0.77, 1.87)	0.407
1970	3747	0.68 (0.39, 1.20)	0.182	3954	0.81 (0.47, 1.39)	0.345
1989-1990	1666	0.99 (0.43, 2.25)	0.979	1768	0.92 (0.43, 2.00)	0.841
2000-2002	2444	1.53 (0.57, 4.14)	0.408	2420	1.86 (0.73, 4.79)	0.196

All analyses used generalized linear models with ordinal logit link.

[^] Adjustment was made for survey non-response weight, shielding letter, sex and ethnicity.

Abbreviations as in *Supplementary Table S4*.