Mental health inequalities in healthcare, economic, and housing disruption during COVID -19: an investigation in 12 longitudinal studies

Supplementary file 2

Contents

S2.1 Ethics and data access statements for each study	2
S2.2 Funding statements for studies and authors	3
S2.3 Further details of measures of psychological distress	5
S2.4 Supplementary Tables	7
Supplementary Table S1. Percent (and N) distribution of demographic and socio-economic characteristics by study	7
Supplementary Table S2. Mean pre-pandemic psychological distress scores and % with high psychological distress, by study	•
Supplementary Table S3. Mean pre-pandemic psychological distress scores (and 95% confidence intervals) by socio-demographic characteristics and study	
Supplementary Table S4. Percentage with high psychological distress scores (and 95% confidence intervals) by socio-demographic characteristics and study	2
Supplementary Table S5. Percent prevalence of any healthcare, economic, and housing disruptions during the pandemic by socio-demographic characteristics and study	1
Supplementary Table S6. Meta-regression assessing moderation by time since pre-pandemic mental health measure	5
Supplementary Table S7. Meta-analysed associations between standardised psychological distress and overall healthcare, economic and housing disruptions stratified by sex, education, ethnicity and age	7
S2.5 References	3

S2.1 Ethics and data access statements for each study

The most recent sweeps of the **NSHD**, **NCDS**, **BCS70**, **Next Steps** and **MCS** have all been granted ethical approval by the National Health Service (NHS) Research Ethics Committee and all participants have given informed consent. Data for NCDS (SN 6137), BCS70 (SN 8547), Next Steps (SN 5545), MCS (SN 8682) and all four COVID-19 surveys (SN 8658) are available through the UK Data Service. NSHD data are available on request to the NSHD Data Sharing Committee. Interested researchers can apply to access the NSHD data via a standard application procedure. Data requests should be submitted to <u>mrclha.swiftinfo@ucl.ac.uk</u>; further details can be found at http://www.nshd.mrc.ac.uk/data.aspx. doi:10.5522/NSHD/Q101; doi:10.5522/NSHD/Q10.

Ethical approval was obtained from the **ALSPAC** Ethics and Law Committee and the Local Research Ethics Committees. The study website contains details of all the data that is available through a fully searchable data dictionary and variable search tool: <u>http://www.bristol.ac.uk/alspac/researchers/our-data</u>. ALSPAC data is available to researchers through an online proposal system. Information regarding access can be found on the ALSPAC website (<u>http://www.bristol.ac.uk/media-</u>library/sites/alspac/documents/researchers/data-access/ALSPAC Access Policy.pdf).

All wave of **TwinsUK** have received ethical approval associated with TwinsUK Biobank (19/NW/0187), TwinsUK (EC04/015) or Healthy Ageing Twin Study (H.A.T.S) (07/H0802/84) studies from NHS Research Ethics Committees at the Department of Twin Research and Genetic Epidemiology, King's College London. The TwinsUK Resource Executive Committee (TREC) oversees management, data sharing and collaborations involving the TwinsUK registry (for further details see <u>https://twinsuk.ac.uk/resources-for-researchers/access-our-data/</u>).

The University of Essex Ethics Committee has approved all data collection for the **Understanding Society** main study and COVID-19 waves. No additional ethical approval was necessary for this secondary data analysis. All data are available through the UK Data Service (SN 6614 and SN 8644).

Waves 1-9 of **ELSA** were approved through the National Research Ethics Service, while the COVID-19 Sub-study was approved by the UCL Research Ethics Committee. All participants provided informed consent. All data are available through the UK Data Service (SN 8688 and 5050).

Generation Scotland obtained ethical approval from the East of Scotland Committee on Medical Research Ethics (on behalf of the National Health Service). Reference number 20/ES/0021. Access to data is approved by the Generation Scotland Access Committee. See https://www.ed.ac.uk/generation-scotland/for-researchers/access or email access@generationscotland.org for further details.

The **GLAD** Study was approved by the London - Fulham Research Ethics Committee on 21st August 2018 (REC reference: 18/LO/1218) following a full review by the committee. Researchers wishing to access GLAD Study participants or data are invited to submit a data and sample access request to the NIHR BioResource to request a collaboration.

S2.2 Funding statements for studies and authors

Understanding Society is an initiative funded by the Economic and Social Research Council and various Government Departments, with scientific leadership by the Institute for Social and Economic Research, University of Essex, and survey delivery by NatCen Social Research and Kantar Public. The Understanding Society COVID-19 study is funded by the Economic and Social Research Council (ES/K005146/1) and the Health Foundation (2076161). The research data are distributed by the UK Data Service.

The Millennium Cohort Study, Next Steps, 1970 British Cohort Study and 1958 National Child Development Study are supported by the Centre for Longitudinal Studies, Resource Centre 2015-20 grant (ES/M001660/1) and a host of other co-funders. The 1946 NSHD cohort is hosted by the the MRC Unit for Lifelong Health and Ageing funded by the Medical Research Council (MC_UU_00019/1Theme 1: Cohorts and Data Collection). The COVID-19 data collections in these five cohorts were funded by the UKRI grant Understanding the economic, social and health impacts of COVID-19 using lifetime data: evidence from 5 nationally representative UK cohorts (ES/V012789/1)

The **English Longitudinal Study of Ageing** was developed by a team of researchers based at University College London, NatCen Social Research, the Institute for Fiscal Studies, the University of Manchester and the University of East Anglia. The data were collected by NatCen Social Research. The funding is currently provided by the National Institute on Aging in the US, and a consortium of UK government departments coordinated by the National Institute for Health Research. Funding has also been received by the Economic and Social Research Council. The English Longitudinal Study of Ageing Covid-19 Substudy was supported by the UK Economic and Social Research Grant (ESRC) ES/V003941/1.

The UK Medical Research Council and Wellcome (Grant Ref: 217065/Z/19/Z) and the University of Bristol provide core support for ALSPAC. A comprehensive list of grants funding is available on the ALSPAC website (http://www.bristol.ac.uk/alspac/external/documents/grant-acknowledgements.pdf). We are extremely grateful to all the families who took part in this study, the midwives for their help in recruiting them, and the whole ALSPAC team, which includes interviewers, computer and laboratory technicians, clerical workers, research scientists, volunteers, managers, receptionists and nurses.

TwinsUK receives funding from the Wellcome Trust (WT212904/Z/18/Z), the National Institute for Health Research (NIHR) Biomedical Research Centre based at Guy's and St Thomas' NHS Foundation Trust and King's College London. TwinsUK is also supported by the Chronic Disease Research Foundation and Zoe Global Ltd. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Generation Scotland received core support from the Chief Scientist Office of the Scottish Government Health Directorates [CZD/16/6] and the Scottish Funding Council [HR03006]. Genotyping of the GS:SFHS samples was carried out by the Genetics Core Laboratory at the Wellcome Trust Clinical Research Facility, Edinburgh, Scotland and was funded by the Medical Research Council UK and the Wellcome Trust (Wellcome Trust Strategic Award "STratifying Resilience and Depression Longitudinally" (STRADL) Reference 104036/Z/14/Z). Generation Scotland is funded by the Wellcome Trust (216767/Z/19/Z).

The Genetic Links to Anxiety and Depression project is supported by the National Institute for Health Research (NIHR) BioResource, the NIHR BioResource Centre Maudsley, and the Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London. This study presents independent research supported by the National Institute for Health Research (NIHR) Biomedical Research Centre BioResource at South London and Maudsley NHS Foundation Trust and King's College London. The views expressed are those of the author(s) and not necessarily those of the NHS, NIHR, Department of Health and Social Care or King's College London. We gratefully acknowledge capital equipment funding from the Maudsley Charity (Grant Ref. 980) and Guy's and St Thomas's Charity (Grant Ref. STR130505).

SVK acknowledges funding from a NRS Senior Clinical Fellowship (SCAF/15/02), the Medical Research Council (MC_UU_00022/2) and the Scottish Government Chief Scientist Office (SPHSU13). **ASFK** acknowledges funding from the ESRC (ES/V011650/1). **DJP** acknowledges funding from the Wellcome Trust (216767/Z/19/Z and 221574/Z/20/Z). **CLN** acknowledges funding from a Medical Research Council Fellowship (MR/R024774/1). **EJT** acknowledges funding from the Wellcome Trust (WT212904/Z/18/Z).

Role of funder. The funders had no role in the methodology, analysis or interpretation of the findings presented in this manuscript.

S2.3 Further details of measures of psychological distress

MCS: The K- 6^1 is a 6-item measure of psychological distress (i.e., general anxiety and depression). Responses are rated on a 5-point Likert-type scale, and capture distress over a period of four weeks prior to administration of the scale. Scores range from 0 to 24, with a conservative cut-off of 13+ applied to indicate probable psychological distress.

NCDS, BCS70: The 9-item version of the Malaise Inventory² was used to assess general psychological distress. Items are scored using a simple 'Yes/No' response, meaning continuous scores range from 0-9. Scores of four or more are indicative of probable psychiatric distress.

Understanding Society, **Next Steps**, **Generation Scotland**, **NSHD**: The 28-item General Health Questionnaire (GHQ)³ was used to detect symptoms of psychological distress in GS and NSHD. The GHQ is a screening instrument designed to detect symptoms of psychological distress (i.e. general anxiety and depression). Each item is scored 0-3 resulting in scores ranging from 0-84. There is an alternative scoring where each item is scored as 0-0-1-1. The 12-item GHQ was used to detect symptoms of psychological distress in Understanding Society and Next Steps. This version is scored in the same manner as the 28-item questionnaire, resulting in scores ranging from 0-36.

GLAD: The Patient Health Questionnaire $(PHQ-9)^4$ is a 9-item tool used by healthcare professionals to assess severity of depressive symptoms. Individuals are asked to indicate, from 0 "Not at all" to 3 "Nearly every day" how often they have been bothered by problems such as "Little interest or pleasure in doing things?". Each answer is scored between 0 and 3, leaving each participant with a total score out of 27.

ALSPAC G1: Self-reported depressive symptoms were measured using the short mood and feelings questionnaire (SMFQ).⁵ The SMFQ is a 13-item questionnaire that measures the presence of depression symptoms in the previous two weeks and was administered via postal questionnaire or in research clinics. Each item is scored between 0-2, resulting in a summed score between 0-26. Depression severity can be rated in the following score bands: 0-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, 20-27 severe.

ALSPAC G0: The Edinburgh Postnatal Depression Scale (EPDS)⁶ was originally developed to screen for postnatal depression in women, but has since been shown to effectively screen for depression in men also.⁷ This 10-item questionnaire assesses the severity of depressive symptoms over the previous 7 days using a 4-point Likert response scale. Cut-off values of 13 or higher are most often used to identify those who might have probable depression.

ELSA: Depressive symptoms were measured using the 8-item version of the Center for Epidemiologic Studies Depression Scale (CES-D).⁸ This measure asks respondents to indicate how often they experienced symptoms over the previous week using a 4-point Likert response. A binary (present/absent) scoring system was applied in the present study.

TwinsUK: The Hospital Anxiety and Depression Scale (HADS)⁹ is a 14-item scale used to measure levels of psychiatric distress in non-psychiatric patient populations. Responses are indicated on a 4-point ordinal Likert scale.

S2.4 Supplementary Tables

Supplementary Table S1. Percent	(and N) dist	ribution of demogra	aphic and socio-econor	nic characteristics by study
	· /			

	MCS	ALSPAC G1	NS	BCS 70	NCDS	NSHD	USOC	ELSA	GS	ALSPAC G0	TWINS UK	GLAD
Total analytic N	3,028	2,698	3,209	4,303	5,394	1,310	13,175	5,061	3,179	3,212	2855	12,107
Female	65.5	68.1	64.7	57.8	53.6	52.8	57.9	57.1	63.7	72.5	89.8	82.1
	(2,007)	(1,837)	(2,077)	(2,494)	(2,892)	(691)	(7,623)	(2,891)	(2,025)	(2,327)	(2,565)	(9,935)
Mean age in 2020 (range)	19.5	27.6	30.6	50.5	62.6	74.0	51.2	70.3	60.1	58.8	64.4	43.0
	(18-20)	(27-29)	(29-31)				(16-96)	(52-90+)	(27-100)	(45-81)	(22-96)	(16-89)
Ethnicity												
White	86.1	96.7	75.1				87.4	96.4	99.3	98.5	98.5	95.8
	(2,636)	(2,608)	(2,409)				(11,517)	(4,881)	(3,157)	(3,143)	(2,811)	(11,572)
South Asian	8.3 (255)		16.5 (528)				6.5 (861)	1.8 (88)	0.2 (7)		0.2 (6)	
Black	2.7 (82)		3.9 (126)				2.5 (329)	1.0 (50)	0(1)		0.6 (18)	0.3 (37)
Mixed	2.5 (76)		4.6 (146)				1.8 (238)	0.8 (42)	0.4 (13)		0.5 (15)	2.1 (259)
Other	0.5 (14)		0				1.8 (230)		0 (1)		0.3 (5)	0.9 (108)
Ethnic minority	13.9 (427)	3.3 (88)	24.9 (800)				12.6 (1,658)	3.6 (180)	0.7 (22)	1.5 (48)	1.5 (44)	4.2 (507)
	56.5	20.4	49.9	47.6	46.4	29.9	47.2	25.6	46.6	30.2	52.9	59.0
High Education	(1,729)	(551)	(1,600)	(2,053)	(2,504)	(391)	(6,219)	(1,297)	(1,483)	(969)	(1,509)	(7,138)
Social class												
Managerial, Admin, and	60.5	45.6	54.0	67.6	60.9	56.0	35.1	34.0	61.0	52.3		
Professional occupation	(1,560)	(1,066)	(1,461)	(2,797)	(3,075)	(733)	(4,624)	(1,720)	(1,939)	(1,520)		
Intermediate occupations	17.9	53.2	23.5	18.4	21.8	34.5	17.1	24.1	11.2	47.1		
Intermediate occupations	(461)	(1,246)	(635)	(763)	(1,098)	(452)	(2,250)	(1,221)	(355)	(1,369)		
Routine and Manual	21.6	1.2	22.5	13.7	16.8	9.2	20.1	28.4	3.3	0.6		
occupations	(556)	(28)	(608)	(567)	(846)	(121)	(2,641)	(1,438)	(104)	(17)		
Never worked, long-term				0.3	0.5	0.3	27.8	13.5	24.5			
unemployed, or missing				(11)	(27)	(4)	(3,660)	(682)	(781)			
Country of residence												
· · · · ·	67.5		96.8	86.0	84.1	87.0	84.1	100	16		92.5	89.5
England	(2,066)		(3,105)	(3,709)	(4,536)	(1, 140)	(11,078)	(5,061)	(0.5)		(2645)	(10,837)
Scotland	13.0 (397)		0.6 (20)	8.1 (351)	8.8 (476)	7.6 (99)	7.5 (983)		99.4 (3,160)		3.6 (104)	5.4 (654)

Wales	11.5 (351)	 0.6 (19)	5.0 (215)	5.2 (281)	4.3 (56)	5.1 (669)	 	 3.2 (92)	2.5 (307)
N.Ireland	7.4 (227)	 0.2 (5)	0.1 (2)	0.1 (3)		3.4 (445)	 	 0.5 (14)	2.6 (309)
Other	0.7 (22)	 1.9 (60)	0.8 (35)	1.8 (98)	0.7 (9)		 0.1 (3)	 	

Sources: MCS (Millennium Cohort Study); ALSPAC G1 (Children of the Avon Longitudinal Study of Parents and Children); NS (Next Steps); BCS 70 (1970 British Cohort Study), NCDS (National Child Development Study); NSHD (National Survey of Health and Development); USOC (Understanding Society); ELSA (English Longitudinal Study of Ageing); GS (Generation Scotland: the Scotlish Family Health Study); TWINS UK (UK Adult Twin Registry); GLAD (Genetic Links to Anxiety and Depression), ALSPAC G0 (parents of ALSPAC). Notes: Samples for each study restricted to respondents with non-missing pre-pandemic psychological distress measure, with at least one disruption experienced during the pandemic, and valid information on sex and age. -- (not available/applicable).

	MCS	ALSPAC G1	NS	BCS70	NCDS	NSHD	USOC	ELSA	GS	ALSPAC G0	TWINS UK	GLAD
Measure	K6	SMFQ	GHQ-12	Malaise	Malaise	GHQ-28	GHQ-12	CES-D	GHQ-28	EPDS	HADS	PHQ9
Range	0-24	0-26	0-36	0-9	0-9	0-27	0-36	0-8	0-70	0-30	0-36	0-27
Mean (SD)	7.7 (5.0)	6.7 (6.2)	11.9 (6.0)	1.9 (2.2)	1.4 (1.9)	1.7 (3.3)	11.5 (8.4)	1.4 (1.9)	14.9 (7.7)	6.4 (5.5)	7.4 (6.0)	11.2 (6.9)
% High psychological distress	18.4	23.9	24.3	21.8	13.2	15.2	20.1	12.8	11.8	18.3	5.8	54.5
Threshold for high psychological distress	13+	11+	4+	4+	4+	4+	4+	4+	24+	12+	11+	10+
Year of pre- pandemic assessment	2018	2017/18	2015	2016	2008	2015	2018/19	2018/19	2006/11	2011/13	2017/18	2018/20
Gap (in years) to pandemic	2	2/3	5	4	12	5	1/2	1/2	9/14	7/9	2/3	0/2
Mean age when assessed	17.3	25.3	26.0	46.9	50.7	69.0	48.0	68.4	49.6	51.1	65.3	42.1

Supplementary Table S2. Mean pre-pandemic psychological distress scores and % with high psychological distress, by study

Sources: MCS (Millennium Cohort Study); ALSPAC G1 (Children of the Avon Longitudinal Study of Parents and Children); NS (Next Steps); BCS 70 (1970 British Cohort Study), NCDS (National Child Development Study); NSHD (National Survey of Health and Development); USOC (Understanding Society); ELSA (English Longitudinal Study of Ageing); GS (Generation Scotland: the Scotlish Family Health Study); TWINS UK (UK Adult Twin Registry); GLAD (Genetic Links to Anxiety and Depression), ALSPAC G0 (parents of ALSPAC). Weighted data.

	MCS	ALSPAC	NS	BCS 70	NCDS	NSHD	USOC	ELSA	GS	ALSPAC	TWINS	GLAD
		G1								GO	UK	
Male	6.8	5.3	11.4	1.6	1.1	1.0	10.8	1.1	13.9	5.4	6.2	10.8
WIAIC	(6.3-7.2)	(4.9-5.7)	(11.0-11.7)	(1.4-1.7)	(1.0-1.2)	(0.7-1.3)	(10.6-11.0)	(1.0-1.25)	(13.5-14.3)	(5.0-5.8)	(5.6-6.8)	(10.5-11.1)
Esmals	8.7	7.4	12.4	2.3	1.67	2.3	12.1	1.7	15.6	6.8	7.6	11.3
Female	(8.2-9.1)	(7.1-7.7)	(12.1-12.6)	(2.1-2.4)	(1.6-1.8)	(1.7-3.0)	(11.9-12.3)	(1.6-1.8)	(15.2-15.9)	(6.5-7.1)	(7.3-7.8)	(11.1-11.4)
No high	8.0	6.9	12.3	2.1	1.51	1.9	11.6	1.5	15.1	6.2	7.6	12.7
education	(7.5-8.6)	(6.6-7.2)	(11.9-12.6)	(1.9-2.3)	(1.4-1.6)	(1.4-2.4)	(11.4-11.8)	(1.4-1.6)	(14.7-15.5)	(6.3-6.9)	(7.3-8.0)	(12.5-12.8)
High	7.4	6.2	11.8	1.5	1.22	1.1	11.3	1.1	14.8	5.8	7.2	10.2
education	(7.0-7.7)	(5.6-6.7)	(11.5-12.1)	(1.4-1.6)	(1.2-1.3)	(0.6-1.5)	(11.1-11.5)	(0.9-1.2)	(14.4-15.2)	(5.5-6.2)	(6.9-7.5)	(10.0-10.3)
	7.8	6.7	12.1				11.5	1.4	14.9	6.5	7.4	11.1
White	(7.5-8.2)	(6.4-7.0)	(11.9-12.4)				(11.3-11.6)	(1.3-1.4)	(14.7-15.2)	(6.3-6.7)	(7.2-7.6)	(11.0-11.2)
Ethnic	7.28	7.8	11.8				11.9	2.4	17.5	5.6	9.1	12.4
minority	(6.8-7.7)	(5.8-9.9)	(11.3-12.2)				(11.3-12.4)	(1.8-2.9)	(12.4-22.7)	(4.1-7.1)	(6.9-11.3)	(11.7-13.1)
							12.4				6.9	14.0
16-24							(12.0-12.9)				(-2.1-15.8)	(13.6-14.3)
							12.1		15.6		9.5	11.6
25-34							(11.6-12.6)		(13.7-17.5)		(8.3-11)	(11.3-11.8)
							12.0		15.4		8.5	11.0
35-44							(11.6-12.3)		(14.5-16.3)		(7.5-9.4)	(10.7-11.3)
							11.9	1.4	15.3	7.1	8.1	11.2
45-54							(11.6-12.2)	(1.1-1.6)	(14.6-15.9)	(6.2-8.1)	(7.4-8.9)	(10.9-11.4)
							11.5	1.5	16.1	6.4	7.9	10.1
55-64							(11.2-11.8)	(1.4-1.7)	(15.6-16.6)	(6.1-6.7)	(7.4-8.4)	(9.8-10.4)
							10.0	1.3	14.1	5.5	6.8	7.8
65-74							(9.8-10.3)	(1.2-1.4)	(13.7-14.5)	(4.8-6.3)	(6.5-7.2)	(7.4 - 8.2)

Supplementary Table S3. Mean pre-pandemic psychological distress scores (and 95% confidence intervals) by sociodemographic characteristics and study

75+	 	 	 	9.9	1.5	12.4	5.6	7.0	6.9
				(9.6-10.3)	(1.4-1.6)	(11.5-13.3)	(2.2-8.9)	(6.6-7.4)	(5.8-8.1)

Sources: MCS (Millennium Cohort Study); ALSPAC G1 (Children of the Avon Longitudinal Study of Parents and Children); NS (Next Steps); BCS 70 (1970 British Cohort Study), NCDS (National Child Development Study); NSHD (National Survey of Health and Development); USOC (Understanding Society); ELSA (English Longitudinal Study of Ageing); GS (Generation Scotland: the Scotlish Family Health Study); TWINS UK (UK Adult Twin Registry); GLAD (Genetic Links to Anxiety and Depression), ALSPAC G0 (parents of ALSPAC). Weighted data. Notes: -- (not available/applicable).

			1	ucint			stics and	study	1		1	
	MCS	ALSPAC G1	NS	BCS 70	NCDS	NSHD	USOC	ELSA	GS	ALSPAC G0	TWINS UK	GLAD
Male	13.3 (9.9-17.7)	16.7 (13.7-20.0)	22.7 (20.4-25.2)	17.5 (14.3-21.2)	9.6 (7.9-11.6)	7.1 (4.3-11.6)	16.4 (15.2-17.8)	9.1 (7.4-11.1)	9.4 (7.7-11.2)	10.7 (7.7-14.7)	2.4 (1.2-5.0)	51.43 (49.3-53.5)
Female	23.5 (20.3-27.1)	27.2 (24.6-30.1)	28.1 (26.2-30.0)	26.1 (23.0-30.0)	16.7 (15.0-18.6)	22.1 (15.3-30.8)	23.5 (22.2-24.8)	16.1 (14.2-18.0)	13.1 (11.7-14.7)	20.9 (18.7-23.4)	6.2 (5.3-7.2)	55.18 (55.0-56.2)
No high education	22.5 (18.1-27.7)	25.2 (22.8-27.8)	27.2 (25.0-29.4)	25.3 (22.0-29.0)	14.6 (12.8-16.5)	16.0 (11.2-22.2)	20.6 (19.3-21.9)	14.1 (12.6-15.8)	12.9 (11.3-14.6)	19.4 (17.1-21.9)	5.6 (4.5-7.0)	63.41 (62.1-64.7)
High education	14.4 (11.8-17.3)	19.0 (15.1-23.6)	25.2 (23.1-27.4)	15.3 (13.4-17.3)	10.9 (9.5-12.5)	11.7 (5.6-22.7)	19.4 (18.1-20.7)	8.5 (6.5-10.9)	10.4 (8.9-12.1)	14.3 (11.9-16.9)	5.9 (4.8-7.2)	48.30 (47.2-49.5)
White	19.2 (16.3-22.3)	23.7 (21.5-25.9)	25.7 (23.9-27.4)				19.7 (18.7-20.7)	11.8 (10.6-13.0)	11.6 (10.5-12.8)	18.4 (16.4-20.5)	5.7 (4.9-6.6)	54.20 (53.3-55.1)
Ethnic minority	15.7 (12.5-19.5)	32.7 (19.9-48.7)	27.8 (24.8-31.0)				24.8 (21.3-28.6)	27.1 (18.6-37.7)	22.7 (7.8-45.4)	13.0 (5.0-29.8)	9.1 (4.4-22.1)	60.95 (56.6-65.1)
16-24							29.9 (26.7-33.4)				12.5 (1.5-57.3)	73.2 (71.0-75.4)
25-34							22.3 (19.3-25.5)		16.0 (9.6-24.4)		14.6 (8.3-24.7)	58.3 (56.4-60.1)
35-44							22.5 (20.1-25.0)		12.6 (8.7-17.3)		8.4 (5.2-13.2)	53.5 (51.5-55.5)
45-54							20.9 (18.9-23.0)	12.1 (8.7-16.6)	12.4 (9.7-15.4)	23.7 (17.7-31.0)	9.2 (6.4-13.1)	52.8 (50.9-54.6)

Supplementary Table S4. Percentage with high psychological distress scores (and 95% confidence intervals) by sociodemographic characteristics and study

55-64	 	 	 	19.1 (17.3-21.0)	15.1 (12.3-18.3)	14.2 (12.0-16.7)	17.5 (15.6-19.6)	6.5 (4.8-8.7)	47.1 (44.9-49.4)
65-74	 	 	 	11.7 (10.2-13.5)	10.9 (9.4-12.6)	9.8 (8.3-11.7)	14.0 (1.0-19.5)	4.8 (3.7-6.2)	32.9 (29.6-36.4)
75+	 	 	 	11.8 (9.5-14.4)	12.3 (9.4-12.6)	5.5 (2.4-10.5)	<0.1	3.0 (1.8-4.7)	30.2 (21.3-40.9)

Sources: MCS (Millennium Cohort Study); ALSPAC G1 (Children of the Avon Longitudinal Study of Parents and Children); NS (Next Steps); BCS 70 (1970 British Cohort Study), NCDS (National Child Development Study); NSHD (National Survey of Health and Development); USOC (Understanding Society); ELSA (English Longitudinal Study of Ageing); GS (Generation Scotland: the Scotlish Family Health Study); TWINS UK (UK Adult Twin Registry); GLAD (Genetic Links to Anxiety and Depression), ALSPAC G0 (parents of ALSPAC). Weighted data. Notes: -- (not available/applicable).

		~	1		1			-J		1			
		Sex		nicity	Educ					ge groi			
	Male	Female	White	Ethnic	Not	High	16-24	25-34	35-44	45-54	55-64	65-74	75+
				minority	high								
Any healthcare disruption	1				-			-		-	-		
MCS	6.6	12.4	10.6	9.6	9.8	10.9	10.4						
ALSPAC-G1	12.8	17.5	16.1	9.0	15.8	16.4		15.9					
NS	8.0	12.7	11.5	9.3	10.7	11.3		11.0					
BCS 70	10.0	15.6			13.3	13.2				13.2			
NCDS	13.9	15.2			14.2	15.1					14.6		
NSHD	17.3	19.3			18.3	18.4						18.3	
USOC	29.4	34.1	32.0	30.0	33.2	29.6	18.5	24.4	24.9	30.8	38.5	43.5	45.3
ELSA	36.4	36.9	36.4	40.4	37.1	36.0				32.6	35.8	36.2	40.5
GS	27.4	27.5	27.4	36.4	29	25.6		24.5	22.4	24.1	25	30.6	39
ALSPAC-G0	18.1	20.5	19.9	25.6	20.1	19.4				21.4	19.2	21.6	30.6
TWINSUK	10.3	8.5	8.7	9.1	8.0	9.3	12.5	8.0	14.7	9.6	8.1	9.2	6.0
GLAD	0.8	0.7	0.7	0.5	0.7	0.7	0.7	0.9	0.8	0.5	0.6	0.8	1.3
Any economic disruption													
MCS	45.1	47.3	47.1	43.5	47.4	45.9	46.6						
ALSPAC-G1	45.4	52.3	49.3	53.8	50.2	50.3		50.2					
NS	41.7	49.6	47.6	44.4	47.3	46.2		46.8					
BCS 70	46.9	50.7			49.0	49.2				49.1			
NCDS	42.8	35.7			40.4	37.4					39.0		
NSHD	11.7	9.3			9.7	12.0						10.4	
USOC	50.7	52.4	48.6	50.7	51.6	56.4	52.7	66.9	66.2	66.4	57.5	22.1	9.9
ELSA	33.9	26.9	29.4	41.5	29.1	34.4				51.6	46.7	20.8	8.0
GS	21.8	20.3	20.7	36.4	20.3	21.4		23.6	31.9	34.9	27.7	9.0	4.1
ALSPAC-G0	50.7	48.0	48.7	49.5	48.9	47.9				50.2	50.0	38.0	11.8

Supplementary Table S5. Percent prevalence of any healthcare, economic, and housing disruptions during the pandemic by sociodemographic characteristics and study

TWINSUK	35.9	30.4	30.9	29.5	26.3	35.1	50	37.3	44	42.3	40.7	25.2	20
GLAD	34.6	43.4	41.5	51.3	42.8	41.2	65.2	46.9	41.2	39.4	32.9	11.7	12.2
Any housing disruption													
MCS	31.8	34.3	35.1	23.4	26.5	38.9	33.5						
ALSPAC-G1	24.3	22.8	23.3	24.0	21.6	30.0		23.3					
NS	13.5	14.4	14.2	13.9	13.1	15.1		14.1					
BCS 70	11.9	15.0			13.9	13.4				13.7			
NCDS	9.7	12.2			8.7	13.8					11.1		
NSHD	2.4	3.8			3.5	2.3						3.1	
USOC	29.6	33.9	31.9	31.0	31.1	33.1	38.1	38.9	27.8	33.9	33.0	26.1	21.1
ELSA	24.5	24.4	23.5	37.3	22.9	30.1				38.9	32.4	18.2	13.4
GS	5.9	8.7	7.7	9.1	5.8	9.8		8.5	5.9	12.6	10.5	4.2	4.8
ALSPAC-G0	10.6	16.8	15.4	4.7	14.6	18.3				17.9	15.1	11.8	0
TWINSUK	4.8	7.1	6.8	9.1	4.2	9.1	25	9.3	11	11.9	9.4	4.5	3.9
GLAD	10.4	12.8	12.2	15.9	13.1	11.8	28.8	12.1	7.2	11.5	9.2	6.9	5.8

Sources: MCS (Millennium Cohort Study); ALSPAC G1 (Children of the Avon Longitudinal Study of Parents and Children); NS (Next Steps); BCS 70 (1970 British Cohort Study), NCDS (National Child Development Study); NSHD (National Survey of Health and Development); USOC (Understanding Society); ELSA (English Longitudinal Study of Ageing); GS (Generation Scotland: the Scottish Family Health Study); TWINS UK (UK Adult Twin Registry); GLAD (Genetic Links to Anxiety and Depression), ALSPAC G0 (parents of ALSPAC). Weighted data. Notes: -- (not available/applicable).

	Any Healthcare disru	otion	Any economic di	isruption	Any housing di	sruption
	OR (95% CI)	p-value	OR (95% CI)	p-value	OR (95% CI)	p-value
Time since pre-pandemic measure	0.99 (0.93, 1.05)	0.63	1.03 (0.98, 1.08)	0.26	0.99 (0.96, 1.03)	0.84

Supplementary Table S6. Meta-regression assessing moderation by time since pre-pandemic mental health measure

	Healthcare disruption		Economic disruption		Housing disruption		1 disruption vs none		2+ disruptions vs none	
	OR (95% CI)	I^2	OR (95% CI)	I ²	OR (95% CI)	I^2	OR (95% CI)	I ²	OR (95% CI)	I ²
Female	1.39 (1.28, 1.50)	72.4%	1.04 (0.96, 1.13)	84.8%	0.99 (0.96, 1.03)	0.0%	1.08 (1.02, 1.15)	70.7%	1.22 (1.13, 1.32)	67.7%
Male	1.44 (1.30, 1.60)	52.4%	1.03 (0.94, 1.14)	69.4%	1.01 (0.95, 1.07)	0.0%	1.08 (1.02, 1.14)	17.3%	1.29 (1.18, 1.40)	34.5%
Degree	1.41 (1.26,1.58)	72.0%	1.10 (1.03, 1.19)	66.9%	1.01 (0.97, 1.06)	0.0%	1.06 (0.99, 1.13)	58.8%	0.84 (0.56, 1.25)	97.9%
No degree	1.40 (1.29, 1.51)	63.5%	1.01 (0.92, 1.10)	83.3%	0.99 (0.95, 1.03)	0.0%	1.08 (0.99, 1.17)	82.0%	1.20 (1.10, 1.31)	64.8%
White	1.42 (1.28, 1.57)	82.4%	1.04 (0.93, 1.16)	90.5%	1.00 (0.96, 1.03)	0.0%	1.08 (1.00, 1.17)	80.8%	1.23 (1.12, 1.36)	79.7%
Ethnic minority	1.53 (1.17, 2.00)	54.4%	1.04 (0.85, 1.27)	59.1%	1.13 (0.97, 1.31)	22.0%	1.10 (0.93, 1.30)	32.0%	1.36 (1.12, 1.65)	27.9%
16-24 years	1.42 (1.24, 1.62)	0.0%	1.05 (0.86, 1.29)	82.5%	0.99 (0.85, 1.17)	70.3%	1.00 (0.91, 1.10)	0.0%	1.13 (0.89, 1.44)	78.0%
25-34 years	1.50 (1.16, 1.95)	52.4%	1.11 (1.01, 1.23)	28.7%	1.07 (0.97, 1.18)	0.0%	1.09 (0.94, 1.26)	54.6%	1.29 (1.15, 1.44)	0.0%
35-44 years	1.70 (1.46, 1.98)	0.0%	0.97 (0.73, 1.30)	88.1%	1.17 (0.81, 1.69)	82.3%	0.99 (0.89, 1.10)	21.2%	1.27 (0.96, 1.67)	65.2%
45-54 years	1.53 (1.39, 1.68)	22.0%	0.95 (0.86, 1.04)	58.3%	0.93 (0.87, 0.99)	0.0%	1.05 (0.94, 1.19)	66.7%	1.18 (0.97, 1.42)	77.3%
55-64 years	1.42 (1.22, 1.65)	81.5%	0.96 (0.82, 1.11)	90.3%	0.98 (0.93, 1.04)	0.0%	1.07 (1.00, 1.15)	50.5%	1.17 (1.06, 1.29)	48.1%
65-74 years	1.51 (1.13, 2.03)	91.8%	1.06 (0.90, 1.25)	76.1%	0.99 (0.91, 1.08)	0.0%	1.21 (1.12, 1.31)	18.5%	1.20 (1.03, 1.41)	42.2%
75+ years	1.51 (1.17, 1.96)	44.2%	1.01 (0.78, 1.29)	51.4%	1.02 (0.86, 1.20)	10.2%	1.31 (1.00, 1.70)	71.0%	1.48 (1.01, 2.16)	51.8%
Adjusted for age, sex, ethnicity, education, and UK Nation										

Supplementary Table S7. Meta-analysed associations between standardised psychological distress and overall healthcare, economic and housing disruptions stratified by sex, education, ethnicity and age.

S2.5 References

- 1. Kessler RC, Andrews G, Colpe LJ, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine* 2002;32(6):959-76.
- 2. Rutter M, Tizard J, Whitmore K. Education, health and behaviour: Longman Publishing Group 1970.
- 3. Goldberg D. Manual of the general health questionnaire: Nfer Nelson 1978.
- 4. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatric Annals* 2002;32(9):509-15.
- 5. Angold A, Costello E, Messer S, et al. Development of a short questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research* 1995;5:237-49.
- Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry* 1987;150(6):782-86.
- 7. Matthey S, Barnett B, Kavanagh DJ, et al. Validation of the Edinburgh Postnatal Depression Scale for men, and comparison of item endorsement with their partners. *Journal of Affective Disorders* 2001;64(2-3):175-84.
- 8. Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement* 1977;1(3):385-401.
- 9. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 1983;67(6):361-70.